

~~HCM Signalized Intersection Capacity Analysis~~

~~1: Sample Road & Riverside Drive~~

PM Peak Hour

Future Total Traffic Conditions

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	0.91		1.00	0.91		1.00	0.95	1.00	1.00	0.95
Frt		1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1770	5025		1770	5009		1770	3539	1583	1770	3539
Flt Permitted		0.95	1.00		0.95	1.00		0.12	1.00	1.00	0.27	1.00
Satd. Flow (perm)		1770	5025		1770	5009		217	3539	1583	504	3539
Volume (vph)	24	139	1801	153	510	2011	224	142	425	442	170	620
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	26	148	1916	163	543	2139	238	151	452	470	181	660
RTOR Reduction (vph)	0	0	6	0	0	8	0	0	0	222	0	0
Lane Group Flow (vph)	0	174	2073	0	543	2369	0	151	452	248	181	660
Turn-Type	Prot	Prot			Prot			pm+pt		Perm	pm+pt	
Protected Phases	1	1	6		5	2		7	4		3	8
Permitted Phases								4		4		8
Actuated Green, G (s)		19.1	55.0		33.7	69.6		46.3	32.8	32.8	48.3	33.8
Effective Green, g (s)		21.1	57.0		35.7	71.6		50.3	34.8	34.8	52.3	35.8
Actuated g/C Ratio		0.13	0.36		0.22	0.45		0.31	0.22	0.22	0.33	0.22
Clearance Time (s)		6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)		1.5	0.2		1.5	0.2		1.5	2.0	2.0	1.5	2.0
Lane Grp Cap (vph)		233	1790		395	2242		219	770	344	295	792
v/s Ratio Prot		0.10	0.41		0.31	0.47		0.07	0.13		0.06	0.19
v/s Ratio Perm								0.15		0.16	0.14	
v/c Ratio		0.75	1.16		1.37	1.06		0.69	0.59	0.72	0.61	0.83
Uniform Delay, d1		66.9	51.5		62.1	44.2		43.5	56.2	58.1	41.4	59.3
Progression Factor		1.00	1.00		0.65	1.25		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		10.8	77.8		175.8	31.0		7.0	0.7	6.2	2.7	7.2
Delay (s)		77.7	129.3		216.3	86.2		50.5	56.9	64.2	44.0	66.4
Level of Service		E	F		F	F		D	E	E	D	E
Approach Delay (s)			125.3			110.4			59.2			59.8
Approach LOS			F			F			E			E
Intersection Summary												
HCM Average Control Delay			100.5									
HCM Volume to Capacity ratio			1.05									
Actuated Cycle Length (s)			160.0									
Intersection Capacity Utilization			104.8%									
Analysis Period (min)			15									
c Critical Lane Group												
HCM Level of Service									F			
Sum of lost time (s)									12.0			
ICU Level of Service									G			

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3/31/2009

Synchro 6 Report

Kimley-Horn and Associates, Inc.

HCM Signalized Intersection Capacity Analysis
1: Sample Road & Riverside Drive

PM Peak Hour
Future Total Traffic Conditions

Movement SBR

Lane Configurations

Ideal Flow (vphpl) 1900

Total Lost time (s) 4.0

Lane Util. Factor 1.00

Frt 0.85

Flt Protected 1.00

Satd. Flow (prot) 1583

Flt Permitted 1.00

Satd. Flow (perm) 1583

Volume (vph) 149

Peak-hour factor, PHF 0.94

Adj. Flow (vph) 159

RTOR Reduction (vph) 99

Lane Group Flow (vph) 60

Turn Type Perm

Protected Phases

Permitted Phases 8

Actuated Green, G (s) 33.8

Effective Green, g (s) 35.8

Actuated g/C Ratio 0.22

Clearance Time (s) 6.0

Vehicle Extension (s) 2.0

Lane Grp Cap (vph) 354

v/s Ratio Prot

v/s Ratio Perm 0.04

v/e Ratio 0.17

Uniform Delay, d1 50.1

Progression Factor 1.00

Incremental Delay, d2 0.1

Delay (s) 50.2

Level of Service D

Approach Delay (s)

Approach LOS

Intersection Summary

Timings

1: Sample Road & Riverside Drive

PM Peak Hour
Future Total Traffic Conditions

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	139	1801	510	2011	142	425	442	170	620	149
Turn Type	Prot		Prot		pm+pt		Perm	pm+pt		Perm
Protected Phases	1	6	5	2	7	4		3	8	
Permitted Phases					4		4	8		8
Detector Phases	1	6	5	2	7	4	4	3	8	8
Minimum Initial (s)	5.0	7.0	5.0	7.0	4.0	6.0	6.0	4.0	6.0	6.0
Minimum Split (s)	11.0	44.0	24.0	44.0	10.0	44.0	44.0	10.0	44.0	44.0
Total Split (s)	20.0	61.0	30.0	71.0	22.0	47.0	47.0	22.0	47.0	47.0
Total Split (%)	12.5%	38.1%	18.8%	44.4%	13.8%	29.4%	29.4%	13.8%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None	None	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 34 (21%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Splits and Phases: 1: Sample Road & Riverside Drive

 ø1	 ø2	 ø3	 ø4
20 s	71 s	22 s	47 s
 ø5	 ø6	 ø7	 ø8
30 s	61 s	22 s	47 s

HCM Signalized Intersection Capacity Analysis

2: Sample Road & Holiday Springs Boulevard

PM Peak Hour
Future Total Traffic Conditions

																			
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT							
Lane Configurations																			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900							
Total Lost time (s)		4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0							
Lane Util. Factor		1.00	0.91		1.00	0.91		1.00	1.00		1.00	0.95							
Frt		1.00	0.99		1.00	0.98		1.00	0.90		1.00	0.90							
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00							
Satd. Flow (prot)		1770	5053		1770	4996		1770	1675		1770	3176							
Flt Permitted		0.95	1.00		0.95	1.00		0.62	1.00		0.23	1.00							
Satd. Flow (perm)		1770	5053		101	4996		1160	1675		421	3176							
Volume (vph)	53	132	1907	85	131	2200	294	109	43	87	223	62							
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95							
Adj. Flow (vph)	56	139	2007	89	138	2316	309	115	45	92	235	65							
RTOR Reduction (vph)	0	0	2	0	0	9	0	0	55	0	0	124							
Lane Group Flow (vph)	0	195	2094	0	138	2616	0	115	82	0	235	82							
Turn Type	Prot	Prot			pm+pt			pm+pt			pm+pt								
Protected Phases	1	1	6		5	2		7	4		3	8							
Permitted Phases					2			4			8								
Actuated Green, G (s)		27.7	93.3		90.8	78.2		24.5	11.7		35.7	17.3							
Effective Green, g (s)		29.7	95.3		94.8	80.2		28.5	13.7		38.1	19.3							
Actuated g/C Ratio		0.19	0.60		0.59	0.50		0.18	0.09		0.24	0.12							
Clearance Time (s)		6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0							
Vehicle Extension (s)		2.0	0.2		2.0	0.2		2.0	2.0		2.0	2.0							
Lane Grp Cap (vph)		329	3010		212	2504		263	143		272	383							
v/s Ratio Prot		0.11	0.41		0.06	0.52		0.04	0.05		0.11	0.03							
v/s Ratio Perm					0.32			0.04			0.10								
v/c Ratio		0.59	0.70		0.65	1.04		0.44	0.57		0.86	0.21							
Uniform Delay, d1		59.6	22.3		34.6	39.9		57.8	70.3		54.1	63.5							
Progression Factor		0.99	0.77		0.67	1.63		1.00	1.00		1.00	1.00							
Incremental Delay, d2		0.2	0.1		2.1	25.3		0.4	3.4		22.9	0.1							
Delay (s)		59.1	17.3		25.3	90.5		58.2	73.8		77.0	63.6							
Level of Service		E	B		C	F		E	E		E	E							
Approach Delay (s)			20.9			87.2			66.7			70.7							
Approach LOS			C			F			E			E							
Intersection Summary																			
HCM Average Control Delay			58.6		HCM Level of Service				E										
HCM Volume to Capacity ratio			0.93																
Actuated Cycle Length (s)			160.0		Sum of lost time (s)				16.0										
Intersection Capacity Utilization			92.6%		ICU Level of Service				F										
Analysis Period (min)			15																
c Critical Lane Group																			

~~HCM Signalized Intersection Capacity Analysis~~
~~2: Sample Road & Holiday Springs Boulevard~~

~~PM Peak Hour~~
~~Future Total Traffic Conditions~~

~~Movement~~ ~~SBR~~

~~Left-Through Configurations~~

~~Ideal Flow (vphpl)~~ ~~1900~~

~~Total Lost time (s)~~

~~Lane Util. Factor~~

~~Frt~~

~~Flt Protected~~

~~Satd. Flow (prot)~~

~~Flt Permitted~~

~~Satd. Flow (perm)~~

~~Volume (vph)~~ ~~134~~

~~Peak-hour factor, PHF~~ ~~0.95~~

~~Adj. Flow (vph)~~ ~~141~~

~~RTOR Reduction (vph)~~ ~~0~~

~~Lane Group Flow (vph)~~ ~~0~~

~~Turn Type~~

~~Protected Phases~~

~~Permitted Phases~~

~~Actuated Green, G (s)~~

~~Effective Green, g (s)~~

~~Actuated g/C Ratio~~

~~Clearance Time (s)~~

~~Vehicle Extension (s)~~

~~Lane Grp Cap (vph)~~

~~v/s Ratio Prot~~

~~v/s Ratio Perm~~

~~v/c Ratio~~

~~Uniform Delay, d1~~

~~Progression Factor~~

~~Incremental Delay, d2~~

~~Delay (s)~~

~~Level of Service~~

~~Approach Delay (s)~~

~~Approach LOS~~

~~Intersection Summary~~

HCM Signalized Intersection Capacity Analysis

3: Sample Road & Rock Island Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	144	1933	382	598	2604	125	257	286	395	91	382	105
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	150	2014	398	623	2712	130	268	298	411	95	398	109
RTOR Reduction (vph)	0	0	104	0	0	20	0	0	231	0	0	92
Lane Group Flow (vph)	150	2014	294	623	2712	110	268	298	180	95	398	17
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	10.4	62.1	62.1	39.7	91.4	91.4	13.2	27.4	27.4	8.3	22.5	22.5
Effective Green, g (s)	11.9	63.6	63.6	41.2	92.9	92.9	14.7	29.4	29.4	9.8	24.5	24.5
Actuated g/C Ratio	0.07	0.40	0.40	0.26	0.58	0.58	0.09	0.18	0.18	0.06	0.15	0.15
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	6.0	6.0	5.5	6.0	6.0
Vehicle Extension (s)	1.5	2.5	2.5	1.5	2.5	2.5	1.5	2.0	2.0	1.5	2.0	2.0
Lane Grp Cap (vph)	255	2021	629	884	2952	919	315	650	291	210	542	242
v/s Ratio Prot	0.04	0.40		0.18	0.53		0.08	0.08		0.03	0.11	
v/s Ratio Perm			0.19			0.07			0.11			0.01
v/c Ratio	0.59	1.00	0.47	0.70	0.92	0.12	0.85	0.46	0.62	0.45	0.73	0.07
Uniform Delay, d1	71.7	48.1	35.7	53.9	30.2	15.1	71.6	58.2	60.1	72.5	64.6	58.0
Progression Factor	1.25	0.93	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	16.8	1.9	2.1	5.9	0.3	18.6	0.2	2.7	0.6	4.4	0.0
Delay (s)	91.2	61.6	32.4	56.0	36.1	15.4	90.2	58.4	62.9	73.1	69.1	58.0
Level of Service	F	E	C	E	D	B	F	E	E	E	E	E
Approach Delay (s)		58.8			38.9			69.0			67.7	
Approach LOS		E			D			E			E	
Intersection Summary												
HCM Average Control Delay			51.7				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			85.7%				ICU Level of Service			E		
Analysis Period (min)			15									
e Critical Lane Group												

Timings

PM Peak Hour

2: Sample Road & Holiday Springs Boulevard

Future Total Traffic Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	132	1907	131	2200	109	43	223	62
Turn Type	Prot		pm+pt		pm+pt		pm+pt	
Protected Phases	1	6	5	2	7	4	3	8
Permitted Phases			2		4		8	
Detector Phases	1	6	5	2	7	4	3	8
Minimum Initial (s)	5.0	7.0	4.0	7.0	4.0	6.0	4.0	6.0
Minimum Split (s)	11.0	33.0	10.0	33.0	10.0	42.0	10.0	40.0
Total Split (s)	22.0	71.0	22.0	71.0	25.0	42.0	25.0	42.0
Total Split (%)	13.8%	44.4%	13.8%	44.4%	15.6%	26.3%	15.6%	26.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 105 (66%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Splits and Phases: 2: Sample Road & Holiday Springs Boulevard

 ø1	 ø2	 ø3	 ø4
22 s	71 s	25 s	42 s
 ø5	 ø6	 ø7	 ø8
22 s	71 s	25 s	42 s

Timings

3: Sample Road & Rock Island Road

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	144	1933	382	598	2604	125	257	286	395	91	382	105
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Detector Phases	1	6	6	5	2	2	7	4	4	3	8	8
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	6.0	6.0	5.0	6.0	6.0
Minimum Split (s)	10.5	45.5	45.5	10.5	45.5	45.5	10.5	46.0	46.0	10.5	40.0	40.0
Total Split (s)	21.0	63.0	63.0	31.0	73.0	73.0	19.0	47.0	47.0	19.0	47.0	47.0
Total Split (%)	13.1%	39.4%	39.4%	19.4%	45.6%	45.6%	11.9%	29.4%	29.4%	11.9%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.0	2.0	1.5	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 4 (3%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Splits and Phases: 3: Sample Road & Rock Island Road

			
21 s	73 s	19 s	47 s
			
31 s	63 s	19 s	47 s

HCM Signalized Intersection Capacity Analysis

4: Sample Road & Turtle Run Boulevard

PM Peak Hour
Future Total Traffic Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SEB	SEB	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00		1.00	1.00	1.00
Flt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	1583		1770	1863	1583
Flt Permitted	0.10	1.00	1.00	0.95	1.00	1.00	0.75	1.00		0.73	1.00	1.00
Satd. Flow (perm)	182	5085	1583	1770	5085	1583	1399	1583		1365	1863	1583
Volume (vph)	110	2483	39	83	3292	144	9	0	35	51	9	126
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	117	2641	41	88	3502	153	10	0	37	54	10	134
RTOR Reduction (vph)	0	0	12	0	0	24	0	32	0	0	0	117
Lane Group Flow (vph)	117	2641	29	88	3502	129	10	5	0	54	10	17
Turn Type	pm+pt		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6			2	4			8		8
Actuated Green, G (s)	44.3	39.0	39.0	7.0	40.7	40.7	7.1	7.1		7.1	7.1	7.1
Effective Green, g (s)	48.3	41.0	41.0	9.0	42.7	42.7	9.1	9.1		9.1	9.1	9.1
Actuated g/C Ratio	0.68	0.58	0.58	0.13	0.60	0.60	0.13	0.13		0.13	0.13	0.13
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	1.5	3.0	3.0	1.5	3.0	3.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	287	2932	913	224	3054	951	179	203		175	238	203
v/s Ratio Prot	0.04	0.52		0.05	0.69			0.00			0.01	
v/s Ratio Perm	0.24		0.02			0.08	0.01			0.04		0.01
v/s Ratio	0.41	0.90	0.03	0.39	1.15	0.14	0.06	0.02		0.31	0.04	0.08
Uniform Delay, d1	15.7	13.3	6.5	28.5	14.2	6.2	27.2	27.1		28.1	27.2	27.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	4.3	0.0	0.4	70.3	0.1	0.0	0.0		0.4	0.0	0.1
Delay (s)	16.1	17.5	6.5	29.0	84.5	6.2	27.3	27.1		28.5	27.2	27.4
Level of Service	B	B	A	C	F	A	C	C		C	C	C
Approach Delay (s)		17.3			80.0			27.2			27.7	
Approach LOS		B			F			C			C	

Intersection Summary

HCM Average Control Delay	52.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	71.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings

PM Peak Hour

4: Sample Road & Turtle Run Boulevard

Future Total Traffic Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations		  			  					 	
Volume (vph)	110	2483	39	83	3292	144	9	0	51	9	126
Turn Type	pm+pt		Perm	Prot		Perm	Perm		Perm		Perm
Protected Phases	1	6		5	2			4		8	
Permitted Phases	6		6			2	4		8		8
Detector Phases	1	6	6	5	2	2	4	4	8	8	8
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	22.0	34.0	34.0	22.0	34.0	34.0	37.0	37.0	37.0	37.0	37.0
Total Split (s)	22.0	34.0	34.0	22.0	34.0	34.0	37.0	37.0	37.0	37.0	37.0
Total Split (%)	23.7%	36.6%	36.6%	23.7%	36.6%	36.6%	39.8%	39.8%	39.8%	39.8%	39.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None

Intersection Summary

Cycle Length: 93

Actuated Cycle Length: 70.4

Natural Cycle: 145

Control Type: Semi-Act-Uncoord

Splits and Phases: 4: Sample Road & Turtle Run Boulevard

		
#1	#2	#4
22 s	34 s	37 s
		
#5	#6	#8
22 s	34 s	37 s

HCM Signalized Intersection Capacity Analysis

5: Sample Road & Turtle Creek Drive

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00		1.00	0.95		1.00	0.95
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.94		1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583		1770	3310		1770	3539
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.34	1.00		0.30	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583		625	3310		552	3539
Volume (vph)	193	1815	257	232	2536	320	14	352	198	150	172	249
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	203	1911	271	244	2669	337	15	371	208	158	181	262
RTOR Reduction (vph)	0	0	114	0	0	62	0	0	99	0	0	0
Lane Group Flow (vph)	203	1911	157	244	2669	275	0	386	267	0	181	262
Turn Type	Prot		Perm	Prot		Perm	pm+pt	pm+pt			pm+pt	
Protected Phases	1	6		5	2		7	7	4		3	8
Permitted Phases			6			2	4	4			8	
Actuated Green, G (s)	12.3	77.4	77.4	13.7	78.8	78.8		38.1	20.1		32.7	17.4
Effective Green, g (s)	14.8	78.4	78.4	16.2	79.8	79.8		42.1	22.1		36.7	19.4
Actuated g/C Ratio	0.10	0.52	0.52	0.11	0.53	0.53		0.28	0.15		0.24	0.13
Clearance Time (s)	6.5	5.0	5.0	6.5	5.0	5.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	1.5	0.2	0.2	1.5	0.2	0.2		1.5	2.0		1.5	2.0
Lane Grp Cap (vph)	339	2658	827	371	2705	842		328	488		276	458
v/s Ratio Prot	0.06	0.38		0.07	0.52			0.16	0.08		0.08	0.07
v/s Ratio Perm			0.10			0.17		0.17			0.08	
v/s Ratio	0.60	0.72	0.19	0.66	0.99	0.33		1.18	0.55		0.66	0.57
Uniform Delay, d1	64.8	27.4	19.0	64.2	34.6	19.9		50.1	59.3		48.0	61.4
Progression Factor	1.00	1.00	1.00	1.14	0.73	0.87		1.00	1.00		1.00	1.00
Incremental Delay, d2	1.9	1.7	0.5	1.8	10.2	0.6		106.8	0.7		4.2	1.1
Delay (s)	66.7	29.1	19.5	74.7	35.4	18.0		156.9	60.0		52.2	62.5
Level of Service	E	C	B	E	D	B		F	E		D	E
Approach Delay (s)		31.2			36.6				109.7			61.9
Approach LOS		C			D				F			E

Intersection Summary

HCM Average Control Delay	45.1	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Sample Road & Turtle Creek Drive

PM Peak Hour
Future Total Traffic Conditions

	
Movement	SBR
Lane Configurations	7
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Volume (vph)	271
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	285
RTOR Reduction (vph)	151
Lane Group Flow (vph)	134
Turn Type	Perm
Protected Phases	
Permitted Phases	8
Actuated Green, G (s)	17.4
Effective Green, g (s)	19.4
Actuated g/C Ratio	0.13
Clearance Time (s)	6.0
Vehicle Extension (s)	2.0
Lane Grp Cap (vph)	205
v/s Ratio Prot	
v/s Ratio Perm	0.08
v/e Ratio	0.65
Uniform Delay, d1	62.1
Progression Factor	1.00
Incremental Delay, d2	5.5
Delay (s)	67.6
Level of Service	E
Approach Delay (s)	
Approach LOS	
Intersection Summary	

~~Timings~~~~5: Sample Road & Turtle Creek Drive~~~~PM Peak Hour~~~~Future Total Traffic Conditions~~

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	193	1815	257	232	2536	320	14	352	198	172	249	271
Turn Type	Prot		Perm	Prot		Perm	pm+pt	pm+pt		pm+pt		Perm
Protected Phases	1	6		5	2		7	7	4	3	8	
Permitted Phases			6			2	4	4		8		8
Detector Phases	1	6	6	5	2	2	7	7	4	3	8	8
Minimum Initial (s)	5.0	7.0	7.0	5.0	7.0	7.0	4.0	4.0	6.0	4.0	6.0	6.0
Minimum Split (s)	11.5	32.0	32.0	11.5	32.0	32.0	10.0	10.0	30.0	10.0	30.0	30.0
Total Split (s)	20.0	72.0	72.0	20.0	72.0	72.0	24.0	24.0	34.0	24.0	34.0	34.0
Total Split (%)	13.3%	48.0%	48.0%	13.3%	48.0%	48.0%	16.0%	16.0%	22.7%	16.0%	22.7%	22.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	1.0	1.0	2.5	1.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

~~Intersection Summary~~~~Cycle Length: 150~~~~Actuated Cycle Length: 150~~~~Offset: 9 (6%), Referenced to phase 2:WBT and 6:EBT, Start of Green~~~~Natural Cycle: 135~~~~Control Type: Actuated-Coordinated~~~~Splits and Phases: 5: Sample Road & Turtle Creek Drive~~

 ø1	 ø2	 ø3	 ø4
20 s	72 s	24 s	34 s
 ø5	 ø6	 ø7	 ø8
20 s	72 s	24 s	34 s

HCM Signalized Intersection Capacity Analysis

6: Sample Road & NB SR 7 On Ramp

PM Peak Hour
Future Total Traffic Conditions

											
Movement	EBL	EBT	EBR2	WBU	WBL	WBT	WBR2	NBL	NBR2	SBL	SBR2
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00		0.97	0.91	1.00	0.97	1.00	0.97	1.00
Frt	1.00	1.00	0.85		1.00	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	5085	1583		3433	5085	1583	3433	1583	3433	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	5085	1583		3433	5085	1583	3433	1583	3433	1583
Volume (vph)	349	1727	103	25	376	2777	404	243	220	284	346
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	371	1837	110	27	400	2954	430	259	234	302	368
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	371	1837	110	0	427	2954	430	259	234	302	368
Turn Type	Prot		Free	Prot	Prot		Free	Prot	Free	Prot	Free
Protected Phases	1	6		5	5	2		4		8	
Permitted Phases			Free				Free		Free		Free
Actuated Green, G (s)	19.7	90.0	150.0		22.3	92.6	150.0	16.7	150.0	16.7	150.0
Effective Green, g (s)	21.7	94.0	150.0		24.3	96.6	150.0	19.7	150.0	19.7	150.0
Actuated g/C Ratio	0.14	0.63	1.00		0.16	0.64	1.00	0.13	1.00	0.13	1.00
Clearance Time (s)	6.0	8.0			6.0	8.0		7.0		7.0	
Vehicle Extension (s)	1.5	1.0			1.5	1.0		1.5		1.5	
Lane Grp Cap (vph)	497	3187	1583		556	3275	1583	451	1583	451	1583
v/s Ratio Prot	0.11	0.36			0.12	0.58		0.08		0.09	
v/s Ratio Perm			0.07				0.27		0.15		0.23
v/c Ratio	0.75	0.58	0.07		0.77	0.90	0.27	0.57	0.15	0.67	0.23
Uniform Delay, d1	61.5	16.4	0.0		60.2	22.7	0.0	61.2	0.0	62.1	0.0
Progression Factor	1.01	0.55	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.9	0.6	0.1		5.7	4.6	0.4	1.1	0.2	2.9	0.3
Delay (s)	65.9	9.5	0.1		65.8	27.3	0.4	62.3	0.2	65.0	0.3
Level of Service	E	A	A		E	C	A	E	A	E	A
Approach Delay (s)		18.1				28.6					
Approach LOS		B				C					
Intersection Summary											
HCM Average Control Delay			25.6		HCM Level of Service					C	
HCM Volume to Capacity ratio			0.84								
Actuated Cycle Length (s)			150.0		Sum of lost time (s)				8.0		
Intersection Capacity Utilization			81.7%		ICU Level of Service				D		
Analysis Period (min)			15								
c Critical Lane Group											

Timings

PM Peak Hour

6: Sample Road & NB SR 7 On Ramp

Future Total Traffic Conditions

											
Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR2	NBL	NBR2	SBL	SBR2	
Lane Configurations											
Volume (vph)	349	1727	103	376	2777	404	243	220	284	346	
Turn Type	Prot		Free	Prot		Free	Prot	Free	Prot	Free	
Protected Phases	1	6		5	2		4		8		
Permitted Phases			Free			Free		Free		Free	
Detector Phases	1	6		5	2		4		8		
Minimum Initial (s)	6.0	7.0		6.0	7.0		6.0		6.0		
Minimum Split (s)	12.0	15.0		12.0	15.0		13.0		13.0		
Total Split (s)	32.0	85.0	0.0	32.0	85.0	0.0	33.0	0.0	33.0	0.0	
Total Split (%)	21.3%	56.7%	0.0%	21.3%	56.7%	0.0%	22.0%	0.0%	22.0%	0.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0		
All-Red Time (s)	2.0	4.0		2.0	4.0		3.0		3.0		
Lead/Lag	Lead	Lag		Lead	Lag						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes						
Recall Mode	None	C-Max		None	C-Max		None		None		

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 4 (3%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Splits and Phases: 6: Sample Road & NB SR 7 On Ramp

		
g1	g2	g4
32 s	85 s	33 s
		
g5	g6	g8
32 s	85 s	33 s

HCM Signalized Intersection Capacity Analysis

7: Sample Road & NW 54th Avenue

PM Peak Hour
Future Total Traffic Conditions

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1770	5085	1583	1770	5085	1583	1770	3539	1583	1770	3539
Flt Permitted		0.05	1.00	1.00	0.09	1.00	1.00	0.64	1.00	1.00	0.63	1.00
Satd. Flow (perm)		88	5085	1583	162	5085	1583	1192	3539	1583	1178	3539
Volume (vph)	16	194	1533	32	359	2417	505	147	133	323	599	129
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	17	202	1597	33	374	2518	526	153	139	336	624	134
RTOR Reduction (vph)	0	0	0	13	0	0	120	0	0	239	0	0
Lane Group Flow (vph)	0	219	1597	20	374	2518	406	153	139	97	624	134
Turn Type	pm+pt	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm	
Protected Phases	1	1	6		5	2			4			8
Permitted Phases	6	6		6	2		2	4		4	8	
Actuated Green, G (s)		94.9	82.9	82.9	119.0	101.0	101.0	29.0	29.0	29.0	29.0	29.0
Effective Green, g (s)		98.9	84.9	84.9	121.0	103.0	103.0	31.0	31.0	31.0	31.0	31.0
Actuated g/C Ratio		0.62	0.53	0.53	0.76	0.64	0.64	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)		1.5	3.0	3.0	1.5	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)		202	2698	840	445	3273	1019	231	686	307	228	686
v/s Ratio Prot		0.10	0.31		0.17	0.50			0.04			0.04
v/s Ratio Perm		0.58		0.01	0.47		0.26	0.13		0.06	0.53	
v/c Ratio		1.08	0.59	0.02	0.84	0.77	0.40	0.66	0.20	0.32	2.74	0.20
Uniform Delay, d1		51.9	25.7	17.8	42.1	20.1	13.7	59.7	54.1	55.4	64.5	54.0
Progression Factor		1.00	1.00	1.00	0.93	1.34	2.51	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		87.5	1.0	0.1	5.0	0.6	0.4	5.4	0.1	0.2	793.8	0.1
Delay (s)		139.4	26.7	17.9	44.3	27.7	34.8	65.1	54.2	55.6	858.3	54.1
Level of Service		F	C	B	D	C	C	E	D	E	F	D
Approach Delay (s)			39.9			30.6			57.6			527.9
Approach LOS			D			C			E			F
Intersection Summary												
HCM Average Control Delay			122.8									
HCM Volume to Capacity ratio			1.39									
Actuated Cycle Length (s)			160.0									
Intersection Capacity Utilization			109.9%									
Analysis Period (min)			15									
c Critical Lane Group												

~~HCM Signalized Intersection Capacity Analysis~~
~~7: Sample Road & NW 54th Avenue~~

~~PM Peak Hour~~
~~Future Total Traffic Conditions~~

~~Movement~~ ~~SBR~~

~~Lane Configurations~~

~~Ideal Flow (vphpl)~~ ~~1900~~

~~Total Lost time (s)~~ ~~4.0~~

~~Lane Util. Factor~~ ~~1.00~~

~~Frt~~ ~~0.85~~

~~Flt Protected~~ ~~1.00~~

~~Satd. Flow (prot)~~ ~~1583~~

~~Flt Permitted~~ ~~1.00~~

~~Satd. Flow (perm)~~ ~~1583~~

~~Volume (vph)~~ ~~479~~

~~Peak-hour factor, PHF~~ ~~0.96~~

~~Adj. Flow (vph)~~ ~~499~~

~~RTOR Reduction (vph)~~ ~~85~~

~~Lane Group Flow (vph)~~ ~~414~~

~~Turn Type~~ ~~Perm~~

~~Protected Phases~~

~~Permitted Phases~~ ~~8~~

~~Actuated Green, G (s)~~ ~~29.0~~

~~Effective Green, g (s)~~ ~~31.0~~

~~Actuated g/C Ratio~~ ~~0.19~~

~~Clearance Time (s)~~ ~~6.0~~

~~Vehicle Extension (s)~~ ~~2.0~~

~~Lane Grp Cap (vph)~~ ~~307~~

~~v/s Ratio Prot~~

~~v/s Ratio Perm~~ ~~0.26~~

~~v/c Ratio~~ ~~1.35~~

~~Uniform Delay, d1~~ ~~64.5~~

~~Progression Factor~~ ~~1.00~~

~~Incremental Delay, d2~~ ~~177.4~~

~~Delay (s)~~ ~~241.9~~

~~Level of Service~~ ~~F~~

~~Approach Delay (s)~~

~~Approach LOS~~

~~Intersection Summary~~

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~~3/31/2009~~

~~Synchro 6 Report~~

~~Kimley-Horn and Associates, Inc.~~

Timings

7: Sample Road & NW 54th Avenue

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	16	194	1533	32	359	2417	505	147	133	323	599	129
Turn Type	pm+pt	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm	
Protected Phases	1	1	6		5	2			4			8
Permitted Phases	6	6		6	2		2	4		4	8	
Detector Phases	1	1	6	6	5	2	2	4	4	4	8	8
Minimum Initial (s)	4.0	4.0	12.0	12.0	4.0	12.0	12.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	10.0	30.0	30.0	10.0	30.0	30.0	32.0	32.0	32.0	32.0	32.0
Total Split (s)	18.0	18.0	85.0	85.0	40.0	107.0	107.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	11.3%	11.3%	53.1%	53.1%	25.0%	66.9%	66.9%	21.9%	21.9%	21.9%	21.9%	21.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 15 (9%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Splits and Phases: 7: Sample Road & NW 54th Avenue

		
18 s	107 s	35 s
		
40 s	85 s	35 s

~~Timings~~

~~PM Peak Hour~~

~~7: Sample Road & NW 54th Avenue~~

~~Future Total Traffic Conditions~~



~~Lane Group~~ ~~SBR~~

~~Lane Configurations~~ ~~7~~

~~Volume (vph)~~ ~~479~~

~~Turn Type~~ ~~Perm~~

~~Protected Phases~~

~~Permitted Phases~~ ~~8~~

~~Detector Phases~~ ~~8~~

~~Minimum Initial (s)~~ ~~6.0~~

~~Minimum Split (s)~~ ~~32.0~~

~~Total Split (s)~~ ~~35.0~~

~~Total Split (%)~~ ~~21.9%~~

~~Yellow Time (s)~~ ~~4.0~~

~~All-Red Time (s)~~ ~~2.0~~

~~Lead/Lag~~

~~Lead-Lag Optimize?~~

~~Recall Mode~~ ~~None~~

~~Intersection Summary~~

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~~3/31/2009~~

~~Synchro 6 Report~~

~~Kimley-Horn and Associates, Inc.~~

HCM Signalized Intersection Capacity Analysis 8: Sample Road & Banks Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00		1.00	0.91	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	1.00	0.85		1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	1583		1770	5085	1583		1863	1583	1770	1863
Flt Permitted	0.04	1.00	1.00		0.04	1.00	1.00		1.00	1.00	0.50	1.00
Satd. Flow (perm)	74	5085	1583		71	5085	1583		1863	1583	941	1863
Volume (vph)	107	2369	188	19	215	3376	169	0	55	203	172	63
Peak-hour factor, PHF	0.99	0.99	0.99	0.92	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	108	2393	190	21	217	3410	171	0	56	205	174	64
RTOR Reduction (vph)	0	0	46	0	0	0	27	0	0	186	0	0
Lane Group Flow (vph)	108	2393	144	0	238	3410	144	0	56	19	174	64
Turn Type	pm+pt		Perm	pm+pt	pm+pt		Perm	pm+pt		Perm	pm+pt	
Protected Phases	7	4		3	3	8		5	2		1	6
Permitted Phases	4		4	8	8		8	2		2	6	
Actuated Green, G (s)	109.3	99.5	99.5		126.1	111.3	111.3		10.9	10.9	23.9	23.9
Effective Green, g (s)	111.3	100.5	100.5		127.1	112.3	112.3		11.9	11.9	24.9	24.9
Actuated g/C Ratio	0.70	0.63	0.63		0.79	0.70	0.70		0.07	0.07	0.16	0.16
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	166	3194	994		296	3569	1111		139	118	193	290
v/s Ratio Prot	0.04	0.47			0.11	0.67			0.03		0.05	0.03
v/s Ratio Perm	0.41		0.09		0.52		0.09			0.01	0.09	
v/e Ratio	0.65	0.75	0.14		0.80	0.96	0.13		0.40	0.16	0.90	0.22
Uniform Delay, d1	48.1	20.9	12.2		53.3	21.6	7.8		70.7	69.4	65.5	59.1
Progression Factor	1.31	0.89	1.03		1.35	0.58	0.66		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.1	0.0		5.3	2.9	0.0		8.5	2.9	38.4	1.7
Delay (s)	64.1	18.7	12.6		77.3	15.5	5.2		79.1	72.3	103.9	60.8
Level of Service	E	B	B		E	B	A		E	E	F	E
Approach Delay (s)		20.1				18.8			73.7			80.2
Approach LOS		C				B			E			F

Intersection Summary

HCM Average Control Delay	24.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

~~HCM Signalized Intersection Capacity Analysis~~
~~8: Sample Road & Banks Road~~

~~PM Peak Hour~~
~~Future Total Traffic Conditions~~

~~Movement~~ ~~SBR~~

~~Lane Configurations~~ ~~7~~

~~Ideal Flow (vphpl)~~ ~~1900~~

~~Total Lost time (s)~~ ~~4.0~~

~~Lane Util. Factor~~ ~~1.00~~

~~Frt~~ ~~0.85~~

~~Flt Protected~~ ~~1.00~~

~~Satd. Flow (prot)~~ ~~1583~~

~~Flt Permitted~~ ~~1.00~~

~~Satd. Flow (perm)~~ ~~1583~~

~~Volume (vph)~~ ~~154~~

~~Peak-hour factor, PHF~~ ~~0.99~~

~~Adj. Flow (vph)~~ ~~156~~

~~RTOR Reduction (vph)~~ ~~96~~

~~Lane Group Flow (vph)~~ ~~60~~

~~Turn Type~~ ~~Perm~~

~~Protected Phases~~

~~Permitted Phases~~ ~~6~~

~~Actuated Green, G (s)~~ ~~23.9~~

~~Effective Green, g (s)~~ ~~24.9~~

~~Actuated g/C Ratio~~ ~~0.16~~

~~Clearance Time (s)~~ ~~5.0~~

~~Vehicle Extension (s)~~ ~~3.0~~

~~Lane Grp Cap (vph)~~ ~~246~~

~~w/s Ratio Prot~~

~~w/s Ratio Perm~~ ~~0.04~~

~~w/e Ratio~~ ~~0.24~~

~~Uniform Delay, d1~~ ~~59.3~~

~~Progression Factor~~ ~~1.00~~

~~Incremental Delay, d2~~ ~~2.3~~

~~Delay (s)~~ ~~61.6~~

~~Level of Service~~ ~~E~~

~~Approach Delay (s)~~

~~Approach LOS~~

~~Intersection Summary~~

Timings

8: Sample Road & Banks Road

PM Peak Hour
Future Total Traffic Conditions

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	107	2369	188	19	215	3376	169	55	203	172	63	154
Turn Type	pm+pt		Perm	pm+pt	pm+pt		Perm		Perm	pm+pt		Perm
Protected Phases	7	4		3	3	8		2		1	6	
Permitted Phases	4		4	8	8		8		2	6		6
Detector Phases	7	4	4	3	3	8	8	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	21.0	21.0	9.0	9.0	21.0	21.0	21.0	21.0	9.0	21.0	21.0
Total Split (s)	12.0	93.0	93.0	33.0	33.0	114.0	114.0	23.0	23.0	11.0	24.0	24.0
Total Split (%)	7.5%	58.1%	58.1%	20.6%	20.6%	71.3%	71.3%	14.4%	14.4%	6.9%	15.0%	15.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 9 (6%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Splits and Phases: 8: Sample Road & Banks Road

11 s	23 s	33 s	93 s
10 s	24 s	12 s	114 s

~~Lane Group~~ ~~ø5~~

~~Lane Configurations~~

~~Volume (vph)~~

~~Turn Type~~

~~Protected Phases~~ ~~5~~

~~Permitted Phases~~

~~Detector Phases~~

~~Minimum Initial (s)~~ ~~4.0~~

~~Minimum Split (s)~~ ~~9.0~~

~~Total Split (s)~~ ~~10.0~~

~~Total Split (%)~~ ~~6%~~

~~Yellow Time (s)~~ ~~4.0~~

~~All-Red Time (s)~~ ~~1.0~~

~~Lead/Lag~~ ~~Lead~~

~~Lead-Lag Optimize?~~ ~~Yes~~

~~Recall Mode~~ ~~None~~

~~Intersection Summary~~

~~HCM Signalized Intersection Capacity Analysis~~ ~~9: Sample Road & Lyons Road~~

~~PM Peak Hour~~
~~Future Total Traffic Conditions~~

												
Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lane Util. Factor	0.97	0.91	1.00		0.97	0.91	1.00	0.97	0.91	1.00		0.97
Frt	1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (prot)	3433	5085	1583		3433	5085	1583	3433	5085	1583		3433
Flt Permitted	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (perm)	3433	5085	1583		3433	5085	1583	3433	5085	1583		3433
Volume (vph)	405	1613	534	12	222	2386	768	725	1538	114	17	478
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	426	1698	562	13	234	2512	808	763	1619	120	18	503
RTOR Reduction (vph)	0	0	163	0	0	0	163	0	0	64	0	0
Lane Group Flow (vph)	426	1698	399	0	247	2512	645	763	1619	56	0	521
Turn Type	Prot		Perm	Prot	Prot		Perm	Prot		Perm	Prot	Prot
Protected Phases	1	6		5	5	2		7	4		3	3
Permitted Phases			6				2			4		
Actuated Green, G (s)	11.5	75.0	75.0		11.5	75.0	75.0	25.5	30.5	30.5		18.5
Effective Green, g (s)	14.0	77.0	77.0		14.0	77.0	77.0	28.0	32.0	32.0		21.0
Actuated g/C Ratio	0.09	0.48	0.48		0.09	0.48	0.48	0.18	0.20	0.20		0.13
Clearance Time (s)	6.5	6.0	6.0		6.5	6.0	6.0	6.5	5.5	5.5		6.5
Vehicle Extension (s)	1.5	1.0	1.0		2.0	1.0	1.0	2.0	2.5	2.5		2.0
Lane Grp Cap (vph)	300	2447	762		300	2447	762	601	1017	317		451
v/s Ratio Prot	c0.12	0.33			0.07	c0.49		c0.22	c0.32			0.15
v/s Ratio Perm			0.25				0.41			0.04		
v/c Ratio	1.42	0.69	0.52		0.82	1.03	0.85	1.27	1.59	0.18		1.16
Uniform Delay, d1	73.0	32.3	28.8		71.8	41.5	36.3	66.0	64.0	53.1		69.5
Progression Factor	1.18	0.66	0.38		1.13	0.84	0.81	1.32	1.16	1.59		1.07
Incremental Delay, d2	203.5	1.3	2.0		1.7	14.1	1.2	130.3	269.6	0.1		87.6
Delay (s)	290.0	22.7	12.9		82.7	48.9	30.5	217.3	343.8	84.3		162.1
Level of Service	F	C	B		F	D	C	F	F	F		F
Approach Delay (s)		63.0				47.1			292.8			
Approach LOS		E				D			F			
Intersection Summary												
HCM Average Control Delay			146.8									
HCM Volume to Capacity ratio			1.24									
Actuated Cycle Length (s)			160.0									
Intersection Capacity Utilization			116.3%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Sample Road & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

	↓	↙
Movement	SBT	SBR
Lane Configurations	AAA	A
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	0.91	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5085	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5085	1583
Volume (vph)	1242	358
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	1307	377
RTOR Reduction (vph)	0	1
Lane Group Flow (vph)	1307	376
Turn Type	pm+ov	
Protected Phases	8	1
Permitted Phases		8
Actuated Green, G (s)	23.5	35.0
Effective Green, g (s)	25.0	39.0
Actuated g/C Ratio	0.16	0.24
Clearance Time (s)	5.5	6.5
Vehicle Extension (s)	2.5	1.5
Lane Grp Cap (vph)	795	425
w/s Ratio Prot	0.26	0.08
w/s Ratio Perm		0.16
w/c Ratio	1.64	0.89
Uniform Delay, d1	67.5	58.3
Progression Factor	0.60	0.57
Incremental Delay, d2	294.1	14.9
Delay (s)	334.4	48.2
Level of Service	F	D
Approach Delay (s)	244.8	
Approach LOS	F	
Intersection Summary		

Timings

9: Sample Road & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	405	1613	534	222	2386	768	725	1538	114	478	1242	358
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	1	6		5	2		7	4		3	8	1
Permitted Phases			6			2			4			8
Detector Phases	1	6	6	5	2	2	7	4	4	3	8	1
Minimum Initial (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	5.0
Minimum Split (s)	11.5	39.0	39.0	11.5	39.0	39.0	11.5	34.5	34.5	11.5	34.5	11.5
Total Split (s)	18.0	81.0	81.0	18.0	81.0	81.0	32.0	36.0	36.0	25.0	29.0	18.0
Total Split (%)	11.3%	50.6%	50.6%	11.3%	50.6%	50.6%	20.0%	22.5%	22.5%	15.6%	18.1%	11.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.5	2.0	2.0	2.5	1.5	1.5	2.5	1.5	2.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 110 (69%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Splits and Phases: 9: Sample Road & Lyons Road

 #1	 #2	 #3	 #4
18 s	81 s	25 s	36 s
 #5	 #6	 #7	 #8
18 s	81 s	32 s	29 s

HCM Signalized Intersection Capacity Analysis

10: Sample Road & NW 42nd Avenue

PM Peak Hour
Future Total Traffic Conditions

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00		1.00	1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88		1.00	0.91
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00
Satd. Flow (prot)		1770	5085	1583	1770	5085	1583	1770	1647		1770	1688
Flt Permitted		0.05	1.00	1.00	0.04	1.00	1.00	0.62	1.00		0.58	1.00
Satd. Flow (perm)		84	5085	1583	80	5085	1583	1149	1647		1080	1688
Volume (vph)	14	56	2291	119	210	3605	168	91	30	102	98	42
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	14	58	2362	123	216	3716	173	94	31	105	101	43
RTOR Reduction (vph)	0	0	0	19	0	0	20	0	76	0	0	38
Lane Group Flow (vph)	0	72	2362	104	216	3716	153	94	60	0	101	77
Turn Type	pm+pt	pm+pt		Perm	pm+pt		Perm	Perm			Perm	
Protected Phases	1	1	6		5	2			4			8
Permitted Phases	6	6		6	2		2	4			8	
Actuated Green, G (s)		94.3	87.2	87.2	108.5	95.9	95.9	40.0	40.0		40.0	40.0
Effective Green, g (s)		97.3	88.7	88.7	110.0	97.4	97.4	42.0	42.0		42.0	42.0
Actuated g/C Ratio		0.61	0.55	0.55	0.69	0.61	0.61	0.26	0.26		0.26	0.26
Clearance Time (s)		5.5	5.5	5.5	5.5	5.5	5.5	6.0	6.0		6.0	6.0
Vehicle Extension (s)		1.5	0.2	0.2	1.5	0.2	0.2	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		142	2819	878	238	3095	964	302	432		284	443
v/s Ratio Prot		0.03	0.46		0.10	0.73			0.04			0.05
v/s Ratio Perm		0.28		0.07	0.52		0.10	0.08			0.09	
v/c Ratio		0.51	0.84	0.12	0.91	1.20	0.16	0.31	0.14		0.36	0.17
Uniform Delay, d1		37.4	29.7	17.0	55.1	31.3	13.6	47.4	45.2		48.0	45.6
Progression Factor		1.54	0.70	0.76	1.11	0.71	0.52	1.00	1.00		1.00	1.00
Incremental Delay, d2		0.7	2.2	0.2	14.2	91.4	0.1	2.7	0.7		3.5	0.9
Delay (s)		58.5	22.9	13.0	75.1	113.6	7.1	50.1	45.8		51.4	46.5
Level of Service		E	C	B	E	F	A	D	D		D	D
Approach Delay (s)			23.4			107.1			47.6			48.8
Approach LOS			C			F			D			D
Intersection Summary												
HCM Average Control Delay			73.3									
HCM Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			160.0									
Intersection Capacity Utilization			100.2%									
Analysis Period (min)			15									
c Critical Lane Group												

~~HCM Signalized Intersection Capacity Analysis~~
~~10: Sample Road & NW 42nd Avenue~~

~~PM Peak Hour~~
~~Future Total Traffic Conditions~~

~~Movement~~ ~~SBR~~

~~Lane Configurations~~

~~Ideal Flow (vphpl)~~ ~~1900~~

~~Total Lost time (s)~~

~~Lane Util. Factor~~

~~Frt~~

~~Flt Protected~~

~~Satd. Flow (prot)~~

~~Flt Permitted~~

~~Satd. Flow (perm)~~

~~Volume (vph)~~ ~~70~~

~~Peak-hour factor, PHF~~ ~~0.97~~

~~Adj. Flow (vph)~~ ~~72~~

~~RTOR Reduction (vph)~~ ~~0~~

~~Lane Group Flow (vph)~~ ~~0~~

~~Turn Type~~

~~Protected Phases~~

~~Permitted Phases~~

~~Actuated Green, G (s)~~

~~Effective Green, g (s)~~

~~Actuated g/C Ratio~~

~~Clearance Time (s)~~

~~Vehicle Extension (s)~~

~~Lane Grp Cap (vph)~~

~~v/s Ratio Prot~~

~~v/s Ratio Perm~~

~~v/c Ratio~~

~~Uniform Delay, d1~~

~~Progression Factor~~

~~Incremental Delay, d2~~

~~Delay (s)~~

~~Level of Service~~

~~Approach Delay (s)~~

~~Approach LOS~~

~~Intersection Summary~~

Timings

10: Sample Road & NW 42nd Avenue

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations												
Volume (vph)	14	56	229	119	210	360	168	91	30	98	42	
Turn Type	pm+pt	pm+pt		Perm	pm+pt		Perm	Perm		Perm		
Protected Phases	1	1	6		5	2			4		8	
Permitted Phases	6	6		6	2		2	4		8		
Detector Phases	1	1	6	6	5	2	2	4	4	8	8	
Minimum Initial (s)	4.0	4.0	7.0	7.0	4.0	7.0	7.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	9.5	9.5	30.5	30.5	9.5	30.5	30.5	39.0	39.0	39.0	39.0	
Total Split (s)	22.0	22.0	92.0	92.0	22.0	92.0	92.0	46.0	46.0	46.0	46.0	
Total Split (%)	13.8%	13.8%	57.5%	57.5%	13.8%	57.5%	57.5%	28.8%	28.8%	28.8%	28.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	C-Max	C-Max	None	C-Max	C-Max	Max	Max	Max	Max	

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 116 (73%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Splits and Phases: 10: Sample Road & NW 42nd Avenue

 ø1	 ø2	 ø4
22 s	92 s	46 s
 ø5	 ø6	 ø8
22 s	92 s	46 s

HCM Signalized Intersection Capacity Analysis

11: Sample Road & Tradewinds Park Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0		4.0
Lane Util. Factor	1.00	0.91	1.00		1.00	0.91	1.00		1.00	1.00		1.00
Frt	1.00	1.00	0.85		1.00	1.00	0.85		1.00	0.85		0.92
Flt Protected	0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00		0.99
Satd. Flow (prot)	1770	5085	1583		1770	5085	1583		1776	1583		1683
Flt Permitted	0.03	1.00	1.00		0.04	1.00	1.00		0.86	1.00		0.90
Satd. Flow (perm)	56	5085	1583		67	5085	1583		1600	1583		1540
Volume (vph)	13	2480	9	14	14	4004	3	34	1	36	6	2
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	14	2667	10	15	15	4305	3	37	1	39	6	2
RTOR Reduction (vph)	0	0	1	0	0	0	0	0	0	37	0	12
Lane Group Flow (vph)	14	2667	9	0	30	4305	3	0	38	2	0	9
Turn Type	pm+pt		Perm	pm+pt	pm+pt		Perm	Perm		Perm	Perm	
Protected Phases	1	6		5	5	2			4			8
Permitted Phases	6		6	2	2		2	4		4	8	
Actuated Green, G (s)	133.9	132.1	132.1		137.5	133.9	133.9		7.3	7.3		7.3
Effective Green, g (s)	136.9	133.6	133.6		140.5	135.4	135.4		9.3	9.3		9.3
Actuated g/C Ratio	0.86	0.83	0.83		0.88	0.85	0.85		0.06	0.06		0.06
Clearance Time (s)	5.5	5.5	5.5		5.5	5.5	5.5		6.0	6.0		6.0
Vehicle Extension (s)	1.5	3.0	3.0		1.5	3.0	3.0		2.0	2.0		2.0
Lane Grp Cap (vph)	83	4246	1322		113	4303	1340		93	92		90
v/s Ratio Prot	0.00	0.52			0.01	0.85			0.02	0.00		0.01
v/s Ratio Perm	0.14		0.01		0.23		0.00		0.41	0.02		0.10
v/e Ratio	0.17	0.63	0.01		0.27	1.00	0.00		0.41	0.02		0.10
Uniform Delay, d1	57.5	4.6	2.2		5.3	12.3	1.9		72.7	71.1		71.4
Progression Factor	1.95	4.31	2.05		1.06	0.66	1.10		1.00	1.00		1.00
Incremental Delay, d2	0.2	0.4	0.0		0.1	7.0	0.0		1.1	0.0		0.2
Delay (s)	112.6	20.2	4.5		5.7	15.2	2.1		73.8	71.1		71.5
Level of Service	F	C	A		A	B	A		E	E		E
Approach Delay (s)		20.6				15.1			72.4			71.5
Approach LOS		C				B			E			E
Intersection Summary												
HCM Average Control Delay			18.0			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			90.6%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

~~HCM Signalized Intersection Capacity Analysis~~
~~11: Sample Road & Tradewinds Park Road~~

~~PM Peak Hour~~
~~Future Total Traffic Conditions~~

~~Movement~~ ~~SBR~~

~~Lane Configurations~~

~~Ideal Flow (vphpl)~~ ~~1900~~

~~Total Lost time (s)~~

~~Lane Util. Factor~~

~~Frt~~

~~Flt Protected~~

~~Satd. Flow (prot)~~

~~Flt Permitted~~

~~Satd. Flow (perm)~~

~~Volume (vph)~~ ~~12~~

~~Peak-hour factor, PHF~~ ~~0.93~~

~~Adj. Flow (vph)~~ ~~13~~

~~RTOR Reduction (vph)~~ ~~0~~

~~Lane Group Flow (vph)~~ ~~0~~

~~Turn Type~~

~~Protected Phases~~

~~Permitted Phases~~

~~Actuated Green, G (s)~~

~~Effective Green, g (s)~~

~~Actuated g/C Ratio~~

~~Clearance Time (s)~~

~~Vehicle Extension (s)~~

~~Lane Grp Cap (vph)~~

~~v/s Ratio Prot~~

~~v/s Ratio Perm~~

~~v/c Ratio~~

~~Uniform Delay, d1~~

~~Progression Factor~~

~~Incremental Delay, d2~~

~~Delay (s)~~

~~Level of Service~~

~~Approach Delay (s)~~

~~Approach LOS~~

~~Intersection Summary~~

Timings

11: Sample Road & Tradewinds Park Road

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	12	2480	9	14	14	4004	3	34	1	36	6	2
Turn Type	pm+pt		Perm	pm+pt	pm+pt		Perm	Perm		Perm	Perm	
Protected Phases	1	6		5	5	2			4			8
Permitted Phases	6		6	2	2		2	4		4	8	
Detector Phases	1	6	6	5	5	2	2	4	4	4	8	8
Minimum Initial (s)	4.0	15.0	15.0	4.0	4.0	15.0	15.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	9.5	34.5	34.5	9.5	9.5	34.5	34.5	45.0	45.0	45.0	45.0	45.0
Total Split (s)	16.0	98.0	98.0	16.0	16.0	98.0	98.0	46.0	46.0	46.0	46.0	46.0
Total Split (%)	10.0%	61.3%	61.3%	10.0%	10.0%	61.3%	61.3%	28.8%	28.8%	28.8%	28.8%	28.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Min	C-Min	None	None	C-Min	C-Min	None	None	None	None	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 69 (43%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Splits and Phases: 11: Sample Road & Tradewinds Park Road

		
ø1	ø2	ø4
16 s	98 s	46 s
		
ø5	ø6	ø8
16 s	98 s	46 s

HCM Signalized Intersection Capacity Analysis

12: Sample Road & Florida's Turnpike

PM Peak Hour
Future Total Traffic Conditions

						
Movement	EBT	EBP	WBL	WBT	NBL	NBR
Lane Configurations	AAA	A	AA	AAA	AA	A
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	1.00	0.97	0.91	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	3433	5085	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	3433	5085	3433	1583
Volume (vph)	1647	938	1214	2955	969	546
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1810	1031	1334	3247	1065	600
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1810	1031	1334	3247	1065	600
Turn Type		Free	Prot			Free
Protected Phases	6		5	2	4	
Permitted Phases		Free				Free
Actuated Green, G (s)	43.0	160.0	56.0	105.0	44.0	160.0
Effective Green, g (s)	44.0	160.0	58.0	106.0	46.0	160.0
Actuated g/C Ratio	0.28	1.00	0.36	0.66	0.29	1.00
Clearance Time (s)	5.0		6.0	5.0	6.0	
Vehicle Extension (s)	3.0		2.0	3.0	2.5	
Lane Grp Cap (vph)	1398	1583	1244	3369	987	1583
v/s Ratio Prot	0.36		0.39	0.64	0.31	
v/s Ratio Perm		0.65				0.38
v/c Ratio	1.29	0.65	1.07	0.96	1.08	0.38
Uniform Delay, d1	58.0	0.0	51.0	25.2	57.0	0.0
Progression Factor	0.64	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	137.1	1.7	47.3	9.1	52.4	0.7
Delay (s)	174.1	1.7	98.3	34.3	109.4	0.7
Level of Service	F	A	F	C	F	A
Approach Delay (s)	111.5			53.0	70.3	
Approach LOS	F			D	E	
Intersection Summary						
HCM Average Control Delay			74.4		HCM Level of Service	E
HCM Volume to Capacity ratio			1.14			
Actuated Cycle Length (s)			160.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			104.1%		ICU Level of Service	G
Analysis Period (min)			15			
e Critical Lane Group						

Timings

12: Sample Road & Florida's Turnpike

PM Peak Hour
Future Total Traffic Conditions

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	AAA	A	AA	AAA	AA	A
Volume (vph)	1647	938	1214	2955	969	546
Turn Type		Free	Prot			Free
Protected Phases	6		5	2	4	
Permitted Phases		Free				Free
Detector Phases	6		5	2	4	
Minimum Initial (s)	15.0		5.0	15.0	6.0	
Minimum Split (s)	21.0		11.0	23.0	22.0	
Total Split (s)	48.0	0.0	62.0	110.0	50.0	0.0
Total Split (%)	30.0%	0.0%	38.8%	68.8%	31.3%	0.0%
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	1.0		2.0	1.0	2.0	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	C-Min		None	C-Min	None	

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 101 (63%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Splits and Phases: 12: Sample Road & Florida's Turnpike

	
110 s	50 s
	
62 s	48 s

HCM Signalized Intersection Capacity Analysis

3: NW 40th Street & NW 54th Avenue

PM Peak Hour
Future Total Traffic Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583		1770	3539
Flt Permitted	0.29	1.00	1.00	0.61	1.00	1.00	0.48	1.00	1.00		0.63	1.00
Satd. Flow (perm)	546	1863	1583	1138	1863	1583	890	3539	1583		1178	3539
Volume (vph)	205	221	515	1	209	61	553	177	4	14	50	247
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	220	238	554	1	225	66	595	190	4	15	54	266
RTOR Reduction (vph)	0	0	380	0	0	53	0	0	2	0	0	0
Lane Group Flow (vph)	220	238	174	1	225	13	595	190	2	0	69	266
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	Perm	pm+pt	
Protected Phases	7	4		3	8		5	2			1	6
Permitted Phases	4		4	8		8	2		2	6	6	
Actuated Green, G (s)	53.0	45.9	45.9	28.6	27.5	27.5	87.8	75.9	75.9		48.7	42.8
Effective Green, g (s)	55.0	47.9	47.9	32.6	29.5	29.5	89.8	77.9	77.9		52.7	44.8
Actuated g/C Ratio	0.36	0.31	0.31	0.21	0.19	0.19	0.59	0.51	0.51		0.34	0.29
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	369	584	496	256	360	306	759	1804	807		437	1038
v/s Ratio Prot	0.08	0.13		0.00	0.12		0.21	0.05			0.01	0.08
v/s Ratio Perm	0.13		0.11	0.00		0.01	0.25		0.00		0.05	
v/c Ratio	0.60	0.41	0.35	0.00	0.62	0.04	0.78	0.11	0.00		0.16	0.26
Uniform Delay, d1	37.0	41.3	40.4	47.3	56.6	50.2	20.2	19.4	18.4		34.1	41.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.6	0.5	0.4	0.0	3.4	0.1	5.3	0.1	0.0		0.2	0.6
Delay (s)	39.6	41.7	40.9	47.3	59.9	50.2	25.5	19.5	18.4		34.3	41.9
Level of Service	D	D	D	D	E	D	C	B	B		C	D
Approach Delay (s)		40.8			57.7			24.0				40.0
Approach LOS		D			E			C				D
Intersection Summary												
HCM Average Control Delay			37.4									
HCM Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			152.8									
Intersection Capacity Utilization			73.2%									
Analysis Period (min)			15									
c Critical Lane Group												

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Synchro 6 Report

Kimley-Horn and Associates, Inc.

~~HCM Signalized Intersection Capacity Analysis~~
~~3: NW 40th Street & NW 54th Avenue~~

~~PM Peak Hour~~
~~Future Total Traffic Conditions~~

~~Movement~~ ~~SBR~~

~~Lane Configurations~~

~~Ideal Flow (vphpl)~~ ~~1900~~

~~Total Lost time (s)~~ ~~4.0~~

~~Lane Util. Factor~~ ~~1.00~~

~~Frt~~ ~~0.85~~

~~Flt Protected~~ ~~1.00~~

~~Satd. Flow (prot)~~ ~~1583~~

~~Flt Permitted~~ ~~1.00~~

~~Satd. Flow (perm)~~ ~~1583~~

~~Volume (vph)~~ ~~83~~

~~Peak-hour factor, PHF~~ ~~0.93~~

~~Adj. Flow (vph)~~ ~~89~~

~~RTOR Reduction (vph)~~ ~~63~~

~~Lane Group Flow (vph)~~ ~~26~~

~~Turn Type~~ ~~Perm~~

~~Protected Phases~~

~~Permitted Phases~~ ~~6~~

~~Actuated Green, G (s)~~ ~~42.8~~

~~Effective Green, g (s)~~ ~~44.8~~

~~Actuated g/C Ratio~~ ~~0.29~~

~~Clearance Time (s)~~ ~~6.0~~

~~Vehicle Extension (s)~~ ~~3.0~~

~~Lane Grp Cap (vph)~~ ~~464~~

~~v/s Ratio Prot~~

~~v/s Ratio Perm~~ ~~0.02~~

~~v/c Ratio~~ ~~0.06~~

~~Uniform Delay, d1~~ ~~38.8~~

~~Progression Factor~~ ~~1.00~~

~~Incremental Delay, d2~~ ~~0.2~~

~~Delay (s)~~ ~~39.0~~

~~Level of Service~~ ~~D~~

~~Approach Delay (s)~~

~~Approach LOS~~

~~Intersection Summary~~

~~K:\FTL TPT\043271000-Main Street CC DR\DR\Calcs\Synchro\PM Total Internal Roadways.sy7~~

~~Synchro 6 Report~~

~~Kimley-Horn and Associates, Inc.~~

Timings

3: NW 40th Street & NW 54th Avenue

PM Peak Hour

Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	205	221	515	1	209	61	553	177	4	14	50	247
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	Perm	pm+pt	
Protected Phases	7	4		3	8		5	2			1	6
Permitted Phases	4		4	8		8	2		2	6	6	
Detector Phases	7	4	4	3	8	8	5	2	2	6	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	22.0	10.0	23.0	23.0	10.0	22.0	22.0	22.0	10.0	22.0
Total Split (s)	28.0	52.0	52.0	13.0	37.0	37.0	72.0	81.0	81.0	23.0	14.0	23.0
Total Split (%)	17.5%	32.5%	32.5%	8.1%	23.1%	23.1%	45.0%	50.6%	50.6%	14.4%	8.8%	14.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max	None	Max

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 146.5

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Splits and Phases: 3: NW 40th Street & NW 54th Avenue

											
14 s	81 s					13 s	52 s				
											
72 s			23 s			28 s			37 s		

Lane Group SBR

Lane Configurations	
Volume (vph)	83
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phases	6
Minimum Initial (s)	4.0
Minimum Split (s)	22.0
Total Split (s)	23.0
Total Split (%)	14.4%
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max

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Synchro 6 Report

Kimley-Horn and Associates, Inc.

HCM Signalized Intersection Capacity Analysis
15: Wiles Road & SR 7

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.97	0.97
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	0.95
Satd. Flow (prot)	3433	5085	1583	3433	3539	1583	3433	5085	1583	3433	3433	3433
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	0.95
Satd. Flow (perm)	3433	5085	1583	3433	3539	1583	3433	5085	1583	3433	3433	3433
Volume (vph)	675	589	315	332	809	337	91	640	1888	218	28	258
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	703	614	328	346	843	351	95	667	1967	227	29	269
RTOR Reduction (vph)	0	0	1	0	0	97	0	0	0	63	0	0
Lane Group Flow (vph)	703	614	327	346	843	254	0	762	1967	164	0	298
Turn Type	Prot	pm+ov		Prot	Perm		Prot	Prot	pm+ov		Prot	Prot
Protected Phases	7	4	5!	3	8		5!	5	2	3	1	1
Permitted Phases			4			8				2		
Actuated Green, G (s)	33.0	58.1	82.0	14.0	39.1	39.1		23.9	49.9	63.9		14.0
Effective Green, g (s)	35.0	60.1	86.0	16.0	41.1	41.1		25.9	51.9	67.9		16.0
Actuated g/C Ratio	0.22	0.38	0.54	0.10	0.26	0.26		0.16	0.32	0.42		0.10
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0		6.0
Vehicle Extension (s)	1.5	2.0	1.5	1.5	2.0	2.0		1.5	1.0	1.5		1.5
Lane Grp Cap (vph)	751	1910	890	343	909	407		556	1649	711		343
v/s Ratio Prot	0.20	0.12	0.06	0.10	c0.24			c0.22	0.39	0.02		0.09
v/s Ratio Perm			0.15			0.16				0.08		
v/e Ratio	0.94	0.32	0.37	1.01	0.93	0.63		1.37	1.19	0.23		0.87
Uniform Delay, d1	61.4	35.5	21.3	72.0	58.0	52.6		67.0	54.0	29.4		71.0
Progression Factor	1.00	1.00	1.00	0.99	1.22	1.41		1.37	0.85	0.53		1.00
Incremental Delay, d2	18.6	0.0	0.1	49.4	14.2	2.0		172.8	90.2	0.0		19.5
Delay (s)	80.0	35.5	21.4	120.7	85.2	76.5		264.6	136.2	15.5		90.5
Level of Service	F	D	C	F	F	E		F	F	B		F
Approach Delay (s)		51.7			91.2			160.0				
Approach LOS		D			F			F				

Intersection Summary

HCM Average Control Delay	131.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	109.1%	ICU Level of Service	H
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

15: Wiles Road & SR 7

PM Peak Hour
Future Total Traffic Conditions

Movement	SBT	SBR
Lane Configurations	AAA	A
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	0.91	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5085	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5085	1583
Volume (vph)	1724	799
Peak-hour factor, PHF	0.96	0.96
Adj. Flow (vph)	1796	832
RTOR Reduction (vph)	0	5
Lane Group Flow (vph)	1796	827
Turn Type	pm+ov	
Protected Phases	6	7
Permitted Phases		6
Actuated Green, G (s)	40.0	73.0
Effective Green, g (s)	42.0	77.0
Actuated g/C Ratio	0.26	0.48
Clearance Time (s)	6.0	6.0
Vehicle Extension (s)	1.0	1.5
Lane Grp Cap (vph)	1335	801
w/s Ratio Prot	0.35	0.23
w/s Ratio Perm		0.30
w/c Ratio	1.35	1.03
Uniform Delay, d1	59.0	41.5
Progression Factor	1.00	1.00
Incremental Delay, d2	160.5	40.4
Delay (s)	219.5	81.9
Level of Service	F	F
Approach Delay (s)	167.2	
Approach LOS	F	
Intersection Summary		

Timings

15: Wiles Road & SR 7

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	675	589	315	332	809	337	640	1888	218	258	1724	799
Turn Type	Prot	pm+ov		Prot	Perm		Prot	pm+ov		Prot	pm+ov	
Protected Phases	7	4	5	3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phases	7	4	5	3	8	8	5	2	3	1	6	7
Minimum Initial (s)	5.0	6.0	5.0	5.0	6.0	6.0	5.0	7.0	5.0	5.0	7.0	5.0
Minimum Split (s)	11.0	43.0	11.0	11.0	40.0	40.0	11.0	42.0	11.0	11.0	42.0	11.0
Total Split (s)	39.0	65.0	29.0	20.0	46.0	46.0	29.0	55.0	20.0	20.0	46.0	39.0
Total Split (%)	24.4%	40.6%	18.1%	12.5%	28.8%	28.8%	18.1%	34.4%	12.5%	12.5%	28.8%	24.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	None	C-Max	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 1 (1%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

! Phase conflict between lane groups.

Splits and Phases: 15: Wiles Road & SR 7

			
20 s	55 s	20 s	65 s
			
29 s	46 s	39 s	46 s

HCM Signalized Intersection Capacity Analysis

16: Wiles Road & Banks Road

PM Peak Hour
Future Total Traffic Conditions

							
Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0
Lane Util. Factor		0.95		1.00	0.95	1.00	1.00
Frt		0.98		1.00	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)		3466		1770	3539	1770	1583
Flt Permitted		1.00		0.20	1.00	0.95	1.00
Satd. Flow (perm)		3466		368	3539	1770	1583
Volume (vph)	0	929	149	287	974	177	182
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	1056	169	326	1107	201	207
RTOR Reduction (vph)	0	5	0	0	0	0	96
Lane Group Flow (vph)	0	1220	0	326	1107	201	111
Turn Type	Perm			Perm			Perm
Protected Phases		4			8	2	
Permitted Phases	4			8			2
Actuated Green, G (s)		121.9		121.9	121.9	28.1	28.1
Effective Green, g (s)		122.9		122.9	122.9	29.1	29.1
Actuated g/C Ratio		0.77		0.77	0.77	0.18	0.18
Clearance Time (s)		5.0		5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		2662		283	2718	322	288
v/s Ratio Prot		0.35			0.31	0.11	
v/s Ratio Perm				0.88			0.07
v/c Ratio		0.46		1.15	0.41	0.62	0.39
Uniform Delay, d1		6.6		18.5	6.3	60.4	57.6
Progression Factor		1.46		1.98	1.26	1.00	1.00
Incremental Delay, d2		0.1		72.5	0.0	8.8	3.9
Delay (s)		9.8		109.2	7.9	69.2	61.5
Level of Service		A		F	A	E	E
Approach Delay (s)		9.8			30.9	65.3	
Approach LOS		A			C	E	
Intersection Summary							
HCM Average Control Delay		27.1		HCM Level of Service		G	
HCM Volume to Capacity ratio		1.05					
Actuated Cycle Length (s)		160.0		Sum of lost time (s)		8.0	
Intersection Capacity Utilization		66.1%		ICU Level of Service		C	
Analysis Period (min)		15					
c Critical Lane Group							

Timings**PM Peak Hour****16: Wiles Road & Banks Road****Future Total Traffic Conditions**

					
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations					
Volume (vph)	929	287	974	177	182
Turn Type	Perm		Perm		Perm
Protected Phases	4		8	2	
Permitted Phases		8			2
Detector Phases	4	8	8	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	21.0	21.0	21.0	21.0
Total Split (s)	104.0	104.0	104.0	56.0	56.0
Total Split (%)	65.0%	65.0%	65.0%	35.0%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	C-Min	C-Min

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

Splits and Phases: 16: Wiles Road & Banks Road

 EBT	 WBL
56 s	104 s
	 WBT
	104 s

~~HCM Signalized Intersection Capacity Analysis~~

~~17: Wiles Road & Lyons Road~~

~~PM Peak Hour
Future Total Traffic Conditions~~

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4897	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4897	
Volume (vph)	433	1084	274	219	1423	164	494	2115	277	130	1638	536
Peak hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	451	1129	285	228	1482	171	515	2203	289	135	1706	558
RTOR Reduction (vph)	0	0	131	0	0	47	0	0	110	0	37	0
Lane Group Flow (vph)	451	1129	154	228	1482	124	515	2203	179	135	2227	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		4	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	20.0	50.9	50.9	14.1	45.0	45.0	14.0	60.9	60.9	10.1	57.0	
Effective Green, g (s)	22.0	52.9	52.9	16.1	47.0	47.0	16.0	62.9	62.9	12.1	59.0	
Actuated g/C Ratio	0.14	0.33	0.33	0.10	0.29	0.29	0.10	0.39	0.39	0.08	0.37	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.5	3.0	3.0	1.5	3.0	
Lane Grp Cap (vph)	472	1170	523	345	1040	465	343	1999	622	260	1806	
v/s Ratio Prot	c0.13	0.32		0.07	c0.42		c0.15	c0.43		0.04	c0.45	
v/s Ratio Perm			0.10			0.08			0.11			
v/c Ratio	0.96	0.96	0.29	0.66	1.43	0.27	1.50	1.10	0.29	0.52	1.23	
Uniform Delay, d1	68.5	52.6	39.7	69.3	56.5	43.3	72.0	48.5	33.2	71.2	50.5	
Progression Factor	1.07	0.97	1.03	0.44	1.07	1.27	1.09	1.05	1.59	1.00	1.00	
Incremental Delay, d2	29.2	17.8	0.1	0.3	191.8	0.0	234.6	51.1	0.7	0.7	110.0	
Delay (s)	102.4	69.0	41.0	30.9	252.0	55.0	313.2	102.3	53.5	71.9	160.5	
Level of Service	F	E	D	C	F	E	F	F	D	E	F	
Approach Delay (s)		72.8			207.3			133.7			155.5	
Approach LOS		E			F			F			F	
Intersection Summary												
HCM Average Control Delay			142.1				HCM Level of Service			F		
HCM Volume to Capacity ratio			1.31									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			122.7%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

17: Wiles Road & Lyons Road

PM Peak Hour

Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4897	1900
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4897	1900
Volume (vph)	433	1127	274	226	1477	171	494	2115	283	136	1638	536
Peak hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	451	1174	285	235	1539	178	515	2203	295	142	1706	558
RTOR Reduction (vph)	0	0	130	0	0	47	0	0	113	0	37	0
Lane Group Flow (vph)	451	1174	155	235	1539	131	515	2203	182	142	2227	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		4	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	20.0	50.6	50.6	14.4	45.0	45.0	14.0	60.6	60.6	10.4	57.0	
Effective Green, g (s)	22.0	52.6	52.6	16.4	47.0	47.0	16.0	62.6	62.6	12.4	59.0	
Actuated g/C Ratio	0.14	0.33	0.33	0.10	0.29	0.29	0.10	0.39	0.39	0.08	0.37	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.5	3.0	3.0	1.5	3.0	
Lane Grp Cap (vph)	472	1163	520	352	1040	465	343	1990	619	266	1806	
v/s Ratio Prot	c0.13	0.33		0.07	c0.43		c0.15	c0.43		0.04	c0.45	
v/s Ratio Perm			0.10			0.08			0.12			
v/c Ratio	0.96	1.01	0.30	0.67	1.48	0.28	1.50	1.11	0.29	0.53	1.23	
Uniform Delay, d1	68.5	53.7	40.0	69.2	56.5	43.5	72.0	48.7	33.5	71.0	50.5	
Progression Factor	1.06	0.98	1.02	0.44	1.06	1.25	1.09	1.05	1.58	1.00	1.00	
Incremental Delay, d2	29.2	28.3	0.1	0.3	216.4	0.0	234.6	53.2	0.7	1.0	110.0	
Delay (s)	102.2	80.7	40.8	30.7	276.5	54.4	313.2	104.5	53.7	72.1	160.5	
Level of Service	F	F	D	C	F	D	F	F	D	E	F	
Approach Delay (s)		79.8			226.7			135.2			155.3	
Approach LOS		E			F			F			F	
Intersection Summary												
HCM Average Control Delay			148.2				HCM Level of Service			F		
HCM Volume to Capacity ratio			1.32									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			124.2%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

Timings

17: Wiles Road & Lyons Road

PM Peak Hour

Future Total Traffic Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	 	 		 	 		 	  		 	  
Volume (vph)	433	1084	274	219	1423	164	494	2115	277	130	1638
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot	
Protected Phases	7	4		3	8		5	2		4	6
Permitted Phases			4			8			2		
Detector Phases	7	4	4	3	8	8	5	2	2	4	6
Minimum Initial (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	12.0	12.0	5.0	12.0
Minimum Split (s)	11.0	48.0	48.0	11.0	45.0	45.0	11.0	49.0	49.0	11.0	49.0
Total Split (s)	26.0	51.0	51.0	26.0	51.0	51.0	20.0	63.0	63.0	20.0	63.0
Total Split (%)	16.3%	31.9%	31.9%	16.3%	31.9%	31.9%	12.5%	30.4%	30.4%	12.5%	30.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C Min	C Min	None	C Min

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 132 (83%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated Coordinated

Splits and Phases: 17: Wiles Road & Lyons Road

			
ø1	ø2	ø3	ø4
20 s	63 s	26 s	51 s
			
ø5	ø6	ø7	ø8
20 s	63 s	26 s	51 s

Timings

PM Peak Hour

17: Wiles Road & Lyons Road

Future Total Traffic Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	 	 		 	 		 	  		 	  
Volume (vph)	433	1127	274	226	1477	171	494	2115	283	136	1638
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot	
Protected Phases	7	4		3	8		5	2		4	6
Permitted Phases			4			8			2		
Detector Phases	7	4	4	3	8	8	5	2	2	4	6
Minimum Initial (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	12.0	12.0	5.0	12.0
Minimum Split (s)	11.0	48.0	48.0	11.0	45.0	45.0	11.0	49.0	49.0	11.0	49.0
Total Split (s)	26.0	51.0	51.0	26.0	51.0	51.0	20.0	63.0	63.0	20.0	63.0
Total Split (%)	16.3%	31.9%	31.9%	16.3%	31.9%	31.9%	12.5%	30.4%	30.4%	12.5%	30.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C Min	C Min	None	C Min

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 132 (83%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated Coordinated

Splits and Phases: 17: Wiles Road & Lyons Road

			
ø1	ø2	ø3	ø4
20 s	63 s	26 s	51 s
			
ø5	ø6	ø7	ø8
20 s	63 s	26 s	51 s

~~HCM Signalized Intersection Capacity Analysis~~

~~18: Wiles Road & Powerline Road~~

~~PM Peak Hour~~

~~Future Total Traffic Conditions~~

												
Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	0.95	1.00		0.97	1.00	1.00	1.00	0.91	1.00		0.97
Frt	1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (prot)	1770	3539	1583		3433	1863	1583	1770	5085	1583		3433
Flt Permitted	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (perm)	1770	3539	1583		3433	1863	1583	1770	5085	1583		3433
Volume (vph)	171	1095	129	18	898	1355	358	163	1554	432	23	323
Peak hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	182	1165	137	19	955	1441	381	173	1653	460	24	344
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	208	0	0
Lane Group Flow (vph)	182	1165	137	0	974	1441	381	173	1653	252	0	368
Turn Type	Prot		Free	Prot	Prot		Free	Prot		Perm	Prot	Prot
Protected Phases	7	4		3	3			5	2		4	4
Permitted Phases			Free			8	Free			2		
Actuated Green, G (s)	19.5	23.0	160.0		29.1	32.6	160.0	17.0	62.5	62.5		17.9
Effective Green, g (s)	23.0	26.0	160.0		32.6	35.6	160.0	19.5	65.0	65.0		20.4
Actuated g/C Ratio	0.14	0.16	1.00		0.20	0.22	1.00	0.12	0.41	0.41		0.13
Clearance Time (s)	7.5	7.0			7.5	7.0		6.5	6.5	6.5		6.5
Vehicle Extension (s)	1.5	2.0			1.5	2.0		1.5	3.0	3.0		1.5
Lane Grp Cap (vph)	254	575	1583		699	415	1583	216	2066	643		438
v/s Ratio Prot	0.10	0.33			c0.28			0.10	c0.33			c0.11
v/s Ratio Perm			0.09			c0.77	c0.24			0.16		
v/c Ratio	0.72	2.03	0.09		1.39	3.47	0.24	0.80	0.80	0.39		0.84
Uniform Delay, d1	65.4	67.0	0.0		63.7	62.2	0.0	68.4	41.8	33.5		68.2
Progression Factor	0.86	1.28	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	4.3	465.1	0.1		185.7	1118.6	0.4	17.9	3.4	1.8		13.0
Delay (s)	60.7	551.1	0.1		249.4	1180.8	0.4	86.2	45.1	35.3		81.2
Level of Service	E	F	A		F	F	A	F	D	D		F
Approach Delay (s)		440.1				695.5			46.3			
Approach LOS		F				F			D			
Intersection Summary												
HCM Average Control Delay			333.0									
HCM Volume to Capacity ratio			1.58									
Actuated Cycle Length (s)			160.0									
Intersection Capacity Utilization			134.0%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

PM Peak Hour

18: Wiles Road & Powerline Road

Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	0.95	1.00		0.97	1.00	1.00	1.00	0.91	1.00		0.97
Frt	1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (prot)	1770	3539	1583		3433	1863	1583	1770	5085	1583		3433
Flt Permitted	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (perm)	1770	3539	1583		3433	1863	1583	1770	5085	1583		3433
Volume (vph)	176	1138	134	18	898	1410	358	169	1554	432	23	323
Peak hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	187	1211	143	19	955	1500	381	180	1653	460	24	344
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	208	0	0
Lane Group Flow (vph)	187	1211	143	0	974	1500	381	180	1653	252	0	368
Turn Type	Prot		Free	Prot	Prot		Free	Prot		Perm	Prot	Prot
Protected Phases	7	4		3	3			5	2		4	4
Permitted Phases			Free			8	Free			2		
Actuated Green, G (s)	19.8	23.0	160.0		29.1	32.3	160.0	17.3	62.5	62.5		17.9
Effective Green, g (s)	23.3	26.0	160.0		32.6	35.3	160.0	19.8	65.0	65.0		20.4
Actuated g/C Ratio	0.15	0.16	1.00		0.20	0.22	1.00	0.12	0.41	0.41		0.13
Clearance Time (s)	7.5	7.0			7.5	7.0		6.5	6.5	6.5		6.5
Vehicle Extension (s)	1.5	2.0			1.5	2.0		1.5	3.0	3.0		1.5
Lane Grp Cap (vph)	258	575	1583		699	411	1583	219	2066	643		438
v/s Ratio Prot	0.11	0.34			0.28			0.10	0.33			0.11
v/s Ratio Perm			0.09			0.81	0.24			0.16		
v/c Ratio	0.72	2.11	0.09		1.39	3.65	0.24	0.82	0.80	0.39		0.84
Uniform Delay, d1	65.3	67.0	0.0		63.7	62.4	0.0	68.4	41.8	33.5		68.2
Progression Factor	0.86	1.28	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	4.2	500.6	0.1		185.7	1198.3	0.4	20.4	3.4	1.8		13.0
Delay (s)	60.0	586.2	0.1		249.4	1260.7	0.4	88.8	45.1	35.3		81.2
Level of Service	E	F	A		F	F	A	F	D	D		F
Approach Delay (s)		467.9				747.5			46.6			
Approach LOS		F				F			D			
Intersection Summary												
HCM Average Control Delay			358.5									
HCM Volume to Capacity ratio			1.62									
Actuated Cycle Length (s)			160.0									
Intersection Capacity Utilization			137.2%									
Analysis Period (min)			15									
c Critical Lane Group												

~~HCM Signalized Intersection Capacity Analysis~~

~~18: Wiles Road & Powerline Road~~

~~PM Peak Hour~~

~~Future Total Traffic Conditions~~

		
Movement	SBT	SBR
Lane Configurations	↑↑↑	↑
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	0.91	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5085	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5085	1583
Volume (vph)	1144	200
Peak hour factor, PHF	0.94	0.94
Adj. Flow (vph)	1217	213
RTOR Reduction (vph)	0	125
Lane Group Flow (vph)	1217	88
Turn Type		Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	63.4	63.4
Effective Green, g (s)	65.9	65.9
Actuated g/C Ratio	0.41	0.41
Clearance Time (s)	6.5	6.5
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	2094	652
v/s Ratio Prot	0.24	
v/s Ratio Perm		0.06
v/c Ratio	0.58	0.13
Uniform Delay, d1	36.4	29.3
Progression Factor	1.00	1.00
Incremental Delay, d2	1.2	0.4
Delay (s)	37.6	29.7
Level of Service	D	C
Approach Delay (s)	45.6	
Approach LOS	D	
Intersection Summary		

		
Movement	SBT	SBR
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	0.91	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5085	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5085	1583
Volume (vph)	1144	206
Peak hour factor, PHF	0.94	0.94
Adj. Flow (vph)	1217	219
RTOR Reduction (vph)	0	129
Lane Group Flow (vph)	1217	90
Turn Type		Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	63.1	63.1
Effective Green, g (s)	65.6	65.6
Actuated g/C Ratio	0.41	0.41
Clearance Time (s)	6.5	6.5
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	2085	649
v/s Ratio Prot	0.24	
v/s Ratio Perm		0.06
v/c Ratio	0.58	0.14
Uniform Delay, d1	36.6	29.5
Progression Factor	1.00	1.00
Incremental Delay, d2	1.2	0.4
Delay (s)	37.8	30.0
Level of Service	D	C
Approach Delay (s)	45.7	
Approach LOS	D	
Intersection Summary		

Timings

18: Wiles Road & Powerline Road

PM Peak Hour

Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	174	1095	129	898	1355	358	163	1554	432	323	1144	200
Turn Type	Prot		Free	Prot		Free	Prot		Perm	Prot		Perm
Protected Phases	7	4		3			5	2		4	6	
Permitted Phases			Free		8	Free			2			6
Detector Phases	7	4		3	8		5	2	2	4	6	6
Minimum Initial (s)	5.0	6.0		5.0	6.0		5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.5	43.0		12.5	43.0		11.5	48.5	48.5	11.5	48.5	48.5
Total Split (s)	31.0	30.0	0.0	31.0	30.0	0.0	25.0	74.0	74.0	25.0	74.0	74.0
Total Split (%)	19.4%	18.8%	0.0%	19.4%	18.8%	0.0%	15.6%	46.3%	46.3%	15.6%	46.3%	46.3%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.5	3.0		3.5	3.0		2.5	2.5	2.5	2.5	2.5	2.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C Min	C Min	None	C Min	C Min

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 63 (39%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated Coordinated

Splits and Phases: 18: Wiles Road & Powerline Road

			
ø1	ø2	ø3	ø4
25 s	74 s	31 s	30 s
			
ø5	ø6	ø7	ø8
25 s	74 s	31 s	30 s

Timings

PM Peak Hour

18: Wiles Road & Powerline Road

Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	176	1138	134	898	1410	358	169	1554	432	323	1144	206
Turn Type	Prot		Free	Prot		Free	Prot		Perm	Prot		Perm
Protected Phases	7	4		3			5	2		4	6	
Permitted Phases			Free		8	Free			2			6
Detector Phases	7	4		3	8		5	2	2	4	6	6
Minimum Initial (s)	5.0	6.0		5.0	6.0		5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.5	43.0		12.5	43.0		11.5	48.5	48.5	11.5	48.5	48.5
Total Split (s)	31.0	30.0	0.0	31.0	30.0	0.0	25.0	74.0	74.0	25.0	74.0	74.0
Total Split (%)	10.4%	18.8%	0.0%	10.4%	18.8%	0.0%	15.6%	46.3%	46.3%	15.6%	46.3%	46.3%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.5	3.0		3.5	3.0		2.5	2.5	2.5	2.5	2.5	2.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C Min	C Min	None	C Min	C Min

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 63 (39%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated Coordinated

Splits and Phases: 18: Wiles Road & Powerline Road

			
ø1	ø2	ø3	ø4
25 s	74 s	31 s	30 s
			
ø5	ø6	ø7	ø8
25 s	74 s	31 s	30 s

HCM Signalized Intersection Capacity Analysis
19: NW 31st Street & SR 7

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.91			1.00	0.91
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99			1.00	0.99
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3408		1770	5037			1770	5023
Flt Permitted	0.65	1.00	1.00	0.62	1.00		0.95	1.00			0.07	1.00
Satd. Flow (perm)	1219	3539	1583	1158	3408		1770	5037			138	5023
Volume (vph)	95	54	478	210	113	37	489	2176	147	18	36	1573
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	98	56	493	216	116	38	504	2243	152	19	37	1622
RTOR Reduction (vph)	0	0	335	0	22	0	0	3	0	0	0	7
Lane Group Flow (vph)	98	56	158	216	132	0	504	2392	0	0	56	1758
Turn Type	pm+pt		Perm		pm+pt		Prot		pm+pt		pm+pt	
Protected Phases	7		4		3		5		2		1	
Permitted Phases	4		4		8				6		6	
Actuated Green, G (s)	29.9		19.2		36.5		50.8		98.4		56.9	
Effective Green, g (s)	33.9		21.2		40.5		52.8		99.9		60.9	
Actuated g/C Ratio	0.21		0.13		0.25		0.33		0.62		0.38	
Clearance Time (s)	6.0		6.0		6.0		6.0		5.5		6.0	
Vehicle Extension (s)	1.5		2.0		1.5		2.5		3.0		1.5	
Lane Grp Cap (vph)	302		469		210		584		3145		123	
v/s Ratio Prot	0.03		0.02		0.06		0.28		0.47		0.02	
v/s Ratio Perm	0.04		0.10		0.09						0.15	
v/c Ratio	0.32		0.12		0.75		0.86		0.76		0.46	
Uniform Delay, d1	52.6		61.2		66.9		50.2		21.5		51.1	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.08	
Incremental Delay, d2	0.2		0.0		12.7		12.4		1.8		0.9	
Delay (s)	52.8		61.2		79.5		62.6		23.3		55.8	
Level of Service	D		E		D		E		C		E	
Approach Delay (s)			73.9				55.9		30.1			
Approach LOS			E				E		C			
Intersection Summary												
HCM Average Control Delay			50.4		HCM Level of Service				D			
HCM Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			160.0		Sum of lost time (s)				20.0			
Intersection Capacity Utilization			90.5%		ICU Level of Service				E			
Analysis Period (min)			15									
c Critical Lane Group												

~~HCM Signalized Intersection Capacity Analysis~~
~~19: NW 31st Street & SR 7~~

~~PM Peak Hour~~
~~Future Total Traffic Conditions~~

~~Movement~~ ~~SBR~~

~~Lane Configurations~~

~~Ideal Flow (vphpl)~~ ~~1900~~

~~Total Lost time (s)~~

~~Lane Util. Factor~~

~~Frt~~

~~Flt Protected~~

~~Satd. Flow (prot)~~

~~Flt Permitted~~

~~Satd. Flow (perm)~~

~~Volume (vph)~~ ~~139~~

~~Peak-hour factor, PHF~~ ~~0.97~~

~~Adj. Flow (vph)~~ ~~143~~

~~RTOR Reduction (vph)~~ ~~0~~

~~Lane Group Flow (vph)~~ ~~0~~

~~Turn Type~~

~~Protected Phases~~

~~Permitted Phases~~

~~Actuated Green, G (s)~~

~~Effective Green, g (s)~~

~~Actuated g/C Ratio~~

~~Clearance Time (s)~~

~~Vehicle Extension (s)~~

~~Lane Grp Cap (vph)~~

~~v/s Ratio Prot~~

~~v/s Ratio Perm~~

~~v/c Ratio~~

~~Uniform Delay, d1~~

~~Progression Factor~~

~~Incremental Delay, d2~~

~~Delay (s)~~

~~Level of Service~~

~~Approach Delay (s)~~

~~Approach LOS~~

~~Intersection Summary~~

Timings

19: NW 31st Street & SR 7

PM Peak Hour

Future Total Traffic Conditions

										
Lane Group	EBL	EBT	EBP	WBL	WBT	NBL	NBT	SBU	SBL	SBT
Lane Configurations										
Volume (vph)	95	54	478	210	113	489	2176	18	36	1573
Turn Type	pm+pt		Perm	pm+pt		Prot		pm+pt	pm+pt	
Protected Phases	7	4		3	8	5	2	1	1	6
Permitted Phases	4		4	8				6	6	
Detector Phases	7	4	4	3	8	5	2	1	1	6
Minimum Initial (s)	4.0	6.0	6.0	4.0	6.0	4.0	15.0	4.0	4.0	15.0
Minimum Split (s)	10.0	29.0	29.0	10.0	29.0	10.0	30.5	10.0	10.0	31.0
Total Split (s)	20.0	42.0	42.0	20.0	42.0	40.0	84.0	14.0	14.0	58.0
Total Split (%)	12.5%	26.3%	26.3%	12.5%	26.3%	25.0%	52.5%	8.8%	8.8%	36.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	1.5	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Min	None	None	C-Min

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 106 (66%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Splits and Phases: 19: NW 31st Street & SR 7

 ø1	 ø2	 ø3	 ø4
14 s	84 s	20 s	42 s
 ø5	 ø6	 ø7	 ø8
40 s	58 s	20 s	42 s

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3/31/2009

Synchro 6 Report

Kimley-Horn and Associates, Inc.

HCM Unsignalized Intersection Capacity Analysis

20: NW 40th Street & SR 7

PM Peak Hour
Future Total Traffic Conditions

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations			  			  		
Sign Control	Stop		Free			Free		
Grade	0%		0%			0%		
Volume (veh/h)	0	201	2428	231	0	2013		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97		
Hourly flow rate (vph)	0	207	2503	238	0	2075		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None							
Median storage (veh)								
Upstream signal (ft)						734		
pX, platoon unblocked	0.79							
vC, conflicting volume	3195	834			2741			
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol	3248	834			2741			
tC, single (s)	6.8	6.9			4.1			
tC, 2 stage (s)								
tF (s)	3.5	3.3			2.2			
p0 queue free %	100	33			100			
cM capacity (veh/h)	6	311			144			
Direction, Lane #	WB-1	NB-1	NB-2	NB-3	NB-4	SB-1	SB-2	SB-3
Volume Total	207	834	834	834	238	692	692	692
Volume Left	0	0	0	0	0	0	0	0
Volume Right	207	0	0	0	238	0	0	0
cSH	311	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.67	0.49	0.49	0.49	0.14	0.41	0.41	0.41
Queue Length 95th (ft)	111	0	0	0	0	0	0	0
Control Delay (s)	36.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	E							
Approach Delay (s)	36.9	0.0				0.0		
Approach LOS	E							
Intersection Summary								
Average Delay			1.5					
Intersection Capacity Utilization			66.0%		ICU Level of Service		C	
Analysis Period (min)			15					

HCM Signalized Intersection Capacity Analysis

21: Cullum Road/Turtle Creek Drive & SR 7

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	1.00		1.00	0.95	1.00		0.97	0.91	1.00		0.97
Frt	1.00	0.90		1.00	1.00	0.85		1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (prot)	1770	1682		1770	3539	1583		3433	5085	1583		3433
Flt Permitted	0.72	1.00		0.42	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (perm)	1345	1682		774	3539	1583		3433	5085	1583		3433
Volume (vph)	295	69	126	134	50	276	42	118	2343	250	43	342
Peak hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	301	70	129	137	51	282	43	120	2391	255	44	349
RTOR Reduction (vph)	0	42	0	0	0	107	0	0	0	69	0	0
Lane Group Flow (vph)	301	157	0	137	51	175	0	163	2391	186	0	393
Turn Type	Perm			Perm		Perm	Prot	Prot		Perm	Prot	Prot
Protected Phases		4			8		5	5	2		1	1
Permitted Phases	4			8		8				2		
Actuated Green, G (s)	32.0	32.0		32.0	32.0	32.0		11.4	88.7	88.7		21.3
Effective Green, g (s)	34.0	34.0		34.0	34.0	34.0		13.4	90.7	90.7		23.3
Actuated g/C Ratio	0.21	0.21		0.21	0.21	0.21		0.08	0.57	0.57		0.15
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		6.0	6.0	6.0		6.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0		1.5	0.2	0.2		1.5
Lane Grp Cap (vph)	286	357		164	752	336		288	2883	897		500
v/s Ratio Prot		0.09			0.01			0.05	0.47			0.11
v/s Ratio Perm	0.22			0.18		0.11				0.12		
v/c Ratio	1.05	0.44		0.84	0.07	0.52		0.57	0.83	0.21		0.79
Uniform Delay, d1	63.0	54.7		60.3	50.3	55.8		70.5	28.3	17.0		65.9
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.15	0.64	0.23		1.06
Incremental Delay, d2	67.7	0.3		28.0	0.0	0.7		1.4	2.7	0.5		0.7
Delay (s)	130.7	55.1		88.4	50.4	56.5		82.8	20.8	4.3		70.7
Level of Service	F	E		F	D	E		F	C	A		E
Approach Delay (s)		100.6			65.1				22.9			
Approach LOS		F			E				G			
Intersection Summary												
HCM Average Control Delay			30.9									
HCM Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			160.0									
Intersection Capacity Utilization			103.0%									
Analysis Period (min)			15									
c Critical Lane Group												
HCM Level of Service												
Sum of lost time (s)												
ICU Level of Service												

HCM Signalized Intersection Capacity Analysis
 21: Cullum Road/Turtle Creek Drive & SR 7

PM Peak Hour
 Future Total Traffic Conditions

	↓	↙
Movement	SBT	SBR
Lane Configurations	AAA	7
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	0.91	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5085	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5085	1583
Volume (vph)	1829	298
Peak-hour factor, PHF	0.98	0.98
Adj. Flow (vph)	1866	304
RTOR Reduction (vph)	0	77
Lane Group Flow (vph)	1866	227
Turn Type		Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	98.6	98.6
Effective Green, g (s)	100.6	100.6
Actuated g/C Ratio	0.63	0.63
Clearance Time (s)	6.0	6.0
Vehicle Extension (s)	0.2	0.2
Lane Grp Cap (vph)	3197	995
v/s Ratio Prot	0.37	
v/s Ratio Perm		0.14
w/o Ratio	0.58	0.23
Uniform Delay, d1	17.4	12.9
Progression Factor	0.65	0.52
Incremental Delay, d2	0.1	0.0
Delay (s)	11.4	6.7
Level of Service	B	A
Approach Delay (s)	19.9	
Approach LOS	B	
Intersection Summary		

Timings

PM Peak Hour

21: Cullum Road/Turtle Creek Drive & SR 7

Future Total Traffic Conditions

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	295	69	134	50	276	118	2343	250	342	1829	298
Turn Type	Perm		Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8			2			6
Detector Phases	4	4	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	5.0	7.0	7.0	5.0	7.0	7.0
Minimum Split (s)	38.0	38.0	38.0	38.0	38.0	11.0	34.0	34.0	11.0	34.0	34.0
Total Split (s)	38.0	38.0	38.0	38.0	38.0	21.0	92.0	92.0	30.0	101.0	101.0
Total Split (%)	23.8%	23.8%	23.8%	23.8%	23.8%	13.1%	57.5%	57.5%	18.8%	63.1%	63.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 138 (86%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Splits and Phases: 21: Cullum Road/Turtle Creek Drive & SR 7

		
30 s	92 s	38 s
		
21 s	101 s	38 s

HCM Signalized Intersection Capacity Analysis

22: Creekside Drive/Winston Park Boulevard & SR 7

PM Peak Hour
Future Total Traffic Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.91	1.00		1.00
Flt	1.00	0.94		1.00	0.92			1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00	1.00		0.95
Satd. Flow (prot)	1770	3314		1770	3264			1770	5085	1583		1770
Flt Permitted	0.25	1.00		0.69	1.00			0.05	1.00	1.00		0.05
Satd. Flow (perm)	469	3314		1277	3264			94	5085	1583		90
Volume (vph)	132	55	41	268	155	167	79	53	2466	283	36	168
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	136	57	42	276	160	172	81	55	2542	292	37	173
RTOR Reduction (vph)	0	38	0	0	102	0	0	0	0	75	0	0
Lane Group Flow (vph)	136	61	0	276	230	0	0	136	2542	217	0	210
Turn Type	pm+pt			pm+pt			pm+pt	pm+pt		Perm	pm+pt	pm+pt
Protected Phases	7	4		3	8		5	5	2		1	1
Permitted Phases	4			8			2	2		2	6	6
Actuated Green, G (s)	22.8	13.9		23.0	14.0			88.7	76.9	76.9		109.1
Effective Green, g (s)	26.8	15.9		27.0	16.0			92.7	78.9	78.9		111.1
Actuated g/C Ratio	0.18	0.11		0.18	0.11			0.62	0.53	0.53		0.74
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0	6.0	6.0		6.0
Vehicle Extension (s)	1.5	2.0		1.5	2.0			1.5	0.2	0.2		1.5
Lane Grp Cap (vph)	178	351		266	348			212	2675	833		383
v/s Ratio Prot	0.06	0.02		0.08	0.07			0.06	0.50			0.10
v/s Ratio Perm	0.08			0.11				0.34		0.14		0.30
v/c Ratio	0.76	0.18		1.04	0.66			0.64	0.95	0.26		0.55
Uniform Delay, d1	55.2	61.1		60.4	64.4			38.0	33.7	19.5		42.8
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2	15.9	0.1		65.3	3.6			4.9	9.1	0.8		0.9
Delay (s)	71.1	61.2		125.7	68.0			42.9	42.8	20.3		43.7
Level of Service	E	E		F	E			D	D	C		D
Approach Delay (s)		66.9			94.2				40.6			
Approach LOS		E			F				D			
Intersection Summary												
HCM Average Control Delay			39.4			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			92.1%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

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Synchro 6 Report

Kimley-Horn and Associates, Inc.

HCM Signalized Intersection Capacity Analysis
22: Creekside Drive/Winston Park Boulevard & SR 7

PM Peak Hour
Future Total Traffic Conditions

	↓	↙
Movement	SBT	SBR
Lane Configurations	AAA	A
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	0.91	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5085	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5085	1583
Volume (vph)	2654	349
Peak-hour factor, PHF	0.97	0.97
Adj. Flow (vph)	2736	360
RTOR Reduction (vph)	0	64
Lane Group Flow (vph)	2736	296
Turn Type		Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	91.3	91.3
Effective Green, g (s)	93.3	93.3
Actuated g/C Ratio	0.62	0.62
Clearance Time (s)	6.0	6.0
Vehicle Extension (s)	0.2	0.2
Lane Grp Cap (vph)	3163	985
v/s Ratio Prot	0.54	
v/s Ratio Perm		0.19
v/c Ratio	0.87	0.30
Uniform Delay, d1	23.2	13.2
Progression Factor	1.00	1.00
Incremental Delay, d2	3.5	0.8
Delay (s)	26.6	14.0
Level of Service	C	B
Approach Delay (s)	26.3	
Approach LOS	C	
Intersection Summary		

Timings

PM Peak Hour

22: Creekside Drive/Winston Park Boulevard & SR 7

Future Total Traffic Conditions

												
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	SBR	SBR
Lane Configurations												
Volume (vph)	132	55	268	155	79	53	2466	283	36	168	2654	349
Turn Type	pm+pt		pm+pt		pm+pt	pm+pt	Perm	pm+pt	pm+pt		Perm	
Protected Phases	7	4	3	8	5	5	2	1	1	6		
Permitted Phases	4		8		2	2	2	6	6		6	
Detector Phases	7	4	3	8	5	5	2	2	1	1	6	6
Minimum Initial (s)	4.0	6.0	4.0	6.0	4.0	4.0	7.0	7.0	4.0	4.0	7.0	7.0
Minimum Split (s)	10.0	39.0	10.0	37.0	10.0	10.0	37.0	37.0	10.0	10.0	37.0	37.0
Total Split (s)	15.0	43.0	15.0	43.0	15.0	15.0	77.0	77.0	15.0	15.0	77.0	77.0
Total Split (%)	10.0%	28.7%	10.0%	28.7%	10.0%	10.0%	51.3%	51.3%	10.0%	10.0%	51.3%	51.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	None	C-Max	C-Max

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 1 (1%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

Splits and Phases: 22: Creekside Drive/Winston Park Boulevard & SR 7

			
15 s	77 s	15 s	43 s
			
15 s	77 s	15 s	43 s

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Synchro 6 Report

Kimley-Horn and Associates, Inc.

HCM Signalized Intersection Capacity Analysis
23: NB Sawgrass Expressway On Ramp & SR 7

PM Peak Hour
Future Total Traffic Conditions

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			0.91	1.00	0.97	0.86
Flt			1.00	0.85	1.00	1.00
Flt Protected			1.00	1.00	0.95	1.00
Satd. Flow (prot)			5085	1583	3433	6408
Flt Permitted			1.00	1.00	0.95	1.00
Satd. Flow (perm)			5085	1583	3433	6408
Volume (vph)	0	0	2361	278	180	2587
Peak hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	2595	305	198	2843
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2595	305	198	2843
Turn Type				Free	Prot	
Protected Phases			2		1	
Permitted Phases				Free		Free
Actuated Green, G (s)			63.8	85.5	9.2	85.5
Effective Green, g (s)			66.8	85.5	10.7	85.5
Actuated g/C Ratio			0.78	1.00	0.13	1.00
Clearance Time (s)			7.0		5.5	
Vehicle Extension (s)			0.2		2.0	
Lane Grp Cap (vph)			3973	1583	430	6408
v/s Ratio Prot			c0.51		0.06	
v/s Ratio Perm				0.19		c0.44
v/c Ratio			0.65	0.19	0.46	0.44
Uniform Delay, d1			4.2	0.0	34.7	0.0
Progression Factor			1.00	1.00	1.00	1.00
Incremental Delay, d2			0.8	0.3	0.3	0.2
Delay (s)			5.0	0.3	35.0	0.2
Level of Service			A	A	D	A
Approach Delay (s)	0.0		4.5			2.5
Approach LOS	A		A			A
Intersection Summary						
HCM Average Control Delay			3.5		HCM Level of Service	A
HCM Volume to Capacity ratio			0.62			
Actuated Cycle Length (s)			85.5		Sum of lost time (s)	4.0
Intersection Capacity Utilization			94.9%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

Timings

PM Peak Hour

23: NB Sawgrass Expressway On Ramp & SR 7

Future Total Traffic Conditions

	↑	↗	↘	↓
Lane Group	NBT	NBR	SBL	SBT
Lane Configurations	AAA	A	AA	AAA
Volume (vph)	2361	278	180	2587
Turn Type		Free	Prot	
Protected Phases	2		1	
Permitted Phases		Free		Free
Detector Phases	2		1	
Minimum Initial (s)	7.0		5.0	
Minimum Split (s)	25.0		10.5	
Total Split (s)	67.0	0.0	25.5	0.0
Total Split (%)	72.4%	0.0%	27.6%	0.0%
Yellow Time (s)	5.0		4.0	
All-Red Time (s)	2.0		1.5	
Lead/Lag	Lag		Lead	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	Max		None	

Intersection Summary

Cycle Length: 92.5

Actuated Cycle Length: 85.5

Natural Cycle: 40

Control Type: Actuated-Uncoordinated

Splits and Phases: 23: NB Sawgrass Expressway On Ramp & SR 7

↘ 01	↑ 02
25.5 s	67 s

HCM Signalized Intersection Capacity Analysis

24: SB Sawgrass Expressway On Ramp & SR 7

PM Peak Hour
Future Total Traffic Conditions

							
Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0
Lane Util. Factor				0.97	0.86	0.91	1.00
Frt				1.00	1.00	1.00	0.85
Flt Protected				0.95	1.00	1.00	1.00
Satd. Flow (prot)				3433	6408	5085	1583
Flt Permitted				0.95	1.00	1.00	1.00
Satd. Flow (perm)				3433	6408	5085	1583
Volume (vph)	0	0	14	272	2806	2424	558
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	15	292	3017	2606	600
RTOR Reduction (vph)	0	0	0	0	0	0	53
Lane Group Flow (vph)	0	0	0	307	3017	2606	547
Turn Type			Prot	Prot			Perm
Protected Phases			5	5		6	
Permitted Phases					Free		6
Actuated Green, G (s)				11.8	84.8	60.5	60.5
Effective Green, g (s)				13.3	84.8	63.5	63.5
Actuated g/C Ratio				0.16	1.00	0.75	0.75
Clearance Time (s)				5.5		7.0	7.0
Vehicle Extension (s)				2.0		0.2	0.2
Lane Grp Cap (vph)				538	6408	3808	1185
v/s Ratio Prot				0.09		0.51	
v/s Ratio Perm					0.47		0.35
v/c Ratio				0.57	0.47	0.68	0.46
Uniform Delay, d1				33.1	0.0	5.5	4.1
Progression Factor				1.00	1.00	1.00	1.00
Incremental Delay, d2				0.9	0.2	1.0	1.3
Delay (s)				34.0	0.2	6.5	5.4
Level of Service				C	A	A	A
Approach Delay (s)	0.0				3.4	6.3	
Approach LOS	A				A	A	
Intersection Summary							
HCM Average Control Delay			4.8		HCM Level of Service		A
HCM Volume to Capacity ratio			0.64				
Actuated Cycle Length (s)			84.8		Sum of lost time (s)	4.0	
Intersection Capacity Utilization			61.7%		ICU Level of Service		B
Analysis Period (min)			15				
c Critical Lane Group							

Timings

PM Peak Hour

24: SB Sawgrass Expressway On Ramp & SR 7

Future Total Traffic Conditions

				
Lane Group	NBL	NBT	SBT	SBR
Lane Configurations				
Volume (vph)	272	2806	2424	558
Turn Type	Prot			Perm
Protected Phases	5		6	
Permitted Phases		Free		6
Detector Phases	5		6	6
Minimum Initial (s)	5.0		7.0	7.0
Minimum Split (s)	10.5		25.0	25.0
Total Split (s)	25.5	0.0	67.0	67.0
Total Split (%)	27.6%	0.0%	72.4%	72.4%
Yellow Time (s)	4.0		5.0	5.0
All-Red Time (s)	1.5		2.0	2.0
Lead/Lag	Load		Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes
Recall Mode	None		Max	Max

Intersection Summary

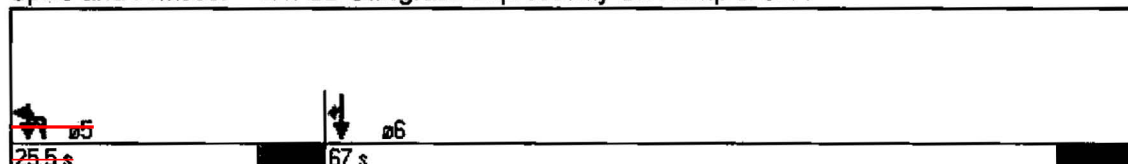
Cycle Length: 92.5

Actuated Cycle Length: 84.9

Natural Cycle: 45

Control Type: Semi Act-Uncoord

Splits and Phases: 24: SB Sawgrass Expressway On Ramp & SR 7



HCM Signalized Intersection Capacity Analysis

25: Coconut Creek Parkway & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	176	893	208	280	1328	301	372	1517	294	423	1009	250
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	187	950	221	298	1413	320	396	1614	313	450	1073	266
RTOR Reduction (vph)	0	0	122	0	0	76	0	0	75	0	0	79
Lane Group Flow (vph)	187	950	99	298	1413	244	396	1614	238	450	1073	187
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	12.3	54.0	54.0	14.0	55.7	55.7	14.0	54.0	54.0	14.0	54.0	54.0
Effective Green, g (s)	14.3	56.0	56.0	16.0	57.7	57.7	16.0	56.0	56.0	16.0	56.0	56.0
Actuated g/C Ratio	0.09	0.35	0.35	0.10	0.36	0.36	0.10	0.35	0.35	0.10	0.35	0.35
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	0.2	0.2	2.0	0.2	0.2	2.0	2.5	2.5	2.0	2.5	2.5
Lane Grp Cap (vph)	307	1239	554	343	1276	571	343	1239	554	343	1239	554
v/s Ratio-Prot	0.05	0.27		0.09	0.40		0.12	0.46		0.13	0.30	
v/s Ratio-Perm			0.06			0.15			0.15			0.12
v/c Ratio	0.61	0.77	0.18	0.87	1.11	0.43	1.15	1.30	0.43	1.31	0.87	0.34
Uniform Delay, d1	70.2	46.2	36.1	71.0	51.1	38.7	72.0	52.0	39.8	72.0	48.5	38.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.21	0.74	0.63
Incremental Delay, d2	2.3	4.6	0.7	19.5	60.0	2.3	97.5	142.2	0.4	155.4	5.0	0.2
Delay (s)	72.5	50.8	36.8	90.5	111.2	41.0	169.5	194.2	40.2	242.7	40.9	24.3
Level of Service	E	D	D	F	F	D	F	F	D	F	D	C
Approach Delay (s)		51.5			97.1			169.2			89.2	
Approach LOS		D			F			F			F	
Intersection Summary												
HCM Average Control Delay			109.3			HCM Level of Service				F		
HCM Volume to Capacity ratio			1.16									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			109.1%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

Timings

25: Coconut Creek Parkway & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	176	893	208	280	1328	301	372	1517	294	423	1009	250
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Detector Phases	1	6	6	5	2	2	7	4	4	3	8	8
Minimum Initial (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Minimum Split (s)	11.0	43.0	43.0	11.0	43.0	43.0	11.0	38.0	38.0	11.0	38.0	38.0
Total Split (s)	20.0	60.0	60.0	20.0	60.0	60.0	20.0	60.0	60.0	20.0	60.0	60.0
Total Split (%)	12.5%	37.5%	37.5%	12.5%	37.5%	37.5%	12.5%	37.5%	37.5%	12.5%	37.5%	37.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 135 (84%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 135

Control Type: Actuated-Coordinated

Splits and Phases: 25: Coconut Creek Parkway & Lyons Road

			
20 s	60 s	20 s	60 s
			
20 s	60 s	20 s	60 s

HCM Signalized Intersection Capacity Analysis 26: Lyons Plaza & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3416		1770	3539	3539	1583
Flt Permitted	0.96		0.09	1.00	1.00	1.00
Satd. Flow (perm)	3416		167	3539	3539	1583
Volume (vph)	252	20	64	1863	1674	112
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	265	21	67	1961	1762	118
RTOR Reduction (vph)	4	0	0	0	0	13
Lane Group Flow (vph)	282	0	67	1961	1762	105
Turn Type			pm+pt			Perm
Protected Phases	4		5	2	6	
Permitted Phases			2			6
Actuated Green, G (s)	17.0		133.0	133.0	120.7	120.7
Effective Green, g (s)	18.0		134.0	134.0	121.7	121.7
Actuated g/C Ratio	0.11		0.84	0.84	0.76	0.76
Clearance Time (s)	5.0		5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.5		1.5	0.2	0.2	0.2
Lane Grp Cap (vph)	384		223	2064	2692	1204
v/s Ratio Prot	0.08		0.02	0.55	0.50	
v/s Ratio Perm			0.24			0.07
v/c Ratio	0.73		0.30	0.66	0.65	0.09
Uniform Delay, d1	68.7		9.3	4.7	9.1	4.9
Progression Factor	1.00		2.09	2.95	0.55	0.88
Incremental Delay, d2	6.7		0.0	0.1	0.9	0.1
Delay (s)	75.4		19.5	14.1	6.0	4.4
Level of Service	E		B	B	A	A
Approach Delay (s)	75.4			14.3	5.9	
Approach LOS	E			B	A	
Intersection Summary						
HCM Average Control Delay			14.7	HCM Level of Service		B
HCM Volume to Capacity ratio			0.67			
Actuated Cycle Length (s)			160.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization			67.6%	ICU Level of Service		C
Analysis Period (min)			15			
c Critical Lane Group						

~~Timings~~

~~26: Lyons Plaza & Lyons Road~~

~~PM Peak Hour~~

~~Future Total Traffic Conditions~~

					
Lane Group	EBL	NBL	NBT	SBT	SBR
Lane Configurations					
Volume (vph)	252	64	1863	1674	112
Turn Type	pm+pt			Perm	
Protected Phases	4	5	2	6	
Permitted Phases		2			6
Detector Phases	4	5	2	6	6
Minimum Initial (s)	6.0	4.0	7.0	7.0	7.0
Minimum Split (s)	38.0	9.0	27.0	27.0	27.0
Total Split (s)	45.0	20.0	115.0	95.0	95.0
Total Split (%)	28.1%	12.5%	71.9%	59.4%	59.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead			Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes
Recall Mode	None	None	C-Max	C-Max	C-Max

~~Intersection Summary~~

~~Cycle Length: 160~~

~~Actuated Cycle Length: 160~~

~~Offset: 30 (19%), Referenced to phase 2:NBT and 6:SBT, Start of Green~~

~~Natural Cycle: 100~~

~~Control Type: Actuated Coordinated~~

~~Splits and Phases: 26: Lyons Plaza & Lyons Road~~

  	
115 s	45 s
 	
20 s	95 s

HCM Signalized Intersection Capacity Analysis

27: Wynmoor Way & Lyons Road

PM Peak Hour

Future Total Traffic Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00		0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95		1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770		1583		1770	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.45		1.00		0.76	1.00	0.08	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	843		1583		1410	1583	148	3539	1583	1770	3539	1583
Volume (vph)	14	0	64	117	0	150	121	1953	151	137	1707	62
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	15	0	69	126	0	161	130	2100	162	147	1835	67
RTOR Reduction (vph)	0	0	60	0	0	141	0	0	19	0	0	9
Lane Group Flow (vph)	15	0	9	0	126	20	130	2100	143	147	1835	58
Turn Type	Perm		Perm	Perm		Perm	pm+pt		Perm	Prot		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8	2	2	2			6
Actuated Green, G (s)	17.8		17.8		17.8	17.8	119.4	109.0	109.0	17.2	115.8	115.8
Effective Green, g (s)	19.8		19.8		19.8	19.8	121.4	110.0	110.0	18.2	116.8	116.8
Actuated g/C Ratio	0.12		0.12		0.12	0.12	0.76	0.69	0.69	0.11	0.73	0.73
Clearance Time (s)	6.0		6.0		6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0	1.5	0.2	0.2	1.5	0.2	0.2
Lane Grp Cap (vph)	104		196		174	196	228	2433	1088	201	2583	1156
v/s Ratio Prot							0.04	0.59		0.08	0.52	
v/s Ratio Perm	0.02		0.01		0.09	0.01	0.39		0.09			0.04
v/e Ratio	0.14		0.04		0.72	0.10	0.57	0.86	0.13	0.73	0.71	0.05
Uniform Delay, d1	62.5		61.8		67.5	62.2	16.1	19.2	8.6	68.5	12.1	6.1
Progression Factor	1.00		1.00		1.00	1.00	0.94	1.35	1.40	1.36	0.25	0.00
Incremental Delay, d2	0.2		0.0		11.9	0.1	1.7	3.4	0.2	5.0	0.7	0.0
Delay (s)	62.8		61.8		79.4	62.3	16.7	29.3	12.2	98.2	3.8	0.0
Level of Service	E		E		E	E	B	C	B	F	A	A
Approach Delay (s)		62.0			69.8			27.5			10.4	
Approach LOS		E			E			C			B	
Intersection Summary												
HCM Average Control Delay			23.4				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			84.7%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Timings

27: Wynmoor Way & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

											
Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	14	64	117	0	150	121	1953	151	137	1707	62
Turn Type	Perm	Perm	Perm		Perm	pm+pt		Perm	Prot		Perm
Protected Phases				8		5	2		1	6	
Permitted Phases	4	4	8		8	2		2			6
Detector Phases	4	4	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	4.0	7.0	7.0	5.0	7.0	7.0
Minimum Split (s)	42.0	42.0	42.0	42.0	42.0	9.0	39.0	39.0	10.0	39.0	39.0
Total Split (s)	45.0	45.0	45.0	45.0	45.0	25.0	90.0	90.0	25.0	90.0	90.0
Total Split (%)	28.1%	28.1%	28.1%	28.1%	28.1%	15.6%	56.3%	56.3%	15.6%	56.3%	56.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 36 (23%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Splits and Phases: 27: Wynmoor Way & Lyons Road

		
ø1	ø2	ø4
25 s	90 s	45 s
		
ø5	ø6	ø8
25 s	90 s	45 s

~~HCM Signalized Intersection Capacity Analysis~~ ~~28: Copans Road & Lyons Road~~

~~PM Peak Hour~~
~~Future Total Traffic Conditions~~

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	283	748	251	370	1394	478	235	1537	100	335	1254	284
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	295	779	261	385	1452	498	245	1601	104	349	1306	296
RTOR Reduction (vph)	0	0	166	0	0	167	0	0	41	0	0	125
Lane Group Flow (vph)	295	779	95	385	1452	331	245	1601	63	349	1306	171
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	16.7	49.5	49.5	18.5	51.3	51.3	14.8	50.0	50.0	18.0	53.2	53.2
Effective Green, g (s)	18.7	51.5	51.5	20.5	53.3	53.3	16.8	52.0	52.0	20.0	55.2	55.2
Actuated g/C Ratio	0.12	0.32	0.32	0.13	0.33	0.33	0.11	0.32	0.32	0.12	0.35	0.35
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	1.5	2.5	2.5	1.5	2.5	2.5	1.5	2.5	2.5	1.5	2.5	2.5
Lane Grp Cap (vph)	401	1139	510	440	1179	527	360	1150	514	429	1221	546
v/s Ratio Prot	0.09	0.22		0.11	0.41		0.07	0.45		0.10	0.37	
v/s Ratio Perm			0.06			0.21			0.04			0.11
v/c Ratio	0.74	0.68	0.19	0.88	1.23	0.63	0.68	1.39	0.12	0.81	1.07	0.31
Uniform Delay, d1	68.3	47.2	39.1	68.5	53.4	45.0	69.0	54.0	38.0	68.2	52.4	38.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.89	0.84	0.85	1.17	0.90	1.02
Incremental Delay, d2	5.9	3.3	0.8	16.9	111.8	5.6	2.2	179.4	0.0	8.4	43.8	0.2
Delay (s)	74.2	50.5	39.9	85.4	165.1	50.6	63.6	224.5	32.4	88.1	91.0	39.3
Level of Service	E	D	D	F	F	D	E	F	C	F	F	D
Approach Delay (s)		53.7			127.5			194.1			82.6	
Approach LOS		D			F			F			F	
Intersection Summary												
HCM Average Control Delay			120.1				HCM Level of Service			F		
HCM Volume to Capacity ratio			1.19									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			112.0%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

Timings

28: Copans Road & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	283	748	251	370	1394	478	235	1537	100	335	1254	284
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Detector Phases	1	6	6	5	2	2	7	4	4	3	8	8
Minimum Initial (s)	5.0	12.0	12.0	5.0	12.0	12.0	5.0	6.0	6.0	5.0	6.0	6.0
Minimum Split (s)	11.0	35.0	35.0	11.0	35.0	35.0	11.0	34.0	34.0	11.0	34.0	34.0
Total Split (s)	25.0	55.0	55.0	25.0	55.0	55.0	25.0	55.0	55.0	25.0	55.0	55.0
Total Split (%)	15.6%	34.4%	34.4%	15.6%	34.4%	34.4%	15.6%	34.4%	34.4%	15.6%	34.4%	34.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 56 (35%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 135

Control Type: Actuated-Coordinated

Splits and Phases: 28: Copans Road & Lyons Road

			
25 s	55 s	25 s	55 s
			
25 s	55 s	25 s	55 s

HCM Signalized Intersection Capacity Analysis

29: NW 34th Street & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↑		↑	↑	↑	↑↑	↑	↑	↑↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1783	1583		1802	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.59	1.00		0.77	1.00	0.09	1.00	1.00	0.04	1.00	1.00
Satd. Flow (perm)		1094	1583		1440	1583	175	3539	1583	81	3539	1583
Volume (vph)	34	4	36	46	22	79	58	2090	73	110	1796	46
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	35	4	38	48	23	82	60	2177	76	115	1871	48
RTOR Reduction (vph)	0	0	35	0	0	75	0	0	6	0	0	5
Lane Group Flow (vph)	0	39	3	0	71	7	60	2177	70	115	1871	43
Turn Type	Perm		Perm	Perm		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)		11.9	11.9		11.9	11.9	126.8	122.7	122.7	138.1	129.0	129.0
Effective Green, g (s)		12.9	12.9		12.9	12.9	128.8	123.7	123.7	139.1	130.0	130.0
Actuated g/C Ratio		0.08	0.08		0.08	0.08	0.81	0.77	0.77	0.87	0.81	0.81
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		2.5	2.5		2.5	2.5	1.5	0.2	0.2	1.5	0.2	0.2
Lane Grp Cap (vph)		88	128		116	128	192	2736	1224	191	2875	1286
v/s Ratio Prot							0.01	0.62		0.04	0.53	
v/s Ratio Perm		0.04	0.00		0.05	0.00	0.24		0.04	0.48		0.03
v/c Ratio		0.44	0.02		0.61	0.05	0.31	0.80	0.06	0.60	0.65	0.03
Uniform Delay, d1		70.1	67.8		71.1	67.9	6.0	10.7	4.3	40.1	6.0	2.9
Progression Factor		1.00	1.00		1.00	1.00	2.71	1.05	0.07	1.78	3.12	0.18
Incremental Delay, d2		2.6	0.1		7.9	0.1	0.0	0.2	0.0	0.3	0.1	0.0
Delay (s)		72.7	67.8		79.0	68.0	16.4	11.4	0.3	71.5	18.7	0.5
Level of Service		E	E		E	E	B	B	A	E	B	A
Approach Delay (s)		70.3			73.1			11.2			21.3	
Approach LOS		E			E			B			C	
Intersection Summary												
HCM Average Control Delay		18.7										
HCM Volume to Capacity ratio		0.77										
Actuated Cycle Length (s)		160.0										
Intersection Capacity Utilization		84.2%										
Analysis Period (min)		15										
c Critical Lane Group												

Timings

29: NW 34th Street & Lyons Road

PM Peak Hour

Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	4	36	46	22	79	58	2090	73	110	1796	46
Turn Type	Perm		Perm	Perm		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phases	4	4	4	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0
Minimum Split (s)	37.0	37.0	37.0	34.0	34.0	34.0	9.0	32.0	32.0	9.0	32.0	32.0
Total Split (s)	42.0	42.0	42.0	42.0	42.0	42.0	26.0	92.0	92.0	26.0	92.0	92.0
Total Split (%)	26.3%	26.3%	26.3%	26.3%	26.3%	26.3%	16.3%	57.5%	57.5%	16.3%	57.5%	57.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 66 (41%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Splits and Phases: 29: NW 34th Street & Lyons Road

		
ø1	ø2	ø4
26 s	92 s	42 s
		
ø5	ø6	ø8
26 s	92 s	42 s

~~HCM Signalized Intersection Capacity Analysis~~
~~30: Winston Park Boulevard & Lyons Road~~

~~PM Peak Hour~~
~~Future Total Traffic Conditions~~

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		0.91	0.91		1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.93		1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3291		1610	3147		1770	5085	1583	1770	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.08	1.00	1.00	0.08	1.00	1.00
Satd. Flow (perm)	1770	3291		1610	3147		146	5085	1583	146	5085	1583
Volume (vph)	211	152	133	183	151	149	283	1922	214	357	2101	330
Peak hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	229	165	145	199	164	162	308	2089	233	388	2284	359
RTOR Reduction (vph)	0	114	0	0	124	0	0	0	89	0	0	99
Lane Group Flow (vph)	229	196	0	164	237	0	308	2089	144	388	2284	260
Turn Type	Split			Split			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)	19.1	19.1		17.8	17.8		81.1	50.0	50.0	81.1	50.0	50.0
Effective Green, g (s)	21.1	21.1		19.8	19.8		83.1	51.0	51.0	83.1	51.0	51.0
Actuated g/C Ratio	0.15	0.15		0.14	0.14		0.59	0.36	0.36	0.59	0.36	0.36
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0		1.5	1.0	1.0	1.5	1.0	1.0
Lane Grp Cap (vph)	267	496		228	445		459	1852	577	459	1852	577
v/s Ratio Prot	0.13	0.06		0.10	0.08		0.15	0.41		0.19	0.45	
v/s Ratio Perm							0.24		0.09	0.31		0.16
v/c Ratio	0.86	0.40		0.72	0.53		0.67	1.13	0.25	0.85	1.23	0.45
Uniform Delay, d1	58.0	53.7		57.4	55.8		37.0	44.5	31.1	41.7	44.5	33.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	22.1	0.2		8.7	0.6		3.0	65.2	1.0	12.9	109.9	2.5
Delay (s)	80.0	53.9		66.1	56.4		40.0	109.7	32.2	54.5	154.4	36.4
Level of Service	F	D		E	E		D	F	C	D	F	D
Approach Delay (s)		65.0			59.5			94.6			127.6	
Approach LOS		E			E			F			F	
Intersection Summary												
HCM Average Control Delay			104.4			HCM Level of Service			F			
HCM Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			91.5%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

Timings

30: Winston Park Boulevard & Lyons Road

PM Peak Hour

Future Total Traffic Conditions

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	211	152	183	151	283	1922	214	357	2101	330
Turn Type	Split		Split		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	7	8	8	5	2		1	6	
Permitted Phases					2		2	6		6
Detector Phases	7	7	8	8	5	2	2	1	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0
Minimum Split (s)	37.0	37.0	37.0	37.0	9.0	27.0	27.0	9.0	27.0	27.0
Total Split (s)	26.0	26.0	40.0	40.0	19.0	55.0	55.0	19.0	55.0	55.0
Total Split (%)	18.6%	18.6%	28.6%	28.6%	13.6%	30.3%	30.3%	13.6%	30.3%	30.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 8 (6%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Splits and Phases: 30: Winston Park Boulevard & Lyons Road

			
ø1	ø2	ø7	ø8
19 s	55 s	26 s	40 s
			
ø5	ø6		
19 s	55 s		

HCM Signalized Intersection Capacity Analysis
311: Sawgrass NB Off Ramp & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

				
Movement	EBT	EBR2	SBT	NWR
Lane Configurations	↑↑	↑	↑↑↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.91	1.00
Flt	1.00	0.85	1.00	0.86
Flt Protected	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3539	1583	5085	1611
Flt Permitted	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3539	1583	5085	1611
Volume (vph)	326	187	2715	150
Peak-hour factor, PHF	0.88	0.88	0.88	0.88
Adj. Flow (vph)	370	212	3085	170
RTOR Reduction (vph)	0	0	0	0
Lane Group Flow (vph)	370	212	3085	170
Turn Type	Free		Custom	
Protected Phases	4		6	
Permitted Phases	Free		11	
Actuated Green, G (s)	24.0	160.0	100.0	124.0
Effective Green, g (s)	26.0	160.0	102.0	126.0
Actuated g/C Ratio	0.16	1.00	0.64	0.79
Clearance Time (s)	6.0		6.0	6.0
Vehicle Extension (s)	2.0		1.0	1.5
Lane Grp Cap (vph)	575	1583	3242	1269
v/s Ratio Prot	0.10		0.61	
v/s Ratio Perm		0.13		0.11
v/c Ratio	0.64	0.13	0.95	0.13
Uniform Delay, d1	62.7	0.0	26.7	4.0
Progression Factor	1.00	1.00	0.61	1.00
Incremental Delay, d2	1.9	0.2	4.8	0.0
Delay (s)	64.5	0.2	21.1	4.1
Level of Service	E	A	C	A
Approach Delay (s)	41.1		21.1	
Approach LOS	D		C	
Intersection Summary				
HCM Average Control Delay		23.4	HCM Level of Service	C
HCM Volume to Capacity ratio		0.77		
Actuated Cycle Length (s)		160.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization		68.1%	ICU Level of Service	C
Analysis Period (min)		15		
e Critical Lane Group				

Timings

311: Sawgrass NB Off Ramp & Lyons Road

PM Peak Hour

Future Total Traffic Conditions

								
Lane Group	EBT	EBR2	SBT	NWR	ø1	ø2	ø5	ø8
Lane Configurations	↑↑	↑	↑↑↑	↑				
Volume (vph)	326	187	2715	150				
Turn Type		Free	custom					
Protected Phases	4		6		1	2	5	8
Permitted Phases		Free		11				
Detector Phases	4		6	11				
Minimum Initial (s)	6.0		7.0	4.0	4.0	7.0	4.0	6.0
Minimum Split (s)	22.0		22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	30.0	0.0	100.0	130.0	30.0	100.0	30.0	30.0
Total Split (%)	18.8%	0.0%	62.5%	81.3%	19%	63%	19%	19%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag			Lag		Lead	Lag	Lead	
Lead-Lag Optimize?			Yes		Yes	Yes	Yes	
Recall Mode	None		C-Max	None	None	C-Max	None	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 10 (6%), Referenced to phase 2:NBT and 6:, Start of Green

Natural Cycle: 120

Control Type: Actuated-Coordinated

Splits and Phases: 311: Sawgrass NB Off Ramp & Lyons Road

#312 	#312#322 	#311#312 
30 s	100 s	30 s
#321 	#311#321 	#321#322 
30 s	100 s	30 s
#311#322 		
130 s		

HCM Signalized Intersection Capacity Analysis 312: Sawgrass NB On Ramp & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0							4.0	4.0	4.0		
Lane Util. Factor	0.97							0.91	1.00	1.00		
Frt	1.00							1.00	0.85	1.00		
Flt Protected	0.95							1.00	1.00	0.95		
Satd. Flow (prot)	3433							5085	1583	1770		
Flt Permitted	0.95							1.00	1.00	0.95		
Satd. Flow (perm)	3433							5085	1583	1770		
Volume (vph)	326	0	0	0	0	0	0	2001	311	372	0	0
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	370	0	0	0	0	0	0	2274	353	423	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	67	0	0	0
Lane Group Flow (vph)	370	0	0	0	0	0	0	2274	286	423	0	0
Turn Type	custom								Perm	Prot		
Protected Phases								2		1		
Permitted Phases	4								2			
Actuated Green, G (s)	24.0							94.0	94.0	24.0		
Effective Green, g (s)	26.0							96.0	96.0	26.0		
Actuated g/C Ratio	0.16							0.60	0.60	0.16		
Clearance Time (s)	6.0							6.0	6.0	6.0		
Vehicle Extension (s)	2.0							1.0	1.0	1.5		
Lane Grp Cap (vph)	558							3051	950	288		
v/s Ratio Prot								0.45		0.24		
v/s Ratio Perm	0.11								0.18			
v/c Ratio	0.66							0.75	0.30	1.47		
Uniform Delay, d1	62.9							23.2	15.6	67.0		
Progression Factor	0.04							1.00	1.00	0.93		
Incremental Delay, d2	1.8							1.7	0.8	228.4		
Delay (s)	4.4							24.9	16.4	290.7		
Level of Service	A							C	B	F		
Approach Delay (s)								23.7			290.7	
Approach LOS	A							C			F	
Intersection Summary												
HCM Average Control Delay	54.7							HCM Level of Service				
HCM Volume to Capacity ratio	0.86							D				
Actuated Cycle Length (s)	160.0							Sum of lost time (s)				
Intersection Capacity Utilization	78.6%							12.0				
Analysis Period (min)	15							ICU Level of Service				
c Critical Lane Group								D				

Timings

312: Sawgrass NB On Ramp & Lyons Road

PM Peak Hour

Future Total Traffic Conditions

								
Lane Group	EBL	NBT	NBP	SBL	ø5	ø6	ø8	ø11
Lane Configurations								
Volume (vph)	326	2001	311	372				
Turn Type	custom		Perm	Prot				
Protected Phases		2		1	5	6	8	11
Permitted Phases	4		2					
Detector Phases	4	2	2	1				
Minimum Initial (s)	6.0	7.0	7.0	4.0	4.0	7.0	6.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	30.0	100.0	100.0	30.0	30.0	100.0	30.0	130.0
Total Split (%)	18.8%	62.5%	62.5%	18.8%	19%	63%	19%	81%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag		Lag	Lag	Lead	Lead	Lag		
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Max	C-Max	None	None	C-Max	None	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 10 (6%), Referenced to phase 2:NBT and 6:, Start of Green

Natural Cycle: 120

Control Type: Actuated-Coordinated

Splits and Phases: 312: Sawgrass NB On Ramp & Lyons Road

#312  ø1	#312#322  ø2	#311#312  ø4
30 s	100 s	30 s
#321  ø5	#311#321  ø6	#321#322  ø8
30 s	100 s	30 s
#311#322  ø11		
130 s		

~~HCM Signalized Intersection Capacity Analysis~~
~~321: Sawgrass SB Off Ramp & Lyons Road~~

~~PM Peak Hour~~
~~Future Total Traffic Conditions~~

										
Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0				4.0	4.0	4.0	
Lane Util. Factor			1.00				0.91	1.00	0.97	
Frt			1.00				1.00	0.85	1.00	
Flt Protected			0.95				1.00	1.00	0.95	
Satd. Flow (prot)			1770				5085	1583	3433	
Flt Permitted			0.95				1.00	1.00	0.95	
Satd. Flow (perm)			1770				5085	1583	3433	
Volume (vph)	0	0	150	0	0	0	2398	434	451	0
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	165	0	0	0	2635	477	496	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	62	0	0
Lane Group Flow (vph)	0	0	165	0	0	0	2635	415	496	0
Turn Type			Prot					Perm	custom	
Protected Phases			5				6			
Permitted Phases								6	8	
Actuated Green, G (s)			18.0				100.0	100.0	24.0	
Effective Green, g (s)			20.0				102.0	102.0	26.0	
Actuated g/C Ratio			0.12				0.64	0.64	0.16	
Clearance Time (s)			6.0				6.0	6.0	6.0	
Vehicle Extension (s)			1.5				1.0	1.0	2.0	
Lane Grp Cap (vph)			221				3242	1009	558	
v/s Ratio Prot			0.09				0.52			
v/s Ratio Perm								0.26	0.14	
v/c Ratio			0.75				0.81	0.41	0.89	
Uniform Delay, d1			67.6				21.8	14.2	65.6	
Progression Factor			0.94				1.00	1.00	0.15	
Incremental Delay, d2			11.3				2.3	1.2	7.6	
Delay (s)			74.9				24.2	15.5	17.7	
Level of Service			E				C	B	B	
Approach Delay (s)	0.0			74.9			22.8		17.7	
Approach LOS	A			E			C		B	
Intersection Summary										
HCM Average Control Delay			24.4				HCM Level of Service		C	
HCM Volume to Capacity ratio			0.82							
Actuated Cycle Length (s)			160.0				Sum of lost time (s)		12.0	
Intersection Capacity Utilization			77.5%				ICU Level of Service		D	
Analysis Period (min)			15							
c Critical Lane Group										

Timings

321: Sawgrass SB Off Ramp & Lyons Road

PM Peak Hour

Future Total Traffic Conditions

Lane Group	NBL	SBT	SBR	SWL	ø1	ø2	ø4	ø11
Lane Configurations								
Volume (vph)	150	2398	434	451				
Turn Type	Prot		Perm	custom				
Protected Phases	5	6			1	2	4	11
Permitted Phases			6	8				
Detector Phases	5	6	6	8				
Minimum Initial (s)	4.0	7.0	7.0	6.0	4.0	7.0	6.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	30.0	100.0	100.0	30.0	30.0	100.0	30.0	130.0
Total Split (%)	18.8%	62.5%	62.5%	18.8%	19%	63%	19%	81%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag		Lead	Lag		
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes		
Recall Mode	None	C-Max	C-Max	None	None	C-Max	None	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 10 (6%), Referenced to phase 2:NBT and 6:, Start of Green

Natural Cycle: 120

Control Type: Actuated-Coordinated

Splits and Phases: 321: Sawgrass SB Off Ramp & Lyons Road

#312  ø1	#312#322  ø2	#311#312  ø4
30 s	100 s	30 s
#321  ø5	#311#321  ø6	#321#322  ø8
30 s	100 s	30 s
#311#322  ø11		
130 s		

~~HCM Signalized Intersection Capacity Analysis~~ ~~322: Sawgrass SB Off Ramp & Lyons Road~~

~~PM Peak Hour~~
~~Future Total Traffic Conditions~~



Movement	WBL	WBR2	NBT	SER
Lane Configurations				
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.91	1.00
Frt	1.00	0.85	1.00	0.86
Flt Protected	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	5085	1611
Flt Permitted	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	5085	1611
Volume (vph)	451	332	2358	372
Peak-hour factor, PHF	0.91	0.91	0.91	0.91
Adj. Flow (vph)	496	365	2591	409
RTOR Reduction (vph)	0	188	0	0
Lane Group Flow (vph)	496	177	2591	409
Turn Type	Perm		custom	
Protected Phases	8		2	
Permitted Phases	8		11	
Actuated Green, G (s)	24.0	24.0	94.0	124.0
Effective Green, g (s)	26.0	26.0	96.0	126.0
Actuated g/C Ratio	0.16	0.16	0.60	0.79
Clearance Time (s)	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	1.0	1.5
Lane Grp Cap (vph)	558	257	3051	1269
v/s Ratio Prot	0.14		0.51	
v/s Ratio Perm		0.11		0.25
v/c Ratio	0.89	0.69	0.85	0.32
Uniform Delay, d1	65.6	63.2	26.1	4.8
Progression Factor	1.00	1.00	0.53	1.00
Incremental Delay, d2	15.5	6.3	2.1	0.1
Delay (s)	81.0	69.5	16.1	4.9
Level of Service	F	E	B	A
Approach Delay (s)	76.2		16.1	
Approach LOS	E		B	

~~Intersection Summary~~

HCM Average Control Delay	28.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings

322: Sawgrass SB Off Ramp & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

Lane Group	WBL	WBP2	NBT	SEP	ø1	ø4	ø5	ø6
Lane Configurations								
Volume (vph)	451	332	2358	372				
Turn Type	Perm		custom					
Protected Phases	8		2		1	4	5	6
Permitted Phases		8		11				
Detector Phases	8	8	2	11				
Minimum Initial (s)	6.0	6.0	7.0	4.0	4.0	6.0	4.0	7.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	30.0	30.0	100.0	130.0	30.0	30.0	30.0	100.0
Total Split (%)	18.8%	18.8%	62.5%	81.3%	19%	19%	19%	63%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag			Lag		Lead		Lead	Lag
Lead-Lag Optimize?			Yes		Yes		Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	None	C-Max

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 10 (6%), Referenced to phase 2:NBT and 6:, Start of Green

Natural Cycle: 120

Control Type: Actuated-Coordinated

Splits and Phases: 322: Sawgrass SB Off Ramp & Lyons Road

#312  ø1 30 s	#312#322  ø2 100 s	#311#312  ø4 30 s
#321  ø5 30 s	#311#321  ø6 100 s	#321#322  ø8 30 s
#311#322  ø11 130 s		

HCM Signalized Intersection Capacity Analysis

33: Sawgrass Boulevard & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.91	1.00	1.00	0.91
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583		1770	5085	1583	1770	5085
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00		0.11	1.00	1.00	0.12	1.00
Satd. Flow (perm)	1403	1863	1583	1405	1863	1583		210	5085	1583	220	5085
Volume (vph)	86	5	119	187	7	27	19	204	2057	326	60	2942
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	91	5	127	199	7	29	20	217	2188	347	64	3130
RTOR Reduction (vph)	0	0	82	0	0	22	0	0	0	67	0	0
Lane Group Flow (vph)	91	5	45	199	7	7	0	237	2188	280	64	3130
Turn Type	Perm		Perm	Perm		Perm	pm+pt	pm+pt		Perm	pm+pt	
Protected Phases		4			8		5	5	2		1	6
Permitted Phases	4		4	8		8	2	2		2	6	
Actuated Green, G (s)	13.2	13.2	13.2	13.2	13.2	13.2		37.5	33.5	33.5	34.1	31.8
Effective Green, g (s)	15.2	15.2	15.2	15.2	15.2	15.2		41.5	35.5	35.5	38.1	33.8
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.23	0.23		0.62	0.53	0.53	0.57	0.50
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		1.5	0.2	0.2	1.5	0.2
Lane Grp Cap (vph)	318	423	359	319	423	359		270	2694	839	225	2565
v/s Ratio Prot		0.00			0.00			0.08	0.43		0.02	0.62
v/s Ratio Perm	0.06		0.03	0.14		0.00		0.47		0.18	0.14	
v/c Ratio	0.29	0.01	0.13	0.62	0.02	0.02		0.88	0.81	0.33	0.28	1.22
Uniform Delay, d1	21.4	20.1	20.6	23.3	20.1	20.1		32.1	13.0	9.0	9.7	16.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.0	0.1	2.7	0.0	0.0		25.2	2.8	1.1	0.3	102.9
Delay (s)	21.6	20.1	20.7	26.1	20.1	20.1		57.2	15.8	10.1	10.0	119.5
Level of Service	C	C	C	C	C	C		E	B	B	A	F
Approach Delay (s)		21.0			25.1				18.6			113.4
Approach LOS		C			C				B			F

Intersection Summary

HCM Average Control Delay	66.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	67.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	100.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

~~HCM Signalized Intersection Capacity Analysis~~
~~33: Sawgrass Boulevard & Lyons Road~~

~~PM Peak Hour~~
~~Future Total Traffic Conditions~~

Movement	SBR
LAAP Configurations	7
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Volume (vph)	110
Peak hour factor, PHF	0.94
Adj. Flow (vph)	117
RTOR Reduction (vph)	31
Lane Group Flow (vph)	86
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Actuated Green, G (s)	31.8
Effective Green, g (s)	33.8
Actuated g/C Ratio	0.50
Clearance Time (s)	6.0
Vehicle Extension (s)	0.2
Lane Grp Cap (vph)	799
v/s Ratio Prot	
v/s Ratio Perm	0.05
v/e Ratio	0.11
Uniform Delay, d1	8.7
Progression Factor	1.00
Incremental Delay, d2	0.3
Delay (s)	9.0
Level of Service	A
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings

33: Sawgrass Boulevard & Lyons Road

PM Peak Hour

Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	86	5	119	187	7	27	19	204	2057	326	60	2942
Turn Type	Perm		Perm	Perm		Perm	pm+pt	pm+pt		Perm	pm+pt	
Protected Phases		4			8		5	5	2		1	6
Permitted Phases	4		4	8		8	2	2		2	6	
Detector Phases	4	4	4	8	8	8	5	5	2	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	7.0	7.0	4.0	7.0
Minimum Split (s)	43.0	43.0	43.0	45.0	45.0	45.0	10.0	10.0	34.0	34.0	10.0	34.0
Total Split (s)	45.0	45.0	45.0	45.0	45.0	45.0	10.0	10.0	35.0	35.0	10.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	11.1%	11.1%	38.9%	38.9%	11.1%	38.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	Max	Max	None	Max

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 64.5

Natural Cycle: 150

Control Type: Semi Act-Uncoord

Splits and Phases: 33: Sawgrass Boulevard & Lyons Road

					
10 s	35 s		45 s		
					
10 s	35 s		45 s		

Lane Group	SBR
Lane Configurations	
Volume (vph)	110
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phases	6
Minimum Initial (s)	7.0
Minimum Split (s)	34.0
Total Split (s)	35.0
Total Split (%)	38.9%
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max

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3/31/2009

Synchro 6 Report

Kimley-Horn and Associates, Inc.

~~HCM Signalized Intersection Capacity Analysis~~
~~34: Holmberg Road & Lyons Road~~

~~PM Peak Hour~~
~~Future Total Traffic Conditions~~

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SEB	SEB	SEB
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00		1.00	0.91		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	1779		1770	5080		1770	5085	1583
Flt Permitted	0.69	1.00	1.00	0.75	1.00		0.09	1.00		0.10	1.00	1.00
Satd. Flow (perm)	1293	3539	1583	1402	1779		162	5080		177	5085	1583
Volume (vph)	339	7	314	36	65	28	264	1865	12	18	2613	314
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	357	7	331	38	68	29	278	1963	13	19	2751	331
RTOR Reduction (vph)	0	0	93	0	5	0	0	0	0	0	0	109
Lane Group Flow (vph)	357	7	238	38	92	0	278	1976	0	19	2751	222
Turn Type	Perm		Perm	Perm			pm+pt			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)	27.9	27.9	27.9	27.9	27.9		51.9	51.9		40.6	40.6	40.6
Effective Green, g (s)	29.9	29.9	29.9	29.9	29.9		53.4	53.4		42.1	42.1	42.1
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33		0.58	0.58		0.46	0.46	0.46
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		1.5	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	423	1159	518	459	583		223	2971		82	2345	730
v/s Ratio Prot		0.00			0.05		0.10	0.39			0.54	
v/s Ratio Perm	0.28		0.15	0.03			0.63			0.11		0.14
v/c Ratio	0.84	0.01	0.46	0.08	0.16		1.25	0.66		0.23	1.17	0.30
Uniform Delay, d1	28.5	20.7	24.3	21.2	21.8		26.8	12.9		14.8	24.6	15.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.7	0.0	0.2	0.0	0.0		142.7	1.2		6.5	82.8	1.1
Delay (s)	42.2	20.7	24.5	21.2	21.8		169.5	14.1		21.3	107.4	16.5
Level of Service	D	C	C	C	C		F	B		C	F	B
Approach Delay (s)		33.6			21.7			33.2			97.2	
Approach LOS		C			C			C			F	
Intersection Summary												
HCM Average Control Delay			65.1			HCM Level of Service				E		
HCM Volume to Capacity ratio			1.08									
Actuated Cycle Length (s)			91.3			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			100.6%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

Timings

34: Holmberg Road & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR		
Lane Configurations												
Volume (vph)	339	7	314	36	65	264	1865	18	2613	314		
Turn Type	Perm		Perm	Perm		pm+pt		Perm		Perm		
Protected Phases		4			8	5	2		6			
Permitted Phases	4		4	8		2		6		6		
Detector Phases	4	4	4	8	8	5	2	6	6	6		
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	4.0	7.0	7.0	7.0	7.0		
Minimum Split (s)	42.0	42.0	42.0	22.0	22.0	9.5	34.5	34.5	34.5	34.5		
Total Split (s)	42.0	42.0	42.0	42.0	42.0	11.3	57.0	45.7	45.7	45.7		
Total Split (%)	42.4%	42.4%	42.4%	42.4%	42.4%	11.4%	57.6%	46.2%	46.2%	46.2%		
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	1.5	1.5	1.5	1.5	1.5		
Lead/Lag						Lead		Lag	Lag	Lag		
Lead-Lag Optimize?						Yes		Yes	Yes	Yes		
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max		

Intersection Summary

Cycle Length: 99

Actuated Cycle Length: 91.3

Natural Cycle: 140

Control Type: Semi Act-Uncoord

Splits and Phases: 34: Holmberg Road & Lyons Road

					
57 s			42 s		
					
11.3 s	45.7 s		42 s		

HCM Signalized Intersection Capacity Analysis

35: Hillsboro Boulevard & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		0.97	0.91	1.00		0.97	0.91	1.00		0.97	0.91	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1583		3433	5085	1583		3433	5085	1583
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1583		3433	5085	1583		3433	5085	1583
Volume (vph)	30	264	734	177	22	838	1082	299	22	190	1228	584
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	31	275	765	184	23	873	1127	311	23	198	1279	608
RTOR Reduction (vph)	0	0	0	148	0	0	0	185	0	0	0	199
Lane Group Flow (vph)	0	306	765	36	0	896	1127	126	0	221	1279	409
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	7	7	4		3	3	8		5	5	2	
Permitted Phases				4			8				2	
Actuated Green, G (s)		12.0	29.3	29.3		32.0	49.3	49.3		14.0	59.6	59.6
Effective Green, g (s)		14.0	31.3	31.3		34.0	51.3	51.3		16.0	61.6	61.6
Actuated g/C Ratio		0.09	0.20	0.20		0.21	0.32	0.32		0.10	0.39	0.39
Clearance Time (s)		6.0	6.0	6.0		6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		1.5	2.5	2.5		1.5	2.5	2.5		1.5	3.0	3.0
Lane Grp Cap (vph)		300	995	310		730	1630	508		343	1958	609
v/s Ratio Prot		0.09	0.15			0.26	0.22			0.06	0.25	
v/s Ratio Perm				0.02				0.08				0.26
v/c Ratio		1.02	0.77	0.12		1.23	0.69	0.25		0.64	0.65	0.67
Uniform Delay, d1		73.0	60.9	53.0		63.0	47.4	40.1		69.3	40.4	40.8
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		57.2	3.5	0.1		114.2	1.2	0.2		3.1	1.7	5.8
Delay (s)		130.2	64.4	53.1		177.2	48.6	40.3		72.4	42.1	46.6
Level of Service		F	E	D		F	D	D		E	D	D
Approach Delay (s)			78.8				96.9				46.6	
Approach LOS			E				F				D	
Intersection Summary												
HCM Average Control Delay			67.6		HCM Level of Service					E		
HCM Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			160.0		Sum of lost time (s)					12.0		
Intersection Capacity Utilization			94.9%		ICU Level of Service					F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
35: Hillsboro Boulevard & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

			
Movement	SBL	SBT	SBR
Lane Configurations			
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583
Volume (vph)	235	1605	196
Peak-hour factor, PHF	0.96	0.96	0.96
Adj. Flow (vph)	245	1672	204
RTOR Reduction (vph)	0	0	88
Lane Group Flow (vph)	245	1672	116
Turn Type	Prot		Perm
Protected Phases	1	6	
Permitted Phases			6
Actuated Green, G (s)	15.1	60.7	60.7
Effective Green, g (s)	17.1	62.7	62.7
Actuated g/C Ratio	0.11	0.39	0.39
Clearance Time (s)	6.0	6.0	6.0
Vehicle Extension (s)	1.5	3.0	3.0
Lane Grp Cap (vph)	367	1993	620
v/s Ratio Prot	0.07	0.33	
v/s Ratio Perm			0.07
v/c Ratio	0.67	0.84	0.19
Uniform Delay, d1	68.7	44.1	31.9
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	3.5	4.4	0.7
Delay (s)	72.3	48.5	32.6
Level of Service	E	D	C
Approach Delay (s)		49.7	
Approach LOS		D	
Intersection Summary			

Timings

35: Hillsboro Boulevard & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	264	734	177	838	1082	299	190	1228	584	235	1605	196
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phases	7	4	4	3	8	8	5	2	2	1	6	6
Minimum Initial (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	11.0	41.0	41.0	11.0	41.0	41.0	11.0	42.0	42.0	11.0	42.0	42.0
Total Split (s)	18.0	45.0	45.0	38.0	65.0	65.0	25.0	52.0	52.0	25.0	52.0	52.0
Total Split (%)	11.3%	28.1%	28.1%	23.8%	40.6%	40.6%	15.6%	32.5%	32.5%	15.6%	32.5%	32.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 21 (13%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Splits and Phases: 35: Hillsboro Boulevard & Lyons Road

 #1	 #2	 #3	 #4
25 s	52 s	38 s	45 s
 #5	 #6	 #7	 #8
25 s	52 s	18 s	65 s

HCM Signalized Intersection Capacity Analysis

36: Cullum Road & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.91			0.91	1.00
Frt	1.00	0.89			1.00		1.00	1.00			1.00	0.86
Flt Protected	0.95	1.00			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1770	1653			1863		1770	5085			5085	1583
Flt Permitted	0.75	1.00			1.00		0.06	1.00			1.00	1.00
Satd. Flow (perm)	1388	1653			1863		105	5085			5085	1583
Volume (vph)	182	21	63	0	18	0	46	2992	0	0	2062	124
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	190	22	66	0	19	0	48	3117	0	0	2148	129
RTOR Reduction (vph)	0	44	0	0	0	0	0	0	0	0	0	30
Lane Group Flow (vph)	190	44	0	0	19	0	48	3117	0	0	2148	99
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	25.2	25.2			26.2		122.8	122.8			112.5	112.5
Effective Green, g (s)	27.2	27.2			27.2		124.8	124.8			114.5	114.5
Actuated g/C Ratio	0.17	0.17			0.17		0.78	0.78			0.72	0.72
Clearance Time (s)	6.0	6.0			5.0		6.0	6.0			6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	236	281			317		147	3966			3639	1133
v/s Ratio Prot		0.03			0.01		0.01	0.61			0.42	
v/s Ratio Perm	0.14						0.24					0.06
v/s Ratio	0.81	0.16			0.06		0.33	0.79			0.59	0.09
Uniform Delay, d1	63.9	56.6			55.7		9.7	10.0			11.2	6.9
Progression Factor	1.00	1.00			1.00		1.59	0.26			0.11	0.00
Incremental Delay, d2	17.8	0.3			0.1		1.0	1.2			0.4	0.1
Delay (s)	81.7	56.9			55.8		16.4	3.8			1.7	0.1
Level of Service	F	E			E		B	A			A	A
Approach Delay (s)		73.8			55.8			4.0			1.6	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM Average Control Delay			6.6				HCM Level of Service			A		
HCM Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			81.2%				ICU Level of Service		D			
Analysis Period (min)			15									
c Critical Lane Group												

Timings

36: Cullum Road & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

								
Lane Group	EBL	EBT	WBT	NBL	NBT	SBT	SBB	ø1
Lane Configurations								
Volume (vph)	182	21	18	46	2992	2062	124	
Turn Type	Perm			pm+pt			Perm	
Protected Phases		4	8	5	2	6		1
Permitted Phases	4			2			6	
Detector Phases	4	4	8	5	2	6	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	21.0	11.0	22.0	22.0	22.0	9.0
Total Split (s)	36.0	36.0	36.0	11.0	115.0	113.0	113.0	9.0
Total Split (%)	22.5%	22.5%	22.5%	6.9%	71.9%	70.6%	70.6%	6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0	2.0	1.0
Lead/Lag				Lead	Lag	Lag	Lag	Lead
Lead-Lag Optimize?				Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 144 (90%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Splits and Phases: 36: Cullum Road & Lyons Road

		ø2		ø4
9	115 s		36 s	
		ø6		ø8
11	113 s		36 s	

~~HCM Signalized Intersection Capacity Analysis~~ ~~37: Jardin Driveway & Lyons Road~~

~~PM Peak Hour~~
~~Future Total Traffic Conditions~~

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	5085	5085	1583
Flt Permitted	0.95	1.00	0.07	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	126	5085	5085	1583
Volume (vph)	93	48	64	2881	2028	43
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	97	50	67	3001	2112	45
RTOR Reduction (vph)	0	45	0	0	0	7
Lane Group Flow (vph)	97	5	67	3001	2112	38
Turn Type	Perm pm+pt				Perm	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	13.8	13.8	136.2	136.2	125.5	125.5
Effective Green, g (s)	14.8	14.8	137.2	137.2	126.5	126.5
Actuated g/C Ratio	0.09	0.09	0.86	0.86	0.79	0.79
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	164	146	177	4360	4020	1252
v/s Ratio Prot	0.05		0.02	0.59	0.42	
v/s Ratio Perm		0.00	0.31			0.02
v/c Ratio	0.59	0.03	0.38	0.69	0.53	0.03
Uniform Delay, d1	69.7	66.1	5.2	4.0	6.0	3.6
Progression Factor	1.00	1.00	2.72	0.28	0.10	0.00
Incremental Delay, d2	5.6	0.1	0.8	0.5	0.4	0.0
Delay (s)	75.3	66.2	14.8	1.6	1.0	0.0
Level of Service	E	E	B	A	A	A
Approach Delay (s)	72.2			1.9	1.0	
Approach LOS	E			A	A	
Intersection Summary						
HCM Average Control Delay			3.4	HCM Level of Service		A
HCM Volume to Capacity ratio			0.68			
Actuated Cycle Length (s)			160.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization			67.5%	ICU Level of Service		C
Analysis Period (min)			15			
e Critical Lane Group						

~~Timings~~

~~37: Jardin Driveway & Lyons Road~~

~~PM Peak Hour~~

~~Future Total Traffic Conditions~~

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	93	48	64	2881	2028	43
Turn Type	Perm pm+pt			Perm		
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	21.0	9.0	21.0	21.0	21.0
Total Split (s)	31.0	31.0	23.0	129.0	106.0	106.0
Total Split (%)	19.4%	19.4%	14.4%	80.6%	66.3%	66.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max

~~Intersection Summary~~

~~Cycle Length: 160~~

~~Actuated Cycle Length: 160~~

~~Offset: 0 (0%); Referenced to phase 2:NBTL and 6:SBT, Start of Green~~

~~Natural Cycle: 65~~

~~Control Type: Actuated-Coordinated~~

~~Splits and Phases: 37: Jardin Driveway & Lyons Road~~

 ø2	 ø4
129 s	31 s
 ø5	 ø6
23 s	106 s

HCM Signalized Intersection Capacity Analysis

38: Uptown Driveway & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	5085	5085	1583
Flt Permitted	0.95	1.00	0.05	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	94	5085	5085	1583
Volume (vph)	390	238	173	2713	1861	315
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	406	248	180	2826	1939	328
RTOR Reduction (vph)	0	134	0	0	0	79
Lane Group Flow (vph)	406	114	180	2826	1939	249
Turn Type	Perm pm+pt				Perm	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	40.3	40.3	109.7	109.7	87.5	87.5
Effective Green, g (s)	41.3	41.3	110.7	110.7	88.5	88.5
Actuated g/C Ratio	0.26	0.26	0.69	0.69	0.55	0.55
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	457	409	256	3518	2813	876
v/s Ratio Prot	0.23		0.08	0.56	0.38	
v/s Ratio Perm		0.07	0.41			0.16
v/c Ratio	0.89	0.28	0.70	0.80	0.69	0.28
Uniform Delay, d1	57.1	47.5	44.2	17.1	25.8	19.0
Progression Factor	1.00	1.00	0.69	2.66	0.40	0.20
Incremental Delay, d2	18.5	0.4	0.8	0.2	1.2	0.7
Delay (s)	75.6	47.8	31.2	45.6	11.7	4.5
Level of Service	E	D	C	D	B	A
Approach Delay (s)	65.1			44.8	10.6	
Approach LOS	E			D	B	
Intersection Summary						
HCM Average Control Delay			34.0		HCM Level of Service	C
HCM Volume to Capacity ratio			0.83			
Actuated Cycle Length (s)			160.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			80.7%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Timings

38: Uptown Driveway & Lyons Road

PM Peak Hour

Future Total Traffic Conditions

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	390	238	173	2713	1861	315
Turn Type	Perm pm+pt			Perm		
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	21.0	9.0	21.0	21.0	21.0
Total Split (s)	54.0	54.0	27.0	106.0	79.0	79.0
Total Split (%)	33.8%	33.8%	16.9%	66.3%	49.4%	49.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead			Lag		
Lead-Lag Optimize?	Yes			Yes		
Recall Mode	None	None	None	C-Max	C-Max	C-Max

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Splits and Phases: 38: Uptown Driveway & Lyons Road

 ø2	 ø4
106 s	54 s
 ø5	 ø6
27 s	79 s

HCM Signalized Intersection Capacity Analysis
39: Sample Road & Fisherman's Landing Driveway

PM Peak Hour
Future Total Traffic Conditions

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.03	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	58	5085	5085	1583	1770	1583
Volume (vph)	57	2503	3650	93	169	106
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	59	2607	3802	97	176	110
RTOR Reduction (vph)	0	0	0	13	0	32
Lane Group Flow (vph)	59	2607	3802	84	176	78
Turn Type	pm+pt			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	132.0	132.0	123.8	123.8	18.0	18.0
Effective Green, g (s)	133.0	133.0	124.8	124.8	19.0	19.0
Actuated g/C Ratio	0.83	0.83	0.78	0.78	0.12	0.12
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	93	4227	3966	1235	210	188
v/s Ratio Prot	0.02	0.51	0.75		0.10	
v/s Ratio Perm	0.51			0.05		0.05
v/c Ratio	0.63	0.62	0.96	0.07	0.84	0.42
Uniform Delay, d1	51.3	4.7	15.3	4.1	69.0	65.4
Progression Factor	1.69	0.32	1.76	1.96	1.00	1.00
Incremental Delay, d2	8.8	0.2	2.0	0.0	31.1	6.7
Delay (s)	95.8	1.7	29.1	8.0	100.1	72.0
Level of Service	F	A	C	A	F	E
Approach Delay (s)		3.8	28.6		89.3	
Approach LOS		A	C		F	
Intersection Summary						
HCM Average Control Delay			21.4		HCM Level of Service	C
HCM Volume to Capacity ratio			0.94			
Actuated Cycle Length (s)			160.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			86.6%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

Timings

PM Peak Hour

39: Sample Road & Fisherman's Landing Driveway

Future Total Traffic Conditions

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		  	  			
Volume (vph)	57	2503	3650	93	169	106
Turn Type	pm+pt			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases	4			8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	9.0	136.0	127.0	127.0	24.0	24.0
Total Split (%)	5.6%	85.0%	79.4%	79.4%	15.0%	15.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	C-Max	C-Max

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green

Natural Cycle: 130

Control Type: Actuated Coordinated

Splits and Phases: 39: Sample Road & Fisherman's Landing Driveway

		
ø6	ø4	ø8
24 s	136 s	127 s

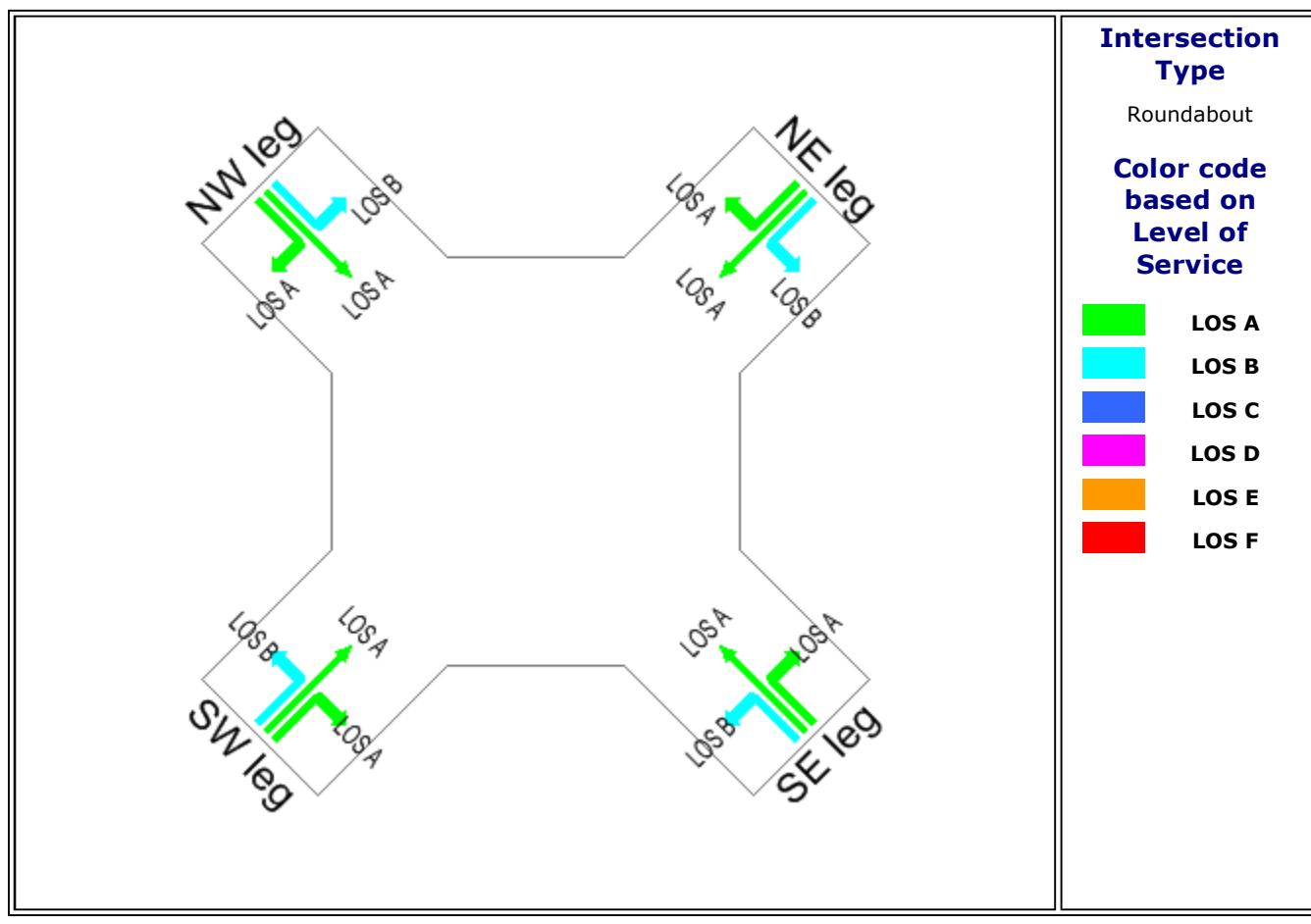


~~Level of Service~~

Based on Delay (HCM method)

Cullum Road and NW 54th Avenue

Enter subtitle



Site: Cullum Road and NW 54th Avenue
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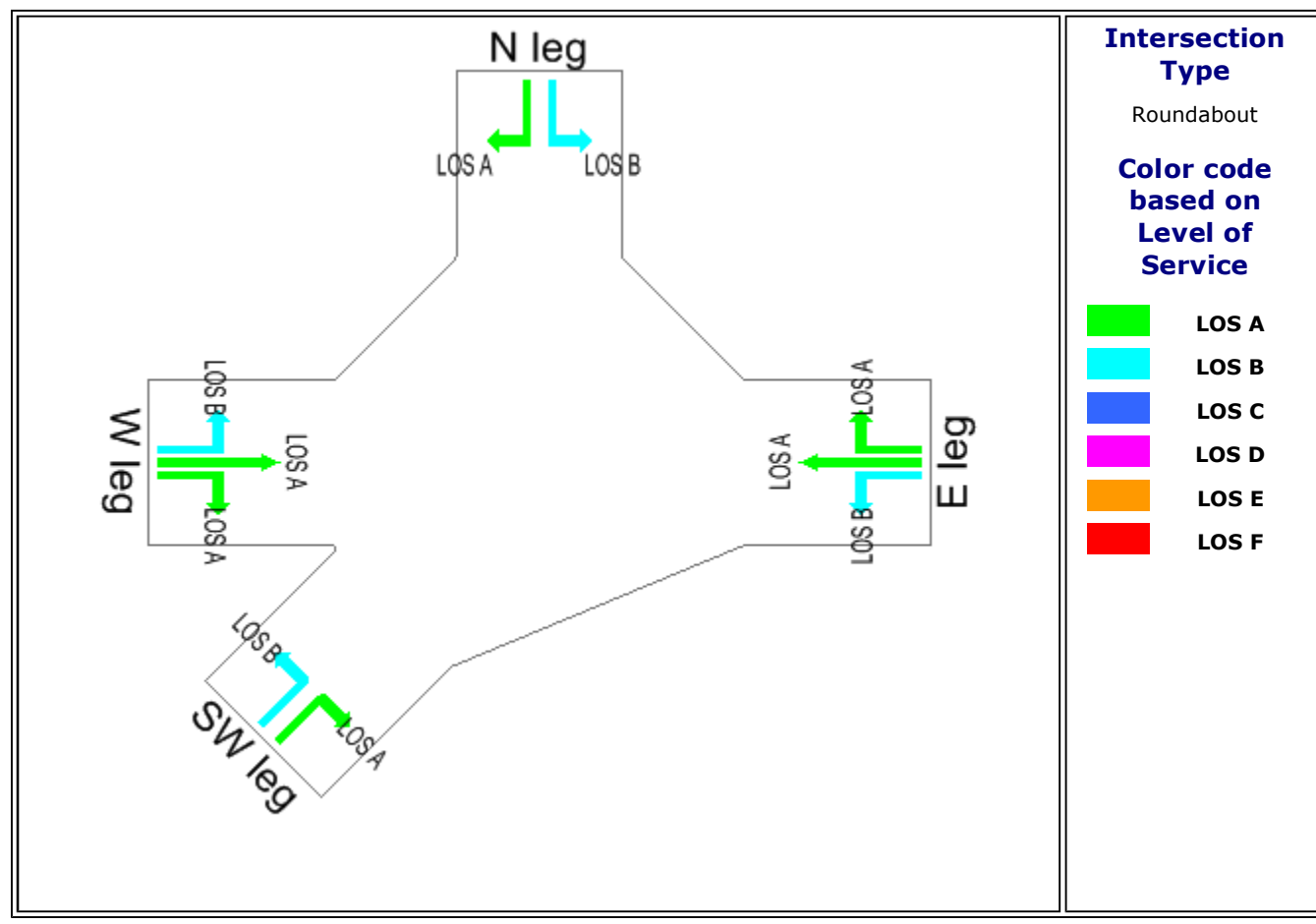


~~Level of Service~~

Based on Delay (HCM method)

Cullum Road and Banks Road

Enter subtitle



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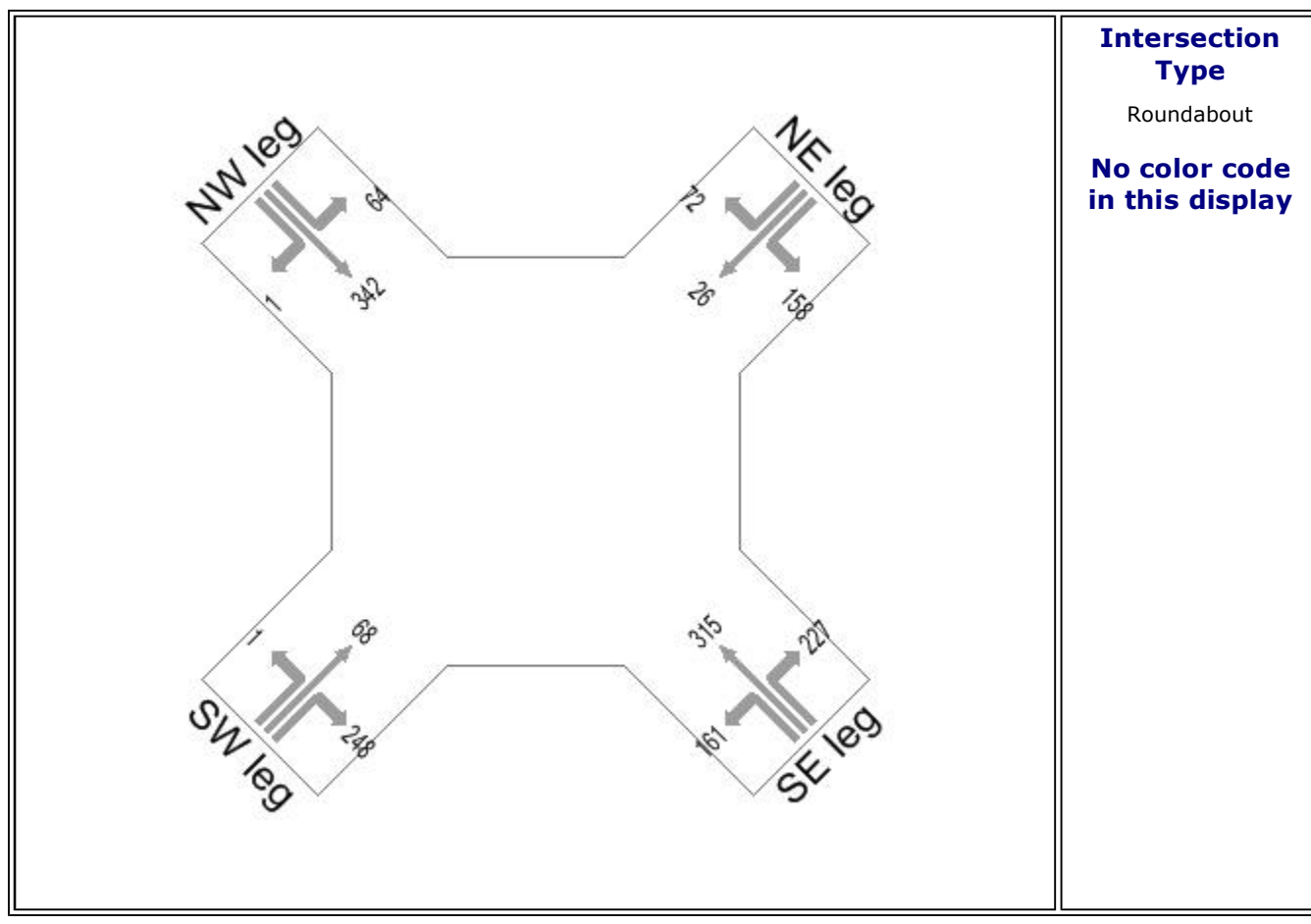


~~Input Volumes~~

Total flow rates as given by the user (veh/60 min)

Cullum Road and NW 54th Avenue

Enter subtitle



Site: Cullum Road and NW 54th Avenue
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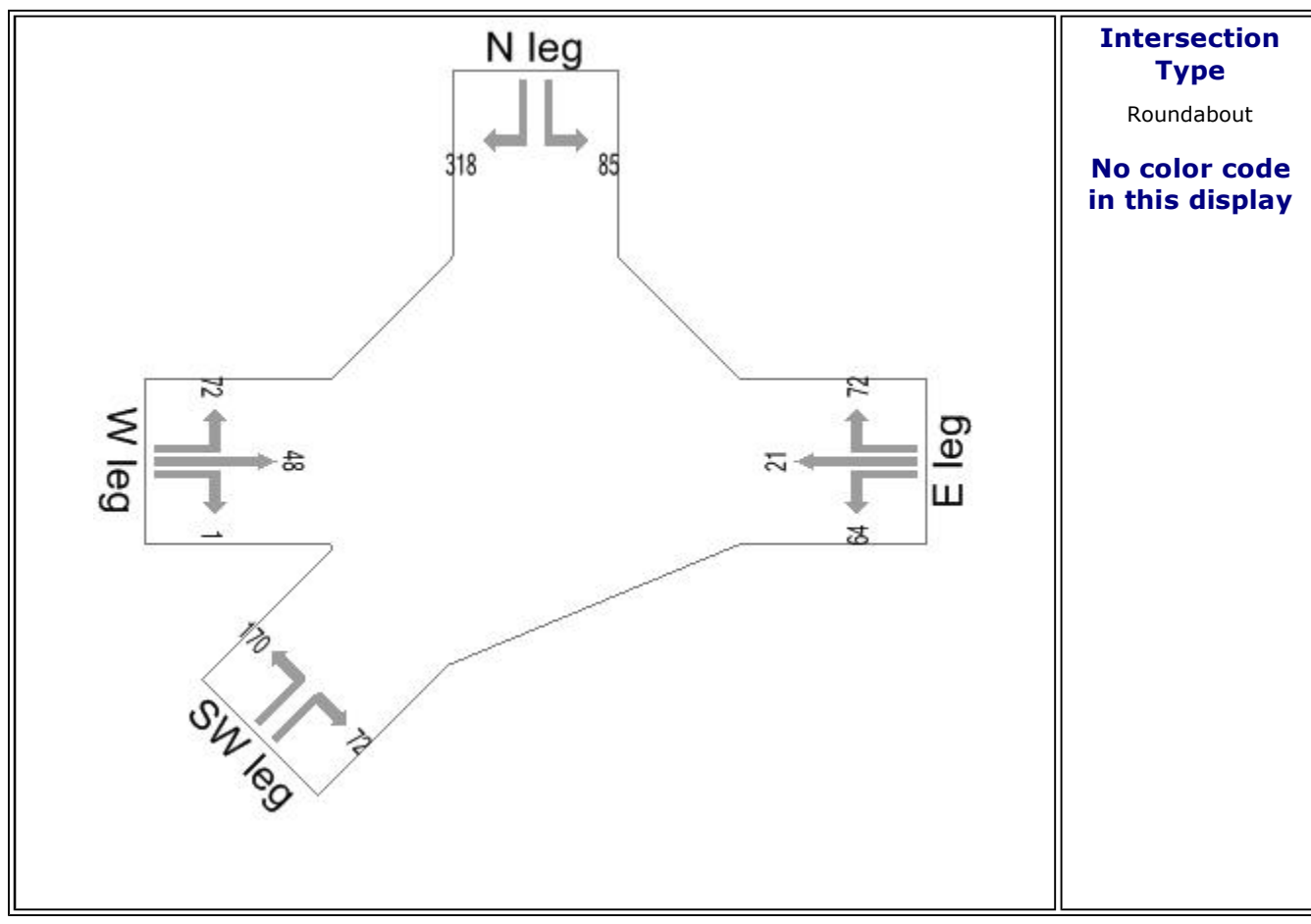


~~Input Volumes~~

Total flow rates as given by the user (veh/60 min)

Cullum Road and Banks Road

Enter subtitle



Site: Cullum Road and NW 54th Avenue
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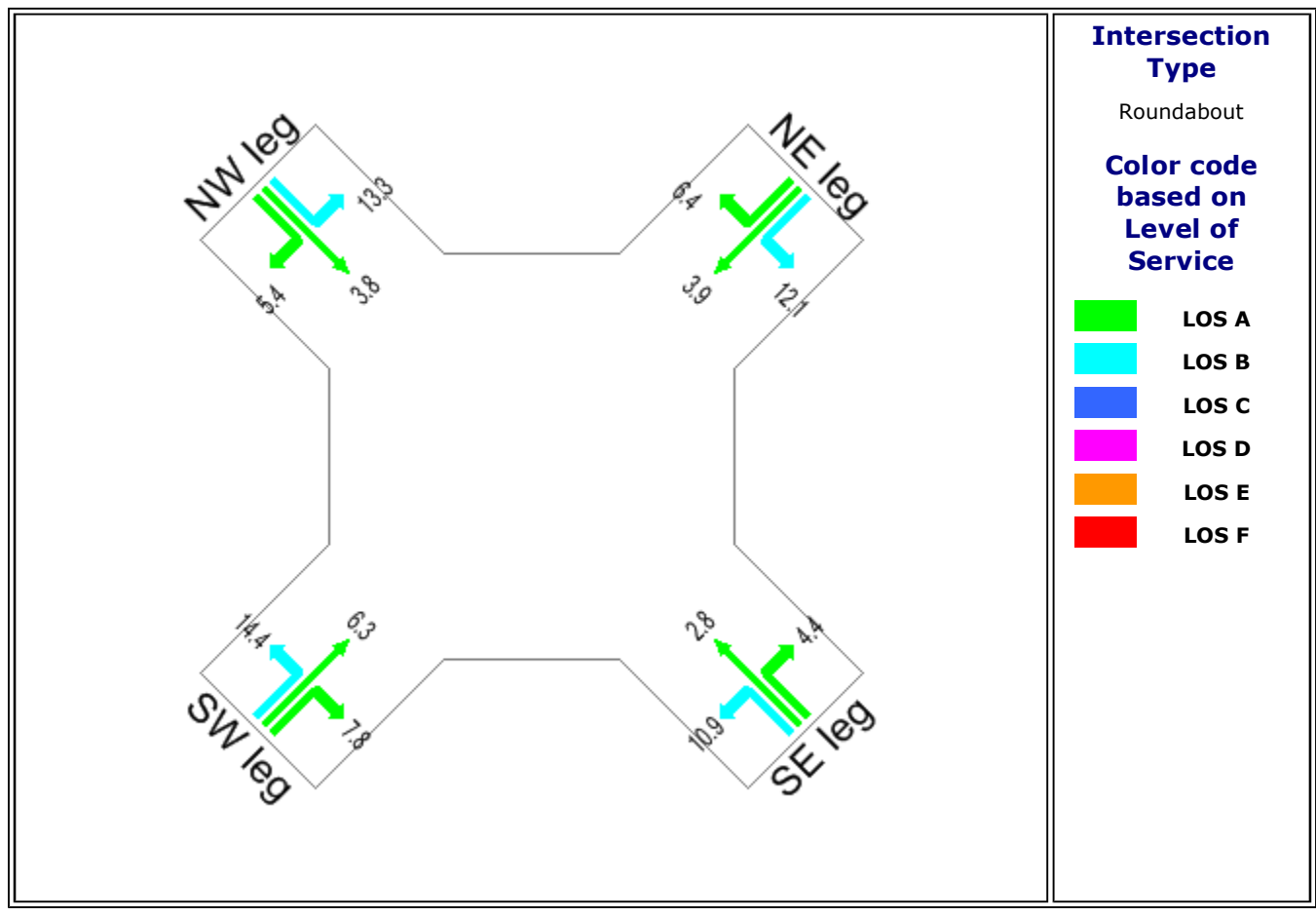


~~Control Delay (Average)~~

Average control delay per vehicle (seconds)

Cullum Road and NW 54th Avenue

Enter subtitle



Site: Cullum Road and NW 54th Avenue
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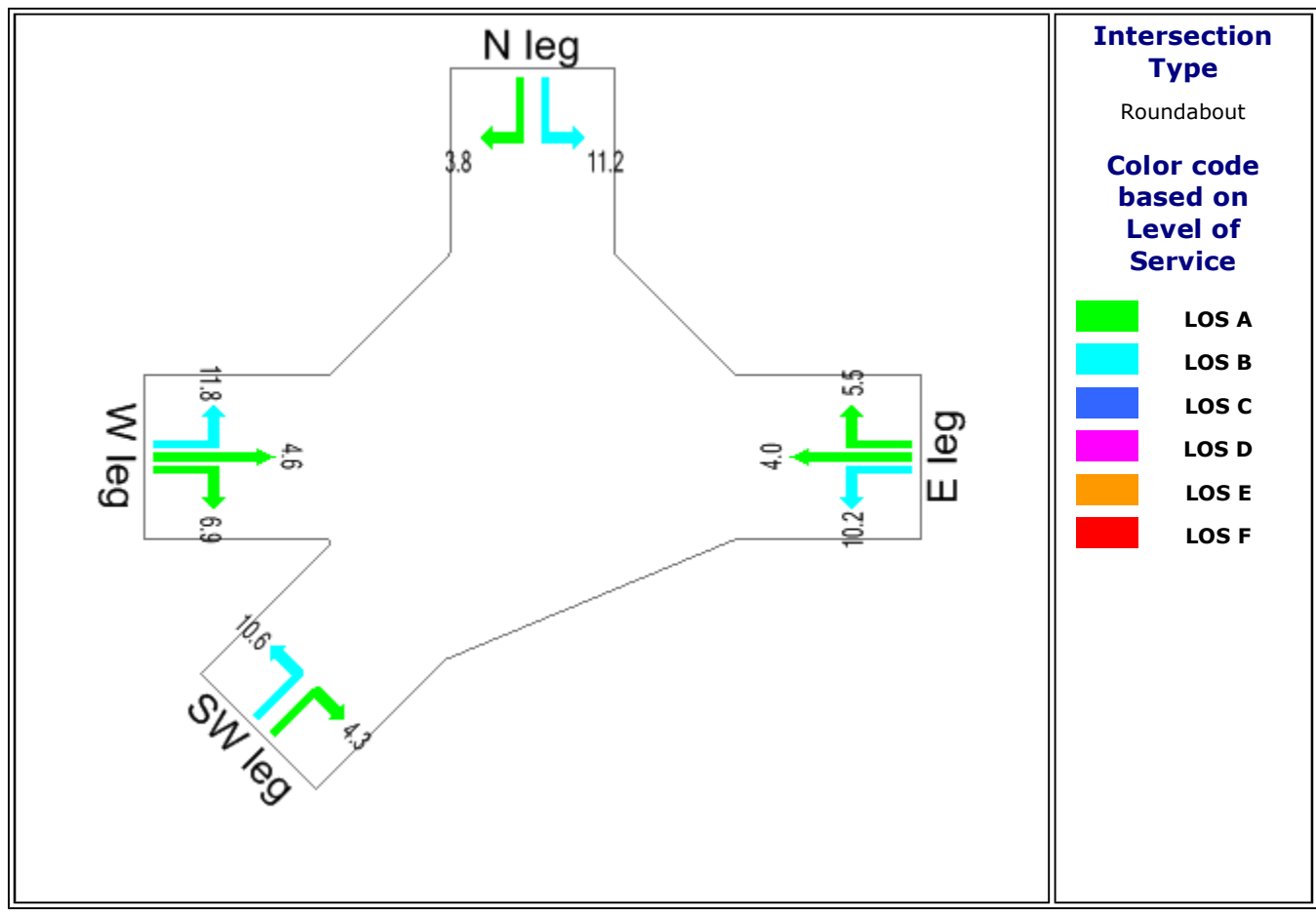


~~Control Delay (Average)~~

Average control delay per vehicle (seconds)

Cullum Road and Banks Road

Enter subtitle



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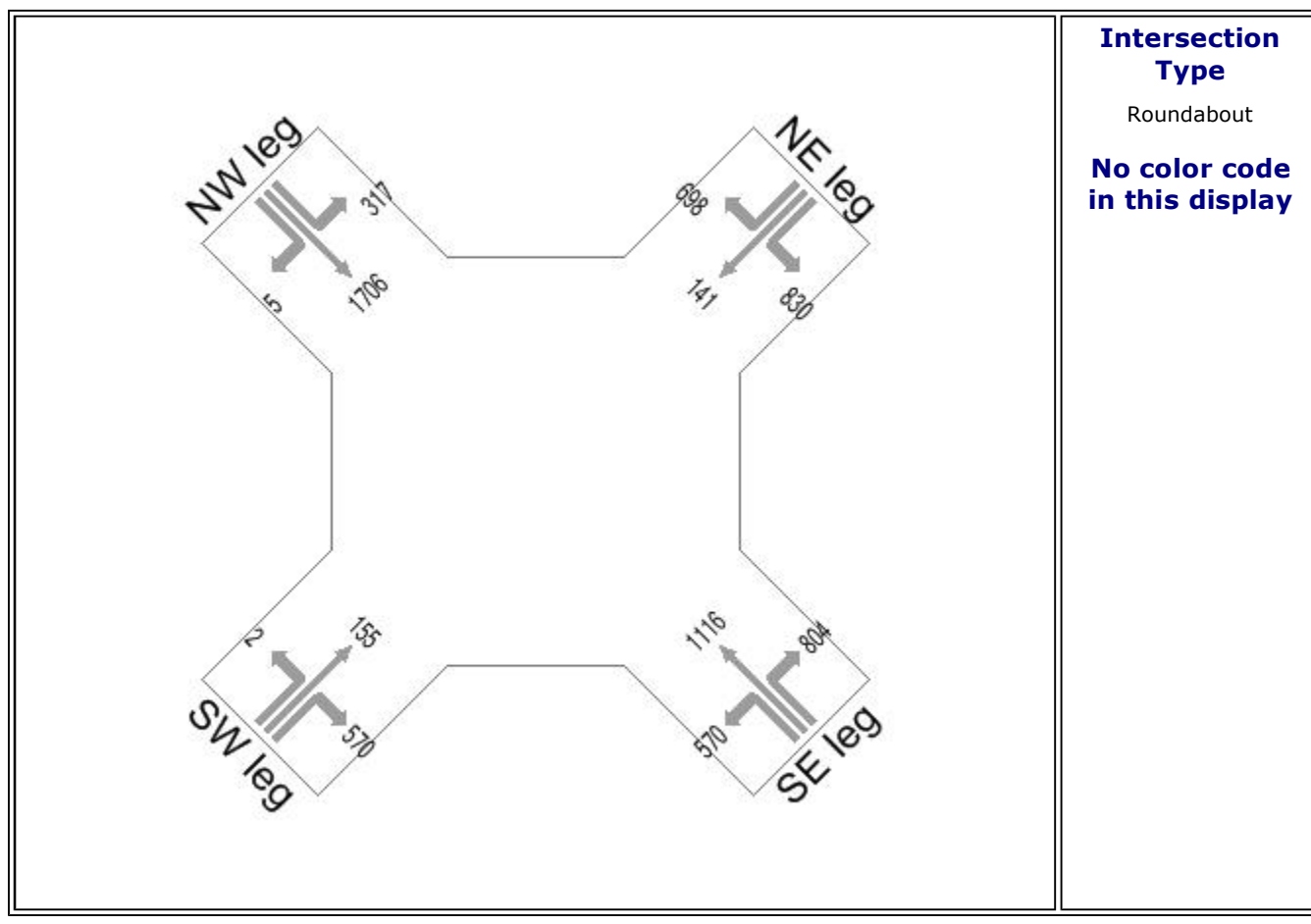


~~Capacity (Total)~~

Total value per vehicle movement (veh/h)

Cullum Road and NW 54th Avenue

Enter subtitle



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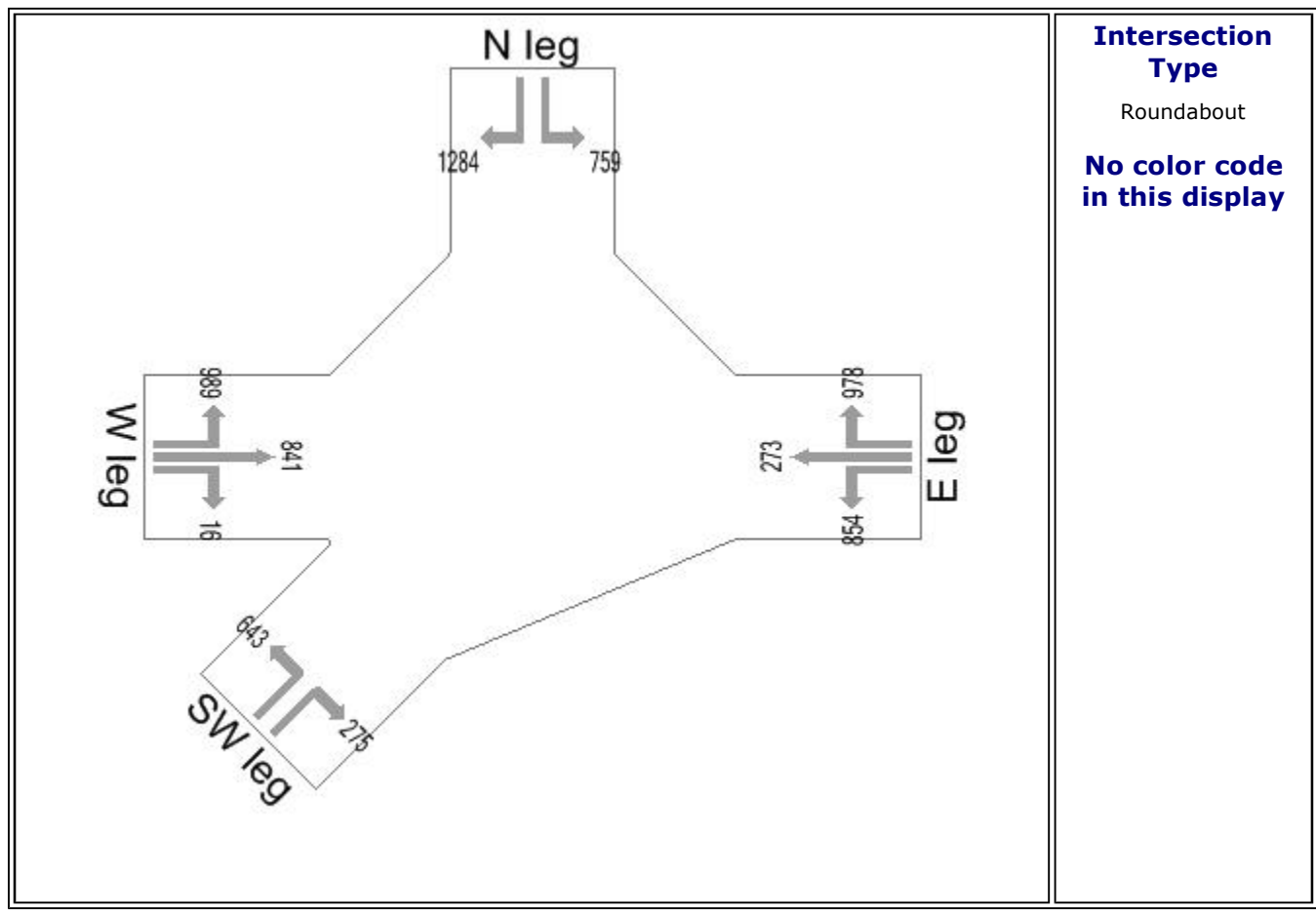


~~Capacity (Total)~~

Total value per vehicle movement (veh/h)

Cullum Road and Banks Road

Enter subtitle



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HCM Signalized Intersection Capacity Analysis

1: Sample Road & Riverside Drive

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	0.91		1.00	0.91		1.00	0.95	1.00	1.00	0.95
Frt		1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1770	5026		1770	5009		1770	3539	1583	1770	3539
Flt Permitted		0.95	1.00		0.95	1.00		0.12	1.00	1.00	0.27	1.00
Satd. Flow (perm)		1770	5026		1770	5009		217	3539	1583	504	3539
Volume (vph)	24	139	1802	153	511	2012	224	142	425	442	171	620
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	26	148	1917	163	544	2140	238	151	452	470	182	660
RTOR Reduction (vph)	0	0	6	0	0	8	0	0	0	222	0	0
Lane Group Flow (vph)	0	174	2074	0	544	2370	0	151	452	248	182	660
Turn Type	Prot	Prot			Prot			pm+pt		Perm	pm+pt	
Protected Phases	1	1	6		5	2		7	4		3	8
Permitted Phases								4		4	8	
Actuated Green, G (s)		19.1	55.0		33.7	69.6		46.3	32.8	32.8	48.3	33.8
Effective Green, g (s)		21.1	57.0		35.7	71.6		50.3	34.8	34.8	52.3	35.8
Actuated g/C Ratio		0.13	0.36		0.22	0.45		0.31	0.22	0.22	0.33	0.22
Clearance Time (s)		6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)		1.5	0.2		1.5	0.2		1.5	2.0	2.0	1.5	2.0
Lane Grp Cap (vph)		233	1791		395	2242		219	770	344	295	792
v/s Ratio Prot		0.10	c0.41		c0.31	0.47		c0.07	0.13		0.06	c0.19
v/s Ratio Perm								0.15		0.16	0.14	
v/c Ratio		0.75	1.16		1.38	1.06		0.69	0.59	0.72	0.62	0.83
Uniform Delay, d1		66.9	51.5		62.2	44.2		43.5	56.2	58.1	41.4	59.3
Progression Factor		1.00	1.00		0.65	1.25		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		10.8	77.7		176.9	31.1		7.0	0.7	6.2	2.7	7.2
Delay (s)		77.7	129.2		217.4	86.4		50.5	56.9	64.2	44.1	66.4
Level of Service		E	F		F	F		D	E	E	D	E
Approach Delay (s)			125.3			110.8			59.2			59.8
Approach LOS			F			F			E			E
Intersection Summary												
HCM Average Control Delay			100.6				HCM Level of Service		F			
HCM Volume to Capacity ratio			1.05									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			104.9%				ICU Level of Service		G			
Analysis Period (min)			15									
c Critical Lane Group												

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11/18/2009

Kimley Horn and Associates

HCM Signalized Intersection Capacity Analysis
1: Sample Road & Riverside Drive

PM Peak Hour
Future Total Traffic Conditions

Movement SBR

Left Configurations

Ideal Flow (vphpl) 1900

Total Lost time (s) 4.0

Lane Util. Factor 1.00

Frt 0.85

Flt Protected 1.00

Satd. Flow (prot) 1583

Flt Permitted 1.00

Satd. Flow (perm) 1583

Volume (vph) 149

Peak-hour factor, PHF 0.94

Adj. Flow (vph) 159

RTOR Reduction (vph) 99

Lane Group Flow (vph) 60

Turn Type Perm

Protected Phases

Permitted Phases 8

Actuated Green, G (s) 33.8

Effective Green, g (s) 35.8

Actuated g/C Ratio 0.22

Clearance Time (s) 6.0

Vehicle Extension (s) 2.0

Lane Grp Cap (vph) 354

v/s Ratio Prot

v/s Ratio Perm 0.04

v/c Ratio 0.17

Uniform Delay, d1 50.1

Progression Factor 1.00

Incremental Delay, d2 0.1

Delay (s) 50.2

Level of Service D

Approach Delay (s)

Approach LOS

Intersection Summary

Phasings

1: Sample Road & Riverside Drive

PM Peak Hour
Future Total Traffic Conditions

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	139	1802	511	2012	142	425	442	171	620	149
Turn Type	Prot		Prot		pm+pt		Perm	pm+pt		Perm
Protected Phases	1	6	5	2	7	4		3	8	
Permitted Phases					4		4	8		8
Detector Phases	1	6	5	2	7	4	4	3	8	8
Minimum Initial (s)	5.0	7.0	5.0	7.0	4.0	6.0	6.0	4.0	6.0	6.0
Minimum Split (s)	11.0	44.0	24.0	44.0	10.0	44.0	44.0	10.0	44.0	44.0
Total Split (s)	20.0	61.0	30.0	71.0	22.0	47.0	47.0	22.0	47.0	47.0
Total Split (%)	12.5%	38.1%	18.8%	44.4%	13.8%	29.4%	29.4%	13.8%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None	None	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 34 (21%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Splits and Phases: 1: Sample Road & Riverside Drive

 ø1	 ø2	 ø3	 ø4
20 s	71 s	22 s	47 s
 ø5	 ø6	 ø7	 ø8
30 s	61 s	22 s	47 s

HCM Signalized Intersection Capacity Analysis

2: Sample Road & Holiday Springs Boulevard

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	0.91		1.00	0.91		1.00	1.00		1.00	0.95
Frt		1.00	0.99		1.00	0.98		1.00	0.90		1.00	0.90
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1770	5053		1770	4995		1770	1674		1770	3176
Flt Permitted		0.95	1.00		0.05	1.00		0.62	1.00		0.23	1.00
Satd. Flow (perm)		1770	5053		101	4995		1160	1674		421	3176
Volume (vph)	53	132	1909	85	131	2202	295	109	43	88	223	62
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	56	139	2009	89	138	2318	311	115	45	93	235	65
RTOR Reduction (vph)	0	0	2	0	0	9	0	0	56	0	0	124
Lane Group Flow (vph)	0	195	2096	0	138	2620	0	115	82	0	235	82
Turn Type	Prot	Prot			pm+pt			pm+pt			pm+pt	
Protected Phases	1	1	6		5	2		7	4		3	8
Permitted Phases					2			4			8	
Actuated Green, G (s)		27.7	93.2		90.9	78.2		24.5	11.7		35.7	17.3
Effective Green, g (s)		29.7	95.2		94.9	80.2		28.5	13.7		38.1	19.3
Actuated g/C Ratio		0.19	0.60		0.59	0.50		0.18	0.09		0.24	0.12
Clearance Time (s)		6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)		2.0	0.2		2.0	0.2		2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		329	3007		213	2504		263	143		272	383
v/s Ratio Prot		c0.11	c0.41		0.06	c0.52		0.04	0.05		c0.11	0.03
v/s Ratio Perm					0.33			0.04			c0.10	
v/c Ratio		0.59	0.70		0.65	1.05		0.44	0.57		0.86	0.21
Uniform Delay, d1		59.6	22.4		34.8	39.9		57.8	70.4		54.1	63.5
Progression Factor		0.99	0.77		0.67	1.62		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.2	0.1		2.2	26.3		0.4	3.4		22.9	0.1
Delay (s)		59.1	17.4		25.6	90.9		58.2	73.8		77.0	63.6
Level of Service		E	B		C	F		E	E		E	E
Approach Delay (s)			20.9			87.7			66.7			70.7
Approach LOS			C			F			E			E
Intersection Summary												
HCM Average Control Delay			58.9				HCM Level of Service		E			
HCM Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			92.7%				ICU Level of Service		F			
Analysis Period (min)			15									
c Critical Lane Group												

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11/18/2009

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Application for Development Approval

21-K-109

HCM Signalized Intersection Capacity Analysis
2: Sample Road & Holiday Springs Boulevard

PM Peak Hour
Future Total Traffic Conditions

Movement SBR

Lane Configurations

Ideal Flow (vphpl) 1900

Total Lost time (s)

Lane Util. Factor

Frt

Flt Protected

Satd. Flow (prot)

Flt Permitted

Satd. Flow (perm)

Volume (vph) 134

Peak-hour factor, PHF 0.95

Adj. Flow (vph) 141

RTOR Reduction (vph) 0

Lane Group Flow (vph) 0

Turn Type

Protected Phases

Permitted Phases

Actuated Green, G (s)

Effective Green, g (s)

Actuated g/C Ratio

Clearance Time (s)

Vehicle Extension (s)

Lane Grp Cap (vph)

v/s Ratio Prot

v/s Ratio Perm

v/c Ratio

Uniform Delay, d1

Progression Factor

Incremental Delay, d2

Delay (s)

Level of Service

Approach Delay (s)

Approach LOS

Intersection Summary

Phasings
2: Sample Road & Holiday Springs Boulevard

PM Peak Hour
Future Total Traffic Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	132	1909	131	2202	109	43	223	62
Turn Type	Prot		pm+pt		pm+pt		pm+pt	
Protected Phases	1	6	5	2	7	4	3	8
Permitted Phases			2		4		8	
Detector Phases	1	6	5	2	7	4	3	8
Minimum Initial (s)	5.0	7.0	4.0	7.0	4.0	6.0	4.0	6.0
Minimum Split (s)	11.0	33.0	10.0	33.0	10.0	42.0	10.0	40.0
Total Split (s)	22.0	71.0	22.0	71.0	25.0	42.0	25.0	42.0
Total Split (%)	13.8%	44.4%	13.8%	44.4%	15.6%	26.3%	15.6%	26.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 105 (66%), Referenced to phase 2:WBTL and 6:EBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Splits and Phases: 2: Sample Road & Holiday Springs Boulevard

			
ø1	ø2	ø3	ø4
22 s	71 s	25 s	42 s
			
ø5	ø6	ø7	ø8
22 s	71 s	25 s	42 s

HCM Signalized Intersection Capacity Analysis

3: Sample Road & Rock Island Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	144	1934	382	599	2607	125	257	286	395	91	382	105
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	150	2015	398	624	2716	130	268	298	411	95	398	109
RTOR Reduction (vph)	0	0	104	0	0	20	0	0	231	0	0	92
Lane Group Flow (vph)	150	2015	294	624	2716	110	268	298	180	95	398	17
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	10.5	62.0	62.0	39.8	91.3	91.3	13.2	27.4	27.4	8.3	22.5	22.5
Effective Green, g (s)	12.0	63.5	63.5	41.3	92.8	92.8	14.7	29.4	29.4	9.8	24.5	24.5
Actuated g/C Ratio	0.08	0.40	0.40	0.26	0.58	0.58	0.09	0.18	0.18	0.06	0.15	0.15
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	6.0	6.0	5.5	6.0	6.0
Vehicle Extension (s)	1.5	2.5	2.5	1.5	2.5	2.5	1.5	2.0	2.0	1.5	2.0	2.0
Lane Grp Cap (vph)	257	2018	628	886	2949	918	315	650	291	210	542	242
v/s Ratio Prot	0.04	c0.40		c0.18	c0.53		c0.08	0.08		0.03	c0.11	
v/s Ratio Perm			0.19			0.07			0.11			0.01
v/c Ratio	0.58	1.00	0.47	0.70	0.92	0.12	0.85	0.46	0.62	0.45	0.73	0.07
Uniform Delay, d1	71.6	48.2	35.7	53.8	30.3	15.2	71.6	58.2	60.1	72.5	64.6	58.0
Progression Factor	1.25	0.93	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	17.2	1.9	2.1	6.1	0.3	18.6	0.2	2.7	0.6	4.4	0.0
Delay (s)	91.0	62.2	32.4	55.9	36.4	15.4	90.2	58.4	62.9	73.1	69.1	58.0
Level of Service	F	E	C	E	D	B	F	E	E	E	E	E
Approach Delay (s)		59.2			39.1			69.0			67.7	
Approach LOS		E			D			E			E	
Intersection Summary												
HCM Average Control Delay			52.0				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			85.8%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-112

Phasings

3: Sample Road & Rock Island Road

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	 		 		
Volume (vph)	144	1934	382	599	2607	125	257	286	395	91	382	105
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Detector Phases	1	6	6	5	2	2	7	4	4	3	8	8
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	6.0	6.0	5.0	6.0	6.0
Minimum Split (s)	10.5	45.5	45.5	10.5	45.5	45.5	10.5	46.0	46.0	10.5	40.0	40.0
Total Split (s)	21.0	63.0	63.0	31.0	73.0	73.0	19.0	47.0	47.0	19.0	47.0	47.0
Total Split (%)	13.1%	39.4%	39.4%	19.4%	45.6%	45.6%	11.9%	29.4%	29.4%	11.9%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.0	2.0	1.5	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 4 (3%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Splits and Phases: 3: Sample Road & Rock Island Road

			
ø1	ø2	ø3	ø4
21 s	73 s	19 s	47 s
			
ø5	ø6	ø7	ø8
31 s	63 s	19 s	47 s

HCM Signalized Intersection Capacity Analysis

4: Sample Road & Turtle Run Boulevard

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  						 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	1583		1770	1863	1583
Flt Permitted	0.10	1.00	1.00	0.95	1.00	1.00	0.75	1.00		0.73	1.00	1.00
Satd. Flow (perm)	182	5085	1583	1770	5085	1583	1399	1583		1365	1863	1583
Volume (vph)	110	2487	39	83	3296	144	9	0	35	51	9	126
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	117	2646	41	88	3506	153	10	0	37	54	10	134
RTOR Reduction (vph)	0	0	12	0	0	24	0	32	0	0	0	117
Lane Group Flow (vph)	117	2646	29	88	3506	129	10	5	0	54	10	17
Turn Type	pm+pt		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6			2	4			8		8
Actuated Green, G (s)	44.3	39.0	39.0	7.0	40.7	40.7	7.1	7.1		7.1	7.1	7.1
Effective Green, g (s)	48.3	41.0	41.0	9.0	42.7	42.7	9.1	9.1		9.1	9.1	9.1
Actuated g/C Ratio	0.68	0.58	0.58	0.13	0.60	0.60	0.13	0.13		0.13	0.13	0.13
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	1.5	3.0	3.0	1.5	3.0	3.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	287	2932	913	224	3054	951	179	203		175	238	203
v/s Ratio Prot	0.04	0.52		c0.05	c0.69			0.00			0.01	
v/s Ratio Perm	0.24		0.02			0.08	0.01			c0.04		0.01
v/c Ratio	0.41	0.90	0.03	0.39	1.15	0.14	0.06	0.02		0.31	0.04	0.08
Uniform Delay, d1	30.7	13.3	6.5	28.5	14.2	6.2	27.2	27.1		28.1	27.2	27.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	4.3	0.0	0.4	70.9	0.1	0.0	0.0		0.4	0.0	0.1
Delay (s)	31.0	17.6	6.5	29.0	85.1	6.2	27.3	27.1		28.5	27.2	27.4
Level of Service	C	B	A	C	F	A	C	C		C	C	C
Approach Delay (s)		18.0			80.6			27.2			27.7	
Approach LOS		B			F			C			C	
Intersection Summary												
HCM Average Control Delay			52.8			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			71.1			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			89.3%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

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11/18/2009

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Phasings

4: Sample Road & Turtle Run Boulevard

PM Peak Hour
Future Total Traffic Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations		  			  						
Volume (vph)	110	2487	39	83	3296	144	9	0	51	9	126
Turn Type	pm+pt		Perm	Prot		Perm	Perm		Perm		Perm
Protected Phases	1	6		5	2			4		8	
Permitted Phases	6		6			2	4		8		8
Detector Phases	1	6	6	5	2	2	4	4	8	8	8
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	22.0	34.0	34.0	22.0	34.0	34.0	37.0	37.0	37.0	37.0	37.0
Total Split (s)	22.0	34.0	34.0	22.0	34.0	34.0	37.0	37.0	37.0	37.0	37.0
Total Split (%)	23.7%	36.6%	36.6%	23.7%	36.6%	36.6%	39.8%	39.8%	39.8%	39.8%	39.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None

Intersection Summary

Cycle Length: 93

Actuated Cycle Length: 70.4

Natural Cycle: 145

Control Type: Semi Act-Uncoord

Splits and Phases: 4: Sample Road & Turtle Run Boulevard

 ø1	 ø2	 ø4
22 s	34 s	37 s
 ø5	 ø6	 ø8
22 s	34 s	37 s

HCM Signalized Intersection Capacity Analysis

5: Sample Road & Turtle Creek Drive

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00		1.00	0.95		1.00	0.95
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.94		1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583		1770	3310		1770	3539
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.34	1.00		0.30	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583		625	3310		552	3539
Volume (vph)	193	1819	257	232	2540	320	14	352	198	150	172	249
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	203	1915	271	244	2674	337	15	371	208	158	181	262
RTOR Reduction (vph)	0	0	114	0	0	62	0	0	99	0	0	0
Lane Group Flow (vph)	203	1915	157	244	2674	275	0	386	267	0	181	262
Turn Type	Prot		Perm	Prot		Perm	pm+pt	pm+pt			pm+pt	
Protected Phases	1	6		5	2		7	7	4		3	8
Permitted Phases			6			2	4	4			8	
Actuated Green, G (s)	12.3	77.4	77.4	13.7	78.8	78.8		38.1	20.1		32.7	17.4
Effective Green, g (s)	14.8	78.4	78.4	16.2	79.8	79.8		42.1	22.1		36.7	19.4
Actuated g/C Ratio	0.10	0.52	0.52	0.11	0.53	0.53		0.28	0.15		0.24	0.13
Clearance Time (s)	6.5	5.0	5.0	6.5	5.0	5.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	1.5	0.2	0.2	1.5	0.2	0.2		1.5	2.0		1.5	2.0
Lane Grp Cap (vph)	339	2658	827	371	2705	842		328	488		276	458
v/s Ratio Prot	0.06	0.38		c0.07	c0.53			c0.16	0.08		0.08	0.07
v/s Ratio Perm			0.10			0.17		c0.17			0.08	
v/c Ratio	0.60	0.72	0.19	0.66	0.99	0.33		1.18	0.55		0.66	0.57
Uniform Delay, d1	64.8	27.4	19.0	64.2	34.6	19.9		50.1	59.3		48.0	61.4
Progression Factor	1.00	1.00	1.00	1.14	0.73	0.88		1.00	1.00		1.00	1.00
Incremental Delay, d2	1.9	1.7	0.5	1.8	10.5	0.6		106.8	0.7		4.2	1.1
Delay (s)	66.7	29.1	19.5	74.7	35.9	18.1		156.9	60.0		52.2	62.5
Level of Service	E	C	B	E	D	B		F	E		D	E
Approach Delay (s)		31.2			36.9				109.7			61.9
Approach LOS		C			D				F			E

Intersection Summary

HCM Average Control Delay	45.3	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

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11/18/2009

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HCM Signalized Intersection Capacity Analysis
5: Sample Road & Turtle Creek Drive

PM Peak Hour
Future Total Traffic Conditions

Movement SBR

Left Configurations

Ideal Flow (vphpl) 1900

Total Lost time (s) 4.0

Lane Util. Factor 1.00

Frt 0.85

Flt Protected 1.00

Satd. Flow (prot) 1583

Flt Permitted 1.00

Satd. Flow (perm) 1583

Volume (vph) 271

Peak-hour factor, PHF 0.95

Adj. Flow (vph) 285

RTOR Reduction (vph) 151

Lane Group Flow (vph) 134

Turn Type Perm

Protected Phases

Permitted Phases 8

Actuated Green, G (s) 17.4

Effective Green, g (s) 19.4

Actuated g/C Ratio 0.13

Clearance Time (s) 6.0

Vehicle Extension (s) 2.0

Lane Grp Cap (vph) 205

v/s Ratio Prot

v/s Ratio Perm 0.08

v/c Ratio 0.65

Uniform Delay, d1 62.1

Progression Factor 1.00

Incremental Delay, d2 5.5

Delay (s) 67.6

Level of Service E

Approach Delay (s)

Approach LOS

Intersection Summary

Phasings

5: Sample Road & Turtle Creek Drive

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	SBL	SBT	SBR
Lane Configurations	 	  		 	  				 		 	
Volume (vph)	193	1819	257	232	2540	320	14	352	198	172	249	271
Turn Type	Prot		Perm	Prot		Perm	pm+pt	pm+pt		pm+pt		Perm
Protected Phases	1	6		5	2		7	7	4	3	8	
Permitted Phases			6			2	4	4		8		8
Detector Phases	1	6	6	5	2	2	7	7	4	3	8	8
Minimum Initial (s)	5.0	7.0	7.0	5.0	7.0	7.0	4.0	4.0	6.0	4.0	6.0	6.0
Minimum Split (s)	11.5	32.0	32.0	11.5	32.0	32.0	10.0	10.0	30.0	10.0	30.0	30.0
Total Split (s)	20.0	72.0	72.0	20.0	72.0	72.0	24.0	24.0	34.0	24.0	34.0	34.0
Total Split (%)	13.3%	48.0%	48.0%	13.3%	48.0%	48.0%	16.0%	16.0%	22.7%	16.0%	22.7%	22.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	1.0	1.0	2.5	1.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 9 (6%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 135

Control Type: Actuated-Coordinated

Splits and Phases: 5: Sample Road & Turtle Creek Drive

			
ø1	ø2	ø3	ø4
20 s	72 s	24 s	34 s
			
ø5	ø6	ø7	ø8
20 s	72 s	24 s	34 s

HCM Signalized Intersection Capacity Analysis

6: Sample Road & NB SR 7 On Ramp

PM Peak Hour
Future Total Traffic Conditions

											
Movement	EBL	EBT	EBR2	WBU	WBL	WBT	WBR2	NBL	NBR2	SBL	SBR2
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00		0.97	0.91	1.00	0.97	1.00	0.97	1.00
Frt	1.00	1.00	0.85		1.00	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	5085	1583		3433	5085	1583	3433	1583	3433	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	5085	1583		3433	5085	1583	3433	1583	3433	1583
Volume (vph)	351	1730	103	25	377	2780	405	243	221	285	347
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	373	1840	110	27	401	2957	431	259	235	303	369
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	373	1840	110	0	428	2957	431	259	235	303	369
Turn Type	Prot		Free	Prot	Prot		Free	Prot	Free	Prot	Free
Protected Phases	1	6		5	5	2		4		8	
Permitted Phases			Free				Free		Free		Free
Actuated Green, G (s)	19.8	90.0	150.0		22.3	92.5	150.0	16.7	150.0	16.7	150.0
Effective Green, g (s)	21.8	94.0	150.0		24.3	96.5	150.0	19.7	150.0	19.7	150.0
Actuated g/C Ratio	0.15	0.63	1.00		0.16	0.64	1.00	0.13	1.00	0.13	1.00
Clearance Time (s)	6.0	8.0			6.0	8.0		7.0		7.0	
Vehicle Extension (s)	1.5	1.0			1.5	1.0		1.5		1.5	
Lane Grp Cap (vph)	499	3187	1583		556	3271	1583	451	1583	451	1583
v/s Ratio Prot	0.11	0.36			c0.12	c0.58		0.08		c0.09	
v/s Ratio Perm			0.07				c0.27		0.15		0.23
v/c Ratio	0.75	0.58	0.07		0.77	0.90	0.27	0.57	0.15	0.67	0.23
Uniform Delay, d1	61.5	16.4	0.0		60.2	22.8	0.0	61.2	0.0	62.1	0.0
Progression Factor	1.01	0.55	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.9	0.6	0.1		5.7	4.7	0.4	1.1	0.2	3.1	0.3
Delay (s)	65.9	9.5	0.1		65.9	27.5	0.4	62.3	0.2	65.2	0.3
Level of Service	E	A	A		E	C	A	E	A	E	A
Approach Delay (s)		18.1				28.7					
Approach LOS		B				C					
Intersection Summary											
HCM Average Control Delay			25.7								
HCM Volume to Capacity ratio			0.84								
Actuated Cycle Length (s)			150.0								
Intersection Capacity Utilization			81.9%								
Analysis Period (min)			15								
c Critical Lane Group											

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Phasings

6: Sample Road & NB SR 7 On Ramp

PM Peak Hour
Future Total Traffic Conditions

										
Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR2	NBL	NBR2	SBL	SBR2
Lane Configurations	 	  		 	  		 		 	
Volume (vph)	351	1730	103	377	2780	405	243	221	285	347
Turn Type	Prot		Free	Prot		Free	Prot	Free	Prot	Free
Protected Phases	1	6		5	2		4		8	
Permitted Phases			Free			Free		Free		Free
Detector Phases	1	6		5	2		4		8	
Minimum Initial (s)	6.0	7.0		6.0	7.0		6.0		6.0	
Minimum Split (s)	12.0	15.0		12.0	15.0		13.0		13.0	
Total Split (s)	32.0	85.0	0.0	32.0	85.0	0.0	33.0	0.0	33.0	0.0
Total Split (%)	21.3%	56.7%	0.0%	21.3%	56.7%	0.0%	22.0%	0.0%	22.0%	0.0%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	
All-Red Time (s)	2.0	4.0		2.0	4.0		3.0		3.0	
Lead/Lag	Lead	Lag		Lead	Lag					
Lead-Lag Optimize?	Yes	Yes		Yes	Yes					
Recall Mode	None	C-Max		None	C-Max		None		None	

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 4 (3%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Splits and Phases: 6: Sample Road & NB SR 7 On Ramp

 ø1	 ø2	 ø4
32 s	85 s	33 s
 ø5	 ø6	 ø8
32 s	85 s	33 s

HCM Signalized Intersection Capacity Analysis

7: Sample Road & NW 54th Avenue

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1770	5085	1583	1770	5085	1583	1770	3539	1583	1770	3539
Flt Permitted		0.05	1.00	1.00	0.09	1.00	1.00	0.64	1.00	1.00	0.63	1.00
Satd. Flow (perm)		88	5085	1583	161	5085	1583	1192	3539	1583	1178	3539
Volume (vph)	16	195	1535	32	359	2420	507	147	133	323	600	129
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	17	203	1599	33	374	2521	528	153	139	336	625	134
RTOR Reduction (vph)	0	0	0	13	0	0	120	0	0	239	0	0
Lane Group Flow (vph)	0	220	1599	20	374	2521	408	153	139	97	625	134
Turn Type	pm+pt	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm	
Protected Phases	1	1	6		5	2			4			8
Permitted Phases	6	6		6	2		2	4		4	8	
Actuated Green, G (s)		94.8	82.8	82.8	119.0	101.0	101.0	29.0	29.0	29.0	29.0	29.0
Effective Green, g (s)		98.8	84.8	84.8	121.0	103.0	103.0	31.0	31.0	31.0	31.0	31.0
Actuated g/C Ratio		0.62	0.53	0.53	0.76	0.64	0.64	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)		1.5	3.0	3.0	1.5	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)		202	2695	839	446	3273	1019	231	686	307	228	686
v/s Ratio Prot		c0.10	0.31		c0.17	0.50			0.04			0.04
v/s Ratio Perm		c0.58		0.01	0.47		0.26	0.13		0.06	c0.53	
v/c Ratio		1.09	0.59	0.02	0.84	0.77	0.40	0.66	0.20	0.32	2.74	0.20
Uniform Delay, d1		51.9	25.8	17.9	42.2	20.1	13.7	59.7	54.1	55.4	64.5	54.0
Progression Factor		1.00	1.00	1.00	0.93	1.34	2.49	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		89.1	1.0	0.1	4.8	0.6	0.4	5.4	0.1	0.2	795.8	0.1
Delay (s)		141.0	26.7	17.9	44.0	27.6	34.4	65.1	54.2	55.6	860.3	54.1
Level of Service		F	C	B	D	C	C	E	D	E	F	D
Approach Delay (s)			40.2			30.4			57.6			529.4
Approach LOS			D			C			E			F
Intersection Summary												
HCM Average Control Delay			123.1									
HCM Volume to Capacity ratio			1.40									
Actuated Cycle Length (s)			160.0									
Intersection Capacity Utilization			110.0%									
Analysis Period (min)			15									
c Critical Lane Group												

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HCM Signalized Intersection Capacity Analysis
7: Sample Road & NW 54th Avenue

PM Peak Hour
Future Total Traffic Conditions

Movement SBR

Lane Configurations

Ideal Flow (vphpl) 1900

Total Lost time (s) 4.0

Lane Util. Factor 1.00

Frt 0.85

Flt Protected 1.00

Satd. Flow (prot) 1583

Flt Permitted 1.00

Satd. Flow (perm) 1583

Volume (vph) 480

Peak-hour factor, PHF 0.96

Adj. Flow (vph) 500

RTOR Reduction (vph) 85

Lane Group Flow (vph) 415

Turn Type Perm

Protected Phases

Permitted Phases 8

Actuated Green, G (s) 29.0

Effective Green, g (s) 31.0

Actuated g/C Ratio 0.19

Clearance Time (s) 6.0

Vehicle Extension (s) 2.0

Lane Grp Cap (vph) 307

v/s Ratio Prot

v/s Ratio Perm 0.26

v/c Ratio 1.35

Uniform Delay, d1 64.5

Progression Factor 1.00

Incremental Delay, d2 178.8

Delay (s) 243.3

Level of Service F

Approach Delay (s)

Approach LOS

Intersection Summary

Phasings

7: Sample Road & NW 54th Avenue

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	16	195	1535	32	359	2420	507	147	133	323	600	129
Turn Type	pm+pt	pm+pt		Perm	pm+pt		Perm	Perm		Perm	Perm	
Protected Phases	1	1	6		5	2			4			8
Permitted Phases	6	6		6	2		2	4		4	8	
Detector Phases	1	1	6	6	5	2	2	4	4	4	8	8
Minimum Initial (s)	4.0	4.0	12.0	12.0	4.0	12.0	12.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	10.0	30.0	30.0	10.0	30.0	30.0	32.0	32.0	32.0	32.0	32.0
Total Split (s)	18.0	18.0	85.0	85.0	40.0	107.0	107.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	11.3%	11.3%	53.1%	53.1%	25.0%	66.9%	66.9%	21.9%	21.9%	21.9%	21.9%	21.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 15 (9%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Splits and Phases: 7: Sample Road & NW 54th Avenue

 ø1	 ø2	 ø4
18 s	107 s	35 s
 ø5	 ø6	 ø8
40 s	85 s	35 s

Phasings
7: Sample Road & NW 54th Avenue

PM Peak Hour
Future Total Traffic Conditions



Lane Group SBR

Lane Configurations 
Volume (vph) 480
Turn Type Perm
Protected Phases
Permitted Phases 8
Detector Phases 8
Minimum Initial (s) 6.0
Minimum Split (s) 32.0
Total Split (s) 35.0
Total Split (%) 21.9%
Yellow Time (s) 4.0
All-Red Time (s) 2.0
Lead/Lag
Lead-Lag Optimize?
Recall Mode None

Intersection Summary

HCM Signalized Intersection Capacity Analysis

8: Sample Road & Banks Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		  				  						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00		1.00	0.91	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	1.00	0.85		1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	1583		1770	5085	1583		1863	1583	1770	1863
Flt Permitted	0.04	1.00	1.00		0.04	1.00	1.00		1.00	1.00	0.52	1.00
Satd. Flow (perm)	74	5085	1583		71	5085	1583		1863	1583	971	1863
Volume (vph)	109	2370	188	19	215	3379	172	0	51	203	174	59
Peak-hour factor, PHF	0.99	0.99	0.99	0.92	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	110	2394	190	21	217	3413	174	0	52	205	176	60
RTOR Reduction (vph)	0	0	46	0	0	0	27	0	0	186	0	0
Lane Group Flow (vph)	110	2394	144	0	238	3413	147	0	52	19	176	60
Turn Type	pm+pt		Perm	pm+pt	pm+pt		Perm	pm+pt		Perm	pm+pt	
Protected Phases	7	4		3	3	8		5	2		1	6
Permitted Phases	4		4	8	8		8	2		2	6	
Actuated Green, G (s)	109.7	99.8	99.8		126.4	111.5	111.5		10.8	10.8	23.6	23.6
Effective Green, g (s)	111.7	100.8	100.8		127.4	112.5	112.5		11.8	11.8	24.6	24.6
Actuated g/C Ratio	0.70	0.63	0.63		0.80	0.70	0.70		0.07	0.07	0.15	0.15
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	167	3204	997		297	3575	1113		137	117	193	286
v/s Ratio Prot	0.04	0.47			c0.11	c0.67			0.03		c0.05	0.03
v/s Ratio Perm	0.41		0.09		0.53		0.09			0.01	c0.09	
v/c Ratio	0.66	0.75	0.14		0.80	0.95	0.13		0.38	0.16	0.91	0.21
Uniform Delay, d1	48.6	20.7	12.0		53.3	21.4	7.8		70.6	69.5	65.8	59.2
Progression Factor	1.32	0.89	1.02		1.35	0.58	0.65		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.1	0.0		5.2	2.8	0.0		7.8	2.9	40.8	1.7
Delay (s)	64.9	18.6	12.3		77.0	15.2	5.1		78.4	72.4	106.6	60.9
Level of Service	E	B	B		E	B	A		E	E	F	E
Approach Delay (s)		20.0				18.6			73.6			81.8
Approach LOS		C				B			E			F
Intersection Summary												
HCM Average Control Delay			24.6				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			97.6%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

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11/18/2009

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HCM Signalized Intersection Capacity Analysis
8: Sample Road & Banks Road

PM Peak Hour
Future Total Traffic Conditions

Movement SBR

Lane Configurations

Ideal Flow (vphpl) 1900

Total Lost time (s) 4.0

Lane Util. Factor 1.00

Frt 0.85

Flt Protected 1.00

Satd. Flow (prot) 1583

Flt Permitted 1.00

Satd. Flow (perm) 1583

Volume (vph) 156

Peak-hour factor, PHF 0.99

Adj. Flow (vph) 158

RTOR Reduction (vph) 96

Lane Group Flow (vph) 62

Turn Type Perm

Protected Phases

Permitted Phases 6

Actuated Green, G (s) 23.6

Effective Green, g (s) 24.6

Actuated g/C Ratio 0.15

Clearance Time (s) 5.0

Vehicle Extension (s) 3.0

Lane Grp Cap (vph) 243

v/s Ratio Prot

v/s Ratio Perm 0.04

v/c Ratio 0.25

Uniform Delay, d1 59.6

Progression Factor 1.00

Incremental Delay, d2 2.5

Delay (s) 62.1

Level of Service E

Approach Delay (s)

Approach LOS

Intersection Summary

Phasings

8: Sample Road & Banks Road

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  				  						
Volume (vph)	109	2370	188	19	215	3379	172	51	203	174	59	156
Turn Type	pm+pt		Perm	pm+pt	pm+pt		Perm		Perm	pm+pt		Perm
Protected Phases	7	4		3	3	8		2		1	6	
Permitted Phases	4		4	8	8		8		2	6		6
Detector Phases	7	4	4	3	3	8	8	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	21.0	21.0	9.0	9.0	21.0	21.0	21.0	21.0	9.0	21.0	21.0
Total Split (s)	12.0	93.0	93.0	33.0	33.0	114.0	114.0	23.0	23.0	11.0	24.0	24.0
Total Split (%)	7.5%	58.1%	58.1%	20.6%	20.6%	71.3%	71.3%	14.4%	14.4%	6.9%	15.0%	15.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 9 (6%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Splits and Phases: 8: Sample Road & Banks Road

							
11 s	23 s		33 s		93 s		
							
10 s	24 s		12 s		114 s		

Lane Group ø5

Lane Configurations

Volume (vph)

Turn Type

Protected Phases 5

Permitted Phases

Detector Phases

Minimum Initial (s) 4.0

Minimum Split (s) 9.0

Total Split (s) 10.0

Total Split (%) 6%

Yellow Time (s) 4.0

All-Red Time (s) 1.0

Lead/Lag Lead

Lead-Lag Optimize? Yes

Recall Mode None

Intersection Summary

HCM Signalized Intersection Capacity Analysis

9: Sample Road & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lane Util. Factor	0.97	0.91	1.00		0.97	0.91	1.00	0.97	0.91	1.00		0.97
Frt	1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (prot)	3433	5085	1583		3433	5085	1583	3433	5085	1583		3433
Flt Permitted	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (perm)	3433	5085	1583		3433	5085	1583	3433	5085	1583		3433
Volume (vph)	405	1613	534	12	222	2386	768	725	1538	114	17	478
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	426	1698	562	13	234	2512	808	763	1619	120	18	503
RTOR Reduction (vph)	0	0	163	0	0	0	163	0	0	64	0	0
Lane Group Flow (vph)	426	1698	399	0	247	2512	645	763	1619	56	0	521
Turn Type	Prot		Perm	Prot	Prot		Perm	Prot		Perm	Prot	Prot
Protected Phases	1	6		5	5	2		7	4		3	3
Permitted Phases			6			2				4		
Actuated Green, G (s)	11.5	75.0	75.0		11.5	75.0	75.0	25.5	30.5	30.5		18.5
Effective Green, g (s)	14.0	77.0	77.0		14.0	77.0	77.0	28.0	32.0	32.0		21.0
Actuated g/C Ratio	0.09	0.48	0.48		0.09	0.48	0.48	0.18	0.20	0.20		0.13
Clearance Time (s)	6.5	6.0	6.0		6.5	6.0	6.0	6.5	5.5	5.5		6.5
Vehicle Extension (s)	1.5	1.0	1.0		2.0	1.0	1.0	2.0	2.5	2.5		2.0
Lane Grp Cap (vph)	300	2447	762		300	2447	762	601	1017	317		451
v/s Ratio Prot	c0.12	0.33			0.07	c0.49		c0.22	c0.32			0.15
v/s Ratio Perm			0.25				0.41			0.04		
v/c Ratio	1.42	0.69	0.52		0.82	1.03	0.85	1.27	1.59	0.18		1.16
Uniform Delay, d1	73.0	32.3	28.8		71.8	41.5	36.3	66.0	64.0	53.1		69.5
Progression Factor	1.18	0.67	0.38		1.13	0.84	0.81	1.32	1.16	1.59		1.07
Incremental Delay, d2	203.5	1.3	2.0		1.7	14.1	1.2	130.3	269.6	0.1		87.5
Delay (s)	289.7	22.8	13.1		82.8	48.9	30.4	217.3	343.7	84.3		161.9
Level of Service	F	C	B		F	D	C	F	F	F		F
Approach Delay (s)		63.1				47.0			292.7			
Approach LOS		E				D			F			
Intersection Summary												
HCM Average Control Delay			146.8									
HCM Volume to Capacity ratio			1.24									
Actuated Cycle Length (s)			160.0									
Intersection Capacity Utilization			116.3%									
Analysis Period (min)			15									
c Critical Lane Group												

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-129

HCM Signalized Intersection Capacity Analysis 9: Sample Road & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

	↓	↙
Movement	SBT	SBR
Lane Configurations	↑↑↑	↑
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	0.91	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5085	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5085	1583
Volume (vph)	1242	358
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	1307	377
RTOR Reduction (vph)	0	1
Lane Group Flow (vph)	1307	376
Turn Type	pm+ov	
Protected Phases	8	1
Permitted Phases		8
Actuated Green, G (s)	23.5	35.0
Effective Green, g (s)	25.0	39.0
Actuated g/C Ratio	0.16	0.24
Clearance Time (s)	5.5	6.5
Vehicle Extension (s)	2.5	1.5
Lane Grp Cap (vph)	795	425
v/s Ratio Prot	0.26	0.08
v/s Ratio Perm		0.16
v/c Ratio	1.64	0.89
Uniform Delay, d1	67.5	58.3
Progression Factor	0.60	0.57
Incremental Delay, d2	294.0	14.8
Delay (s)	334.3	48.1
Level of Service	F	D
Approach Delay (s)	244.6	
Approach LOS	F	
Intersection Summary		

Phasings

9: Sample Road & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	  		 		
Volume (vph)	405	1613	534	222	2386	768	725	1538	114	478	1242	358
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	1	6		5	2		7	4		3	8	1
Permitted Phases			6			2			4			8
Detector Phases	1	6	6	5	2	2	7	4	4	3	8	1
Minimum Initial (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	5.0
Minimum Split (s)	11.5	39.0	39.0	11.5	39.0	39.0	11.5	34.5	34.5	11.5	34.5	11.5
Total Split (s)	18.0	81.0	81.0	18.0	81.0	81.0	32.0	36.0	36.0	25.0	29.0	18.0
Total Split (%)	11.3%	50.6%	50.6%	11.3%	50.6%	50.6%	20.0%	22.5%	22.5%	15.6%	18.1%	11.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.5	2.0	2.0	2.5	1.5	1.5	2.5	1.5	2.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 110 (69%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Splits and Phases: 9: Sample Road & Lyons Road

			
ø1	ø2	ø3	ø4
18 s	81 s	25 s	36 s
			
ø5	ø6	ø7	ø8
18 s	81 s	32 s	29 s

HCM Signalized Intersection Capacity Analysis

10: Sample Road & NW 42nd Avenue

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00		1.00	1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88		1.00	0.91
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00
Satd. Flow (prot)		1770	5085	1583	1770	5085	1583	1770	1647		1770	1688
Flt Permitted		0.05	1.00	1.00	0.04	1.00	1.00	0.62	1.00		0.58	1.00
Satd. Flow (perm)		84	5085	1583	80	5085	1583	1149	1647		1080	1688
Volume (vph)	14	56	2297	119	210	3611	168	91	30	102	98	42
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	14	58	2368	123	216	3723	173	94	31	105	101	43
RTOR Reduction (vph)	0	0	0	19	0	0	20	0	76	0	0	38
Lane Group Flow (vph)	0	72	2368	104	216	3723	153	94	60	0	101	77
Turn Type	pm+pt	pm+pt		Perm	pm+pt		Perm	Perm			Perm	
Protected Phases	1	1	6		5	2			4			8
Permitted Phases	6	6		6	2		2	4			8	
Actuated Green, G (s)		94.3	87.2	87.2	108.5	95.9	95.9	40.0	40.0		40.0	40.0
Effective Green, g (s)		97.3	88.7	88.7	110.0	97.4	97.4	42.0	42.0		42.0	42.0
Actuated g/C Ratio		0.61	0.55	0.55	0.69	0.61	0.61	0.26	0.26		0.26	0.26
Clearance Time (s)		5.5	5.5	5.5	5.5	5.5	5.5	6.0	6.0		6.0	6.0
Vehicle Extension (s)		1.5	0.2	0.2	1.5	0.2	0.2	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		142	2819	878	238	3095	964	302	432		284	443
v/s Ratio Prot		0.03	0.47		c0.10	c0.73			0.04			0.05
v/s Ratio Perm		0.28		0.07	0.52		0.10	0.08			c0.09	
v/c Ratio		0.51	0.84	0.12	0.91	1.20	0.16	0.31	0.14		0.36	0.17
Uniform Delay, d1		74.7	29.7	17.0	55.1	31.3	13.6	47.4	45.2		48.0	45.6
Progression Factor		1.55	0.70	0.76	1.10	0.71	0.52	1.00	1.00		1.00	1.00
Incremental Delay, d2		0.7	2.3	0.2	14.1	92.4	0.1	2.7	0.7		3.5	0.9
Delay (s)		116.2	23.0	13.0	74.9	114.6	7.1	50.1	45.8		51.4	46.5
Level of Service		F	C	B	E	F	A	D	D		D	D
Approach Delay (s)			25.1			108.0			47.6			48.8
Approach LOS			C			F			D			D
Intersection Summary												
HCM Average Control Delay			74.4		HCM Level of Service				E			
HCM Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			160.0		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			100.3%		ICU Level of Service				G			
Analysis Period (min)			15									
c Critical Lane Group												

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-132

HCM Signalized Intersection Capacity Analysis
10: Sample Road & NW 42nd Avenue

PM Peak Hour
Future Total Traffic Conditions

Movement SBR

Lane Configurations

Ideal Flow (vphpl) 1900

Total Lost time (s)

Lane Util. Factor

Frt

Flt Protected

Satd. Flow (prot)

Flt Permitted

Satd. Flow (perm)

Volume (vph) 70

Peak-hour factor, PHF 0.97

Adj. Flow (vph) 72

RTOR Reduction (vph) 0

Lane Group Flow (vph) 0

Turn Type

Protected Phases

Permitted Phases

Actuated Green, G (s)

Effective Green, g (s)

Actuated g/C Ratio

Clearance Time (s)

Vehicle Extension (s)

Lane Grp Cap (vph)

v/s Ratio Prot

v/s Ratio Perm

v/c Ratio

Uniform Delay, d1

Progression Factor

Incremental Delay, d2

Delay (s)

Level of Service

Approach Delay (s)

Approach LOS

Intersection Summary

Phasings
10: Sample Road & NW 42nd Avenue

PM Peak Hour
Future Total Traffic Conditions

											
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations											
Volume (vph)	14	56	2297	119	210	3611	168	91	30	98	42
Turn Type	pm+pt	pm+pt		Perm	pm+pt		Perm	Perm		Perm	
Protected Phases	1	1	6		5	2			4		8
Permitted Phases	6	6		6	2		2	4		8	
Detector Phases	1	1	6	6	5	2	2	4	4	8	8
Minimum Initial (s)	4.0	4.0	7.0	7.0	4.0	7.0	7.0	6.0	6.0	6.0	6.0
Minimum Split (s)	9.5	9.5	30.5	30.5	9.5	30.5	30.5	39.0	39.0	39.0	39.0
Total Split (s)	22.0	22.0	92.0	92.0	22.0	92.0	92.0	46.0	46.0	46.0	46.0
Total Split (%)	13.8%	13.8%	57.5%	57.5%	13.8%	57.5%	57.5%	28.8%	28.8%	28.8%	28.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	None	C-Max	C-Max	None	C-Max	C-Max	Max	Max	Max	Max

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 116 (73%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Splits and Phases: 10: Sample Road & NW 42nd Avenue

 ø1	 ø2	 ø4
22 s	92 s	46 s
 ø5	 ø6	 ø8
22 s	92 s	46 s

HCM Signalized Intersection Capacity Analysis

11: Sample Road & Tradewinds Park Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		  				  						 
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0		4.0
Lane Util. Factor	1.00	0.91	1.00		1.00	0.91	1.00		1.00	1.00		1.00
Frt	1.00	1.00	0.85		1.00	1.00	0.85		1.00	0.85		0.92
Flt Protected	0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00		0.99
Satd. Flow (prot)	1770	5085	1583		1770	5085	1583		1776	1583		1683
Flt Permitted	0.03	1.00	1.00		0.04	1.00	1.00		0.86	1.00		0.90
Satd. Flow (perm)	56	5085	1583		66	5085	1583		1600	1583		1540
Volume (vph)	13	2486	9	14	14	4010	3	34	1	36	6	2
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	14	2673	10	15	15	4312	3	37	1	39	6	2
RTOR Reduction (vph)	0	0	1	0	0	0	0	0	0	37	0	12
Lane Group Flow (vph)	14	2673	9	0	30	4312	3	0	38	2	0	9
Turn Type	pm+pt		Perm	pm+pt	pm+pt		Perm	Perm		Perm	Perm	
Protected Phases	1	6		5	5	2			4			8
Permitted Phases	6		6	2	2		2	4		4	8	
Actuated Green, G (s)	133.9	132.1	132.1		137.5	133.9	133.9		7.3	7.3		7.3
Effective Green, g (s)	136.9	133.6	133.6		140.5	135.4	135.4		9.3	9.3		9.3
Actuated g/C Ratio	0.86	0.84	0.84		0.88	0.85	0.85		0.06	0.06		0.06
Clearance Time (s)	5.5	5.5	5.5		5.5	5.5	5.5		6.0	6.0		6.0
Vehicle Extension (s)	1.5	3.0	3.0		1.5	3.0	3.0		2.0	2.0		2.0
Lane Grp Cap (vph)	83	4246	1322		112	4303	1340		93	92		90
v/s Ratio Prot	0.00	0.53			c0.01	c0.85						
v/s Ratio Perm	0.14		0.01		0.23		0.00		c0.02	0.00		0.01
v/c Ratio	0.17	0.63	0.01		0.27	1.00	0.00		0.41	0.02		0.10
Uniform Delay, d1	77.3	4.6	2.2		5.4	12.3	1.9		72.7	71.1		71.4
Progression Factor	1.95	4.30	2.05		1.06	0.67	1.10		1.00	1.00		1.00
Incremental Delay, d2	0.2	0.4	0.0		0.1	7.3	0.0		1.1	0.0		0.2
Delay (s)	151.4	20.2	4.5		5.8	15.5	2.1		73.8	71.1		71.5
Level of Service	F	C	A		A	B	A		E	E		E
Approach Delay (s)		20.8				15.5			72.4			71.5
Approach LOS		C				B			E			E
Intersection Summary												
HCM Average Control Delay			18.3			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			90.8%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-135

HCM Signalized Intersection Capacity Analysis
11: Sample Road & Tradewinds Park Road

PM Peak Hour
Future Total Traffic Conditions

Movement SBR

Lane Configurations

Ideal Flow (vphpl) 1900

Total Lost time (s)

Lane Util. Factor

Frt

Flt Protected

Satd. Flow (prot)

Flt Permitted

Satd. Flow (perm)

Volume (vph) 12

Peak-hour factor, PHF 0.93

Adj. Flow (vph) 13

RTOR Reduction (vph) 0

Lane Group Flow (vph) 0

Turn Type

Protected Phases

Permitted Phases

Actuated Green, G (s)

Effective Green, g (s)

Actuated g/C Ratio

Clearance Time (s)

Vehicle Extension (s)

Lane Grp Cap (vph)

v/s Ratio Prot

v/s Ratio Perm

v/c Ratio

Uniform Delay, d1

Progression Factor

Incremental Delay, d2

Delay (s)

Level of Service

Approach Delay (s)

Approach LOS

Intersection Summary

Phasings

11: Sample Road & Tradewinds Park Road

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		  				  						 
Volume (vph)	13	2486	9	14	14	4010	3	34	1	36	6	2
Turn Type	pm+pt		Perm	pm+pt	pm+pt		Perm	Perm		Perm	Perm	
Protected Phases	1	6		5	5	2			4			8
Permitted Phases	6		6	2	2		2	4		4	8	
Detector Phases	1	6	6	5	5	2	2	4	4	4	8	8
Minimum Initial (s)	4.0	15.0	15.0	4.0	4.0	15.0	15.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	9.5	34.5	34.5	9.5	9.5	34.5	34.5	45.0	45.0	45.0	45.0	45.0
Total Split (s)	16.0	98.0	98.0	16.0	16.0	98.0	98.0	46.0	46.0	46.0	46.0	46.0
Total Split (%)	10.0%	61.3%	61.3%	10.0%	10.0%	61.3%	61.3%	28.8%	28.8%	28.8%	28.8%	28.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Min	C-Min	None	None	C-Min	C-Min	None	None	None	None	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 69 (43%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Splits and Phases: 11: Sample Road & Tradewinds Park Road

		
ø1	ø2	ø4
16 s	98 s	46 s
		
ø5	ø6	ø8
16 s	98 s	46 s

HCM Signalized Intersection Capacity Analysis

12: Sample Road & Florida's Turnpike

PM Peak Hour
Future Total Traffic Conditions

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑	↘↙	↑↑↑	↘↙	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	1.00	0.97	0.91	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	3433	5085	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	3433	5085	3433	1583
Volume (vph)	1649	941	1214	2957	973	546
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1812	1034	1334	3249	1069	600
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1812	1034	1334	3249	1069	600
Turn Type		Free	Prot			Free
Protected Phases	6		5	2	4	
Permitted Phases		Free				Free
Actuated Green, G (s)	43.0	160.0	56.0	105.0	44.0	160.0
Effective Green, g (s)	44.0	160.0	58.0	106.0	46.0	160.0
Actuated g/C Ratio	0.28	1.00	0.36	0.66	0.29	1.00
Clearance Time (s)	5.0		6.0	5.0	6.0	
Vehicle Extension (s)	3.0		2.0	3.0	2.5	
Lane Grp Cap (vph)	1398	1583	1244	3369	987	1583
v/s Ratio Prot	c0.36		c0.39	0.64	c0.31	
v/s Ratio Perm		0.65				0.38
v/c Ratio	1.30	0.65	1.07	0.96	1.08	0.38
Uniform Delay, d1	58.0	0.0	51.0	25.2	57.0	0.0
Progression Factor	0.64	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	137.7	1.7	47.3	9.2	53.9	0.7
Delay (s)	174.7	1.7	98.3	34.4	110.9	0.7
Level of Service	F	A	F	C	F	A
Approach Delay (s)	111.9			53.0	71.3	
Approach LOS	F			D	E	
Intersection Summary						
HCM Average Control Delay			74.8		HCM Level of Service	E
HCM Volume to Capacity ratio			1.14			
Actuated Cycle Length (s)			160.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			104.3%		ICU Level of Service	G
Analysis Period (min)			15			
c Critical Lane Group						

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-138

Phasings
12: Sample Road & Florida's Turnpike

PM Peak Hour
Future Total Traffic Conditions

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑	↘↙	↑↑↑	↘↙	↑
Volume (vph)	1649	941	1214	2957	973	546
Turn Type		Free	Prot			Free
Protected Phases	6		5	2	4	
Permitted Phases		Free				Free
Detector Phases	6		5	2	4	
Minimum Initial (s)	15.0		5.0	15.0	6.0	
Minimum Split (s)	21.0		11.0	23.0	22.0	
Total Split (s)	48.0	0.0	62.0	110.0	50.0	0.0
Total Split (%)	30.0%	0.0%	38.8%	68.8%	31.3%	0.0%
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	1.0		2.0	1.0	2.0	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	C-Min		None	C-Min	None	

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 101 (63%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Splits and Phases: 12: Sample Road & Florida's Turnpike

← ø2		↖ ø4
110 s		50 s
↙ ø5	→ ø6	
62 s	48 s	

HCM Signalized Intersection Capacity Analysis

15: Wiles Road & SR 7

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.95	1.00		0.97	0.91	1.00		0.97
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (prot)	3433	5085	1583	3433	3539	1583		3433	5085	1583		3433
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (perm)	3433	5085	1583	3433	3539	1583		3433	5085	1583		3433
Volume (vph)	675	590	315	332	810	339	91	641	1890	218	28	259
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	703	615	328	346	844	353	95	668	1969	227	29	270
RTOR Reduction (vph)	0	0	1	0	0	97	0	0	0	63	0	0
Lane Group Flow (vph)	703	615	327	346	844	256	0	763	1969	164	0	299
Turn Type	Prot	pm+ov		Prot		Perm	Prot	Prot	pm+ov		Prot	Prot
Protected Phases	7	4	5!	3	8		5!	5	2	3	1	1
Permitted Phases			4			8				2		
Actuated Green, G (s)	33.0	58.1	82.0	14.0	39.1	39.1		23.9	49.9	63.9		14.0
Effective Green, g (s)	35.0	60.1	86.0	16.0	41.1	41.1		25.9	51.9	67.9		16.0
Actuated g/C Ratio	0.22	0.38	0.54	0.10	0.26	0.26		0.16	0.32	0.42		0.10
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0		6.0
Vehicle Extension (s)	1.5	2.0	1.5	1.5	2.0	2.0		1.5	1.0	1.5		1.5
Lane Grp Cap (vph)	751	1910	890	343	909	407		556	1649	711		343
v/s Ratio Prot	0.20	0.12	0.06	0.10	c0.24			c0.22	0.39	0.02		0.09
v/s Ratio Perm			0.15			0.16				0.08		
v/c Ratio	0.94	0.32	0.37	1.01	0.93	0.63		1.37	1.19	0.23		0.87
Uniform Delay, d1	61.4	35.5	21.3	72.0	58.0	52.7		67.0	54.0	29.4		71.0
Progression Factor	1.00	1.00	1.00	0.98	1.23	1.43		1.40	0.87	0.53		1.00
Incremental Delay, d2	18.6	0.0	0.1	49.4	14.4	2.1		173.3	90.6	0.0		20.2
Delay (s)	80.0	35.5	21.4	119.9	85.8	77.3		267.5	137.4	15.5		91.2
Level of Service	F	D	C	F	F	E		F	F	B		F
Approach Delay (s)		51.7			91.5				161.6			
Approach LOS		D			F				F			

Intersection Summary

HCM Average Control Delay	131.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	109.2%	ICU Level of Service	H
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis 15: Wiles Road & SR 7

PM Peak Hour
Future Total Traffic Conditions

	↓	↙
Movement	SBT	SBR
Left Lane Configurations	↑↑↑	↑
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	0.91	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5085	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5085	1583
Volume (vph)	1727	799
Peak-hour factor, PHF	0.96	0.96
Adj. Flow (vph)	1799	832
RTOR Reduction (vph)	0	5
Lane Group Flow (vph)	1799	827
Turn Type	pm+ov	
Protected Phases	6	7
Permitted Phases		6
Actuated Green, G (s)	40.0	73.0
Effective Green, g (s)	42.0	77.0
Actuated g/C Ratio	0.26	0.48
Clearance Time (s)	6.0	6.0
Vehicle Extension (s)	1.0	1.5
Lane Grp Cap (vph)	1335	801
v/s Ratio Prot	c0.35	c0.23
v/s Ratio Perm		0.30
v/c Ratio	1.35	1.03
Uniform Delay, d1	59.0	41.5
Progression Factor	1.00	1.00
Incremental Delay, d2	161.5	40.4
Delay (s)	220.5	81.9
Level of Service	F	F
Approach Delay (s)	167.9	
Approach LOS	F	
Intersection Summary		

Phasings
15: Wiles Road & SR 7

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	 		 	  		  		
Volume (vph)	675	590	315	332	810	339	641	1890	218	259	1727	799
Turn Type	Prot	pm+ov		Prot	Perm		Prot	pm+ov		Prot	pm+ov	
Protected Phases	7	4	5!	3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phases	7	4	5	3	8	8	5	2	3	1	6	7
Minimum Initial (s)	5.0	6.0	5.0	5.0	6.0	6.0	5.0	7.0	5.0	5.0	7.0	5.0
Minimum Split (s)	11.0	43.0	11.0	11.0	40.0	40.0	11.0	42.0	11.0	11.0	42.0	11.0
Total Split (s)	39.0	65.0	29.0	20.0	46.0	46.0	29.0	55.0	20.0	20.0	46.0	39.0
Total Split (%)	24.4%	40.6%	18.1%	12.5%	28.8%	28.8%	18.1%	34.4%	12.5%	12.5%	28.8%	24.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	None	C-Max	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 1 (1%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

! Phase conflict between lane groups.

Splits and Phases: 15: Wiles Road & SR 7

 ø1	 ø2	 ø3	 ø4
20 s	55 s	20 s	65 s
 ø5	 ø6	 ø7	 ø8
29 s	46 s	39 s	46 s

HCM Signalized Intersection Capacity Analysis

16: Wiles Road & Banks Road

PM Peak Hour
Future Total Traffic Conditions

							
Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0
Lane Util. Factor		0.95		1.00	0.95	1.00	1.00
Frt		0.98		1.00	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)		3465		1770	3539	1770	1583
Flt Permitted		1.00		0.20	1.00	0.95	1.00
Satd. Flow (perm)		3465		368	3539	1770	1583
Volume (vph)	0	929	151	292	974	179	184
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	1056	172	332	1107	203	209
RTOR Reduction (vph)	0	5	0	0	0	0	96
Lane Group Flow (vph)	0	1223	0	332	1107	203	113
Turn Type	Perm			Perm			Perm
Protected Phases		4			8	2	
Permitted Phases	4			8			2
Actuated Green, G (s)		122.5		122.5	122.5	27.5	27.5
Effective Green, g (s)		123.5		123.5	123.5	28.5	28.5
Actuated g/C Ratio		0.77		0.77	0.77	0.18	0.18
Clearance Time (s)		5.0		5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		2675		284	2732	315	282
v/s Ratio Prot		0.35			0.31	0.11	
v/s Ratio Perm				0.90			0.07
v/c Ratio		0.46		1.17	0.41	0.64	0.40
Uniform Delay, d1		6.4		18.2	6.1	61.0	58.2
Progression Factor		1.48		2.02	1.23	1.00	1.00
Incremental Delay, d2		0.1		79.8	0.0	9.8	4.2
Delay (s)		9.6		116.8	7.4	70.8	62.4
Level of Service		A		F	A	E	E
Approach Delay (s)		9.6			32.7	66.5	
Approach LOS		A			C	E	
Intersection Summary							
HCM Average Control Delay			28.0		HCM Level of Service		C
HCM Volume to Capacity ratio			1.07				
Actuated Cycle Length (s)			160.0		Sum of lost time (s)		8.0
Intersection Capacity Utilization			66.6%		ICU Level of Service		C
Analysis Period (min)			15				
c Critical Lane Group							

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11/18/2009

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Application for Development Approval

21-K-143

Phasings
16: Wiles Road & Banks Road

PM Peak Hour
Future Total Traffic Conditions

					
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	 		 		 
Volume (vph)	929	292	974	179	184
Turn Type		Perm			Perm
Protected Phases	4		8	2	
Permitted Phases		8			2
Detector Phases	4	8	8	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	21.0	21.0	21.0	21.0
Total Split (s)	104.0	104.0	104.0	56.0	56.0
Total Split (%)	65.0%	65.0%	65.0%	35.0%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	C-Min	C-Min

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated

Splits and Phases: 16: Wiles Road & Banks Road

 ø2	 ø4
56 s	104 s
	 ø8
	104 s

HCM Signalized Intersection Capacity Analysis

17: Wiles Road & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4897	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4897	
Volume (vph)	434	1128	274	227	1479	171	494	2121	285	136	1643	539
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	452	1175	285	236	1541	178	515	2209	297	142	1711	561
RTOR Reduction (vph)	0	0	130	0	0	47	0	0	113	0	37	0
Lane Group Flow (vph)	452	1175	155	236	1541	131	515	2209	184	142	2235	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	20.0	50.5	50.5	14.5	45.0	45.0	14.0	60.6	60.6	10.4	57.0	
Effective Green, g (s)	22.0	52.5	52.5	16.5	47.0	47.0	16.0	62.6	62.6	12.4	59.0	
Actuated g/C Ratio	0.14	0.33	0.33	0.10	0.29	0.29	0.10	0.39	0.39	0.08	0.37	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.5	3.0	3.0	1.5	3.0	
Lane Grp Cap (vph)	472	1161	519	354	1040	465	343	1990	619	266	1806	
v/s Ratio Prot	c0.13	0.33		0.07	c0.44		c0.15	c0.43		0.04	c0.46	
v/s Ratio Perm			0.10			0.08			0.12			
v/c Ratio	0.96	1.01	0.30	0.67	1.48	0.28	1.50	1.11	0.30	0.53	1.24	
Uniform Delay, d1	68.5	53.8	40.0	69.1	56.5	43.5	72.0	48.7	33.5	71.0	50.5	
Progression Factor	1.06	0.98	1.02	0.44	1.06	1.25	1.09	1.05	1.57	1.00	1.00	
Incremental Delay, d2	29.6	29.0	0.1	0.3	217.3	0.0	234.6	54.4	0.7	1.0	111.9	
Delay (s)	102.4	81.6	40.8	30.7	277.3	54.3	313.0	105.6	53.4	72.1	162.4	
Level of Service	F	F	D	C	F	D	F	F	D	E	F	
Approach Delay (s)		80.5			227.3			135.8			157.1	
Approach LOS		F			F			F			F	
Intersection Summary												
HCM Average Control Delay			149.2			HCM Level of Service			F			
HCM Volume to Capacity ratio			1.33									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			124.5%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-145

Phasings

17: Wiles Road & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	 	 		 	 		 	  		 	  
Volume (vph)	434	1128	274	227	1479	171	494	2121	285	136	1643
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot	
Protected Phases	7	4		3	8		5	2		1	6
Permitted Phases			4			8			2		
Detector Phases	7	4	4	3	8	8	5	2	2	1	6
Minimum Initial (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	12.0	12.0	5.0	12.0
Minimum Split (s)	11.0	48.0	48.0	11.0	45.0	45.0	11.0	49.0	49.0	11.0	49.0
Total Split (s)	26.0	51.0	51.0	26.0	51.0	51.0	20.0	63.0	63.0	20.0	63.0
Total Split (%)	16.3%	31.9%	31.9%	16.3%	31.9%	31.9%	12.5%	39.4%	39.4%	12.5%	39.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 132 (83%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Splits and Phases: 17: Wiles Road & Lyons Road

			
ø1	ø2	ø3	ø4
20 s	63 s	26 s	51 s
			
ø5	ø6	ø7	ø8
20 s	63 s	26 s	51 s

HCM Signalized Intersection Capacity Analysis

18: Wiles Road & Powerline Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL
Lane Configurations		 			 				  			 
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	0.95	1.00		0.97	1.00	1.00	1.00	0.91	1.00		0.97
Frt	1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (prot)	1770	3539	1583		3433	1863	1583	1770	5085	1583		3433
Flt Permitted	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (perm)	1770	3539	1583		3433	1863	1583	1770	5085	1583		3433
Volume (vph)	177	1139	134	18	898	1411	358	169	1554	432	23	323
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	188	1212	143	19	955	1501	381	180	1653	460	24	344
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	208	0	0
Lane Group Flow (vph)	188	1212	143	0	974	1501	381	180	1653	252	0	368
Turn Type	Prot		Free	Prot	Prot		Free	Prot		Perm	Prot	Prot
Protected Phases	7	4		3	3			5	2		1	1
Permitted Phases			Free			8	Free			2		
Actuated Green, G (s)	19.8	23.0	160.0		29.1	32.3	160.0	17.3	62.5	62.5		17.9
Effective Green, g (s)	23.3	26.0	160.0		32.6	35.3	160.0	19.8	65.0	65.0		20.4
Actuated g/C Ratio	0.15	0.16	1.00		0.20	0.22	1.00	0.12	0.41	0.41		0.13
Clearance Time (s)	7.5	7.0			7.5	7.0		6.5	6.5	6.5		6.5
Vehicle Extension (s)	1.5	2.0			1.5	2.0		1.5	3.0	3.0		1.5
Lane Grp Cap (vph)	258	575	1583		699	411	1583	219	2066	643		438
v/s Ratio Prot	0.11	0.34			c0.28			0.10	c0.33			c0.11
v/s Ratio Perm			0.09			c0.81	c0.24			0.16		
v/c Ratio	0.73	2.11	0.09		1.39	3.65	0.24	0.82	0.80	0.39		0.84
Uniform Delay, d1	65.3	67.0	0.0		63.7	62.4	0.0	68.4	41.8	33.5		68.2
Progression Factor	0.86	1.28	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	4.2	501.4	0.1		185.7	1199.4	0.4	20.4	3.4	1.8		13.0
Delay (s)	60.1	586.8	0.1		249.4	1261.8	0.4	88.8	45.1	35.3		81.2
Level of Service	E	F	A		F	F	A	F	D	D		F
Approach Delay (s)		468.3				748.3			46.6			
Approach LOS		F				F			D			
Intersection Summary												
HCM Average Control Delay			358.9				HCM Level of Service		F			
HCM Volume to Capacity ratio			1.62									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			137.3%				ICU Level of Service		H			
Analysis Period (min)			15									
c Critical Lane Group												

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11/18/2009

Kimley Horn and Associates

HCM Signalized Intersection Capacity Analysis 18: Wiles Road & Powerline Road

PM Peak Hour
Future Total Traffic Conditions

	↓	↙
Movement	SBT	SBR
Lane Configurations	↑↑↑	↑
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	0.91	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5085	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5085	1583
Volume (vph)	1144	206
Peak-hour factor, PHF	0.94	0.94
Adj. Flow (vph)	1217	219
RTOR Reduction (vph)	0	129
Lane Group Flow (vph)	1217	90
Turn Type		Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	63.1	63.1
Effective Green, g (s)	65.6	65.6
Actuated g/C Ratio	0.41	0.41
Clearance Time (s)	6.5	6.5
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	2085	649
v/s Ratio Prot	0.24	
v/s Ratio Perm		0.06
v/c Ratio	0.58	0.14
Uniform Delay, d1	36.6	29.5
Progression Factor	1.00	1.00
Incremental Delay, d2	1.2	0.4
Delay (s)	37.8	30.0
Level of Service	D	C
Approach Delay (s)	45.7	
Approach LOS	D	
Intersection Summary		

Phasings

18: Wiles Road & Powerline Road

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	177	1139	134	898	1411	358	169	1554	432	323	1144	206
Turn Type	Prot		Free	Prot		Free	Prot		Perm	Prot		Perm
Protected Phases	7	4		3			5	2		1	6	
Permitted Phases			Free		8	Free			2			6
Detector Phases	7	4		3	8		5	2	2	1	6	6
Minimum Initial (s)	5.0	6.0		5.0	6.0		5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.5	43.0		12.5	43.0		11.5	48.5	48.5	11.5	48.5	48.5
Total Split (s)	31.0	30.0	0.0	31.0	30.0	0.0	25.0	74.0	74.0	25.0	74.0	74.0
Total Split (%)	19.4%	18.8%	0.0%	19.4%	18.8%	0.0%	15.6%	46.3%	46.3%	15.6%	46.3%	46.3%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.5	3.0		3.5	3.0		2.5	2.5	2.5	2.5	2.5	2.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	C-Min	C-Min

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 63 (39%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Splits and Phases: 18: Wiles Road & Powerline Road

			
ø1	ø2	ø3	ø4
25 s	74 s	31 s	30 s
			
ø5	ø6	ø7	ø8
25 s	74 s	31 s	30 s

HCM Signalized Intersection Capacity Analysis

19: NW 31st Street & SR 7

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.91			1.00	0.91
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99			1.00	0.99
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3408		1770	5037			1770	5024
Flt Permitted	0.65	1.00	1.00	0.62	1.00		0.95	1.00			0.07	1.00
Satd. Flow (perm)	1219	3539	1583	1158	3408		1770	5037			138	5024
Volume (vph)	95	54	478	210	113	37	489	2178	147	18	36	1574
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	98	56	493	216	116	38	504	2245	152	19	37	1623
RTOR Reduction (vph)	0	0	335	0	22	0	0	3	0	0	0	7
Lane Group Flow (vph)	98	56	158	216	132	0	504	2394	0	0	56	1759
Turn Type	pm+pt		Perm	pm+pt			Prot			pm+pt	pm+pt	
Protected Phases	7	4		3	8		5	2		1	1	6
Permitted Phases	4		4	8						6	6	
Actuated Green, G (s)	29.9	19.2	19.2	36.5	22.5		50.8	98.4			56.9	52.0
Effective Green, g (s)	33.9	21.2	21.2	40.5	24.5		52.8	99.9			60.9	54.0
Actuated g/C Ratio	0.21	0.13	0.13	0.25	0.15		0.33	0.62			0.38	0.34
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	5.5			6.0	6.0
Vehicle Extension (s)	1.5	2.0	2.0	1.5	2.0		2.5	3.0			1.5	3.0
Lane Grp Cap (vph)	302	469	210	354	522		584	3145			123	1696
v/s Ratio Prot	0.03	0.02		c0.06	0.04		c0.28	0.48			0.02	c0.35
v/s Ratio Perm	0.04		c0.10	0.09							0.15	
v/c Ratio	0.32	0.12	0.75	0.61	0.25		0.86	0.76			0.46	1.04
Uniform Delay, d1	52.6	61.2	66.9	51.0	59.7		50.2	21.5			51.1	53.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.08	0.80
Incremental Delay, d2	0.2	0.0	12.7	2.2	0.1		12.4	1.8			0.9	31.5
Delay (s)	52.8	61.2	79.5	53.2	59.8		62.6	23.3			56.2	73.7
Level of Service	D	E	E	D	E		E	C			E	E
Approach Delay (s)		73.9			55.9			30.1				73.2
Approach LOS		E			E			C				E
Intersection Summary												
HCM Average Control Delay			50.4			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			90.6%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-150

HCM Signalized Intersection Capacity Analysis
19: NW 31st Street & SR 7

PM Peak Hour
Future Total Traffic Conditions

Movement SBR

~~Left~~ Lane Configurations

Ideal Flow (vphpl) 1900

Total Lost time (s)

Lane Util. Factor

Frt

Flt Protected

Satd. Flow (prot)

Flt Permitted

Satd. Flow (perm)

Volume (vph) 139

Peak-hour factor, PHF 0.97

Adj. Flow (vph) 143

RTOR Reduction (vph) 0

Lane Group Flow (vph) 0

Turn Type

Protected Phases

Permitted Phases

Actuated Green, G (s)

Effective Green, g (s)

Actuated g/C Ratio

Clearance Time (s)

Vehicle Extension (s)

Lane Grp Cap (vph)

v/s Ratio Prot

v/s Ratio Perm

v/c Ratio

Uniform Delay, d1

Progression Factor

Incremental Delay, d2

Delay (s)

Level of Service

Approach Delay (s)

Approach LOS

Intersection Summary

Phasings

19: NW 31st Street & SR 7

PM Peak Hour
Future Total Traffic Conditions

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBU	SBL	SBT
Lane Configurations										
Volume (vph)	95	54	478	210	113	489	2178	18	36	1574
Turn Type	pm+pt		Perm	pm+pt		Prot		pm+pt	pm+pt	
Protected Phases	7	4		3	8	5	2	1	1	6
Permitted Phases	4		4	8				6	6	
Detector Phases	7	4	4	3	8	5	2	1	1	6
Minimum Initial (s)	4.0	6.0	6.0	4.0	6.0	4.0	15.0	4.0	4.0	15.0
Minimum Split (s)	10.0	29.0	29.0	10.0	29.0	10.0	30.5	10.0	10.0	31.0
Total Split (s)	20.0	42.0	42.0	20.0	42.0	40.0	84.0	14.0	14.0	58.0
Total Split (%)	12.5%	26.3%	26.3%	12.5%	26.3%	25.0%	52.5%	8.8%	8.8%	36.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	1.5	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Min	None	None	C-Min

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 106 (66%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Splits and Phases: 19: NW 31st Street & SR 7

											
ø1	ø2	ø3	ø4	ø5	ø6	ø7	ø8	ø9	ø10	ø11	ø12
14 s	84 s	20 s	42 s	40 s	58 s	20 s	42 s	20 s	42 s	20 s	42 s

HCM Unsignalized Intersection Capacity Analysis

20: NW 40th Street & SR 7

PM Peak Hour
Future Total Traffic Conditions

									
Movement	WBL	WBR	NBT	NBR	SBL	SBT			
Lane Configurations			  			  			
Sign Control	Stop		Free			Free			
Grade	0%		0%			0%			
Volume (veh/h)	0	202	2429	160	0	2013			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97			
Hourly flow rate (vph)	0	208	2504	165	0	2075			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type	None								
Median storage (veh)									
Upstream signal (ft)						734			
pX, platoon unblocked	0.80								
vC, conflicting volume	3196	835				2669			
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	3246	835				2669			
tC, single (s)	6.8	6.9				4.1			
tC, 2 stage (s)									
tF (s)	3.5	3.3				2.2			
p0 queue free %	100	33				100			
cM capacity (veh/h)	6	311				154			
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	
Volume Total	208	835	835	835	165	692	692	692	
Volume Left	0	0	0	0	0	0	0	0	
Volume Right	208	0	0	0	165	0	0	0	
cSH	311	1700	1700	1700	1700	1700	1700	1700	
Volume to Capacity	0.67	0.49	0.49	0.49	0.10	0.41	0.41	0.41	
Queue Length 95th (ft)	113	0	0	0	0	0	0	0	
Control Delay (s)	37.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Lane LOS	E								
Approach Delay (s)	37.2	0.0					0.0		
Approach LOS	E								
Intersection Summary									
Average Delay			1.6						
Intersection Capacity Utilization			66.1%	ICU Level of Service				C	
Analysis Period (min)			15						

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-153

HCM Signalized Intersection Capacity Analysis

21: Cullum Road/Turtle Creek Drive & SR 7

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	1.00		1.00	0.95	1.00		0.97	0.91	1.00		0.97
Frt	1.00	0.90		1.00	1.00	0.85		1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (prot)	1770	1679		1770	3539	1583		3433	5085	1583		3433
Flt Permitted	0.73	1.00		0.42	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (perm)	1351	1679		786	3539	1583		3433	5085	1583		3433
Volume (vph)	295	66	126	135	45	277	42	118	2343	250	43	419
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	301	67	129	138	46	283	43	120	2391	255	44	428
RTOR Reduction (vph)	0	43	0	0	0	107	0	0	0	71	0	0
Lane Group Flow (vph)	301	153	0	138	46	176	0	163	2391	184	0	472
Turn Type	Perm			Perm		Perm	Prot	Prot		Perm	Prot	Prot
Protected Phases		4			8		5	5	2		1	1
Permitted Phases	4			8		8				2		
Actuated Green, G (s)	32.0	32.0		32.0	32.0	32.0		11.4	86.8	86.8		23.2
Effective Green, g (s)	34.0	34.0		34.0	34.0	34.0		13.4	88.8	88.8		25.2
Actuated g/C Ratio	0.21	0.21		0.21	0.21	0.21		0.08	0.55	0.55		0.16
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		6.0	6.0	6.0		6.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0		1.5	0.2	0.2		1.5
Lane Grp Cap (vph)	287	357		167	752	336		288	2822	879		541
v/s Ratio Prot		0.09			0.01			0.05	c0.47			c0.14
v/s Ratio Perm	c0.22			0.18		0.11				0.12		
v/c Ratio	1.05	0.43		0.83	0.06	0.52		0.57	0.85	0.21		0.87
Uniform Delay, d1	63.0	54.6		60.2	50.3	55.8		70.5	29.9	17.9		65.8
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.15	0.65	0.24		1.08
Incremental Delay, d2	66.5	0.3		26.0	0.0	0.7		1.4	3.1	0.5		1.5
Delay (s)	129.5	54.9		86.2	50.3	56.5		82.8	22.7	4.8		72.8
Level of Service	F	D		F	D	E		F	C	A		E
Approach Delay (s)		100.1			64.7				24.5			
Approach LOS		F			E				C			
Intersection Summary												
HCM Average Control Delay			32.3				HCM Level of Service		C			
HCM Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			105.3%				ICU Level of Service		G			
Analysis Period (min)			15									
c Critical Lane Group												

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11/18/2009

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HCM Signalized Intersection Capacity Analysis
21: Cullum Road/Turtle Creek Drive & SR 7

PM Peak Hour
Future Total Traffic Conditions

	↓	↙
Movement	SBT	SBR
Lane Configurations	↑↑↑	↑
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	0.91	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5085	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5085	1583
Volume (vph)	1756	298
Peak-hour factor, PHF	0.98	0.98
Adj. Flow (vph)	1792	304
RTOR Reduction (vph)	0	81
Lane Group Flow (vph)	1792	223
Turn Type		Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	98.6	98.6
Effective Green, g (s)	100.6	100.6
Actuated g/C Ratio	0.63	0.63
Clearance Time (s)	6.0	6.0
Vehicle Extension (s)	0.2	0.2
Lane Grp Cap (vph)	3197	995
v/s Ratio Prot	0.35	
v/s Ratio Perm		0.14
v/c Ratio	0.56	0.22
Uniform Delay, d1	17.0	12.8
Progression Factor	0.63	0.50
Incremental Delay, d2	0.1	0.0
Delay (s)	10.9	6.5
Level of Service	B	A
Approach Delay (s)	21.7	
Approach LOS	C	
Intersection Summary		

Phasings

21: Cullum Road/Turtle Creek Drive & SR 7

PM Peak Hour
Future Total Traffic Conditions

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	295	66	135	45	277	118	2343	250	419	1756	298
Turn Type	Perm		Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8			2			6
Detector Phases	4	4	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	5.0	7.0	7.0	5.0	7.0	7.0
Minimum Split (s)	38.0	38.0	38.0	38.0	38.0	11.0	34.0	34.0	11.0	34.0	34.0
Total Split (s)	38.0	38.0	38.0	38.0	38.0	21.0	92.0	92.0	30.0	101.0	101.0
Total Split (%)	23.8%	23.8%	23.8%	23.8%	23.8%	13.1%	57.5%	57.5%	18.8%	63.1%	63.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 138 (86%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Splits and Phases: 21: Cullum Road/Turtle Creek Drive & SR 7

		
ø1	ø2	ø4
30 s	92 s	38 s
		
ø5	ø6	ø8
21 s	101 s	38 s

HCM Signalized Intersection Capacity Analysis

22: Creekside Drive/Winston Park Boulevard & SR 7

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.91	1.00		1.00
Frt	1.00	0.94		1.00	0.92			1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00	1.00		0.95
Satd. Flow (prot)	1770	3314		1770	3264			1770	5085	1583		1770
Flt Permitted	0.25	1.00		0.69	1.00			0.05	1.00	1.00		0.05
Satd. Flow (perm)	469	3314		1277	3264			94	5085	1583		90
Volume (vph)	132	55	41	269	155	167	79	53	2469	283	36	168
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	136	57	42	277	160	172	81	55	2545	292	37	173
RTOR Reduction (vph)	0	38	0	0	102	0	0	0	0	75	0	0
Lane Group Flow (vph)	136	61	0	277	230	0	0	136	2545	217	0	210
Turn Type	pm+pt			pm+pt			pm+pt	pm+pt		Perm	pm+pt	pm+pt
Protected Phases	7	4		3	8		5	5	2		1	1
Permitted Phases	4			8			2	2		2	6	6
Actuated Green, G (s)	22.8	13.9		23.0	14.0			88.7	76.9	76.9		109.1
Effective Green, g (s)	26.8	15.9		27.0	16.0			92.7	78.9	78.9		111.1
Actuated g/C Ratio	0.18	0.11		0.18	0.11			0.62	0.53	0.53		0.74
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0	6.0	6.0		6.0
Vehicle Extension (s)	1.5	2.0		1.5	2.0			1.5	0.2	0.2		1.5
Lane Grp Cap (vph)	178	351		266	348			212	2675	833		383
v/s Ratio Prot	0.06	0.02		c0.08	0.07			c0.06	c0.50			0.10
v/s Ratio Perm	0.08			c0.11				0.34		0.14		0.30
v/c Ratio	0.76	0.18		1.04	0.66			0.64	0.95	0.26		0.55
Uniform Delay, d1	55.2	61.1		60.4	64.4			38.0	33.7	19.5		42.8
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2	15.9	0.1		66.4	3.6			4.9	9.3	0.8		0.9
Delay (s)	71.1	61.2		126.8	68.0			42.9	43.0	20.3		43.7
Level of Service	E	E		F	E			D	D	C		D
Approach Delay (s)		66.9			94.8				40.8			
Approach LOS		E			F				D			
Intersection Summary												
HCM Average Control Delay			39.6			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			92.2%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

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11/18/2009

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HCM Signalized Intersection Capacity Analysis
22: Creekside Drive/Winston Park Boulevard & SR 7

PM Peak Hour
Future Total Traffic Conditions

	↓	↙
Movement	SBT	SBR
Lane Configurations	↑↑↑	↑
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	0.91	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5085	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5085	1583
Volume (vph)	2658	349
Peak-hour factor, PHF	0.97	0.97
Adj. Flow (vph)	2740	360
RTOR Reduction (vph)	0	64
Lane Group Flow (vph)	2740	296
Turn Type		Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	91.3	91.3
Effective Green, g (s)	93.3	93.3
Actuated g/C Ratio	0.62	0.62
Clearance Time (s)	6.0	6.0
Vehicle Extension (s)	0.2	0.2
Lane Grp Cap (vph)	3163	985
v/s Ratio Prot	0.54	
v/s Ratio Perm		0.19
v/c Ratio	0.87	0.30
Uniform Delay, d1	23.2	13.2
Progression Factor	1.00	1.00
Incremental Delay, d2	3.5	0.8
Delay (s)	26.7	14.0
Level of Service	C	B
Approach Delay (s)	26.4	
Approach LOS	C	
Intersection Summary		

Phasings

22: Creekside Drive/Winston Park Boulevard & SR 7

PM Peak Hour

Future Total Traffic Conditions

												
Lane Group	EBL	EBT	WBL	WBT	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	132	55	269	155	79	53	2469	283	36	168	2658	349
Turn Type	pm+pt		pm+pt		pm+pt	pm+pt		Perm	pm+pt	pm+pt		Perm
Protected Phases	7	4	3	8	5	5	2		1	1	6	
Permitted Phases	4		8		2	2		2	6	6		6
Detector Phases	7	4	3	8	5	5	2	2	1	1	6	6
Minimum Initial (s)	4.0	6.0	4.0	6.0	4.0	4.0	7.0	7.0	4.0	4.0	7.0	7.0
Minimum Split (s)	10.0	39.0	10.0	37.0	10.0	10.0	37.0	37.0	10.0	10.0	37.0	37.0
Total Split (s)	15.0	43.0	15.0	43.0	15.0	15.0	77.0	77.0	15.0	15.0	77.0	77.0
Total Split (%)	10.0%	28.7%	10.0%	28.7%	10.0%	10.0%	51.3%	51.3%	10.0%	10.0%	51.3%	51.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	None	C-Max	C-Max

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 1 (1%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

Splits and Phases: 22: Creekside Drive/Winston Park Boulevard & SR 7

			
15 s	77 s	15 s	43 s
			
15 s	77 s	15 s	43 s

HCM Signalized Intersection Capacity Analysis
23: NB Sawgrass Expressway On Ramp & SR 7

PM Peak Hour
Future Total Traffic Conditions

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↑	↑↑	↑↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			0.91	1.00	0.97	0.86
Frt			1.00	0.85	1.00	1.00
Flt Protected			1.00	1.00	0.95	1.00
Satd. Flow (prot)			5085	1583	3433	6408
Flt Permitted			1.00	1.00	0.95	1.00
Satd. Flow (perm)			5085	1583	3433	6408
Volume (vph)	0	0	2364	279	180	2590
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	2598	307	198	2846
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2598	307	198	2846
Turn Type				Free	Prot	
Protected Phases			2		1	
Permitted Phases				Free		Free
Actuated Green, G (s)			63.8	85.5	9.2	85.5
Effective Green, g (s)			66.8	85.5	10.7	85.5
Actuated g/C Ratio			0.78	1.00	0.13	1.00
Clearance Time (s)			7.0		5.5	
Vehicle Extension (s)			0.2		2.0	
Lane Grp Cap (vph)			3973	1583	430	6408
v/s Ratio Prot			c0.51		0.06	
v/s Ratio Perm				0.19		c0.44
v/c Ratio			0.65	0.19	0.46	0.44
Uniform Delay, d1			4.2	0.0	34.7	0.0
Progression Factor			1.00	1.00	1.00	1.00
Incremental Delay, d2			0.9	0.3	0.3	0.2
Delay (s)			5.0	0.3	35.0	0.2
Level of Service			A	A	D	A
Approach Delay (s)	0.0		4.5			2.5
Approach LOS	A		A			A
Intersection Summary						
HCM Average Control Delay			3.5		HCM Level of Service	A
HCM Volume to Capacity ratio			0.62			
Actuated Cycle Length (s)			85.5		Sum of lost time (s)	4.0
Intersection Capacity Utilization			94.9%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

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Phasings
23: NB Sawgrass Expressway On Ramp & SR 7

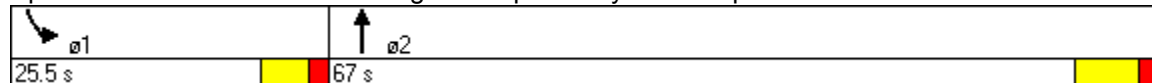
PM Peak Hour
Future Total Traffic Conditions

	↑	↗	↘	↓
Lane Group	NBT	NBR	SBL	SBT
Lane Configurations	↑↑↑	↑	↘↘	↓↓↓
Volume (vph)	2364	279	180	2590
Turn Type		Free	Prot	
Protected Phases	2		1	
Permitted Phases		Free		Free
Detector Phases	2		1	
Minimum Initial (s)	7.0		5.0	
Minimum Split (s)	25.0		10.5	
Total Split (s)	67.0	0.0	25.5	0.0
Total Split (%)	72.4%	0.0%	27.6%	0.0%
Yellow Time (s)	5.0		4.0	
All-Red Time (s)	2.0		1.5	
Lead/Lag	Lag		Lead	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	Max		None	

Intersection Summary

Cycle Length: 92.5
Actuated Cycle Length: 85.5
Natural Cycle: 40
Control Type: Actuated-Uncoordinated

Splits and Phases: 23: NB Sawgrass Expressway On Ramp & SR 7



HCM Signalized Intersection Capacity Analysis
24: SB Sawgrass Expressway On Ramp & SR 7

PM Peak Hour
Future Total Traffic Conditions

							
Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0
Lane Util. Factor				0.97	0.86	0.91	1.00
Frt				1.00	1.00	1.00	0.85
Flt Protected				0.95	1.00	1.00	1.00
Satd. Flow (prot)				3433	6408	5085	1583
Flt Permitted				0.95	1.00	1.00	1.00
Satd. Flow (perm)				3433	6408	5085	1583
Volume (vph)	0	0	14	273	2808	2426	558
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	15	294	3019	2609	600
RTOR Reduction (vph)	0	0	0	0	0	0	53
Lane Group Flow (vph)	0	0	0	309	3019	2609	547
Turn Type			Prot	Prot			Perm
Protected Phases			5	5		6	
Permitted Phases					Free		6
Actuated Green, G (s)				11.9	84.9	60.5	60.5
Effective Green, g (s)				13.4	84.9	63.5	63.5
Actuated g/C Ratio				0.16	1.00	0.75	0.75
Clearance Time (s)				5.5		7.0	7.0
Vehicle Extension (s)				2.0		0.2	0.2
Lane Grp Cap (vph)				542	6408	3803	1184
v/s Ratio Prot				0.09		c0.51	
v/s Ratio Perm					c0.47		0.35
v/c Ratio				0.57	0.47	0.69	0.46
Uniform Delay, d1				33.1	0.0	5.5	4.1
Progression Factor				1.00	1.00	1.00	1.00
Incremental Delay, d2				0.9	0.2	1.0	1.3
Delay (s)				34.0	0.2	6.6	5.4
Level of Service				C	A	A	A
Approach Delay (s)	0.0				3.4	6.4	
Approach LOS	A				A	A	
Intersection Summary							
HCM Average Control Delay			4.8		HCM Level of Service		A
HCM Volume to Capacity ratio			0.64				
Actuated Cycle Length (s)			84.9		Sum of lost time (s)		4.0
Intersection Capacity Utilization			61.7%		ICU Level of Service		B
Analysis Period (min)			15				
c Critical Lane Group							

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11/18/2009

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Application for Development Approval

21-K-162

Phasings
24: SB Sawgrass Expressway On Ramp & SR 7

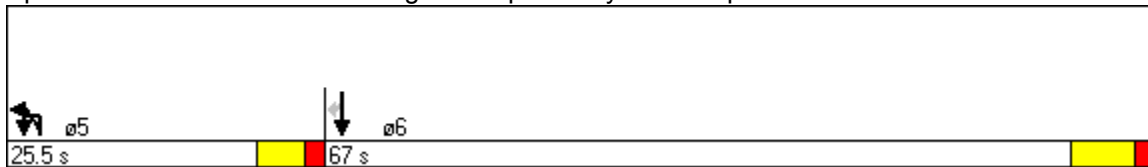
PM Peak Hour
Future Total Traffic Conditions

				
Lane Group	NBL	NBT	SBT	SBR
Lane Configurations				
Volume (vph)	273	2808	2426	558
Turn Type	Prot			Perm
Protected Phases	5		6	
Permitted Phases		Free		6
Detector Phases	5		6	6
Minimum Initial (s)	5.0		7.0	7.0
Minimum Split (s)	10.5		25.0	25.0
Total Split (s)	25.5	0.0	67.0	67.0
Total Split (%)	27.6%	0.0%	72.4%	72.4%
Yellow Time (s)	4.0		5.0	5.0
All-Red Time (s)	1.5		2.0	2.0
Lead/Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes
Recall Mode	None		Max	Max

Intersection Summary

Cycle Length: 92.5
Actuated Cycle Length: 84.9
Natural Cycle: 45
Control Type: Semi Act-Uncoord

Splits and Phases: 24: SB Sawgrass Expressway On Ramp & SR 7



HCM Signalized Intersection Capacity Analysis

25: Coconut Creek Parkway & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	176	893	208	280	1328	301	372	1519	294	424	1010	250
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	187	950	221	298	1413	320	396	1616	313	451	1074	266
RTOR Reduction (vph)	0	0	122	0	0	76	0	0	75	0	0	79
Lane Group Flow (vph)	187	950	99	298	1413	244	396	1616	238	451	1074	187
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	12.3	54.0	54.0	14.0	55.7	55.7	14.0	54.0	54.0	14.0	54.0	54.0
Effective Green, g (s)	14.3	56.0	56.0	16.0	57.7	57.7	16.0	56.0	56.0	16.0	56.0	56.0
Actuated g/C Ratio	0.09	0.35	0.35	0.10	0.36	0.36	0.10	0.35	0.35	0.10	0.35	0.35
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	0.2	0.2	2.0	0.2	0.2	2.0	2.5	2.5	2.0	2.5	2.5
Lane Grp Cap (vph)	307	1239	554	343	1276	571	343	1239	554	343	1239	554
v/s Ratio Prot	0.05	0.27		c0.09	c0.40		0.12	c0.46		c0.13	0.30	
v/s Ratio Perm			0.06			0.15			0.15			0.12
v/c Ratio	0.61	0.77	0.18	0.87	1.11	0.43	1.15	1.30	0.43	1.31	0.87	0.34
Uniform Delay, d1	70.2	46.2	36.1	71.0	51.2	38.7	72.0	52.0	39.8	72.0	48.5	38.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.21	0.74	0.63
Incremental Delay, d2	2.3	4.6	0.7	19.5	60.0	2.3	97.5	142.9	0.4	156.6	5.0	0.2
Delay (s)	72.5	50.8	36.8	90.5	111.2	41.0	169.5	194.9	40.2	243.9	40.9	24.3
Level of Service	E	D	D	F	F	D	F	F	D	F	D	C
Approach Delay (s)		51.5			97.1			169.7			89.6	
Approach LOS		D			F			F			F	
Intersection Summary												
HCM Average Control Delay			109.6			HCM Level of Service			F			
HCM Volume to Capacity ratio			1.16									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			109.1%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

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11/18/2009

Kimley Horn and Associates

Phasings

25: Coconut Creek Parkway & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 		 	 		 	 		 	 	
Volume (vph)	176	893	208	280	1328	301	372	1519	294	424	1010	250
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Detector Phases	1	6	6	5	2	2	7	4	4	3	8	8
Minimum Initial (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	6.0	6.0	5.0	6.0	6.0
Minimum Split (s)	11.0	43.0	43.0	11.0	43.0	43.0	11.0	38.0	38.0	11.0	38.0	38.0
Total Split (s)	20.0	60.0	60.0	20.0	60.0	60.0	20.0	60.0	60.0	20.0	60.0	60.0
Total Split (%)	12.5%	37.5%	37.5%	12.5%	37.5%	37.5%	12.5%	37.5%	37.5%	12.5%	37.5%	37.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 135 (84%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Splits and Phases: 25: Coconut Creek Parkway & Lyons Road

			
ø1	ø2	ø3	ø4
20 s	60 s	20 s	60 s
			
ø5	ø6	ø7	ø8
20 s	60 s	20 s	60 s

HCM Signalized Intersection Capacity Analysis

26: Lyons Plaza & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3416		1770	3539	3539	1583
Flt Permitted	0.96		0.09	1.00	1.00	1.00
Satd. Flow (perm)	3416		167	3539	3539	1583
Volume (vph)	252	20	64	1865	1676	112
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	265	21	67	1963	1764	118
RTOR Reduction (vph)	4	0	0	0	0	13
Lane Group Flow (vph)	282	0	67	1963	1764	105
Turn Type			pm+pt			Perm
Protected Phases	4		5	2	6	
Permitted Phases			2			6
Actuated Green, G (s)	17.0		133.0	133.0	120.7	120.7
Effective Green, g (s)	18.0		134.0	134.0	121.7	121.7
Actuated g/C Ratio	0.11		0.84	0.84	0.76	0.76
Clearance Time (s)	5.0		5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.5		1.5	0.2	0.2	0.2
Lane Grp Cap (vph)	384		223	2964	2692	1204
v/s Ratio Prot	c0.08		0.02	c0.55	0.50	
v/s Ratio Perm			0.24			0.07
v/c Ratio	0.73		0.30	0.66	0.66	0.09
Uniform Delay, d1	68.7		9.3	4.7	9.1	4.9
Progression Factor	1.00		2.09	2.96	0.56	0.88
Incremental Delay, d2	6.7		0.0	0.1	0.9	0.1
Delay (s)	75.4		19.6	14.2	6.0	4.4
Level of Service	E		B	B	A	A
Approach Delay (s)	75.4			14.3	5.9	
Approach LOS	E			B	A	
Intersection Summary						
HCM Average Control Delay			14.7		HCM Level of Service	B
HCM Volume to Capacity ratio			0.67			
Actuated Cycle Length (s)			160.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			67.7%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-166

Phasings
26: Lyons Plaza & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

					
Lane Group	EBL	NBL	NBT	SBT	SBR
Lane Configurations	  	 	 	 	 
Volume (vph)	252	64	1865	1676	112
Turn Type	pm+pt			Perm	
Protected Phases	4	5	2	6	
Permitted Phases		2			6
Detector Phases	4	5	2	6	6
Minimum Initial (s)	6.0	4.0	7.0	7.0	7.0
Minimum Split (s)	38.0	9.0	27.0	27.0	27.0
Total Split (s)	45.0	20.0	115.0	95.0	95.0
Total Split (%)	28.1%	12.5%	71.9%	59.4%	59.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag		Lead		Lag	Lag
Lead-Lag Optimize?		Yes		Yes	Yes
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 30 (19%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated

Splits and Phases: 26: Lyons Plaza & Lyons Road

 ø2		 ø4
115 s		45 s
 ø5	 ø6	
20 s	95 s	

HCM Signalized Intersection Capacity Analysis

27: Wynmoor Way & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00		0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95		1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770		1583		1770	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.45		1.00		0.76	1.00	0.08	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	843		1583		1410	1583	147	3539	1583	1770	3539	1583
Volume (vph)	14	0	64	117	0	151	121	1955	151	137	1709	62
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	15	0	69	126	0	162	130	2102	162	147	1838	67
RTOR Reduction (vph)	0	0	60	0	0	142	0	0	19	0	0	9
Lane Group Flow (vph)	15	0	9	0	126	20	130	2102	143	147	1838	58
Turn Type	Perm		Perm	Perm		Perm	pm+pt		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2			6
Actuated Green, G (s)	17.8		17.8		17.8	17.8	119.4	109.0	109.0	17.2	115.8	115.8
Effective Green, g (s)	19.8		19.8		19.8	19.8	121.4	110.0	110.0	18.2	116.8	116.8
Actuated g/C Ratio	0.12		0.12		0.12	0.12	0.76	0.69	0.69	0.11	0.73	0.73
Clearance Time (s)	6.0		6.0		6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0	1.5	0.2	0.2	1.5	0.2	0.2
Lane Grp Cap (vph)	104		196		174	196	227	2433	1088	201	2583	1156
v/s Ratio Prot							0.04	c0.59		c0.08	0.52	
v/s Ratio Perm	0.02		0.01		c0.09	0.01	0.39		0.09			0.04
v/c Ratio	0.14		0.04		0.72	0.10	0.57	0.86	0.13	0.73	0.71	0.05
Uniform Delay, d1	62.5		61.8		67.5	62.2	16.3	19.2	8.6	68.5	12.1	6.1
Progression Factor	1.00		1.00		1.00	1.00	0.94	1.35	1.40	1.36	0.25	0.00
Incremental Delay, d2	0.2		0.0		11.9	0.1	1.7	3.5	0.2	4.9	0.7	0.0
Delay (s)	62.8		61.8		79.4	62.3	16.9	29.4	12.2	98.2	3.8	0.0
Level of Service	E		E		E	E	B	C	B	F	A	A
Approach Delay (s)		62.0			69.8			27.5			10.4	
Approach LOS		E			E			C			B	
Intersection Summary												
HCM Average Control Delay			23.4				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			84.8%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-168

Phasings

27: Wynmoor Way & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

											
Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	14	64	117	0	151	121	1955	151	137	1709	62
Turn Type	Perm	Perm	Perm		Perm	pm+pt		Perm	Prot		Perm
Protected Phases				8		5	2		1	6	
Permitted Phases	4	4	8		8	2		2			6
Detector Phases	4	4	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	4.0	7.0	7.0	5.0	7.0	7.0
Minimum Split (s)	42.0	42.0	42.0	42.0	42.0	9.0	39.0	39.0	10.0	39.0	39.0
Total Split (s)	45.0	45.0	45.0	45.0	45.0	25.0	90.0	90.0	25.0	90.0	90.0
Total Split (%)	28.1%	28.1%	28.1%	28.1%	28.1%	15.6%	56.3%	56.3%	15.6%	56.3%	56.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 36 (23%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Splits and Phases: 27: Wynmoor Way & Lyons Road

		
25 s	90 s	45 s
		
25 s	90 s	45 s

HCM Signalized Intersection Capacity Analysis

28: Copans Road & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	283	748	251	370	1394	478	235	1540	100	336	1256	284
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	295	779	261	385	1452	498	245	1604	104	350	1308	296
RTOR Reduction (vph)	0	0	166	0	0	167	0	0	41	0	0	124
Lane Group Flow (vph)	295	779	95	385	1452	331	245	1604	63	350	1308	172
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	16.7	49.5	49.5	18.5	51.3	51.3	14.8	50.0	50.0	18.0	53.2	53.2
Effective Green, g (s)	18.7	51.5	51.5	20.5	53.3	53.3	16.8	52.0	52.0	20.0	55.2	55.2
Actuated g/C Ratio	0.12	0.32	0.32	0.13	0.33	0.33	0.11	0.32	0.32	0.12	0.34	0.34
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	1.5	2.5	2.5	1.5	2.5	2.5	1.5	2.5	2.5	1.5	2.5	2.5
Lane Grp Cap (vph)	401	1139	510	440	1179	527	360	1150	514	429	1221	546
v/s Ratio Prot	0.09	0.22		c0.11	c0.41		0.07	c0.45		c0.10	c0.37	
v/s Ratio Perm			0.06			0.21			0.04			0.11
v/c Ratio	0.74	0.68	0.19	0.88	1.23	0.63	0.68	1.39	0.12	0.82	1.07	0.31
Uniform Delay, d1	68.3	47.2	39.1	68.5	53.4	45.0	69.0	54.0	38.0	68.2	52.4	38.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.89	0.84	0.85	1.17	0.90	1.01
Incremental Delay, d2	5.9	3.3	0.8	16.9	111.8	5.6	2.2	180.5	0.0	8.5	44.4	0.2
Delay (s)	74.2	50.5	39.9	85.4	165.1	50.6	63.7	225.7	32.3	88.2	91.5	39.2
Level of Service	E	D	D	F	F	D	E	F	C	F	F	D
Approach Delay (s)		53.7			127.5			195.1			83.0	
Approach LOS		D			F			F			F	
Intersection Summary												
HCM Average Control Delay			120.5			HCM Level of Service			F			
HCM Volume to Capacity ratio			1.19									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			112.1%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-170

Phasings

28: Copans Road & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 		 	 		 	 		 	 	
Volume (vph)	283	748	251	370	1394	478	235	1540	100	336	1256	284
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Detector Phases	1	6	6	5	2	2	7	4	4	3	8	8
Minimum Initial (s)	5.0	12.0	12.0	5.0	12.0	12.0	5.0	6.0	6.0	5.0	6.0	6.0
Minimum Split (s)	11.0	35.0	35.0	11.0	35.0	35.0	11.0	34.0	34.0	11.0	34.0	34.0
Total Split (s)	25.0	55.0	55.0	25.0	55.0	55.0	25.0	55.0	55.0	25.0	55.0	55.0
Total Split (%)	15.6%	34.4%	34.4%	15.6%	34.4%	34.4%	15.6%	34.4%	34.4%	15.6%	34.4%	34.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 56 (35%), Referenced to phase 2:WBT and 6:EBT, Start of Green

Natural Cycle: 135

Control Type: Actuated-Coordinated

Splits and Phases: 28: Copans Road & Lyons Road

			
25 s	55 s	25 s	55 s
			
25 s	55 s	25 s	55 s

HCM Signalized Intersection Capacity Analysis

29: NW 34th Street & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1783	1583		1802	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.59	1.00		0.77	1.00	0.09	1.00	1.00	0.04	1.00	1.00
Satd. Flow (perm)		1094	1583		1440	1583	174	3539	1583	81	3539	1583
Volume (vph)	34	4	36	46	22	80	58	2094	73	110	1799	46
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	35	4	38	48	23	83	60	2181	76	115	1874	48
RTOR Reduction (vph)	0	0	35	0	0	76	0	0	6	0	0	5
Lane Group Flow (vph)	0	39	3	0	71	7	60	2181	70	115	1874	43
Turn Type	Perm		Perm	Perm		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)		11.9	11.9		11.9	11.9	127.0	122.9	122.9	138.1	129.0	129.0
Effective Green, g (s)		12.9	12.9		12.9	12.9	129.0	123.9	123.9	139.1	130.0	130.0
Actuated g/C Ratio		0.08	0.08		0.08	0.08	0.81	0.77	0.77	0.87	0.81	0.81
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		2.5	2.5		2.5	2.5	1.5	0.2	0.2	1.5	0.2	0.2
Lane Grp Cap (vph)		88	128		116	128	191	2741	1226	189	2875	1286
v/s Ratio Prot							0.01	c0.62		c0.04	0.53	
v/s Ratio Perm		0.04	0.00		c0.05	0.00	0.24		0.04	0.49		0.03
v/c Ratio		0.44	0.02		0.61	0.05	0.31	0.80	0.06	0.61	0.65	0.03
Uniform Delay, d1		70.1	67.8		71.1	67.9	6.1	10.6	4.3	40.2	6.0	2.9
Progression Factor		1.00	1.00		1.00	1.00	2.74	1.05	0.07	1.77	3.14	0.18
Incremental Delay, d2		2.6	0.1		7.9	0.1	0.0	0.2	0.0	0.3	0.1	0.0
Delay (s)		72.7	67.8		79.0	68.0	16.7	11.4	0.3	71.5	18.9	0.5
Level of Service		E	E		E	E	B	B	A	E	B	A
Approach Delay (s)		70.3			73.1			11.2			21.4	
Approach LOS		E			E			B			C	
Intersection Summary												
HCM Average Control Delay			18.8				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			84.3%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-172

Phasings

29: NW 34th Street & Lyons Road

PM Peak Hour

Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	4	36	46	22	80	58	2094	73	110	1799	46
Turn Type	Perm		Perm	Perm		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phases	4	4	4	8	8	8	5	2	2	1	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0
Minimum Split (s)	37.0	37.0	37.0	34.0	34.0	34.0	9.0	32.0	32.0	9.0	32.0	32.0
Total Split (s)	42.0	42.0	42.0	42.0	42.0	42.0	26.0	92.0	92.0	26.0	92.0	92.0
Total Split (%)	26.3%	26.3%	26.3%	26.3%	26.3%	26.3%	16.3%	57.5%	57.5%	16.3%	57.5%	57.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 66 (41%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Splits and Phases: 29: NW 34th Street & Lyons Road

		
ø1	ø2	ø4
26 s	92 s	42 s
		
ø5	ø6	ø8
26 s	92 s	42 s

HCM Signalized Intersection Capacity Analysis

30: Winston Park Boulevard & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		0.91	0.91		1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.93		1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3291		1610	3147		1770	5085	1583	1770	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.08	1.00	1.00	0.08	1.00	1.00
Satd. Flow (perm)	1770	3291		1610	3147		146	5085	1583	146	5085	1583
Volume (vph)	211	152	133	183	151	149	283	1928	215	357	2107	330
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	229	165	145	199	164	162	308	2096	234	388	2290	359
RTOR Reduction (vph)	0	114	0	0	124	0	0	0	89	0	0	99
Lane Group Flow (vph)	229	196	0	164	237	0	308	2096	145	388	2290	260
Turn Type	Split			Split			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)	19.1	19.1		17.8	17.8		81.1	50.0	50.0	81.1	50.0	50.0
Effective Green, g (s)	21.1	21.1		19.8	19.8		83.1	51.0	51.0	83.1	51.0	51.0
Actuated g/C Ratio	0.15	0.15		0.14	0.14		0.59	0.36	0.36	0.59	0.36	0.36
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0		1.5	1.0	1.0	1.5	1.0	1.0
Lane Grp Cap (vph)	267	496		228	445		459	1852	577	459	1852	577
v/s Ratio Prot	c0.13	0.06		c0.10	0.08		0.15	0.41		c0.19	c0.45	
v/s Ratio Perm							0.24		0.09	0.31		0.16
v/c Ratio	0.86	0.40		0.72	0.53		0.67	1.13	0.25	0.85	1.24	0.45
Uniform Delay, d1	58.0	53.7		57.4	55.8		37.0	44.5	31.1	41.7	44.5	33.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	22.1	0.2		8.7	0.6		3.0	66.7	1.0	12.9	111.3	2.5
Delay (s)	80.0	53.9		66.1	56.4		40.0	111.2	32.2	54.5	155.8	36.4
Level of Service	F	D		E	E		D	F	C	D	F	D
Approach Delay (s)		65.0			59.5			95.9			128.7	
Approach LOS		E			E			F			F	
Intersection Summary												
HCM Average Control Delay			105.4			HCM Level of Service			F			
HCM Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			91.6%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-174

Phasings

30: Winston Park Boulevard & Lyons Road

PM Peak Hour

Future Total Traffic Conditions

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	211	152	183	151	283	1928	215	357	2107	330
Turn Type	Split		Split		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	7	8	8	5	2		1	6	
Permitted Phases					2		2	6		6
Detector Phases	7	7	8	8	5	2	2	1	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0
Minimum Split (s)	37.0	37.0	37.0	37.0	9.0	27.0	27.0	9.0	27.0	27.0
Total Split (s)	26.0	26.0	40.0	40.0	19.0	55.0	55.0	19.0	55.0	55.0
Total Split (%)	18.6%	18.6%	28.6%	28.6%	13.6%	39.3%	39.3%	13.6%	39.3%	39.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 8 (6%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Splits and Phases: 30: Winston Park Boulevard & Lyons Road

			
ø1	ø2	ø7	ø8
19 s	55 s	26 s	40 s
			
ø5	ø6		
19 s	55 s		

HCM Signalized Intersection Capacity Analysis 311: Sawgrass NB On Ramp & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

	→	↘	↓	↙
Movement	EBT	EBR2	SBT	NWR
Lane Configurations	↑↑	↑	↑↑↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.91	1.00
Frt	1.00	0.85	1.00	0.86
Flt Protected	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3539	1583	5085	1611
Flt Permitted	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3539	1583	5085	1611
Volume (vph)	326	187	2721	150
Peak-hour factor, PHF	0.88	0.88	0.88	0.88
Adj. Flow (vph)	370	212	3092	170
RTOR Reduction (vph)	0	0	0	0
Lane Group Flow (vph)	370	212	3092	170
Turn Type		Free	custom	
Protected Phases	4		6	
Permitted Phases		Free		11
Actuated Green, G (s)	24.0	160.0	100.0	124.0
Effective Green, g (s)	26.0	160.0	102.0	126.0
Actuated g/C Ratio	0.16	1.00	0.64	0.79
Clearance Time (s)	6.0		6.0	6.0
Vehicle Extension (s)	2.0		1.0	1.5
Lane Grp Cap (vph)	575	1583	3242	1269
v/s Ratio Prot	c0.10		c0.61	
v/s Ratio Perm		c0.13		0.11
v/c Ratio	0.64	0.13	0.95	0.13
Uniform Delay, d1	62.7	0.0	26.8	4.0
Progression Factor	1.00	1.00	0.61	1.00
Incremental Delay, d2	1.9	0.2	4.9	0.0
Delay (s)	64.5	0.2	21.3	4.1
Level of Service	E	A	C	A
Approach Delay (s)	41.1		21.3	
Approach LOS	D		C	
Intersection Summary				
HCM Average Control Delay		23.5	HCM Level of Service	C
HCM Volume to Capacity ratio		0.77		
Actuated Cycle Length (s)		160.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization		68.3%	ICU Level of Service	C
Analysis Period (min)		15		
c Critical Lane Group				

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-176

Phasings
311: Sawgrass NB On Ramp & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

	→	↘	↓	↙				
Lane Group	EBT	EBR2	SBT	NWR	ø1	ø2	ø5	ø8
Lane Configurations	↑↑	↑	↑↑↑	↑				
Volume (vph)	326	187	2721	150				
Turn Type		Free	custom					
Protected Phases	4		6		1	2	5	8
Permitted Phases		Free		11				
Detector Phases	4		6	11				
Minimum Initial (s)	6.0		7.0	4.0	4.0	7.0	4.0	6.0
Minimum Split (s)	22.0		22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	30.0	0.0	100.0	130.0	30.0	100.0	30.0	30.0
Total Split (%)	18.8%	0.0%	62.5%	81.3%	19%	63%	19%	19%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag			Lag		Lead	Lag	Lead	
Lead-Lag Optimize?			Yes		Yes	Yes	Yes	
Recall Mode	None		C-Max	None	None	C-Max	None	None

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 10 (6%), Referenced to phase 2:NBT and 6:, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated

Splits and Phases: 311: Sawgrass NB On Ramp & Lyons Road

#312 ↘ ø1 30 s	#312#322 ↑↑ ø2 100 s	#311#312 → ø4 30 s
#321 ↙ ø5 30 s	#311#321 ↓↓ ø6 100 s	#321#322 ↘ ø8 30 s
#311#322 ↙ ø11 130 s		

HCM Signalized Intersection Capacity Analysis 312: Sawgrass NB On Ramp & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 							  				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0							4.0	4.0	4.0		
Lane Util. Factor	0.97							0.91	1.00	1.00		
Frt	1.00							1.00	0.85	1.00		
Flt Protected	0.95							1.00	1.00	0.95		
Satd. Flow (prot)	3433							5085	1583	1770		
Flt Permitted	0.95							1.00	1.00	0.95		
Satd. Flow (perm)	3433							5085	1583	1770		
Volume (vph)	326	0	0	0	0	0	0	2005	313	372	0	0
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	370	0	0	0	0	0	0	2278	356	423	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	67	0	0	0
Lane Group Flow (vph)	370	0	0	0	0	0	0	2278	289	423	0	0
Turn Type	custom								Perm	Prot		
Protected Phases								2		1		
Permitted Phases	4								2			
Actuated Green, G (s)	24.0							94.0	94.0	24.0		
Effective Green, g (s)	26.0							96.0	96.0	26.0		
Actuated g/C Ratio	0.16							0.60	0.60	0.16		
Clearance Time (s)	6.0							6.0	6.0	6.0		
Vehicle Extension (s)	2.0							1.0	1.0	1.5		
Lane Grp Cap (vph)	558							3051	950	288		
v/s Ratio Prot								c0.45		c0.24		
v/s Ratio Perm	c0.11								0.18			
v/c Ratio	0.66							0.75	0.30	1.47		
Uniform Delay, d1	62.9							23.2	15.7	67.0		
Progression Factor	0.04							1.00	1.00	0.93		
Incremental Delay, d2	1.8							1.7	0.8	228.4		
Delay (s)	4.4							24.9	16.5	290.7		
Level of Service	A							C	B	F		
Approach Delay (s)		4.4			0.0			23.8			290.7	
Approach LOS		A			A			C			F	
Intersection Summary												
HCM Average Control Delay		54.6						HCM Level of Service		D		
HCM Volume to Capacity ratio		0.86										
Actuated Cycle Length (s)		160.0						Sum of lost time (s)		12.0		
Intersection Capacity Utilization		78.6%						ICU Level of Service		D		
Analysis Period (min)		15										
c Critical Lane Group												

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-178

Phasings
312: Sawgrass NB On Ramp & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

								
Lane Group	EBL	NBT	NBR	SBL	ø5	ø6	ø8	ø11
Lane Configurations	 	  						
Volume (vph)	326	2005	313	372				
Turn Type	custom		Perm	Prot				
Protected Phases		2		1	5	6	8	11
Permitted Phases	4		2					
Detector Phases	4	2	2	1				
Minimum Initial (s)	6.0	7.0	7.0	4.0	4.0	7.0	6.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	30.0	100.0	100.0	30.0	30.0	100.0	30.0	130.0
Total Split (%)	18.8%	62.5%	62.5%	18.8%	19%	63%	19%	81%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag		Lag	Lag	Lead	Lead	Lag		
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Max	C-Max	None	None	C-Max	None	None

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 10 (6%), Referenced to phase 2:NBT and 6:, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated

Splits and Phases: 312: Sawgrass NB On Ramp & Lyons Road

#312  ø1 30 s	#312#322   ø2 100 s	#311#312  ø4 30 s
#321  ø5 30 s	#311#321   ø6 100 s	#321#322  ø8 30 s
#311#322   ø11 130 s		

HCM Signalized Intersection Capacity Analysis

321: Sawgrass SB Off Ramp & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

										
Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations							  		  	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0				4.0	4.0	4.0	
Lane Util. Factor			1.00				0.91	1.00	0.97	
Frt			1.00				1.00	0.85	1.00	
Flt Protected			0.95				1.00	1.00	0.95	
Satd. Flow (prot)			1770				5085	1583	3433	
Flt Permitted			0.95				1.00	1.00	0.95	
Satd. Flow (perm)			1770				5085	1583	3433	
Volume (vph)	0	0	150	0	0	0	2402	434	451	0
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	165	0	0	0	2640	477	496	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	62	0	0
Lane Group Flow (vph)	0	0	165	0	0	0	2640	415	496	0
Turn Type			Prot					Perm	custom	
Protected Phases			5				6			
Permitted Phases								6	8	
Actuated Green, G (s)			18.0				100.0	100.0	24.0	
Effective Green, g (s)			20.0				102.0	102.0	26.0	
Actuated g/C Ratio			0.12				0.64	0.64	0.16	
Clearance Time (s)			6.0				6.0	6.0	6.0	
Vehicle Extension (s)			1.5				1.0	1.0	2.0	
Lane Grp Cap (vph)			221				3242	1009	558	
v/s Ratio Prot			c0.09				c0.52			
v/s Ratio Perm								0.26	c0.14	
v/c Ratio			0.75				0.81	0.41	0.89	
Uniform Delay, d1			67.6				21.9	14.2	65.6	
Progression Factor			0.94				1.00	1.00	0.16	
Incremental Delay, d2			11.3				2.4	1.2	7.5	
Delay (s)			74.9				24.2	15.5	17.7	
Level of Service			E				C	B	B	
Approach Delay (s)	0.0			74.9			22.9		17.7	
Approach LOS	A			E			C		B	
Intersection Summary										
HCM Average Control Delay			24.5				HCM Level of Service		C	
HCM Volume to Capacity ratio			0.82							
Actuated Cycle Length (s)			160.0				Sum of lost time (s)		12.0	
Intersection Capacity Utilization			77.6%				ICU Level of Service		D	
Analysis Period (min)			15							
c Critical Lane Group										

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-180

Phasings
321: Sawgrass SB Off Ramp & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

								
Lane Group	NBL	SBT	SBR	SWL	ø1	ø2	ø4	ø11
Lane Configurations		  		 				
Volume (vph)	150	2402	434	451				
Turn Type	Prot		Perm	custom				
Protected Phases	5	6			1	2	4	11
Permitted Phases			6	8				
Detector Phases	5	6	6	8				
Minimum Initial (s)	4.0	7.0	7.0	6.0	4.0	7.0	6.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	30.0	100.0	100.0	30.0	30.0	100.0	30.0	130.0
Total Split (%)	18.8%	62.5%	62.5%	18.8%	19%	63%	19%	81%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag		Lead	Lag		
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes		
Recall Mode	None	C-Max	C-Max	None	None	C-Max	None	None

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 10 (6%), Referenced to phase 2:NBT and 6:, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated

Splits and Phases: 321: Sawgrass SB Off Ramp & Lyons Road

#312  ø1	#312#322    ø2	#311#312   ø4
30 s	100 s	30 s
#321  ø5	#311#321    ø6	#321#322   ø8
30 s	100 s	30 s
#311#322   ø11		
130 s		

HCM Signalized Intersection Capacity Analysis

322: Sawgrass SB Off Ramp & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

				
Movement	WBL	WBR2	NBT	SER
Lane Configurations				
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.91	1.00
Frt	1.00	0.85	1.00	0.86
Flt Protected	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	5085	1611
Flt Permitted	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	5085	1611
Volume (vph)	453	332	2362	372
Peak-hour factor, PHF	0.91	0.91	0.91	0.91
Adj. Flow (vph)	498	365	2596	409
RTOR Reduction (vph)	0	188	0	0
Lane Group Flow (vph)	498	177	2596	409
Turn Type	Perm		custom	
Protected Phases	8		2	
Permitted Phases		8		11
Actuated Green, G (s)	24.0	24.0	94.0	124.0
Effective Green, g (s)	26.0	26.0	96.0	126.0
Actuated g/C Ratio	0.16	0.16	0.60	0.79
Clearance Time (s)	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	1.0	1.5
Lane Grp Cap (vph)	558	257	3051	1269
v/s Ratio Prot	c0.15		c0.51	
v/s Ratio Perm		0.11		c0.25
v/c Ratio	0.89	0.69	0.85	0.32
Uniform Delay, d1	65.6	63.2	26.2	4.8
Progression Factor	1.00	1.00	0.53	1.00
Incremental Delay, d2	16.1	6.3	2.2	0.1
Delay (s)	81.7	69.5	16.1	4.9
Level of Service	F	E	B	A
Approach Delay (s)	76.6		16.1	
Approach LOS	E		B	
Intersection Summary				
HCM Average Control Delay		28.4	HCM Level of Service	C
HCM Volume to Capacity ratio		0.77		
Actuated Cycle Length (s)		160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization		72.9%	ICU Level of Service	C
Analysis Period (min)		15		
c Critical Lane Group				

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-182

Phasings
322: Sawgrass SB Off Ramp & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

	   				ø1	ø4	ø5	ø6
Lane Group	WBL	WBR2	NBT	SER				
Lane Configurations	 		  					
Volume (vph)	453	332	2362	372				
Turn Type		Perm	custom					
Protected Phases	8		2		1	4	5	6
Permitted Phases		8		11				
Detector Phases	8	8	2	11				
Minimum Initial (s)	6.0	6.0	7.0	4.0	4.0	6.0	4.0	7.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	30.0	30.0	100.0	130.0	30.0	30.0	30.0	100.0
Total Split (%)	18.8%	18.8%	62.5%	81.3%	19%	19%	19%	63%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag			Lag		Lead		Lead	Lag
Lead-Lag Optimize?			Yes		Yes		Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	None	C-Max

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 10 (6%), Referenced to phase 2:NBT and 6:, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated

Splits and Phases: 322: Sawgrass SB Off Ramp & Lyons Road

#312  ø1 30 s	#312#322   ø2 100 s	#311#312  ø4 30 s
#321  ø5 30 s	#311#321   ø6 100 s	#321#322  ø8 30 s
#311#322   ø11 130 s		

HCM Signalized Intersection Capacity Analysis

33: Sawgrass Boulevard & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.91	1.00	1.00	0.91
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583		1770	5085	1583	1770	5085
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00		0.11	1.00	1.00	0.12	1.00
Satd. Flow (perm)	1403	1863	1583	1405	1863	1583		210	5085	1583	220	5085
Volume (vph)	86	5	119	187	7	27	19	204	2061	326	60	2946
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	91	5	127	199	7	29	20	217	2193	347	64	3134
RTOR Reduction (vph)	0	0	82	0	0	22	0	0	0	67	0	0
Lane Group Flow (vph)	91	5	45	199	7	7	0	237	2193	280	64	3134
Turn Type	Perm		Perm	Perm		Perm	pm+pt	pm+pt		Perm	pm+pt	
Protected Phases		4			8		5	5	2			6
Permitted Phases	4		4	8		8	2	2		2	6	
Actuated Green, G (s)	13.2	13.2	13.2	13.2	13.2	13.2		37.5	33.5	33.5	34.1	31.8
Effective Green, g (s)	15.2	15.2	15.2	15.2	15.2	15.2		41.5	35.5	35.5	38.1	33.8
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.23	0.23		0.62	0.53	0.53	0.57	0.50
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		1.5	0.2	0.2	1.5	0.2
Lane Grp Cap (vph)	318	423	359	319	423	359		270	2694	839	225	2565
v/s Ratio Prot		0.00			0.00			c0.08	0.43		0.02	c0.62
v/s Ratio Perm	0.06		0.03	c0.14		0.00		0.47		0.18	0.14	
v/c Ratio	0.29	0.01	0.13	0.62	0.02	0.02		0.88	0.81	0.33	0.28	1.22
Uniform Delay, d1	21.4	20.1	20.6	23.3	20.1	20.1		32.1	13.0	9.0	9.8	16.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.0	0.1	2.7	0.0	0.0		25.2	2.8	1.1	0.3	103.6
Delay (s)	21.6	20.1	20.7	26.1	20.1	20.1		57.2	15.9	10.1	10.0	120.2
Level of Service	C	C	C	C	C	C		E	B	B	B	F
Approach Delay (s)		21.0			25.1				18.7			114.1
Approach LOS		C			C				B			F

Intersection Summary

HCM Average Control Delay	67.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	67.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	100.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-184

HCM Signalized Intersection Capacity Analysis
33: Sawgrass Boulevard & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

Movement SBR

~~Left~~ Configurations

Ideal Flow (vphpl) 1900

Total Lost time (s) 4.0

Lane Util. Factor 1.00

Frt 0.85

Flt Protected 1.00

Satd. Flow (prot) 1583

Flt Permitted 1.00

Satd. Flow (perm) 1583

Volume (vph) 110

Peak-hour factor, PHF 0.94

Adj. Flow (vph) 117

RTOR Reduction (vph) 31

Lane Group Flow (vph) 86

Turn Type Perm

Protected Phases

Permitted Phases 6

Actuated Green, G (s) 31.8

Effective Green, g (s) 33.8

Actuated g/C Ratio 0.50

Clearance Time (s) 6.0

Vehicle Extension (s) 0.2

Lane Grp Cap (vph) 799

v/s Ratio Prot

v/s Ratio Perm 0.05

v/c Ratio 0.11

Uniform Delay, d1 8.7

Progression Factor 1.00

Incremental Delay, d2 0.3

Delay (s) 9.0

Level of Service A

Approach Delay (s)

Approach LOS

Intersection Summary

Phasings

33: Sawgrass Boulevard & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	86	5	119	187	7	27	19	204	2061	326	60	2946
Turn Type	Perm		Perm	Perm		Perm	pm+pt	pm+pt		Perm	pm+pt	
Protected Phases		4			8		5	5	2		1	6
Permitted Phases	4		4	8		8	2	2		2	6	
Detector Phases	4	4	4	8	8	8	5	5	2	2	1	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	7.0	7.0	4.0	7.0
Minimum Split (s)	43.0	43.0	43.0	45.0	45.0	45.0	10.0	10.0	34.0	34.0	10.0	34.0
Total Split (s)	45.0	45.0	45.0	45.0	45.0	45.0	10.0	10.0	35.0	35.0	10.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	11.1%	11.1%	38.9%	38.9%	11.1%	38.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	Max	Max	None	Max

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 64.5

Natural Cycle: 150

Control Type: Semi Act-Uncoord

Splits and Phases: 33: Sawgrass Boulevard & Lyons Road

		
ø1	ø2	ø4
10 s	35 s	45 s
		
ø5	ø6	ø8
10 s	35 s	45 s

Lane Group	SBR
Lane Configurations	
Volume (vph)	110
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phases	6
Minimum Initial (s)	7.0
Minimum Split (s)	34.0
Total Split (s)	35.0
Total Split (%)	38.9%
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max

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11/18/2009

Kimley Horn and Associates

HCM Signalized Intersection Capacity Analysis

34: Holmberg Road & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00		1.00	0.91		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	1779		1770	5080		1770	5085	1583
Flt Permitted	0.69	1.00	1.00	0.75	1.00		0.09	1.00		0.10	1.00	1.00
Satd. Flow (perm)	1293	3539	1583	1402	1779		162	5080		177	5085	1583
Volume (vph)	339	7	314	36	65	28	265	1867	12	18	2616	314
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	357	7	331	38	68	29	279	1965	13	19	2754	331
RTOR Reduction (vph)	0	0	93	0	5	0	0	0	0	0	0	109
Lane Group Flow (vph)	357	7	238	38	92	0	279	1978	0	19	2754	222
Turn Type	Perm		Perm	Perm			pm+pt			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)	27.9	27.9	27.9	27.9	27.9		51.9	51.9		40.6	40.6	40.6
Effective Green, g (s)	29.9	29.9	29.9	29.9	29.9		53.4	53.4		42.1	42.1	42.1
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33		0.58	0.58		0.46	0.46	0.46
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		1.5	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	423	1159	518	459	583		223	2971		82	2345	730
v/s Ratio Prot		0.00			0.05		c0.10	0.39			0.54	
v/s Ratio Perm	c0.28		0.15	0.03			c0.63			0.11		0.14
v/c Ratio	0.84	0.01	0.46	0.08	0.16		1.25	0.67		0.23	1.17	0.30
Uniform Delay, d1	28.5	20.7	24.3	21.2	21.8		44.2	12.9		14.8	24.6	15.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.7	0.0	0.2	0.0	0.0		144.5	1.2		6.5	83.4	1.1
Delay (s)	42.2	20.7	24.5	21.2	21.8		188.7	14.1		21.3	108.0	16.5
Level of Service	D	C	C	C	C		F	B		C	F	B
Approach Delay (s)		33.6			21.7			35.7			97.7	
Approach LOS		C			C			D			F	

Intersection Summary

HCM Average Control Delay	66.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	91.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-187

Phasings

34: Holmberg Road & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	339	7	314	36	65	265	1867	18	2616	314
Turn Type	Perm		Perm	Perm		pm+pt		Perm		Perm
Protected Phases		4			8	5	2		6	
Permitted Phases	4		4	8		2		6		6
Detector Phases	4	4	4	8	8	5	2	6	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	4.0	7.0	7.0	7.0	7.0
Minimum Split (s)	42.0	42.0	42.0	22.0	22.0	9.5	34.5	34.5	34.5	34.5
Total Split (s)	42.0	42.0	42.0	42.0	42.0	11.3	57.0	45.7	45.7	45.7
Total Split (%)	42.4%	42.4%	42.4%	42.4%	42.4%	11.4%	57.6%	46.2%	46.2%	46.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	1.5	1.5	1.5	1.5	1.5
Lead/Lag						Lead		Lag	Lag	Lag
Lead-Lag Optimize?						Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max

Intersection Summary

Cycle Length: 99

Actuated Cycle Length: 91.3

Natural Cycle: 140

Control Type: Semi Act-Uncoord

Splits and Phases: 34: Holmberg Road & Lyons Road

 ø2	 ø4
57 s	42 s
 ø5	 ø8
11.3 s	42 s
 ø6	
45.7 s	

HCM Signalized Intersection Capacity Analysis

35: Hillsboro Boulevard & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		0.97	0.91	1.00		0.97	0.91	1.00		0.97	0.91	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1583		3433	5085	1583		3433	5085	1583
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1583		3433	5085	1583		3433	5085	1583
Volume (vph)	30	264	734	177	22	839	1082	299	22	190	1230	584
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	31	275	765	184	23	874	1127	311	23	198	1281	608
RTOR Reduction (vph)	0	0	0	148	0	0	0	185	0	0	0	199
Lane Group Flow (vph)	0	306	765	36	0	897	1127	126	0	221	1281	409
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	7	7	4		3	3	8		5	5	2	
Permitted Phases				4				8				2
Actuated Green, G (s)		12.0	29.3	29.3		32.0	49.3	49.3		14.0	59.6	59.6
Effective Green, g (s)		14.0	31.3	31.3		34.0	51.3	51.3		16.0	61.6	61.6
Actuated g/C Ratio		0.09	0.20	0.20		0.21	0.32	0.32		0.10	0.38	0.38
Clearance Time (s)		6.0	6.0	6.0		6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		1.5	2.5	2.5		1.5	2.5	2.5		1.5	3.0	3.0
Lane Grp Cap (vph)		300	995	310		730	1630	508		343	1958	609
v/s Ratio Prot		0.09	c0.15			c0.26	0.22			0.06	0.25	
v/s Ratio Perm				0.02				0.08				0.26
v/c Ratio		1.02	0.77	0.12		1.23	0.69	0.25		0.64	0.65	0.67
Uniform Delay, d1		73.0	60.9	53.0		63.0	47.4	40.1		69.3	40.4	40.8
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		57.2	3.5	0.1		114.8	1.2	0.2		3.1	1.7	5.8
Delay (s)		130.2	64.4	53.1		177.8	48.6	40.3		72.4	42.2	46.6
Level of Service		F	E	D		F	D	D		E	D	D
Approach Delay (s)			78.8				97.1				46.6	
Approach LOS			E				F				D	
Intersection Summary												
HCM Average Control Delay			67.7		HCM Level of Service					E		
HCM Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			160.0		Sum of lost time (s)					12.0		
Intersection Capacity Utilization			94.9%		ICU Level of Service					F		
Analysis Period (min)			15									
c Critical Lane Group												

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Application for Development Approval

21-K-189

HCM Signalized Intersection Capacity Analysis 35: Hillsboro Boulevard & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

			
Movement	SBL	SBT	SBR
Lane Configurations	  	  	
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583
Volume (vph)	235	1607	196
Peak-hour factor, PHF	0.96	0.96	0.96
Adj. Flow (vph)	245	1674	204
RTOR Reduction (vph)	0	0	88
Lane Group Flow (vph)	245	1674	116
Turn Type	Prot		Perm
Protected Phases	1	6	
Permitted Phases			6
Actuated Green, G (s)	15.1	60.7	60.7
Effective Green, g (s)	17.1	62.7	62.7
Actuated g/C Ratio	0.11	0.39	0.39
Clearance Time (s)	6.0	6.0	6.0
Vehicle Extension (s)	1.5	3.0	3.0
Lane Grp Cap (vph)	367	1993	620
v/s Ratio Prot	c0.07	c0.33	
v/s Ratio Perm			0.07
v/c Ratio	0.67	0.84	0.19
Uniform Delay, d1	68.7	44.1	31.9
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	3.5	4.5	0.7
Delay (s)	72.3	48.6	32.6
Level of Service	E	D	C
Approach Delay (s)		49.8	
Approach LOS		D	
Intersection Summary			

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21-K-190

Phasings

35: Hillsboro Boulevard & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	  		  	  	
Volume (vph)	264	734	177	839	1082	299	190	1230	584	235	1607	196
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phases	7	4	4	3	8	8	5	2	2	1	6	6
Minimum Initial (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	11.0	41.0	41.0	11.0	41.0	41.0	11.0	42.0	42.0	11.0	42.0	42.0
Total Split (s)	18.0	45.0	45.0	38.0	65.0	65.0	25.0	52.0	52.0	25.0	52.0	52.0
Total Split (%)	11.3%	28.1%	28.1%	23.8%	40.6%	40.6%	15.6%	32.5%	32.5%	15.6%	32.5%	32.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 21 (13%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Splits and Phases: 35: Hillsboro Boulevard & Lyons Road

 ø1	 ø2	 ø3	 ø4
25 s	52 s	38 s	45 s
 ø5	 ø6	 ø7	 ø8
25 s	52 s	18 s	65 s

HCM Signalized Intersection Capacity Analysis

36: Cullum Road & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.91			0.91	1.00
Frt	1.00	0.88			1.00		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1770	1641			1863		1770	5085			5085	1583
Flt Permitted	0.75	1.00			1.00		0.06	1.00			1.00	1.00
Satd. Flow (perm)	1392	1641			1863		107	5085			5085	1583
Volume (vph)	183	16	63	0	15	0	47	2999	0	0	2067	124
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	191	17	66	0	16	0	49	3124	0	0	2153	129
RTOR Reduction (vph)	0	44	0	0	0	0	0	0	0	0	0	29
Lane Group Flow (vph)	191	39	0	0	16	0	49	3124	0	0	2153	100
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	25.6	25.6			25.6		124.4	124.4			115.1	115.1
Effective Green, g (s)	26.6	26.6			26.6		125.4	125.4			116.1	116.1
Actuated g/C Ratio	0.17	0.17			0.17		0.78	0.78			0.73	0.73
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	231	273			310		139	3985			3690	1149
v/s Ratio Prot		0.02			0.01		0.01	c0.61			0.42	
v/s Ratio Perm	c0.14						0.27					0.06
v/c Ratio	0.83	0.14			0.05		0.35	0.78			0.58	0.09
Uniform Delay, d1	64.5	57.0			56.1		9.3	9.7			10.4	6.4
Progression Factor	1.00	1.00			1.00		1.48	0.26			0.12	0.00
Incremental Delay, d2	20.9	0.2			0.1		1.1	1.2			0.1	0.0
Delay (s)	85.4	57.2			56.2		14.9	3.7			1.3	0.0
Level of Service	F	E			E		B	A			A	A
Approach Delay (s)		76.8			56.2			3.9			1.2	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM Average Control Delay			6.4			HCM Level of Service				A		
HCM Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			81.4%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

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Application for Development Approval

21-K-192

Phasings
36: Cullum Road & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

								
Lane Group	EBL	EBT	WBT	NBL	NBT	SBT	SBR	ø1
Lane Configurations								
Volume (vph)	183	16	15	47	2999	2067	124	
Turn Type	Perm			pm+pt			Perm	
Protected Phases		4	8	5	2	6		1
Permitted Phases	4			2			6	
Detector Phases	4	4	8	5	2	6	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	21.0	21.0	9.0	21.0	21.0	21.0	9.0
Total Split (s)	36.0	36.0	36.0	10.0	115.0	114.0	114.0	9.0
Total Split (%)	22.5%	22.5%	22.5%	6.3%	71.9%	71.3%	71.3%	6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag				Lead	Lag	Lag	Lag	Lead
Lead-Lag Optimize?				Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	None

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 148 (93%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated

Splits and Phases: 36: Cullum Road & Lyons Road

		ø2		ø4
9 s	115 s		36 s	
		ø6		ø8
10 s	114 s		36 s	

HCM Signalized Intersection Capacity Analysis

37: Jardin Driveway & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				  	  	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	5085	5085	1583
Flt Permitted	0.95	1.00	0.07	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	124	5085	5085	1583
Volume (vph)	94	49	65	2888	2033	43
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	98	51	68	3008	2118	45
RTOR Reduction (vph)	0	46	0	0	0	7
Lane Group Flow (vph)	98	5	68	3008	2118	38
Turn Type	Perm pm+pt					Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	13.8	13.8	136.2	136.2	124.3	124.3
Effective Green, g (s)	14.8	14.8	137.2	137.2	125.3	125.3
Actuated g/C Ratio	0.09	0.09	0.86	0.86	0.78	0.78
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	164	146	188	4360	3982	1240
v/s Ratio Prot	c0.06		0.02	c0.59	0.42	
v/s Ratio Perm		0.00	0.29			0.02
v/c Ratio	0.60	0.03	0.36	0.69	0.53	0.03
Uniform Delay, d1	69.7	66.1	5.5	4.0	6.4	3.9
Progression Factor	1.00	1.00	2.76	0.28	0.09	0.00
Incremental Delay, d2	5.7	0.1	0.7	0.5	0.4	0.0
Delay (s)	75.5	66.2	15.9	1.6	1.0	0.0
Level of Service	E	E	B	A	A	A
Approach Delay (s)	72.3			1.9	1.0	
Approach LOS	E			A	A	
Intersection Summary						
HCM Average Control Delay			3.5		HCM Level of Service	A
HCM Volume to Capacity ratio			0.68			
Actuated Cycle Length (s)			160.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			67.7%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

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Application for Development Approval

21-K-194

Phasings
37: Jardin Driveway & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	94	49	65	2888	2033	43
Turn Type	Perm		pm+pt		Perm	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	21.0	9.0	21.0	21.0	21.0
Total Split (s)	31.0	31.0	23.0	129.0	106.0	106.0
Total Split (%)	19.4%	19.4%	14.4%	80.6%	66.3%	66.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated

Splits and Phases: 37: Jardin Driveway & Lyons Road

 ø2	 ø4
129 s	31 s
 ø5	 ø6
23 s	106 s

HCM Signalized Intersection Capacity Analysis 38: Uptown Driveway & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				  	  	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	5085	5085	1583
Flt Permitted	0.95	1.00	0.05	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	92	5085	5085	1583
Volume (vph)	394	241	176	2716	1862	319
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	410	251	183	2829	1940	332
RTOR Reduction (vph)	0	133	0	0	0	80
Lane Group Flow (vph)	410	118	183	2829	1940	252
Turn Type	Perm		pm+pt		Perm	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	40.6	40.6	109.4	109.4	87.0	87.0
Effective Green, g (s)	41.6	41.6	110.4	110.4	88.0	88.0
Actuated g/C Ratio	0.26	0.26	0.69	0.69	0.55	0.55
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	460	412	256	3509	2797	871
v/s Ratio Prot	c0.23		0.08	c0.56	0.38	
v/s Ratio Perm		0.07	0.41			0.16
v/c Ratio	0.89	0.29	0.71	0.81	0.69	0.29
Uniform Delay, d1	57.0	47.3	45.0	17.3	26.2	19.3
Progression Factor	1.00	1.00	0.69	2.64	0.41	0.21
Incremental Delay, d2	19.0	0.4	0.9	0.2	1.3	0.7
Delay (s)	76.1	47.7	31.8	45.9	12.0	4.7
Level of Service	E	D	C	D	B	A
Approach Delay (s)	65.3			45.1	10.9	
Approach LOS	E			D	B	
Intersection Summary						
HCM Average Control Delay			34.3		HCM Level of Service	C
HCM Volume to Capacity ratio			0.83			
Actuated Cycle Length (s)			160.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			81.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

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11/18/2009

Kimley Horn and Associates

Application for Development Approval

21-K-196

Phasings
38: Uptown Driveway & Lyons Road

PM Peak Hour
Future Total Traffic Conditions

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	394	241	176	2716	1862	319
Turn Type	Perm		pm+pt		Perm	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	21.0	9.0	21.0	21.0	21.0
Total Split (s)	54.0	54.0	27.0	106.0	79.0	79.0
Total Split (%)	33.8%	33.8%	16.9%	66.3%	49.4%	49.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated

Splits and Phases: 38: Uptown Driveway & Lyons Road

 ø2	 ø4
106 s	54 s
 ø5	 ø6
27 s	79 s

HCM Signalized Intersection Capacity Analysis

39: Sample Road & Fisherman's Landing Driveway

PM Peak Hour
Future Total Traffic Conditions

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		  	  			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.03	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	58	5085	5085	1583	1770	1583
Volume (vph)	57	2507	3654	95	171	107
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	59	2611	3806	99	178	111
RTOR Reduction (vph)	0	0	0	14	0	32
Lane Group Flow (vph)	59	2611	3806	85	178	79
Turn Type	pm+pt			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	132.0	132.0	123.8	123.8	18.0	18.0
Effective Green, g (s)	133.0	133.0	124.8	124.8	19.0	19.0
Actuated g/C Ratio	0.83	0.83	0.78	0.78	0.12	0.12
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	93	4227	3966	1235	210	188
v/s Ratio Prot	0.02	c0.51	c0.75		c0.10	
v/s Ratio Perm	0.51			0.05		0.05
v/c Ratio	0.63	0.62	0.96	0.07	0.85	0.42
Uniform Delay, d1	51.5	4.7	15.4	4.1	69.1	65.4
Progression Factor	1.69	0.32	1.76	1.96	1.00	1.00
Incremental Delay, d2	8.8	0.2	2.1	0.0	32.4	6.8
Delay (s)	95.9	1.7	29.2	8.0	101.5	72.2
Level of Service	F	A	C	A	F	E
Approach Delay (s)		3.8	28.7		90.2	
Approach LOS		A	C		F	
Intersection Summary						
HCM Average Control Delay			21.6		HCM Level of Service	C
HCM Volume to Capacity ratio			0.94			
Actuated Cycle Length (s)			160.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			86.7%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

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21-K-198

Phasings
39: Sample Road & Fisherman's Landing Driveway

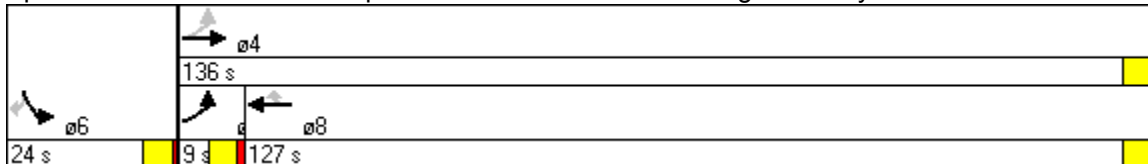
PM Peak Hour
Future Total Traffic Conditions

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		  	  			
Volume (vph)	57	2507	3654	95	171	107
Turn Type	pm+pt			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases	4			8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	9.0	136.0	127.0	127.0	24.0	24.0
Total Split (%)	5.6%	85.0%	79.4%	79.4%	15.0%	15.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	C-Max	C-Max

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated

Splits and Phases: 39: Sample Road & Fisherman's Landing Driveway



HCM Unsignalized Intersection Capacity Analysis

911: Lyons Road &

PM Peak Hour
Future Total Traffic Conditions

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑↑↑		↑↑↑		
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	2606	0	3248	0	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	2864	0	3569	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		799	194			
pX, platoon unblocked					0.56	
vC, conflicting volume	3569				955	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3569				0	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	66				577	1084
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	955	955	955	1190	1190	1190
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	1190	1190	1190
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.56	0.56	0.56	0.70	0.70	0.70
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						
Approach Delay (s)	0.0			0.0		
Approach LOS						
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			79.1%		ICU Level of Service	D
Analysis Period (min)			15			

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HCM Unsignalized Intersection Capacity Analysis
981: NB Sawgrass Expressway Off Ramp (to NB) & SR 7

PM Peak Hour
Future Total Traffic Conditions

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations			  			  		
Sign Control	Yield		Free			Free		
Grade	0%		0%			0%		
Volume (veh/h)	0	688	2364	0	0	2767		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91		
Hourly flow rate (vph)	0	756	2598	0	0	3041		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None							
Median storage veh)								
Upstream signal (ft)			442			993		
pX, platoon unblocked	0.83	0.74			0.74			
vC, conflicting volume	3358	866			2598			
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol	2319	134			2460			
tC, single (s)	6.8	6.9			4.1			
tC, 2 stage (s)								
tF (s)	3.5	3.3			2.2			
p0 queue free %	100	0			100			
cM capacity (veh/h)	26	663			139			
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	756	866	866	866	760	760	760	760
Volume Left	0	0	0	0	0	0	0	0
Volume Right	756	0	0	0	0	0	0	0
cSH	663	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	1.14	0.51	0.51	0.51	0.45	0.45	0.45	0.45
Queue Length 95th (ft)	591	0	0	0	0	0	0	0
Control Delay (s)	103.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	F							
Approach Delay (s)	103.7	0.0			0.0			
Approach LOS	F							
Intersection Summary								
Average Delay			12.3					
Intersection Capacity Utilization			94.9%	ICU Level of Service			F	
Analysis Period (min)			15					

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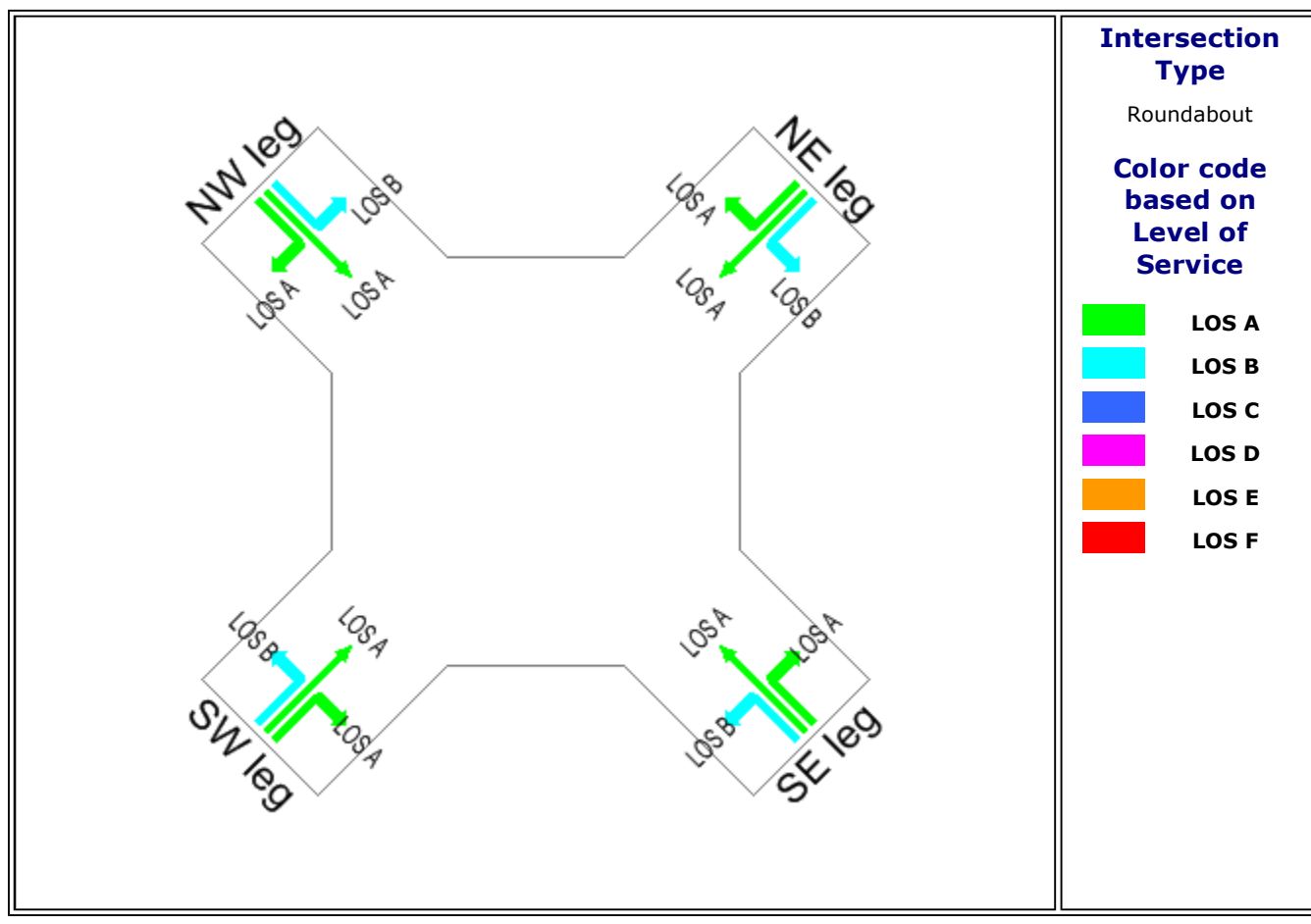


Level of Service

Based on Delay (HCM method)

Cullum Road and NW 54th Avenue

Enter subtitle



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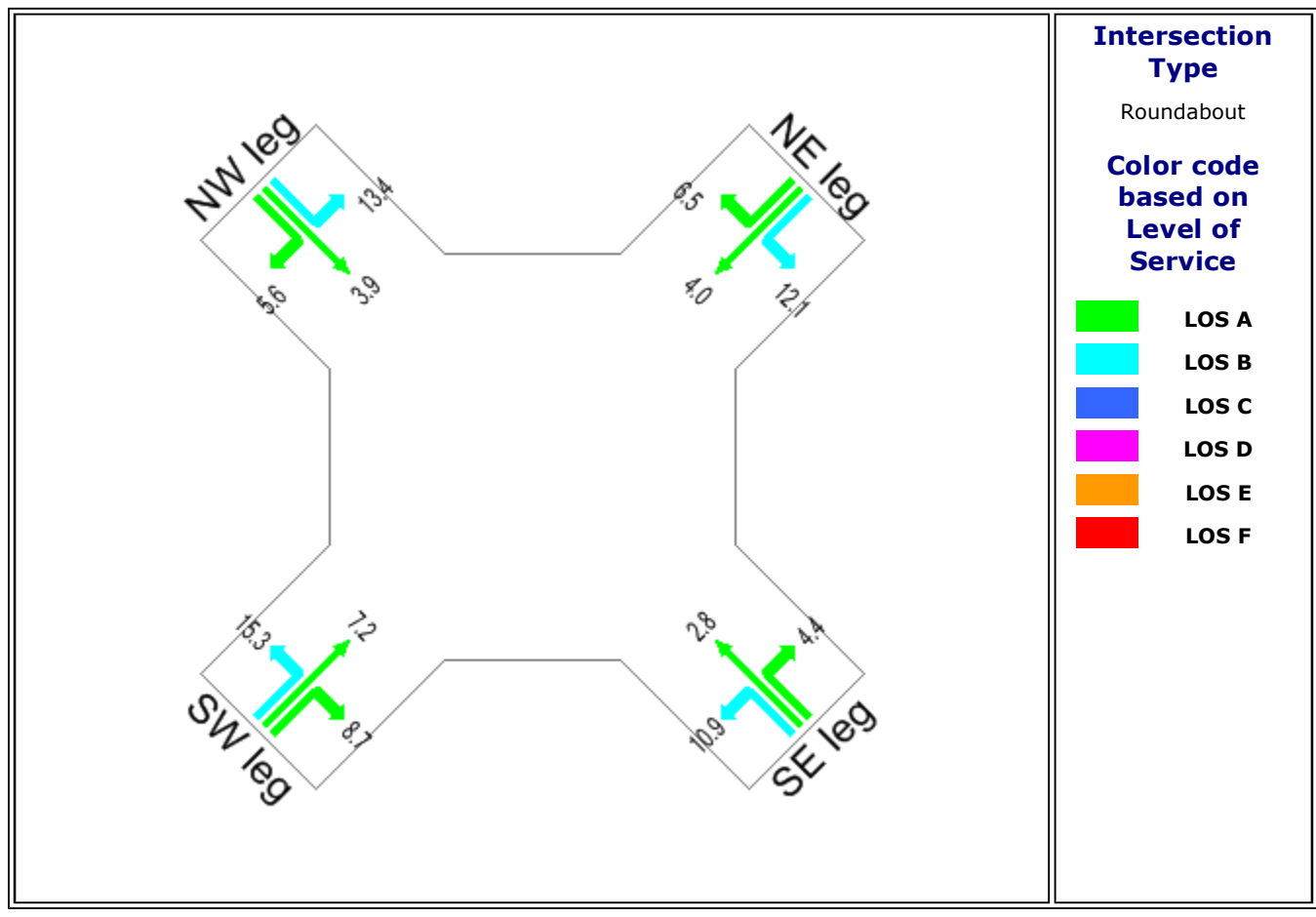


Control Delay (Average)

Average control delay per vehicle (seconds)

Cullum Road and NW 54th Avenue

Enter subtitle



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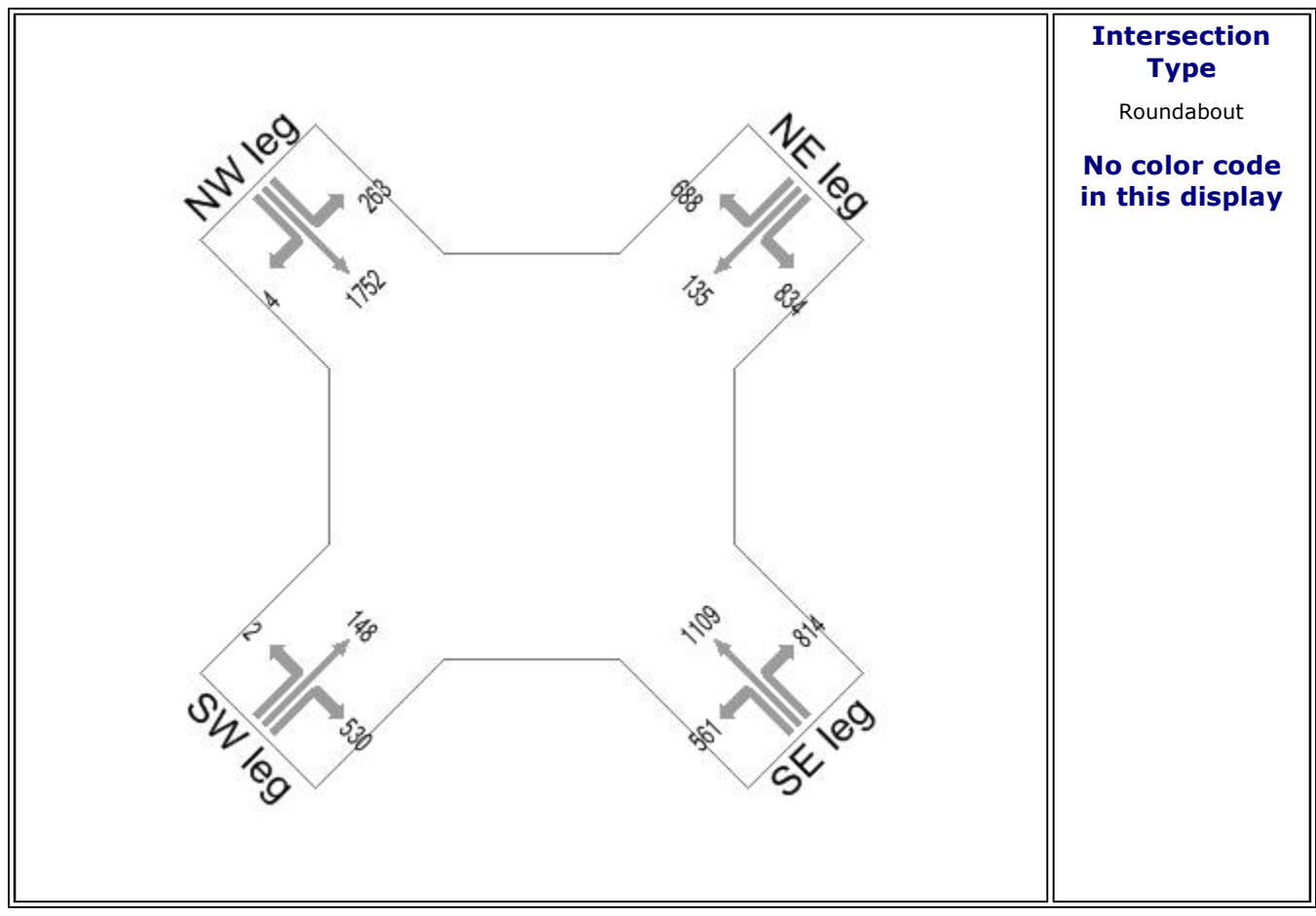


Capacity (Total)

Total value per vehicle movement (veh/h)

Cullum Road and NW 54th Avenue

Enter subtitle



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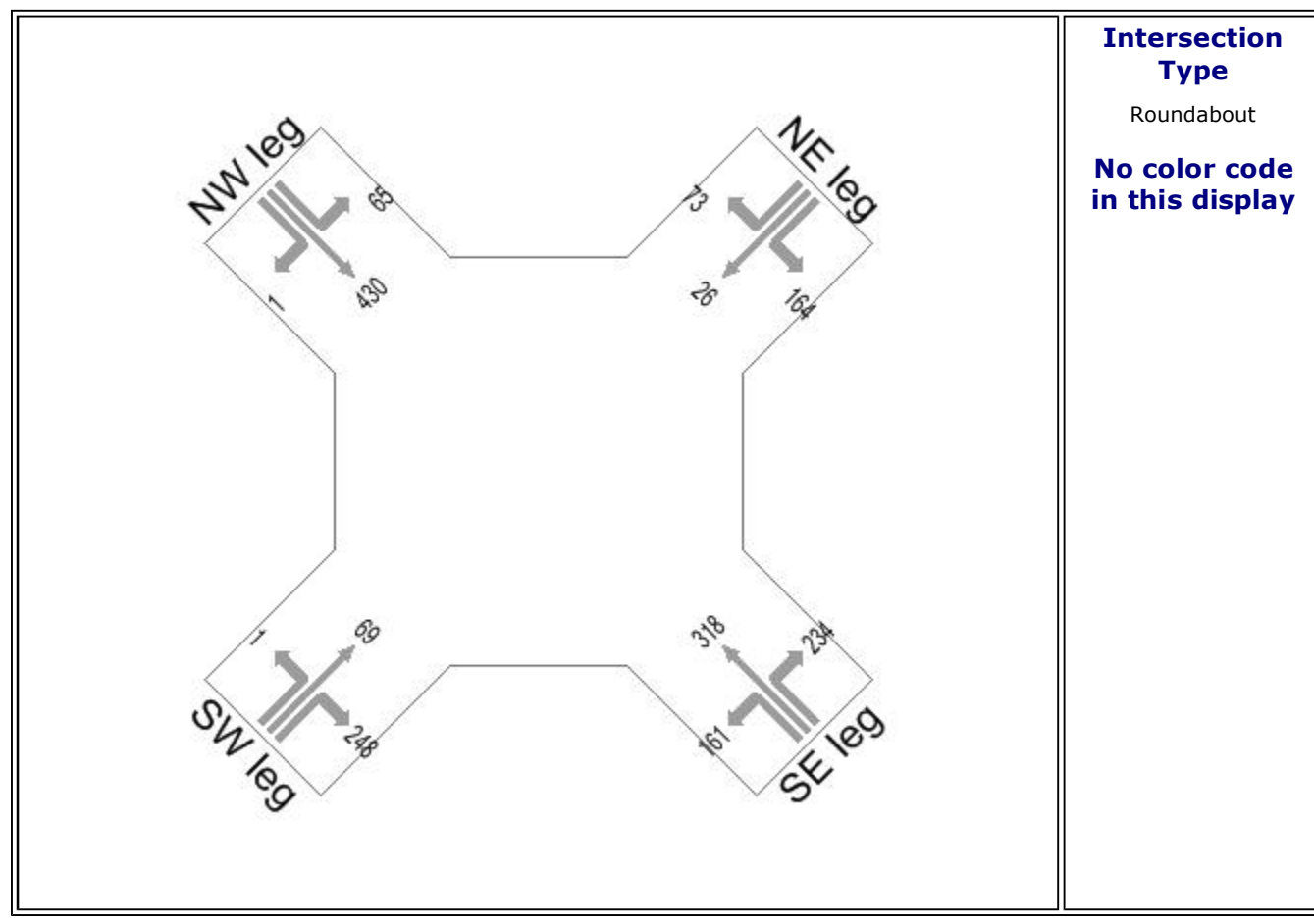


Input Volumes

Total flow rates as given by the user (veh/60 min)

Cullum Road and NW 54th Avenue

Enter subtitle



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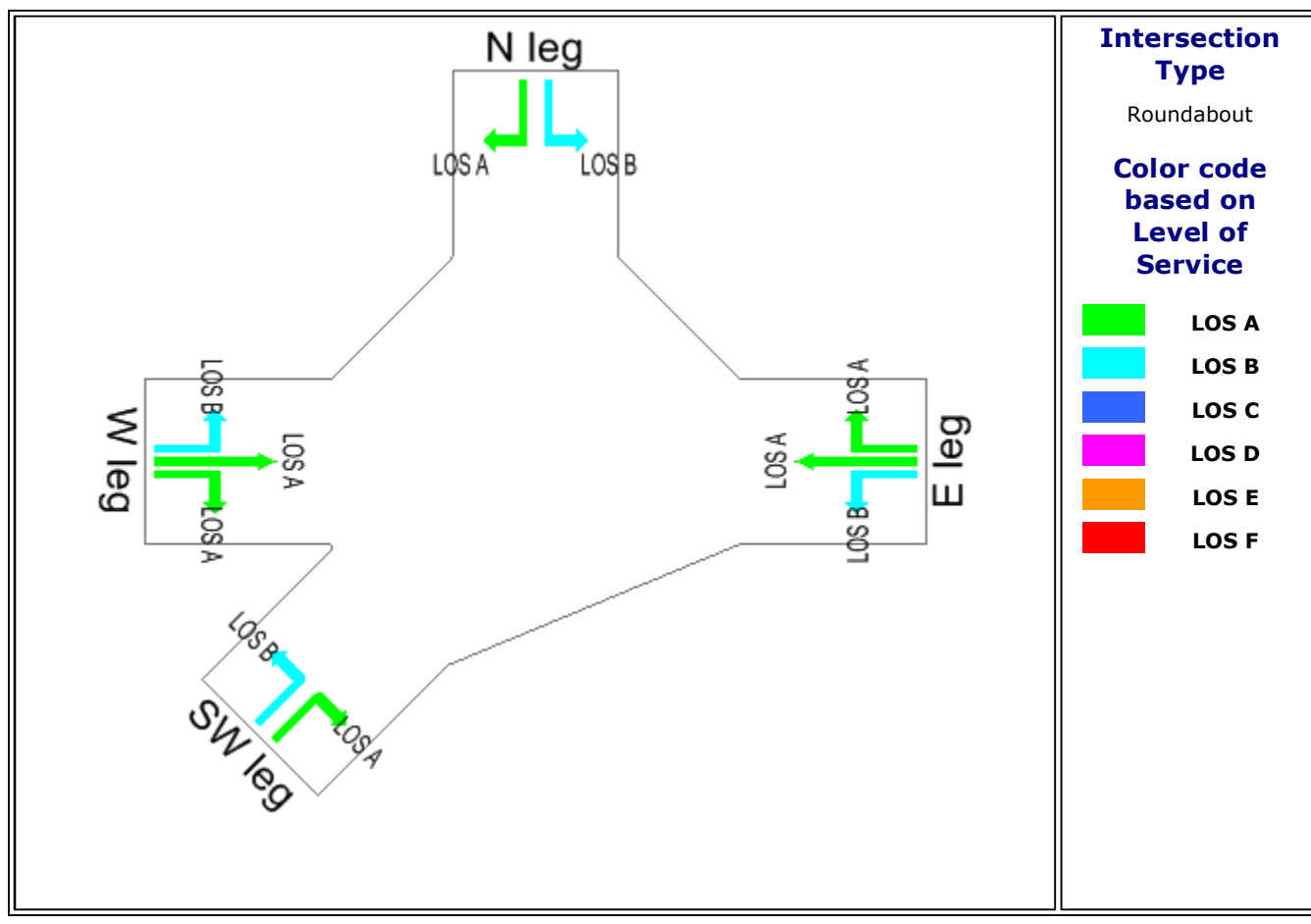


Level of Service

Based on Delay (HCM method)

Cullum Road and Banks Road

Enter subtitle



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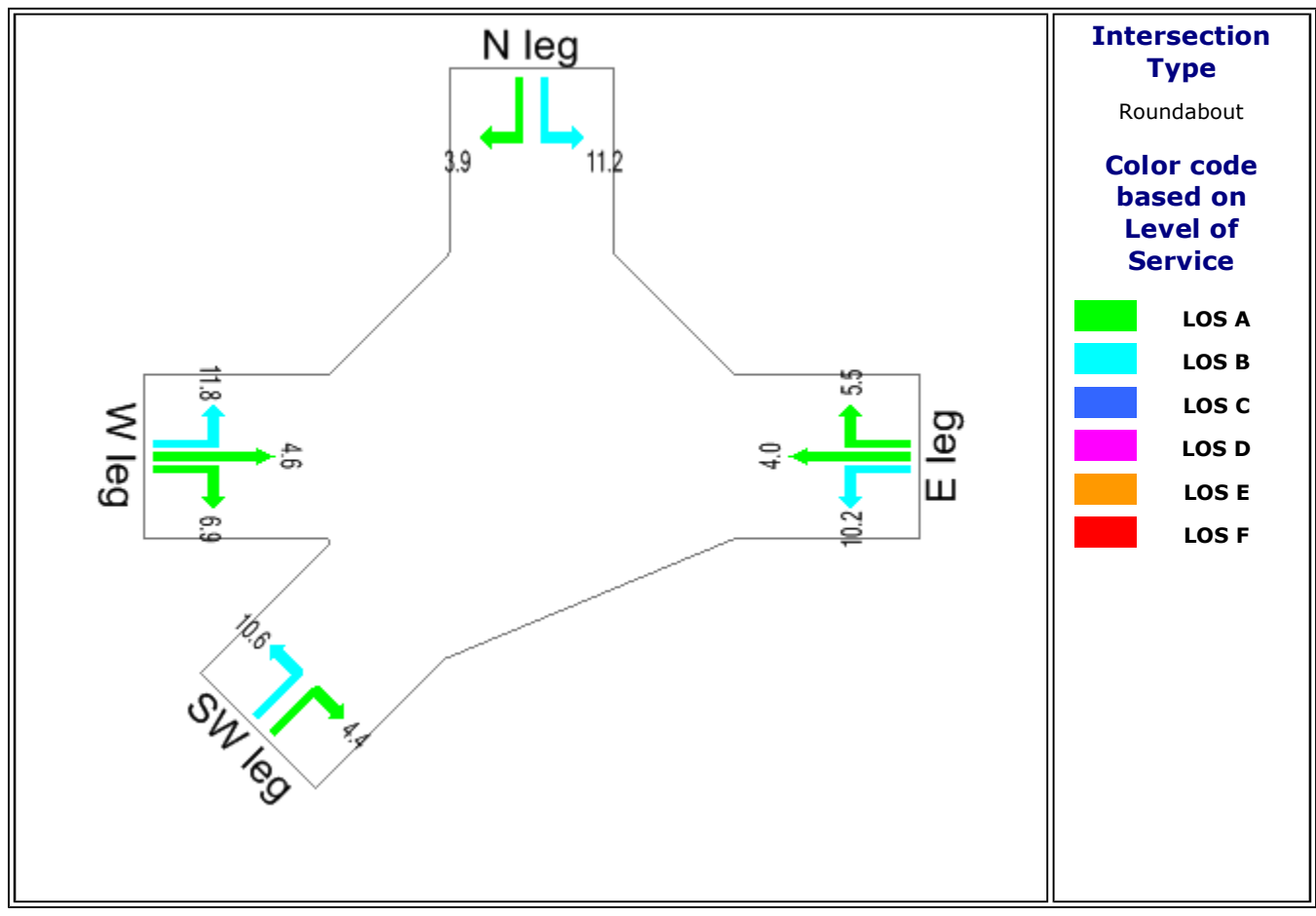


Control Delay (Average)

Average control delay per vehicle (seconds)

Cullum Road and Banks Road

Enter subtitle



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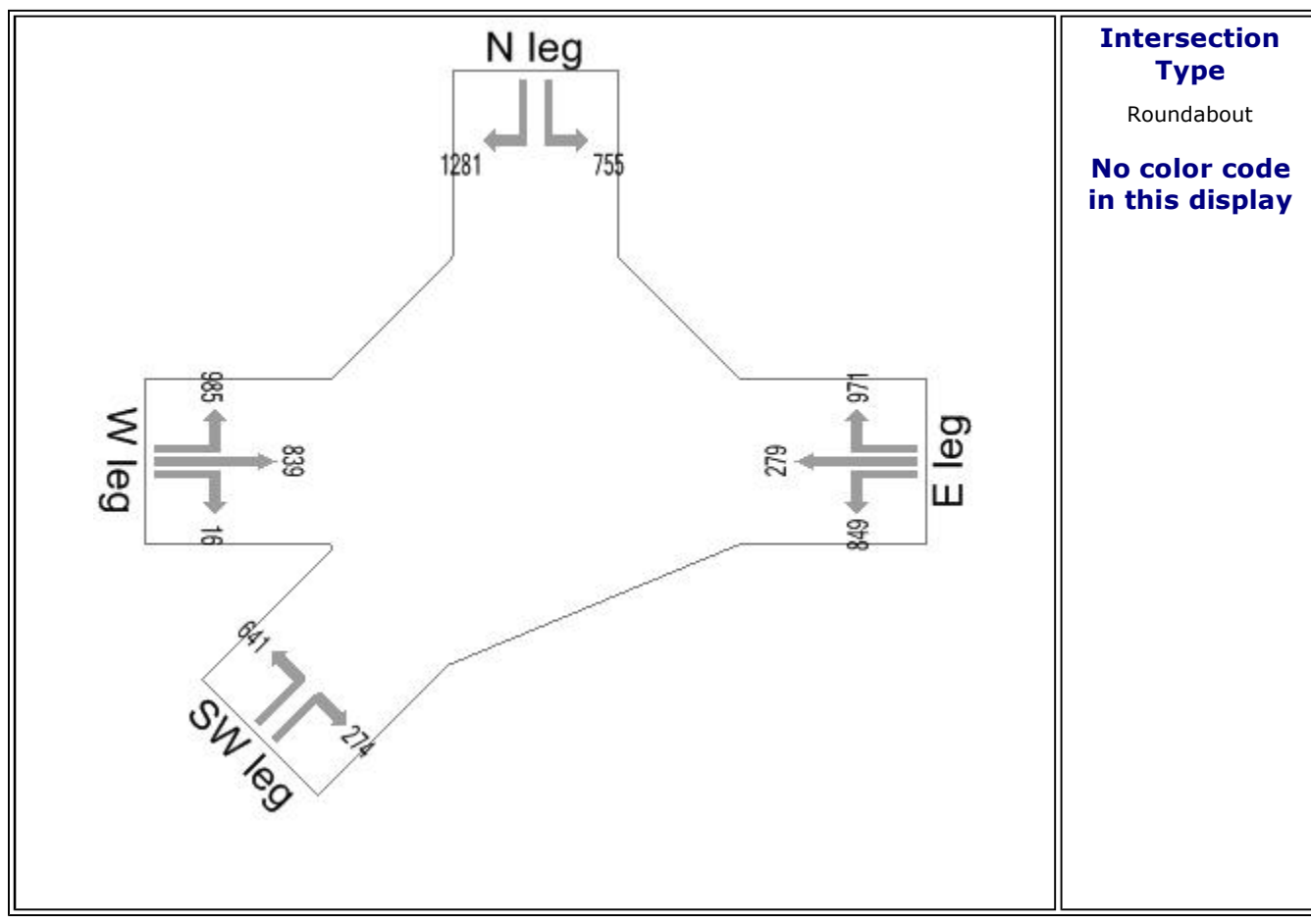


Capacity (Total)

Total value per vehicle movement (veh/h)

Cullum Road and Banks Road

Enter subtitle



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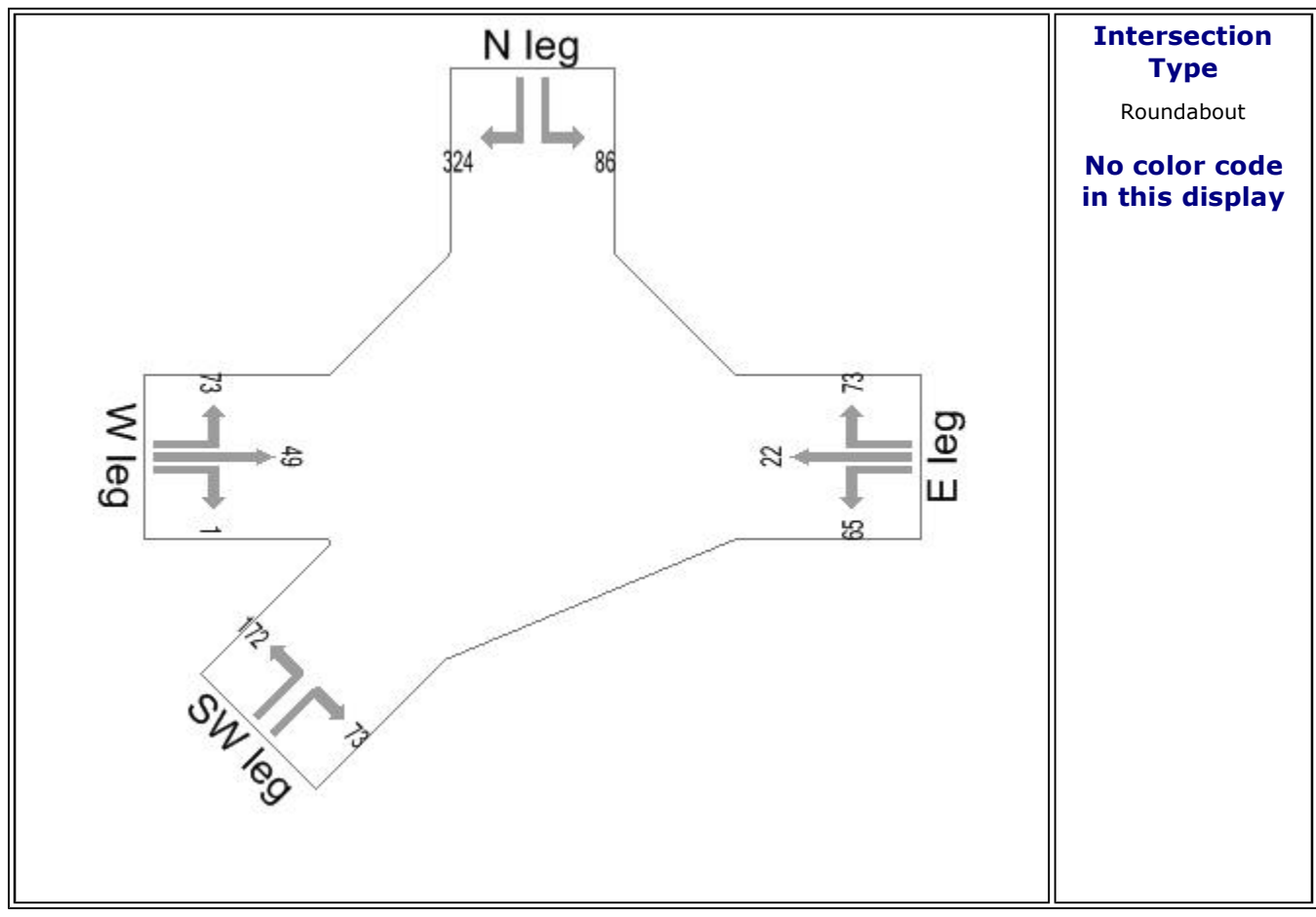


Input Volumes

Total flow rates as given by the user (veh/60 min)

Cullum Road and Banks Road

Enter subtitle



Site: Cullum Road and NW 54th Avenue
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