

Alternative N: Kingwood Widening + Kingwood Grade Separation
 1: Trailwood Village Dr. & Kingwood Dr.

PM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø2	ø3	ø4	ø5	ø7	ø8
Detector Phase	2 7		1	6	8 3	8 3						
Switch Phase												
Minimum Initial (s)			3.0	2.0			10.0	1.0	5.0	3.0	1.0	5.0
Minimum Split (s)			10.0	21.0			29.5	14.0	10.0	9.0	8.0	21.0
Total Split (s)			10.0	87.0			109.0	21.0	10.0	32.0	10.0	21.0
Total Split (%)			6.7%	58.0%			73%	14%	7%	21%	7%	14%
Maximum Green (s)			4.0	82.0			96.0	8.0	5.0	26.0	5.0	16.0
Yellow Time (s)			4.0	4.0			4.0	3.5	3.5	4.0	3.5	3.5
All-Red Time (s)			2.0	1.0			9.0	9.5	1.5	2.0	1.5	1.5
Lost Time Adjust (s)			0.0	0.0								
Total Lost Time (s)			6.0	5.0								
Lead/Lag			Lag	Lag			Lead			Lead		
Lead-Lag Optimize?			Yes	Yes			Yes			Yes		
Vehicle Extension (s)			0.2	0.2			0.2	0.2	0.2	0.2	0.2	0.2
Recall Mode			None	C-Max			C-Max	Max	None	None	None	Max
Walk Time (s)				5.0			5.0					
Flash Dont Walk (s)				11.0			11.0					
Pedestrian Calls (#/hr)				0			0					
Act Effect Green (s)	96.0		4.0	86.3	16.0	16.0						
Actuated g/C Ratio	0.64		0.03	0.58	0.11	0.11						
v/c Ratio	0.86		1.62	0.54	0.56	0.26						
Control Delay	3.9		397.4	20.9	74.5	17.8						
Queue Delay	0.0		0.0	0.0	0.0	0.0						
Total Delay	3.9		397.4	20.9	74.5	17.8						
LOS	A		F	C	E	B						
Approach Delay	3.9			38.2	55.3							
Approach LOS	A			D	E							

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.62
 Intersection Signal Delay: 18.0
 Intersection LOS: B
 Intersection Capacity Utilization 72.9%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 1: Trailwood Village Dr. & Kingwood Dr.



Alternative N: Kingwood Widening + Kingwood Grade Separation
 4: Green Oak Dr. & Kingwood Dr.

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	36	1809	82	0	0	0	0	172	163	304	92	0
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994							0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1805	5055	0	0	0	0	0	1863	1583	1770	1863	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	1805	5055	0	0	0	0	0	1863	1583	1770	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7							145			
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		2489			1560			515			89	
Travel Time (s)		42.4			26.6			11.7			2.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	117%	117%	117%	117%	117%	117%	117%	117%	117%	117%	117%	117%
Heavy Vehicles (%)	0%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	46	2301	104	0	0	0	0	219	207	387	117	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	2405	0	0	0	0	0	219	207	387	117	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2						2	1	1	2	
Detector Template	Left	Thru						Thru	Right	Left	Thru	
Leading Detector (ft)	20	100						100	20	20	100	
Trailing Detector (ft)	0	0						0	0	0	0	
Detector 1 Position(ft)	0	0						0	0	0	0	
Detector 1 Size(ft)	20	6						6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex						Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0						0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0						0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0						0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Prot	NA						NA	Perm	Prot	NA	
Protected Phases	15	2						8		1 4	4	

Lane Group	ø1	ø6
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Growth Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	1	6

Alternative N: Kingwood Widening + Kingwood Grade Separation
 4: Green Oak Dr. & Kingwood Dr.

PM Peak Hour

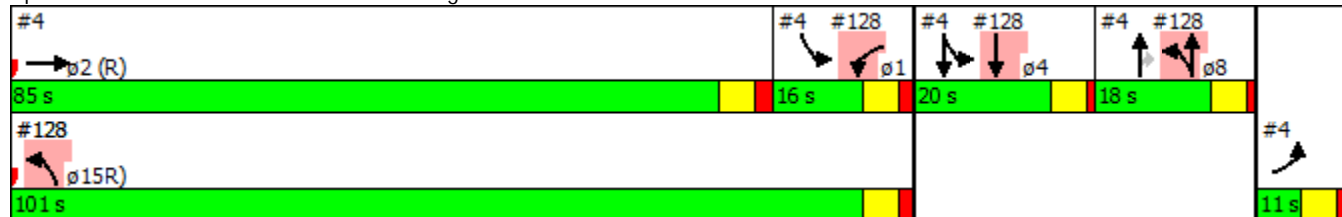


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases									8			
Detector Phase	15	2						8	8	14	4	
Switch Phase												
Minimum Initial (s)	5.0	4.0						5.0	5.0		5.0	
Minimum Split (s)	11.0	20.0						18.0	18.0		10.0	
Total Split (s)	11.0	85.0						18.0	18.0		20.0	
Total Split (%)	7.3%	56.7%						12.0%	12.0%		13.3%	
Maximum Green (s)	5.0	79.0						13.0	13.0		15.0	
Yellow Time (s)	4.0	4.0						4.0	4.0		4.0	
All-Red Time (s)	2.0	2.0						1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0						0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0						5.0	5.0		5.0	
Lead/Lag		Lead						Lag	Lag		Lead	
Lead-Lag Optimize?		Yes						Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0						3.0	3.0		3.0	
Recall Mode	None	C-Max						None	None		None	
Walk Time (s)		4.0						6.0	6.0			
Flash Dont Walk (s)		10.0						7.0	7.0			
Pedestrian Calls (#/hr)		0						0	0			
Act Effct Green (s)	5.0	79.0						13.0	13.0	30.0	15.0	
Actuated g/C Ratio	0.03	0.53						0.09	0.09	0.20	0.10	
v/c Ratio	0.77	0.90						1.36	0.77	1.09	0.63	
Control Delay	133.9	26.4						245.2	40.6	103.2	19.1	
Queue Delay	71.0	0.0						0.5	0.0	0.0	0.0	
Total Delay	204.9	26.4						245.7	40.6	103.2	19.1	
LOS	F	C						F	D	F	B	
Approach Delay		29.7						146.0			83.7	
Approach LOS		C						F			F	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	117 (78%), Referenced to phase 2:EBT and 6:, Start of Green
Natural Cycle:	140
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.40
Intersection Signal Delay:	52.4
Intersection LOS:	D
Intersection Capacity Utilization:	106.7%
ICU Level of Service:	G
Analysis Period (min):	15

Splits and Phases: 4: Green Oak Dr. & Kingwood Dr.



Lane Group	ø1	ø6
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	4.0
Minimum Split (s)	11.0	10.0
Total Split (s)	16.0	101.0
Total Split (%)	11%	67%
Maximum Green (s)	10.0	95.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	C-Max
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Alternative N: Kingwood Widening + Kingwood Grade Separation
6: Northpark Dr. & Sorters

PM Peak Hour



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	49	327	326	0	196	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				
Flt Protected	0.950					0.969
Satd. Flow (prot)	1770	1583	1863	0	0	1805
Flt Permitted	0.950					0.969
Satd. Flow (perm)	1770	1583	1863	0	0	1805
Link Speed (mph)	40		30			35
Link Distance (ft)	1488		70			496
Travel Time (s)	25.4		1.6			9.7
Peak Hour Factor	0.61	0.94	0.92	0.92	0.83	0.84
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	91	393	400	0	267	153
Shared Lane Traffic (%)						
Lane Group Flow (vph)	91	393	400	0	0	420
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	20		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	51.8%
Analysis Period (min)	15
	ICU Level of Service A

Alternative N: Kingwood Widening + Kingwood Grade Separation
 8: Lake Houston Pkwy/Lake Houston Pwky & Northpark Dr.

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	105	657	533	230	362	32	567	293	298	22	198	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	2		0	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Frt		0.931			0.985			0.923			0.951	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3295	0	1770	3486	0	3433	3267	0	3433	3366	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3295	0	1770	3486	0	3433	3267	0	3433	3366	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		149			9			190			48	
Link Speed (mph)		45			40			40			40	
Link Distance (ft)		2785			2651			1043			1141	
Travel Time (s)		42.2			45.2			17.8			19.4	
Peak Hour Factor	0.88	0.94	0.90	0.89	0.87	0.67	0.94	0.86	0.83	0.69	0.85	0.81
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	135	790	669	292	470	54	682	385	406	36	263	127
Shared Lane Traffic (%)												
Lane Group Flow (vph)	135	1459	0	292	524	0	682	791	0	36	390	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		50			50			60			60	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Minimum Split (s)	13.0	21.0		13.0	21.0		13.0	21.0		13.0	21.0	
Total Split (s)	25.0	54.0		25.0	54.0		36.0	56.0		15.0	22.0	
Total Split (%)	16.7%	36.0%		16.7%	36.0%		24.0%	37.3%		10.0%	14.7%	
Maximum Green (s)	19.0	48.0		19.0	48.0		30.0	50.0		9.0	16.0	
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	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Walk Time (s)		5.0			5.0			5.0			5.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	19.0	48.0		19.0	48.0		30.0	50.0		9.0	29.0	
Actuated g/C Ratio	0.13	0.32		0.13	0.32		0.20	0.33		0.06	0.19	
v/c Ratio	0.60	1.26		1.30	0.47		0.99	0.65		0.18	0.57	

Alternative N: Kingwood Widening + Kingwood Grade Separation
 8: Lake Houston Pkwy/Lake Houston Pwky & Northpark Dr.

PM Peak Hour

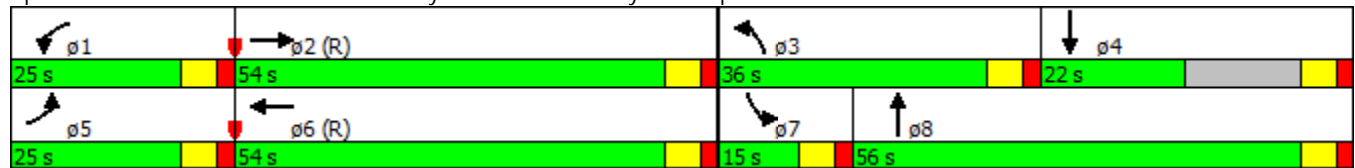


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	58.5	150.2		214.1	41.7		92.1	34.6		69.2	51.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	58.5	150.2		214.1	41.7		92.1	34.6		69.2	51.4	
LOS	E	F		F	D		F	C		E	D	
Approach Delay		142.4			103.4			61.2			52.9	
Approach LOS		F			F			E			D	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	130 (87%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle:	140
Control Type:	Pretimed
Maximum v/c Ratio:	1.30
Intersection Signal Delay:	98.4
Intersection LOS:	F
Intersection Capacity Utilization	102.0%
ICU Level of Service	G
Analysis Period (min)	15

Splits and Phases: 8: Lake Houston Pkwy/Lake Houston Pwky & Northpark Dr.



Alternative N: Kingwood Widening + Kingwood Grade Separation
 11: Woodland Hills & Northpark Dr.

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	1364	179	171	936	108	277	149	276	138	159	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	2		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	0.95
Frt		0.981			0.979			0.905			0.966	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3472	0	1770	3465	0	3433	3203	0	1770	3419	0
Flt Permitted	0.057			0.062			0.467			0.276		
Satd. Flow (perm)	106	3472	0	115	3465	0	1688	3203	0	514	3419	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			12			203			21	
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		981			4845			3684			2505	
Travel Time (s)		14.9			73.4			83.7			56.9	
Peak Hour Factor	0.78	0.99	0.88	0.89	0.94	0.68	0.92	0.87	0.92	0.91	0.72	0.69
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	85	1557	230	217	1125	179	340	194	339	171	250	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	85	1787	0	217	1304	0	340	533	0	171	322	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		40			100			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 11: Woodland Hills & Northpark Dr.

PM Peak Hour

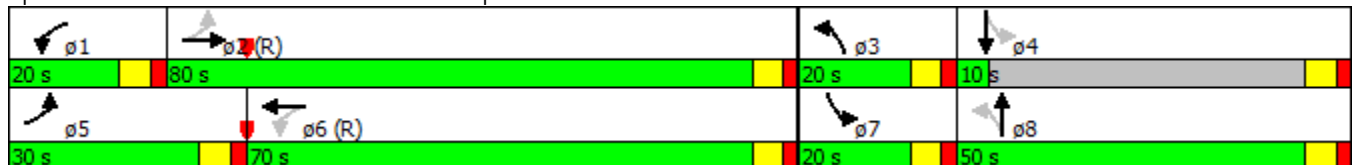


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	8.0	10.0		10.0	10.0		8.0	8.0		10.0	4.0	
Minimum Split (s)	14.0	26.0		16.0	26.0		14.0	14.0		16.0	20.0	
Total Split (s)	30.0	80.0		20.0	70.0		20.0	50.0		20.0	10.0	
Total Split (%)	17.6%	47.1%		11.8%	41.2%		11.8%	29.4%		11.8%	5.9%	
Maximum Green (s)	24.0	74.0		14.0	64.0		14.0	44.0		14.0	4.0	
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	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	C-Max		Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	0.0	4.0		0.0	4.0		0.0	0.0		0.0	4.0	
Flash Dont Walk (s)	0.0	16.0		0.0	16.0		0.0	0.0		0.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	94.0	74.0		78.0	64.0		58.0	44.0		58.0	44.0	
Actuated g/C Ratio	0.55	0.44		0.46	0.38		0.34	0.26		0.34	0.26	
v/c Ratio	0.29	1.18		1.15	0.99		0.47	0.54		0.62	0.36	
Control Delay	24.4	129.0		155.7	75.1		39.4	35.0		47.6	49.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.4	129.0		155.7	75.1		39.4	35.0		47.6	49.3	
LOS	C	F		F	E		D	D		D	D	
Approach Delay		124.2			86.6			36.7			48.7	
Approach LOS		F			F			D			D	

Intersection Summary

Area Type: Other
 Cycle Length: 170
 Actuated Cycle Length: 170
 Offset: 120 (71%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.18
 Intersection Signal Delay: 88.3
 Intersection LOS: F
 Intersection Capacity Utilization 103.1%
 ICU Level of Service G
 Analysis Period (min) 15

Splits and Phases: 11: Woodland Hills & Northpark Dr.



Alternative N: Kingwood Widening + Kingwood Grade Separation
 14: US 59 SBFR & Northpark Dr.

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↑		↖↗	↑↑					↖	↖↑↑↑	↖
Volume (vph)	0	304	131	776	875	0	0	0	0	316	172	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		150	0		0	0		0	0		0
Storage Lanes	0		2	2		0	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	0.97	0.95	1.00	1.00	1.00	1.00	0.86	0.81	0.86
Frt		0.956									0.997	0.850
Flt Protected				0.950						0.950	0.978	
Satd. Flow (prot)	0	6126	0	3433	3539	0	0	0	0	1522	4414	1362
Flt Permitted				0.950						0.950	0.978	
Satd. Flow (perm)	0	6126	0	3433	3539	0	0	0	0	1522	4414	1362
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		56									1	223
Link Speed (mph)		40			30			30			30	
Link Distance (ft)		3872			281			368			304	
Travel Time (s)		66.0			6.4			8.4			6.9	
Peak Hour Factor	0.92	0.82	0.86	0.90	0.94	0.92	0.92	0.92	0.92	0.88	0.78	0.76
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	419	172	974	1052	0	0	0	0	406	249	91
Shared Lane Traffic (%)										50%		10%
Lane Group Flow (vph)	0	591	0	974	1052	0	0	0	0	203	461	82
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		50			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2		1	2					1	2	1
Detector Template		Thru		Left	Thru					Left	Thru	Right
Leading Detector (ft)		100		20	100					20	100	20
Trailing Detector (ft)		0		0	0					0	0	0
Detector 1 Position(ft)		0		0	0					0	0	0
Detector 1 Size(ft)		6		20	6					20	6	20
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0					0.0	0.0	0.0
Detector 1 Queue (s)		0.0		0.0	0.0					0.0	0.0	0.0
Detector 1 Delay (s)		0.0		0.0	0.0					0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type		NA		Prot	NA					Perm	NA	Perm
Protected Phases		2		1 11 21	1 2 11						3 4	
Permitted Phases										3 4		3 4

Alternative N: Kingwood Widening + Kingwood Grade Separation
 14: US 59 SBFR & Northpark Dr.

PM Peak Hour

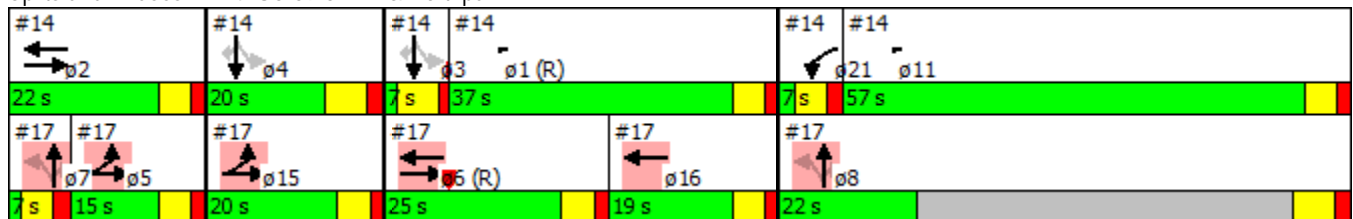


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2		1 1 1	2 1 1					3 4	3 4	3 4
Switch Phase												
Minimum Initial (s)		7.0										
Minimum Split (s)		14.0										
Total Split (s)		22.0										
Total Split (%)		14.7%										
Maximum Green (s)		16.7										
Yellow Time (s)		3.6										
All-Red Time (s)		1.7										
Lost Time Adjust (s)		0.0										
Total Lost Time (s)		5.3										
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0										
Recall Mode		None										
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		16.7		95.7	105.4					21.3	21.3	21.3
Actuated g/C Ratio		0.11		0.64	0.70					0.14	0.14	0.14
v/c Ratio		0.81		0.44	0.42					0.94	0.89dl	0.21
Control Delay		68.3		2.1	1.8					110.2	69.3	1.3
Queue Delay		0.0		1.4	0.6					0.0	0.0	0.0
Total Delay		68.3		3.5	2.4					110.2	69.3	1.3
LOS		E		A	A					F	E	A
Approach Delay		68.3			2.9						73.0	
Approach LOS		E			A						E	

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Offset: 96 (64%), Referenced to phase 1:WBTL and 6:, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.06
 Intersection Signal Delay: 29.9
 Intersection LOS: C
 Intersection Capacity Utilization 91.0%
 ICU Level of Service E
 Analysis Period (min) 15
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 14: US 59 SBFR & Northpark Dr.



Alternative N: Kingwood Widening + Kingwood Grade Separation
 14: US 59 SBFR & Northpark Dr.

PM Peak Hour

Lane Group	ø1	ø3	ø4	ø5	ø6	ø7	ø8	ø11	ø15	ø16	ø21
Detector Phase											
Switch Phase											
Minimum Initial (s)	3.0	1.0	5.0	2.7	5.0	1.0	1.0	3.0	3.0	4.0	1.0
Minimum Split (s)	21.3	7.0	11.7	8.0	26.3	7.0	21.7	8.3	8.3	21.3	7.0
Total Split (s)	37.0	7.0	20.0	15.0	25.0	7.0	22.0	57.0	20.0	19.0	7.0
Total Split (%)	25%	5%	13%	10%	17%	5%	15%	38%	13%	13%	5%
Maximum Green (s)	31.7	1.3	13.3	9.7	19.7	1.3	15.3	51.7	14.7	13.7	1.7
Yellow Time (s)	3.6	4.7	4.7	3.6	3.6	3.7	4.7	3.6	3.6	3.6	3.6
All-Red Time (s)	1.7	1.0	2.0	1.7	1.7	2.0	2.0	1.7	1.7	1.7	1.7
Lost Time Adjust (s)											
Total Lost Time (s)											
Lead/Lag	Lag	Lead		Lag	Lead	Lead		Lag		Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes		Yes		Yes	Yes
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
Recall Mode	C-Max	None	None	None	C-Max	None	None	None	None	None	None
Walk Time (s)					5.0		7.0				
Flash Dont Walk (s)					16.0		8.0				
Pedestrian Calls (#/hr)					0		0				
Act Effct Green (s)											
Actuated g/C Ratio											
v/c Ratio											
Control Delay											
Queue Delay											
Total Delay											
LOS											
Approach Delay											
Approach LOS											
Intersection Summary											

Alternative N: Kingwood Widening + Kingwood Grade Separation
 17: US 59 NBFR & Northpark Dr.

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	141	495	0	0	1061	304	553	541	1115	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		150	0		0	0		0
Storage Lanes	2		0	0		2	2		2	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.86	0.86	0.97	0.95	0.88	1.00	1.00	1.00
Frt					0.967				0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3433	3539	0	0	6196	0	3433	3539	2787	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3433	3539	0	0	6196	0	3433	3539	2787	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					45				681			
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		281			1797			365			309	
Travel Time (s)		6.4			27.2			8.3			7.0	
Peak Hour Factor	0.75	0.94	0.92	0.92	0.89	0.91	0.93	0.96	0.90	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	212	595	0	0	1347	377	672	637	1400	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	212	595	0	0	1724	0	672	637	1400	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2	1			
Detector Template	Left	Thru			Thru		Left	Thru	Right			
Leading Detector (ft)	20	100			100		20	100	20			
Trailing Detector (ft)	0	0			0		0	0	0			
Detector 1 Position(ft)	0	0			0		0	0	0			
Detector 1 Size(ft)	20	6			6		20	6	20			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	Prot	NA			NA		Perm	NA	Perm			
Protected Phases	5 15	5 6 15			6 16			7 8				
Permitted Phases							7 8		7 8			

Alternative N: Kingwood Widening + Kingwood Grade Separation
 17: US 59 NBFR & Northpark Dr.

PM Peak Hour

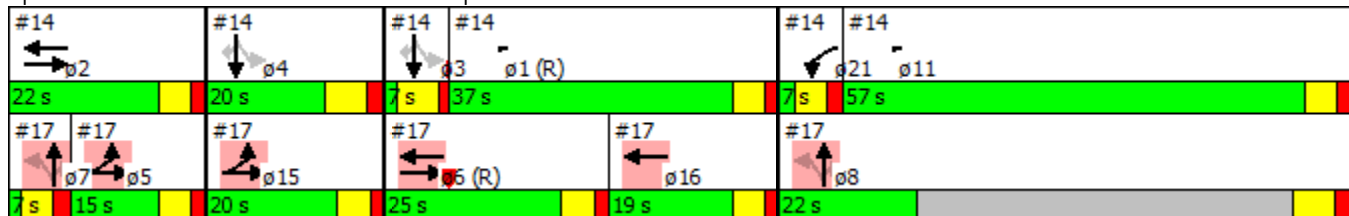


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5 15	5 6 15			6 16		7 8	7 8	7 8			
Switch Phase												
Minimum Initial (s)												
Minimum Split (s)												
Total Split (s)												
Total Split (%)												
Maximum Green (s)												
Yellow Time (s)												
All-Red Time (s)												
Lost Time Adjust (s)												
Total Lost Time (s)												
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)												
Recall Mode												
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	29.7	54.7			38.7		65.3	65.3	65.3			
Actuated g/C Ratio	0.20	0.36			0.26		0.44	0.44	0.44			
v/c Ratio	0.31	0.46			1.06		0.45	0.41	0.88			
Control Delay	32.8	2.4			77.7		31.0	30.2	26.4			
Queue Delay	0.0	2.6			0.0		0.0	0.0	0.0			
Total Delay	32.8	5.0			77.7		31.0	30.2	26.4			
LOS	C	A			E		C	C	C			
Approach Delay		12.3			77.7			28.4				
Approach LOS		B			E			C				

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	96 (64%), Referenced to phase 1:WBTL and 6:, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.06
Intersection Signal Delay:	42.2
Intersection LOS:	D
Intersection Capacity Utilization	91.0%
ICU Level of Service	E
Analysis Period (min)	15

Splits and Phases: 17: US 59 NBFR & Northpark Dr.




















Alternative N: Kingwood Widening + Kingwood Grade Separation
 17: US 59 NBFR & Northpark Dr.

PM Peak Hour

Lane Group	ø1	ø2	ø3	ø4	ø5	ø6	ø7	ø8	ø11	ø15	ø16	ø21				
Detector Phase																
Switch Phase																
Minimum Initial (s)	3.0	7.0	1.0	5.0	2.7	5.0	1.0	1.0	3.0	3.0	4.0	1.0				
Minimum Split (s)	21.3	14.0	7.0	11.7	8.0	26.3	7.0	21.7	8.3	8.3	21.3	7.0				
Total Split (s)	37.0	22.0	7.0	20.0	15.0	25.0	7.0	22.0	57.0	20.0	19.0	7.0				
Total Split (%)	25%	15%	5%	13%	10%	17%	5%	15%	38%	13%	13%	5%				
Maximum Green (s)	31.7	16.7	1.3	13.3	9.7	19.7	1.3	15.3	51.7	14.7	13.7	1.7				
Yellow Time (s)	3.6	3.6	4.7	4.7	3.6	3.6	3.7	4.7	3.6	3.6	3.6	3.6				
All-Red Time (s)	1.7	1.7	1.0	2.0	1.7	1.7	2.0	2.0	1.7	1.7	1.7	1.7				
Lost Time Adjust (s)																
Total Lost Time (s)																
Lead/Lag	Lag		Lead		Lag		Lead		Lead		Lag		Lag		Lead	
Lead-Lag Optimize?	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
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	3.0				
Recall Mode	C-Max	None	None	None	None	C-Max	None	None	None	None	None	None				
Walk Time (s)							5.0						7.0			
Flash Dont Walk (s)							16.0						8.0			
Pedestrian Calls (#/hr)							0						0			
Act Effect Green (s)																
Actuated g/C Ratio																
v/c Ratio																
Control Delay																
Queue Delay																
Total Delay																
LOS																
Approach Delay																
Approach LOS																
Intersection Summary																

Alternative N: Kingwood Widening + Kingwood Grade Separation
 19: US 59 NBFR & Hamblen

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								 				
Volume (vph)	4	96	0	0	0	123	0	808	878	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt						0.865			0.850			
Flt Protected		0.998										
Satd. Flow (prot)	0	1859	0	0	0	1611	0	3539	1583	0	0	0
Flt Permitted		0.998										
Satd. Flow (perm)	0	1859	0	0	0	1611	0	3539	1583	0	0	0
Link Speed (mph)		30			30			30				30
Link Distance (ft)		168			123			612				7207
Travel Time (s)		3.8			2.8			13.9				163.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	5	118	0	0	0	151	0	992	1078	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	123	0	0	0	151	0	992	1078	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	74.1%
Analysis Period (min)	15
	ICU Level of Service D

Alternative N: Kingwood Widening + Kingwood Grade Separation
 20: Loop 494 & Northpark Dr.

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	1433	61	192	989	155	89	158	420	205	245	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	500		500	0		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.980				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3518	0	1770	3468	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3518	0	1770	3468	0	1770	1863	1583	1770	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			14				174			241
Link Speed (mph)		45			45			45				45
Link Distance (ft)		1797			1638			3315				2861
Travel Time (s)		27.2			24.8			50.2				43.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	25	1760	75	236	1215	190	109	194	516	252	301	244
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	1835	0	236	1405	0	109	194	516	252	301	244
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4

Alternative N: Kingwood Widening + Kingwood Grade Separation
 23: Brookdale & Northpark Dr.

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	141	1332	54	9	1047	31	54	13	21	36	14	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.993			0.994			0.968			0.906	
Flt Protected	0.950			0.950				0.971			0.989	
Satd. Flow (prot)	1770	3514	0	1770	3518	0	0	3327	0	0	3171	0
Flt Permitted	0.950			0.950				0.688			0.855	
Satd. Flow (perm)	1770	3514	0	1770	3518	0	0	2357	0	0	2742	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			3			24			159	
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		4845			2785			1365			843	
Travel Time (s)		73.4			42.2			31.0			19.2	
Peak Hour Factor	0.77	0.97	0.84	0.75	0.94	0.70	0.79	0.65	0.88	0.69	0.44	0.69
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	207	1552	73	14	1259	50	77	23	27	59	36	159
Shared Lane Traffic (%)												
Lane Group Flow (vph)	207	1625	0	14	1309	0	0	127	0	0	254	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		100			100			45			45	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Minimum Split (s)	12.0	19.0		12.0	19.0		12.0	21.0		12.0	21.0	
Total Split (s)	30.0	70.0		20.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	20.0%	46.7%		13.3%	40.0%		20.0%	20.0%		20.0%	20.0%	
Maximum Green (s)	24.0	64.0		14.0	54.0		24.0	24.0		24.0	24.0	
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	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Walk Time (s)	0.0	4.0		0.0	4.0		0.0	4.0		0.0	4.0	
Flash Dont Walk (s)	0.0	9.0		0.0	9.0		0.0	11.0		0.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	24.0	64.0		14.0	54.0		24.0	48.0		24.0	48.0	
Actuated g/C Ratio	0.16	0.43		0.09	0.36		0.32	0.32		0.32	0.32	
v/c Ratio	0.73	1.08		0.08	1.03		0.20	0.33		0.33	0.33	

Alternative N: Kingwood Widening + Kingwood Grade Separation
 23: Brookdale & Northpark Dr.

PM Peak Hour

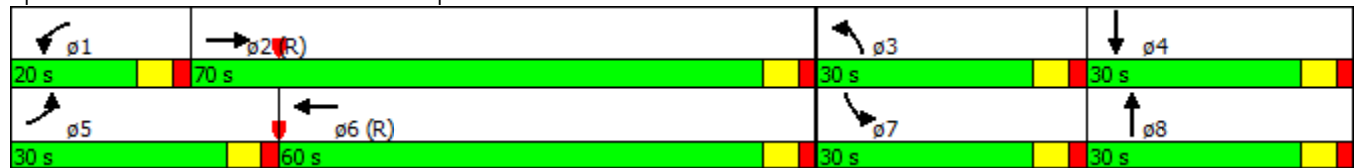


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	75.9	89.7		68.6	53.8			26.7			13.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	75.9	89.7		68.6	53.8			26.7			13.4	
LOS	E	F		E	D			C			B	
Approach Delay		88.2			53.9			26.7			13.4	
Approach LOS		F			D			C			B	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	55 (37%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle:	90
Control Type:	Pretimed
Maximum v/c Ratio:	1.08
Intersection Signal Delay:	67.8
Intersection LOS:	E
Intersection Capacity Utilization	78.7%
ICU Level of Service	D
Analysis Period (min)	15

Splits and Phases: 23: Brookdale & Northpark Dr.



Alternative N: Kingwood Widening + Kingwood Grade Separation
 26: Northpark Dr. & Mills Branch

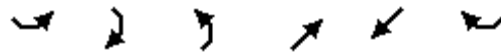
PM Peak Hour



Lane Group	WBL	WBR	SEL	SER	NEL	NER
Lane Configurations						
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1863	0	0	0	0	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	0	0	0
Right Turn on Red	Yes	Yes		Yes		Yes
Satd. Flow (RTOR)						
Link Speed (mph)	30		30		40	
Link Distance (ft)	8307		3268		1785	
Travel Time (s)	188.8		74.3		30.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Right
Median Width(ft)	12		0		0	
Link Offset(ft)	0		0		0	
Crosswalk Width(ft)	16		16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15	9	15	9
Turn Type						
Protected Phases	8					
Permitted Phases						
Minimum Split (s)	20.0					
Total Split (s)	20.0					
Total Split (%)	100.0%					
Maximum Green (s)	16.0					
Yellow Time (s)	3.5					
All-Red Time (s)	0.5					
Lost Time Adjust (s)	0.0					
Total Lost Time (s)	4.0					
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	5.0					
Flash Dont Walk (s)	11.0					
Pedestrian Calls (#/hr)	0					
Act Effect Green (s)						
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						
Total Delay						

Alternative N: Kingwood Widening + Kingwood Grade Separation
 28: Kingwood Dr./Kingwood Dr. & Mills Branch

PM Peak Hour



Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations				↑↑		
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	0	0	3539	0	0
Flt Permitted						
Satd. Flow (perm)	0	0	0	3539	0	0
Right Turn on Red	Yes	Yes	Yes			Yes
Satd. Flow (RTOR)						
Link Speed (mph)	30			40	30	
Link Distance (ft)	71			1387	344	
Travel Time (s)	1.6			23.6	7.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type						
Protected Phases				2		
Permitted Phases						
Minimum Split (s)				20.0		
Total Split (s)				20.0		
Total Split (%)				100.0%		
Maximum Green (s)				16.0		
Yellow Time (s)				3.5		
All-Red Time (s)				0.5		
Lost Time Adjust (s)				0.0		
Total Lost Time (s)				4.0		
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)				5.0		
Flash Dont Walk (s)				11.0		
Pedestrian Calls (#/hr)				0		
Act Effect Green (s)						
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						
Total Delay						

Alternative N: Kingwood Widening + Kingwood Grade Separation
 28: Kingwood Dr./Kingwood Dr. & Mills Branch

PM Peak Hour



Lane Group	SEL	SER	NEL	NET	SWT	SWR
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LOS						
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Approach Delay						
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Approach LOS						
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Intersection Summary

Area Type:	Other
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Cycle Length:	20
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Actuated Cycle Length:	20
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Offset:	0 (0%), Referenced to phase 2:NET and 6:, Start of Green
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Natural Cycle:	40
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Control Type:	Pretimed
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Maximum v/c Ratio:	0.00
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Intersection Signal Delay:	0.0	Intersection LOS:	A
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Intersection Capacity Utilization:	0.0%	ICU Level of Service:	A
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Analysis Period (min)	15
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Splits and Phases: 28: Kingwood Dr./Kingwood Dr. & Mills Branch



Alternative N: Kingwood Widening + Kingwood Grade Separation
 29: Northpark Dr. & Rock Springs

PM Peak Hour

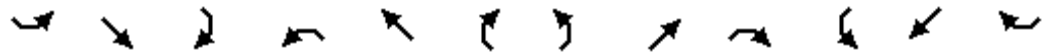


Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↑↑		↖	↑↑					↖	↑↑	
Volume (vph)	0	28	55	39	84	0	0	0	0	16	502	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.898									0.994	
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3178	0	1770	3539	0	0	0	0	1770	3518	0
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3178	0	1770	3539	0	0	0	0	1770	3518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		77										4
Link Speed (mph)		30			30			40				40
Link Distance (ft)		292			173			576				1785
Travel Time (s)		6.6			3.9			9.8				30.4
Peak Hour Factor	0.92	0.88	0.81	0.61	0.75	0.92	0.92	0.92	0.92	0.80	0.88	0.67
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	36	77	72	127	0	0	0	0	23	645	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	113	0	72	127	0	0	0	0	23	672	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2		1	2					1	2	
Detector Template		Thru		Left	Thru					Left	Thru	
Leading Detector (ft)		100		20	100					20	100	
Trailing Detector (ft)		0		0	0					0	0	
Detector 1 Position(ft)		0		0	0					0	0	
Detector 1 Size(ft)		6		20	6					20	6	
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0					0.0	0.0	
Detector 1 Queue (s)		0.0		0.0	0.0					0.0	0.0	
Detector 1 Delay (s)		0.0		0.0	0.0					0.0	0.0	
Detector 2 Position(ft)		94			94							94
Detector 2 Size(ft)		6			6							6
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0
Turn Type		NA		Prot	NA					Prot	NA	
Protected Phases		4		15 8	8					1	6	
Permitted Phases												
Detector Phase		4		15 8	8					1	6	
Switch Phase												
Minimum Initial (s)		5.0			5.0					5.0	4.0	

Lane Group	ø2	ø15
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Growth Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	2	15
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	5.0

Alternative N: Kingwood Widening + Kingwood Grade Separation
 29: Northpark Dr. & Rock Springs

PM Peak Hour

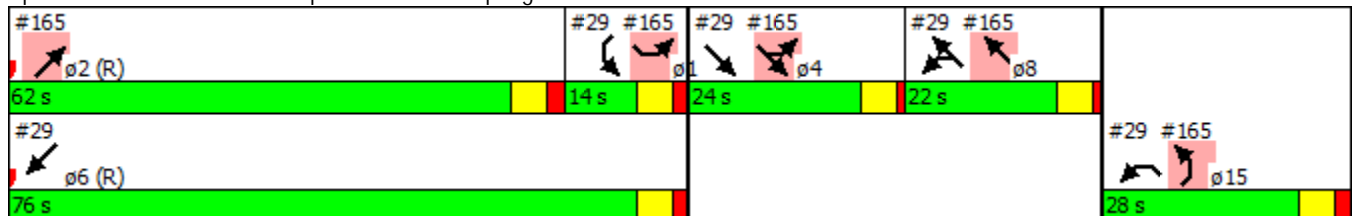


Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Minimum Split (s)		22.0			20.0					11.0	18.0	
Total Split (s)		24.0			22.0					14.0	76.0	
Total Split (%)		16.0%			14.7%					9.3%	50.7%	
Maximum Green (s)		19.0			17.0					8.0	70.0	
Yellow Time (s)		4.0			4.0					4.0	4.0	
All-Red Time (s)		1.0			1.0					2.0	2.0	
Lost Time Adjust (s)		0.0			0.0					0.0	0.0	
Total Lost Time (s)		5.0			5.0					6.0	6.0	
Lead/Lag		Lead			Lag					Lag		
Lead-Lag Optimize?		Yes			Yes					Yes		
Vehicle Extension (s)		3.0			3.0					3.0	3.0	
Recall Mode		None			Max					None	C-Max	
Walk Time (s)		5.0			5.0						5.0	
Flash Dont Walk (s)		11.0			10.0						7.0	
Pedestrian Calls (#/hr)		0			0						0	
Act Effect Green (s)		7.6		49.8	28.4					7.2	75.6	
Actuated g/C Ratio		0.05		0.33	0.19					0.05	0.50	
v/c Ratio		0.48		0.12	0.19					0.27	0.38	
Control Delay		32.4		4.5	74.8					76.7	24.0	
Queue Delay		0.0		0.9	2.7					0.0	0.0	
Total Delay		32.4		5.5	77.5					76.7	24.0	
LOS		C		A	E					E	C	
Approach Delay		32.4			51.5						25.7	
Approach LOS		C			D						C	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	45 (30%), Referenced to phase 2:NET and 6:, Start of Green
Natural Cycle:	95
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	31.6
Intersection LOS:	C
Intersection Capacity Utilization:	45.9%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 29: Northpark Dr. & Rock Springs



Lane Group	ø2	ø15
Minimum Split (s)	18.0	11.0
Total Split (s)	62.0	28.0
Total Split (%)	41%	19%
Maximum Green (s)	56.0	22.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	C-Max	None
Walk Time (s)	5.0	
Flash Dont Walk (s)	7.0	
Pedestrian Calls (#/hr)	0	
Act Effect Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 34: Kingwood Dr. & Woodland Grove

PM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	ø1	ø3	ø4	ø6	ø7	ø8
Detector Phase	5	2	3 6		4 7							
Switch Phase												
Minimum Initial (s)	3.0	10.0					3.0	1.0	5.0	2.0	1.0	5.0
Minimum Split (s)	9.0	29.5					10.0	14.0	10.0	21.0	8.0	21.0
Total Split (s)	32.0	109.0					10.0	21.0	10.0	87.0	10.0	21.0
Total Split (%)	21.3%	72.7%					7%	14%	7%	58%	7%	14%
Maximum Green (s)	26.0	96.0					4.0	8.0	5.0	82.0	5.0	16.0
Yellow Time (s)	4.0	4.0					4.0	3.5	3.5	4.0	3.5	3.5
All-Red Time (s)	2.0	9.0					2.0	9.5	1.5	1.0	1.5	1.5
Lost Time Adjust (s)	0.0	0.0										
Total Lost Time (s)	6.0	13.0										
Lead/Lag	Lead	Lead					Lag			Lag		
Lead-Lag Optimize?	Yes	Yes					Yes			Yes		
Vehicle Extension (s)	0.2	0.2					0.2	0.2	0.2	0.2	0.2	0.2
Recall Mode	None	C-Max					None	Max	None	C-Max	None	Max
Walk Time (s)		5.0								5.0		
Flash Dont Walk (s)		11.0								11.0		
Pedestrian Calls (#/hr)		0								0		
Act Effct Green (s)	21.7	96.0	99.3		5.0							
Actuated g/C Ratio	0.14	0.64	0.66		0.03							
v/c Ratio	0.90	0.83	0.50		0.84							
Control Delay	98.3	23.7	2.1		59.6							
Queue Delay	0.0	0.0	0.0		0.0							
Total Delay	98.3	23.7	2.2		59.6							
LOS	F	C	A		E							
Approach Delay		29.6	2.2		59.6							
Approach LOS		C	A		E							

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.62
 Intersection Signal Delay: 21.1
 Intersection LOS: C
 Intersection Capacity Utilization 68.1%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 34: Kingwood Dr. & Woodland Grove



Alternative N: Kingwood Widening + Kingwood Grade Separation
 35: Russel Palmer & Northpark Dr.

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↓						↑	↗		↖	
Volume (vph)	0	1861	69	0	0	0	0	158	106	37	102	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	0		0
Storage Lanes	0		0	0		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994							0.850			
Flt Protected												0.987
Satd. Flow (prot)	0	3518	0	0	0	0	0	1863	1583	0	1839	0
Flt Permitted												0.451
Satd. Flow (perm)	0	3518	0	0	0	0	0	1863	1583	0	840	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5							144			
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		122			4384			1145			80	
Travel Time (s)		2.8			66.4			26.0			1.8	
Peak Hour Factor	0.92	0.99	0.82	0.92	0.92	0.92	0.92	0.78	0.83	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	2124	95	0	0	0	0	229	144	45	125	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2219	0	0	0	0	0	229	144	0	170	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2						2	1	1	2	
Detector Template		Thru						Thru	Right	Left	Thru	
Leading Detector (ft)		100						100	20	20	100	
Trailing Detector (ft)		0						0	0	0	0	
Detector 1 Position(ft)		0						0	0	0	0	
Detector 1 Size(ft)		6						6	20	20	6	
Detector 1 Type		Cl+Ex						Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0						0.0	0.0	0.0	0.0	
Detector 1 Queue (s)		0.0						0.0	0.0	0.0	0.0	
Detector 1 Delay (s)		0.0						0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type		NA						NA	Perm	Perm	NA	
Protected Phases		2						8			4	
Permitted Phases									8	4		

Lane Group	ø1	ø6
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Growth Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	1	6
Permitted Phases		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 35: Russel Palmer & Northpark Dr.

PM Peak Hour

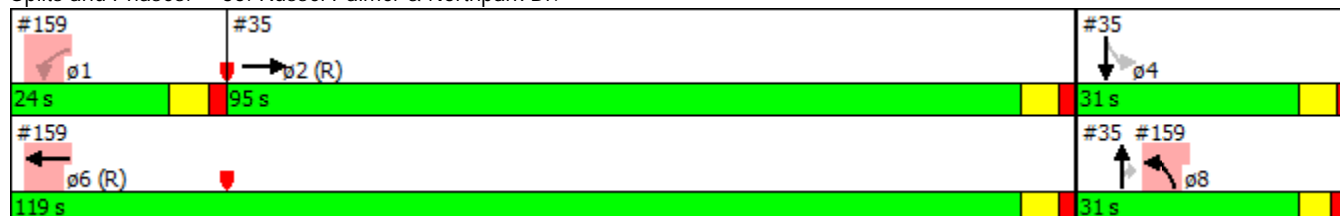


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2						8	8	4	4	
Switch Phase												
Minimum Initial (s)		15.0						5.0	5.0	5.0	5.0	
Minimum Split (s)		21.3						11.2	11.2	11.3	11.3	
Total Split (s)		95.0						31.0	31.0	31.0	31.0	
Total Split (%)		63.3%						20.7%	20.7%	20.7%	20.7%	
Maximum Green (s)		88.7						24.8	24.8	24.7	24.7	
Yellow Time (s)		4.3						3.6	3.6	4.3	4.3	
All-Red Time (s)		2.0						2.6	2.6	2.0	2.0	
Lost Time Adjust (s)		0.0						0.0	0.0		0.0	
Total Lost Time (s)		6.3						6.2	6.2		6.3	
Lead/Lag		Lag										
Lead-Lag Optimize?		Yes										
Vehicle Extension (s)		3.0						3.0	3.0	3.0	3.0	
Recall Mode		C-Max						Max	Max	None	None	
Act Effect Green (s)		88.8						24.8	24.8		24.7	
Actuated g/C Ratio		0.59						0.17	0.17		0.16	
v/c Ratio		1.07						0.74	0.38		1.23	
Control Delay		70.0						75.1	10.9		212.5	
Queue Delay		0.0						0.0	0.0		0.0	
Total Delay		70.0						75.1	10.9		212.5	
LOS		E						E	B		F	
Approach Delay		70.0						50.3			212.5	
Approach LOS		E						D			F	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	25 (17%), Referenced to phase 2:EBT and 6:, Start of Green
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.23
Intersection Signal Delay:	76.1
Intersection LOS:	E
Intersection Capacity Utilization	94.1%
ICU Level of Service	F
Analysis Period (min)	15

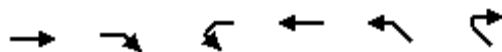
Splits and Phases: 35: Russel Palmer & Northpark Dr.



Lane Group	ø1	ø6
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	15.0
Minimum Split (s)	11.3	21.3
Total Split (s)	24.0	119.0
Total Split (%)	16%	79%
Maximum Green (s)	17.7	112.7
Yellow Time (s)	4.3	4.3
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	C-Max
Act Effect Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 36: Northpark Dr.

PM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations	↑↑			↑↑		
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	3539	0	0	3539	0	0
Flt Permitted						
Satd. Flow (perm)	3539	0	0	3539	0	0
Link Speed (mph)	45			30	45	
Link Distance (ft)	1638			2817	2834	
Travel Time (s)	24.8			64.0	42.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	51.5%
Analysis Period (min)	15
	ICU Level of Service A

Alternative N: Kingwood Widening + Kingwood Grade Separation
 43: Sorters Rd & US 59 SBFR

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↖	↑↑						↖↑	↖
Volume (vph)	0	21	110	291	252	0	0	0	0	103	19	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		150	200		0	0		0	0		150
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.879										0.850
Flt Protected				0.950							0.961	
Satd. Flow (prot)	0	4470	0	1770	3539	0	0	0	0	0	3401	1583
Flt Permitted				0.642							0.961	
Satd. Flow (perm)	0	4470	0	1196	3539	0	0	0	0	0	3401	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		135										49
Link Speed (mph)		35			35			30				30
Link Distance (ft)		893			863			983				6715
Travel Time (s)		17.4			16.8			22.3				152.6
Peak Hour Factor	0.92	0.75	0.92	0.78	0.86	0.92	0.92	0.92	0.92	0.74	0.59	0.80
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	32	135	422	331	0	0	0	0	157	36	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	167	0	422	331	0	0	0	0	0	193	49
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Minimum Split (s)		20.0		20.0	20.0					20.0	20.0	20.0
Total Split (s)		20.0		20.0	20.0					20.0	20.0	20.0
Total Split (%)		50.0%		50.0%	50.0%					50.0%	50.0%	50.0%
Maximum Green (s)		16.0		16.0	16.0					16.0	16.0	16.0
Yellow Time (s)		3.5		3.5	3.5					3.5	3.5	3.5
All-Red Time (s)		0.5		0.5	0.5					0.5	0.5	0.5
Lost Time Adjust (s)		0.0		0.0	0.0						0.0	0.0
Total Lost Time (s)		4.0		4.0	4.0						4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		5.0		5.0	5.0					5.0	5.0	5.0
Flash Dont Walk (s)		11.0		11.0	11.0					11.0	11.0	11.0
Pedestrian Calls (#/hr)		0		0	0					0	0	0
Act Effect Green (s)		16.0		16.0	16.0						16.0	16.0
Actuated g/C Ratio		0.40		0.40	0.40						0.40	0.40
v/c Ratio		0.09		0.88	0.23						0.14	0.07

Alternative N: Kingwood Widening + Kingwood Grade Separation
 43: Sorters Rd & US 59 SBFR

PM Peak Hour

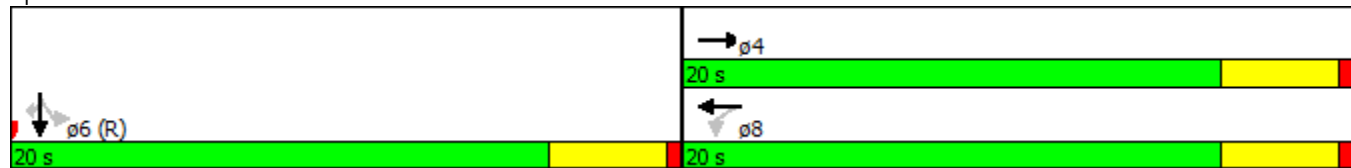


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		2.9		33.9	4.8						8.0	3.4
Queue Delay		0.0		0.0	0.0						0.0	0.0
Total Delay		2.9		33.9	4.8						8.0	3.4
LOS		A		C	A						A	A
Approach Delay		2.9			21.1						7.1	
Approach LOS		A			C						A	

Intersection Summary

Area Type:	Other
Cycle Length:	40
Actuated Cycle Length:	40
Offset:	0 (0%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle:	50
Control Type:	Pretimed
Maximum v/c Ratio:	0.88
Intersection Signal Delay:	15.6
Intersection LOS:	B
Intersection Capacity Utilization	38.0%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 43: Sorters Rd & US 59 SBFR



Alternative N: Kingwood Widening + Kingwood Grade Separation
45: Loop 494 & Sorters Rd

PM Peak Hour



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	63	55	291	613	251	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	150	180			225
Storage Lanes	2	1	1			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.88	0.97	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3433	2787	3433	3539	3539	1583
Flt Permitted	0.950		0.537			
Satd. Flow (perm)	3433	2787	1941	3539	3539	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		82				133
Link Speed (mph)	30			45	45	
Link Distance (ft)	863			804	572	
Travel Time (s)	19.6			12.2	8.7	
Peak Hour Factor	0.75	0.76	0.89	0.92	0.79	0.75
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	95	82	369	753	359	133
Shared Lane Traffic (%)						
Lane Group Flow (vph)	95	82	369	753	359	133
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	36			24	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	16.0	16.0	16.0	16.0	16.0	16.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	16.0	16.0	16.0	16.0	16.0	16.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.07	0.07	0.48	0.53	0.25	0.19

Alternative N: Kingwood Widening + Kingwood Grade Separation
 45: Loop 494 & Sorters Rd

PM Peak Hour

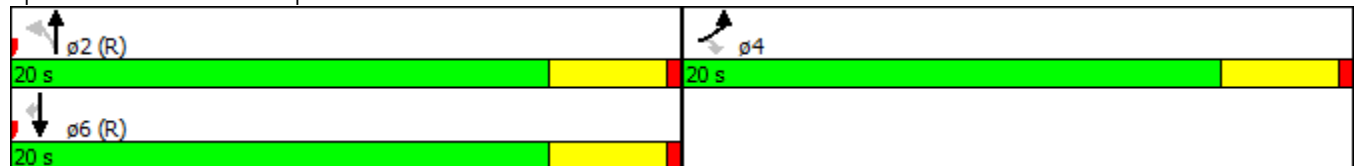


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Control Delay	2.1	0.3	11.5	10.9	8.6	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.1	0.3	11.5	10.9	8.6	2.9
LOS	A	A	B	B	A	A
Approach Delay	1.2			11.1	7.1	
Approach LOS	A			B	A	

Intersection Summary

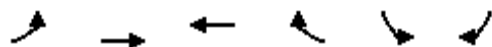
Area Type:	Other
Cycle Length:	40
Actuated Cycle Length:	40
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle:	40
Control Type:	Pretimed
Maximum v/c Ratio:	0.53
Intersection Signal Delay:	9.0
Intersection LOS:	A
Intersection Capacity Utilization	30.6%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 45: Loop 494 & Sorters Rd



Alternative N: Kingwood Widening + Kingwood Grade Separation
 49: Hamblen & Laurel Springs

PM Peak Hour



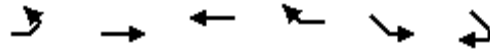
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	185	840	174	12	6	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.987		0.877	
Flt Protected		0.990			0.996	
Satd. Flow (prot)	0	1844	1839	0	1627	0
Flt Permitted		0.990			0.996	
Satd. Flow (perm)	0	1844	1839	0	1627	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		1799	1596		734	
Travel Time (s)		40.9	36.3		16.7	
Peak Hour Factor	0.89	0.99	0.75	0.50	0.75	0.76
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	235	959	262	27	9	91
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1194	289	0	100	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		40	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	87.3%
Analysis Period (min)	15
	ICU Level of Service E

Alternative N: Kingwood Widening + Kingwood Grade Separation
 53: Kingwood Dr.

PM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↑↑↑	↑↑↑			
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	5085	5085	0	0	0
Flt Permitted						
Satd. Flow (perm)	0	5085	5085	0	0	0
Link Speed (mph)		40	40		30	
Link Distance (ft)		736	252		743	
Travel Time (s)		12.5	4.3		16.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		40	40		40	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0%
Analysis Period (min)	15
	ICU Level of Service A

Alternative N: Kingwood Widening + Kingwood Grade Separation
 54: Woodland Hills & Hamblen

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	1863	0	0	0	0	1863	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	1863	0	0	0	0	1863	0	1863	0	0	1863	0
Link Speed (mph)	30				30				30		30	
Link Distance (ft)	6657				795				912		3265	
Travel Time (s)	151.3				18.1				20.7		74.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)	0%											
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	12				12				0		0	
Link Offset(ft)	0				0				0		0	
Crosswalk Width(ft)	16				16				16		16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control	Stop				Stop				Stop		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0%
Analysis Period (min)	15
	ICU Level of Service A

Alternative N: Kingwood Widening + Kingwood Grade Separation
57: Redbud & Hamblen

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	15	43	10	1	17	0	93	53	1	3	32	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.968						0.996			0.964	
Flt Protected		0.988			0.991			0.969			0.995	
Satd. Flow (prot)	0	1781	0	0	1846	0	0	1798	0	0	1787	0
Flt Permitted		0.988			0.991			0.969			0.995	
Satd. Flow (perm)	0	1781	0	0	1846	0	0	1798	0	0	1787	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		753			6657			439			363	
Travel Time (s)		17.1			151.3			10.0			8.3	
Peak Hour Factor	0.63	0.83	0.42	0.25	0.85	0.25	0.86	0.95	0.25	0.38	0.67	0.65
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	27	59	27	5	23	0	122	63	5	9	54	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	113	0	0	28	0	0	190	0	0	86	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	32.0%
Analysis Period (min)	15
	ICU Level of Service A

Alternative N: Kingwood Widening + Kingwood Grade Separation
60: Forest Cove & Hamblen

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	520	140	51	1	49	2	16	16	3	3	27	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.987			0.987			0.981			0.911	
Flt Protected		0.966			0.997			0.982			0.997	
Satd. Flow (prot)	0	1776	0	0	1833	0	0	1794	0	0	1692	0
Flt Permitted		0.966			0.997			0.982			0.997	
Satd. Flow (perm)	0	1776	0	0	1833	0	0	1794	0	0	1692	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1966			1019			472			603	
Travel Time (s)		44.7			23.2			10.7			13.7	
Peak Hour Factor	0.90	0.90	0.67	0.25	0.68	0.25	0.80	0.57	0.38	0.38	0.61	0.75
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	653	176	86	5	81	9	23	32	9	9	50	113
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	915	0	0	95	0	0	64	0	0	172	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	66.5%
Analysis Period (min)	15
	ICU Level of Service C

Alternative N: Kingwood Widening + Kingwood Grade Separation
64: Woodland Hills & Kingwood Dr.

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	379	1506	107	229	1013	144	35	210	302	126	221	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990			0.981				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5034	0	1770	4989	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	5034	0	1770	4989	0	1770	1863	1583	1770	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			17				354			317
Link Speed (mph)		40			40			35				35
Link Distance (ft)		468			1473			652				2207
Travel Time (s)		8.0			25.1			12.7				43.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	117%	117%	117%	117%	117%	117%	117%	117%	117%	117%	117%	117%
Adj. Flow (vph)	482	1915	136	291	1288	183	45	267	384	160	281	362
Shared Lane Traffic (%)												
Lane Group Flow (vph)	482	2051	0	291	1471	0	45	267	384	160	281	362
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		40			75			20				30
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5 15	2		1	6		3	8		7	4	
Permitted Phases									8			4

Lane Group	ø5	ø15
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Growth Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	5	15
Permitted Phases		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 64: Woodland Hills & Kingwood Dr.

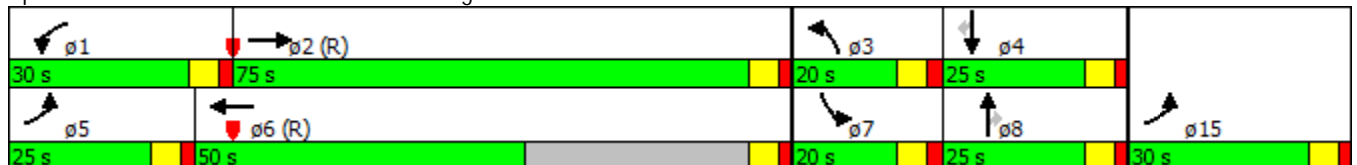
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5 15	2		1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)		10.0		5.0	10.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)		22.0		22.0	22.0		11.0	22.0	22.0	11.0	22.0	22.0
Total Split (s)		75.0		30.0	50.0		20.0	25.0	25.0	20.0	25.0	25.0
Total Split (%)		41.7%		16.7%	27.8%		11.1%	13.9%	13.9%	11.1%	13.9%	13.9%
Maximum Green (s)		69.0		24.0	44.0		14.0	19.0	19.0	14.0	19.0	19.0
Yellow Time (s)		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
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag		Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?		Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode		C-Min		None	C-Min		None	None	None	None	None	None
Walk Time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)		11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	0
Act Effct Green (s)	49.0	69.0		24.0	74.0		10.0	19.0	19.0	14.0	25.4	25.4
Actuated g/C Ratio	0.27	0.38		0.13	0.41		0.06	0.11	0.11	0.08	0.14	0.14
v/c Ratio	1.00	1.06		1.23	0.71		0.46	1.36	0.80	1.17	1.07	0.73
Control Delay	105.1	90.7		195.8	46.0		96.4	247.0	22.7	195.6	142.5	21.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	105.1	90.7		195.8	46.0		96.4	247.0	22.7	195.6	142.5	21.3
LOS	F	F		F	D		F	F	C	F	F	C
Approach Delay		93.5			70.7			113.5			98.4	
Approach LOS		F			E			F			F	

Intersection Summary

Area Type: Other
 Cycle Length: 180
 Actuated Cycle Length: 180
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.36
 Intersection Signal Delay: 89.7
 Intersection LOS: F
 Intersection Capacity Utilization 92.8%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 64: Woodland Hills & Kingwood Dr.



Lane Group	ø5	ø15
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	4.0
Minimum Split (s)	13.0	10.0
Total Split (s)	25.0	30.0
Total Split (%)	14%	17%
Maximum Green (s)	19.0	24.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 69: Kingwood Dr. & High Valley

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	24	0	0	102	42	7	285	129	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Frt					0.956			0.954				
Flt Protected	0.950	0.998						0.999				
Satd. Flow (prot)	1681	1766	0	0	3383	0	0	3373	0	0	0	0
Flt Permitted	0.950	0.998						0.999				
Satd. Flow (perm)	1681	1766	0	0	3383	0	0	3373	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					35			76				
Link Speed (mph)		30			30			40				40
Link Distance (ft)		140			765			1296				1387
Travel Time (s)		3.2			17.4			22.1				23.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	10	29	0	0	125	52	9	350	158	0	0	0
Shared Lane Traffic (%)	10%											
Lane Group Flow (vph)	9	30	0	0	177	0	0	517	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA			NA		Prot	NA				
Protected Phases	1 4	4			8		15	2				
Permitted Phases												
Minimum Split (s)		10.0			18.0		11.0	20.0				
Total Split (s)		14.0			25.0		18.0	78.0				
Total Split (%)		9.3%			16.7%		12.0%	52.0%				
Maximum Green (s)		9.0			20.0		12.0	72.0				
Yellow Time (s)		4.0			4.0		4.0	4.0				
All-Red Time (s)		1.0			1.0		2.0	2.0				
Lost Time Adjust (s)		0.0			0.0			0.0				
Total Lost Time (s)		5.0			5.0			6.0				
Lead/Lag		Lead			Lag			Lead				
Lead-Lag Optimize?		Yes			Yes			Yes				
Walk Time (s)					6.0			4.0				
Flash Dont Walk (s)					7.0			10.0				
Pedestrian Calls (#/hr)					0			0				
Act Effct Green (s)	23.0	24.0			20.0			84.0				
Actuated g/C Ratio	0.15	0.16			0.13			0.56				
v/c Ratio	0.04	0.11			0.37			0.49				
Control Delay	43.0	43.3			49.7			8.2				
Queue Delay	1.9	5.9			0.0			0.0				
Total Delay	44.9	49.2			49.7			8.2				

Lane Group	ø1	ø6
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Growth Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	1	6
Permitted Phases		
Minimum Split (s)	11.0	10.0
Total Split (s)	15.0	93.0
Total Split (%)	10%	62%
Maximum Green (s)	9.0	87.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 69: Kingwood Dr. & High Valley

PM Peak Hour

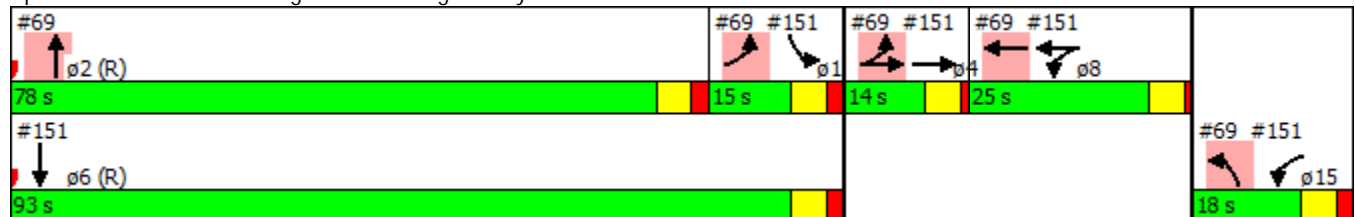


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	D			D			A				
Approach Delay		48.2			49.7			8.2				
Approach LOS		D			D			A				

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	48 (32%), Referenced to phase 2:NBT and 6:, Start of Green
Natural Cycle:	70
Control Type:	Pretimed
Maximum v/c Ratio:	0.49
Intersection Signal Delay:	20.3
Intersection LOS:	C
Intersection Capacity Utilization	27.7%
ICU Level of Service	A
Analysis Period (min)	15

















Splits and Phases: 69: Kingwood Dr. & High Valley



Lane Group	ø1	ø6
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 74: Kingwood Dr. & Willtow Terrace

PM Peak Hour

												
Lane Group	SBL	SBR	SEL	SET	SER	NWL	NWT	NWR	NEL2	NEL	NER	ø1
Lane Configurations												
Volume (vph)	0	0	2	51	0	0	306	37	80	494	483	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	0	0		0	0		0		150	0	
Storage Lanes	0	0	0		0	0		0		1	0	
Taper Length (ft)	25		25			25				25		
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.97	0.95	
Fr _t							0.979			0.928		
Fl _t Protected				0.997					0.950	0.975		
Satd. Flow (prot)	0	0	0	3529	0	0	3465	0	1770	3270	0	
Fl _t Permitted				0.997					0.950	0.975		
Satd. Flow (perm)	0	0	0	3529	0	0	3465	0	1770	3270	0	
Right Turn on Red					Yes			Yes			Yes	
Satd. Flow (RTOR)							10			193		
Link Speed (mph)	40			30			30			30		
Link Distance (ft)	525			105			533			1469		
Travel Time (s)	8.9			2.4			12.1			33.4		
Peak Hour Factor	0.92	0.92	0.50	0.75	0.92	0.92	0.87	0.66	0.74	0.92	0.97	
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	
Adj. Flow (vph)	0	0	5	77	0	0	397	63	122	607	563	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	82	0	0	460	0	122	1170	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(ft)	0			0			0			36		
Link Offset(ft)	0			0			0			0		
Crosswalk Width(ft)	16			16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15		9	15		9	15	15	9	
Turn Type			Prot	NA			NA		Prot	NA		
Protected Phases			1 4	4			8		15	2		1
Permitted Phases												
Minimum Split (s)				10.0			18.0		11.0	20.0		11.0
Total Split (s)				12.0			31.0		23.0	69.0		15.0
Total Split (%)				8.0%			20.7%		15.3%	46.0%		10%
Maximum Green (s)				7.0			26.0		17.0	63.0		9.0
Yellow Time (s)				4.0			4.0		4.0	4.0		4.0
All-Red Time (s)				1.0			1.0		2.0	2.0		2.0
Lost Time Adjust (s)				0.0			0.0		0.0	0.0		
Total Lost Time (s)				5.0			5.0		6.0	6.0		
Lead/Lag				Lead			Lag		Lead		Lag	
Lead-Lag Optimize?				Yes			Yes		Yes		Yes	
Walk Time (s)							6.0			4.0		
Flash Dont Walk (s)							7.0			10.0		
Pedestrian Calls (#/hr)							0			0		
Act Effct Green (s)				22.0			26.0		17.0	63.0		
Actuated g/C Ratio				0.15			0.17		0.11	0.42		
v/c Ratio				0.16			0.76		0.61	0.79		

Lane Group	ø6
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Growth Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	6
Permitted Phases	
Minimum Split (s)	10.0
Total Split (s)	84.0
Total Split (%)	56%
Maximum Green (s)	78.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	

Alternative N: Kingwood Widening + Kingwood Grade Separation
 74: Kingwood Dr. & Willtow Terrace

PM Peak Hour

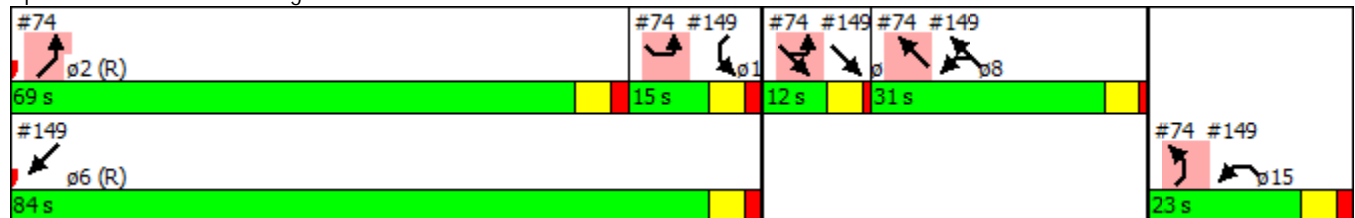


Lane Group	SBL	SBR	SEL	SET	SER	NWL	NWT	NWR	NEL2	NEL	NER	ø1
Control Delay				16.5			66.6		50.2	73.4		
Queue Delay				2.8			0.0		0.0	0.0		
Total Delay				19.3			66.6		50.2	73.4		
LOS				B			E		D	E		
Approach Delay				19.3			66.6			71.3		
Approach LOS				B			E			E		

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	48 (32%), Referenced to phase 2:NEL and 6:, Start of Green
Natural Cycle:	80
Control Type:	Pretimed
Maximum v/c Ratio:	0.79
Intersection Signal Delay:	67.8
Intersection LOS:	E
Intersection Capacity Utilization	53.2%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 74: Kingwood Dr. & Willtow Terrace



Lane Group	ø6
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Alternative N: Kingwood Widening + Kingwood Grade Separation
 77: Timber Shade Dr. & Kingwood Dr.

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	1074	48	0	0	0	0	33	0	9	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00
Frt		0.992										
Flt Protected	0.950										0.973	
Satd. Flow (prot)	1770	3511	0	0	0	0	0	3539	0	0	3444	0
Flt Permitted	0.950										0.973	
Satd. Flow (perm)	1770	3511	0	0	0	0	0	3539	0	0	3444	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5										
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		826			1617			741			136	
Travel Time (s)		18.8			36.8			16.8			3.1	
Peak Hour Factor	0.90	0.96	0.80	0.92	0.92	0.92	0.92	0.69	0.25	0.56	0.25	0.92
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	144	1264	68	0	0	0	0	54	0	18	14	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	144	1332	0	0	0	0	0	54	0	0	32	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA						NA		Prot	NA	
Protected Phases	15	2						8		14	4	
Permitted Phases												
Minimum Split (s)	11.0	20.0						18.0			10.0	
Total Split (s)	27.0	82.0						18.0			12.0	
Total Split (%)	18.0%	54.7%						12.0%			8.0%	
Maximum Green (s)	21.0	76.0						13.0			7.0	
Yellow Time (s)	4.0	4.0						4.0			4.0	
All-Red Time (s)	2.0	2.0						1.0			1.0	
Lost Time Adjust (s)	0.0	0.0						0.0			0.0	
Total Lost Time (s)	6.0	6.0						5.0			5.0	
Lead/Lag		Lead						Lag			Lead	
Lead-Lag Optimize?		Yes						Yes			Yes	
Walk Time (s)		4.0						6.0				
Flash Dont Walk (s)		10.0						7.0				
Pedestrian Calls (#/hr)		0						0				
Act Effct Green (s)	21.0	76.0						13.0			18.0	
Actuated g/C Ratio	0.14	0.51						0.09			0.12	
v/c Ratio	0.58	0.75						0.18			0.08	

Alternative N: Kingwood Widening + Kingwood Grade Separation
 77: Timber Shade Dr. & Kingwood Dr.

PM Peak Hour

Lane Group	ø1	ø6
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Growth Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	1	6
Permitted Phases		
Minimum Split (s)	11.0	10.0
Total Split (s)	11.0	93.0
Total Split (%)	7%	62%
Maximum Green (s)	5.0	87.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 77: Timber Shade Dr. & Kingwood Dr.

PM Peak Hour

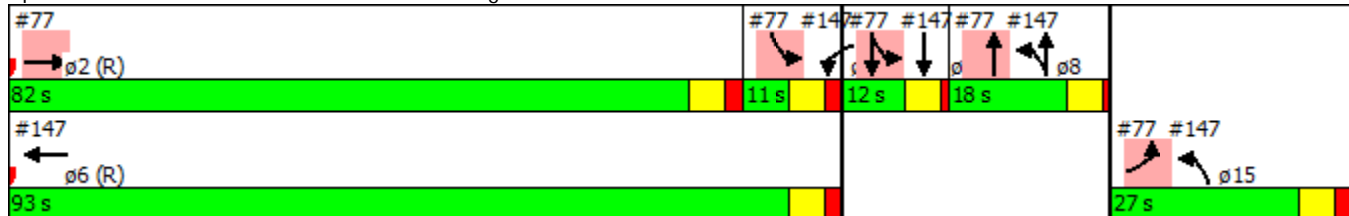


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	70.8	32.6						65.1			41.9	
Queue Delay	0.0	0.0						0.0			1.6	
Total Delay	70.8	32.6						65.1			43.5	
LOS	E	C						E			D	
Approach Delay		36.3						65.1			43.5	
Approach LOS		D						E			D	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	48 (32%), Referenced to phase 2:EBT and 6:, Start of Green
Natural Cycle:	90
Control Type:	Pretimed
Maximum v/c Ratio:	0.75
Intersection Signal Delay:	37.4
Intersection LOS:	D
Intersection Capacity Utilization	51.7%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 77: Timber Shade Dr. & Kingwood Dr.



Lane Group	ø1	ø6
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 80: Kingwood Dr.

PM Peak Hour



Lane Group	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations			↑↑			↑↑
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt						
Flt Protected						
Satd. Flow (prot)	0	0	3539	0	0	3539
Flt Permitted						
Satd. Flow (perm)	0	0	3539	0	0	3539
Link Speed (mph)	30		30			30
Link Distance (ft)	826		596			833
Travel Time (s)	18.8		13.5			18.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	80		80			80
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Free		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0% ICU Level of Service A
Analysis Period (min)	15

Alternative N: Kingwood Widening + Kingwood Grade Separation
 81: US 59 SBFR

PM Peak Hour



Lane Group	NBT	NBR	SBU	SBL	SBT	NWL	NWR
Lane Configurations			⬇		⬆⬆⬆⬆		
Volume (vph)	0	0	188	0	549	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.81	1.00	1.00
Frt							
Flt Protected			0.950				
Satd. Flow (prot)	0	0	1770	0	7544	0	0
Flt Permitted			0.950				
Satd. Flow (perm)	0	0	1770	0	7544	0	0
Link Speed (mph)	30				30	30	
Link Distance (ft)	304				1812	283	
Travel Time (s)	6.9				41.2	6.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	231	0	674	0	0
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	231	0	674	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No
Lane Alignment	Left	Right	R NA	Left	Left	Left	Right
Median Width(ft)	12				12	0	
Link Offset(ft)	0				0	0	
Crosswalk Width(ft)	16				16	16	
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	9	15		15	9
Sign Control	Stop				Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	35.5%
Analysis Period (min)	15
	ICU Level of Service A

Alternative N: Kingwood Widening + Kingwood Grade Separation
 83: US 59 NBFR

PM Peak Hour



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	188	0	0	986	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	1.00	1.00
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1770	0	0	5085	0	0
Flt Permitted	0.950					
Satd. Flow (perm)	1770	0	0	5085	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	283			309	1638	
Travel Time (s)	6.4			7.0	37.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	231	0	0	1211	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	231	0	0	1211	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Yield			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	35.5%
Analysis Period (min)	15
	ICU Level of Service A

Alternative N: Kingwood Widening + Kingwood Grade Separation
 84: US 59 SBFR

PM Peak Hour



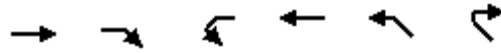
Lane Group	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations							6		7	
Volume (vph)	0	0	0	0	0	0	1079	0	246	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.76	1.00	1.00	1.00
Frt										
Flt Protected									0.950	
Satd. Flow (prot)	0	0	0	0	0	0	8494	0	1770	0
Flt Permitted									0.950	
Satd. Flow (perm)	0	0	0	0	0	0	8494	0	1770	0
Link Speed (mph)	30			30			30		30	
Link Distance (ft)	48			6181			368		362	
Travel Time (s)	1.1			140.5			8.4		8.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	0	0	0	1325	0	302	0
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	0	0	0	0	1325	0	302	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right
Median Width(ft)	0			0			0		12	
Link Offset(ft)	0			0			0		0	
Crosswalk Width(ft)	16			16			16		16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15		9	15		9	15	9
Sign Control	Stop			Stop			Free		Yield	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	33.8%
Analysis Period (min)	15
	ICU Level of Service A

Alternative N: Kingwood Widening + Kingwood Grade Separation
87: Kingwood Dr.

PM Peak Hour



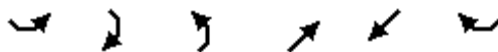
Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations		↑↑↑		↑↑		
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.76	1.00	0.95	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	4247	0	3539	0	0
Flt Permitted						
Satd. Flow (perm)	0	4247	0	3539	0	0
Link Speed (mph)	40			40	30	
Link Distance (ft)	1473			540	4245	
Travel Time (s)	25.1			9.2	96.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	75			70	70	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9		15	15		9
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0% ICU Level of Service A
Analysis Period (min)	15

Alternative N: Kingwood Widening + Kingwood Grade Separation
 88: Kingwood Dr. & Kingwood High School

PM Peak Hour



Lane Group	SEL	SER	NEL	NET	SWT	SWR	ø6	ø8
Lane Configurations	↔↔		↔	↑↑				
Volume (vph)	165	0	18	1818	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	1.00		
Frt								
Flt Protected	0.950		0.950					
Satd. Flow (prot)	3433	0	1770	3539	0	0		
Flt Permitted	0.950		0.950					
Satd. Flow (perm)	3433	0	1770	3539	0	0		
Right Turn on Red		Yes				Yes		
Satd. Flow (RTOR)								
Link Speed (mph)	30			30	30			
Link Distance (ft)	110			162	922			
Travel Time (s)	2.5			3.7	21.0			
Peak Hour Factor	0.79	0.92	0.56	0.90	0.92	0.92		
Growth Factor	113%	113%	113%	113%	113%	113%		
Adj. Flow (vph)	236	0	36	2283	0	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	236	0	36	2283	0	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Right	Left	Left	Left	Right		
Median Width(ft)	24			60	60			
Link Offset(ft)	0			0	0			
Crosswalk Width(ft)	16			16	16			
Two way Left Turn Lane								
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Turning Speed (mph)	15	9	15			9		
Turn Type	NA		Prot	NA				
Protected Phases	4		15	2			6	8
Permitted Phases								
Minimum Split (s)	10.0		10.0	10.0			10.0	10.0
Total Split (s)	20.0		12.0	107.0			107.0	11.0
Total Split (%)	13.3%		8.0%	71.3%			71%	7%
Maximum Green (s)	15.0		6.0	101.0			101.0	6.0
Yellow Time (s)	4.0		4.0	4.0			4.0	4.0
All-Red Time (s)	1.0		2.0	2.0			2.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0				
Total Lost Time (s)	5.0		6.0	6.0				
Lead/Lag	Lead						Lag	
Lead-Lag Optimize?	Yes						Yes	
Act Effct Green (s)	15.0		6.0	101.0				
Actuated g/C Ratio	0.10		0.04	0.67				
v/c Ratio	0.69		0.51	0.96				
Control Delay	16.2		71.8	20.5				
Queue Delay	0.4		124.8	0.0				
Total Delay	16.6		196.6	20.5				
LOS	B		F	C				
Approach Delay	16.6			23.2				
Approach LOS	B			C				

Alternative N: Kingwood Widening + Kingwood Grade Separation
 88: Kingwood Dr. & Kingwood High School

PM Peak Hour

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	0 (0%), Referenced to phase 2:NET and 6:, Start of Green
Natural Cycle:	100
Control Type:	Pretimed
Maximum v/c Ratio:	0.96
Intersection Signal Delay:	22.6
Intersection LOS:	C
Intersection Capacity Utilization:	121.9%
ICU Level of Service:	H
Analysis Period (min):	15

Splits and Phases: 88: Kingwood Dr. & Kingwood High School



Alternative N: Kingwood Widening + Kingwood Grade Separation
 90: Kingwood Dr.

PM Peak Hour



Lane Group	EBU	EBL	SBL	SBR	SWR
Lane Configurations					
Volume (vph)	0	1836	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Storage Length (ft)		100	0	0	0
Storage Lanes		1	0	0	0
Taper Length (ft)		25	25		
Lane Util. Factor	1.00	0.97	1.00	1.00	1.00
Frt					
Flt Protected		0.950			
Satd. Flow (prot)	1863	3433	0	0	0
Flt Permitted		0.950			
Satd. Flow (perm)	1863	3433	0	0	0
Link Speed (mph)		30	40		30
Link Distance (ft)		380	176		162
Travel Time (s)		8.6	3.0		3.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	2255	0	0	0
Shared Lane Traffic (%)					
Lane Group Flow (vph)	0	2255	0	0	0
Enter Blocked Intersection	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Right
Median Width(ft)		36	0		0
Link Offset(ft)		0	0		0
Crosswalk Width(ft)		16	16		16
Two way Left Turn Lane					
Headway Factor	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15	15	9	9
Sign Control		Free	Stop		Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	69.2%
ICU Level of Service	C
Analysis Period (min)	15

Lane Group	ø1	ø6
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Growth Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	1	6
Permitted Phases		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 91: Lake Kingwood Trail & Kingwood Dr.

PM Peak Hour

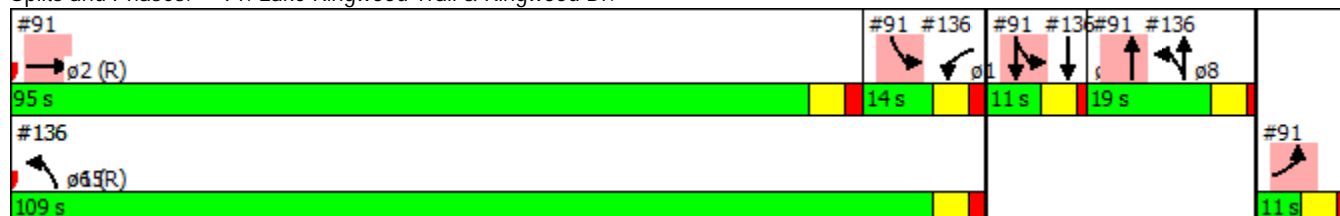


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	15	2						8		14	4	
Switch Phase												
Minimum Initial (s)	5.0	4.0						5.0			5.0	
Minimum Split (s)	11.0	20.0						18.0			10.0	
Total Split (s)	11.0	95.0						19.0			11.0	
Total Split (%)	7.3%	63.3%						12.7%			7.3%	
Maximum Green (s)	5.0	89.0						14.0			6.0	
Yellow Time (s)	4.0	4.0						4.0			4.0	
All-Red Time (s)	2.0	2.0						1.0			1.0	
Lost Time Adjust (s)	0.0	0.0						0.0			0.0	
Total Lost Time (s)	6.0	6.0						5.0			5.0	
Lead/Lag		Lead						Lag			Lead	
Lead-Lag Optimize?		Yes						Yes			Yes	
Vehicle Extension (s)	3.0	3.0						3.0			3.0	
Recall Mode	None	C-Max						None			None	
Walk Time (s)		4.0						6.0				
Flash Dont Walk (s)		10.0						7.0				
Pedestrian Calls (#/hr)		0						0				
Act Effct Green (s)	5.1	95.9						13.7			20.0	
Actuated g/C Ratio	0.03	0.64						0.09			0.13	
v/c Ratio	0.28	0.96						0.86			0.17	
Control Delay	82.8	38.0						81.5			26.4	
Queue Delay	0.0	0.0						0.0			6.6	
Total Delay	82.8	38.0						81.5			33.0	
LOS	F	D						F			C	
Approach Delay		38.4						81.5			33.0	
Approach LOS		D						F			C	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	0 (0%), Referenced to phase 2:EBT and 6:, Start of Green
Natural Cycle:	140
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.96
Intersection Signal Delay:	43.2
Intersection LOS:	D
Intersection Capacity Utilization	77.1%
ICU Level of Service	D
Analysis Period (min)	15

Splits and Phases: 91: Lake Kingwood Trail & Kingwood Dr.



Lane Group	ø1	ø6
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	4.0
Minimum Split (s)	11.0	10.0
Total Split (s)	14.0	109.0
Total Split (%)	9%	73%
Maximum Green (s)	8.0	103.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	C-Max
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 96: Chestnut Ridge Dr. & Kingwood Dr.

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	687	88	0	0	0	0	89	161	97	116	0
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.983						0.913				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1805	3479	0	0	0	0	0	1701	0	1770	1863	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	1805	3479	0	0	0	0	0	1701	0	1770	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10						53				
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		530			2489			973			98	
Travel Time (s)		9.0			42.4			22.1			2.2	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	117%	117%	117%	117%	117%	117%	117%	117%	117%	117%	117%	117%
Heavy Vehicles (%)	0%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	118	903	116	0	0	0	0	117	212	128	152	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	118	1019	0	0	0	0	0	329	0	128	152	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2						2		1	2	
Detector Template	Left	Thru						Thru		Left	Thru	
Leading Detector (ft)	20	100						100		20	100	
Trailing Detector (ft)	0	0						0		0	0	
Detector 1 Position(ft)	0	0						0		0	0	
Detector 1 Size(ft)	20	6						6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex						Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0						0.0		0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Prot	NA						NA		Prot	NA	
Protected Phases	15	2						8		1 4	4	

Lane Group	ø1	ø6
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Growth Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	1	6

Alternative N: Kingwood Widening + Kingwood Grade Separation
 96: Chestnut Ridge Dr. & Kingwood Dr.

PM Peak Hour

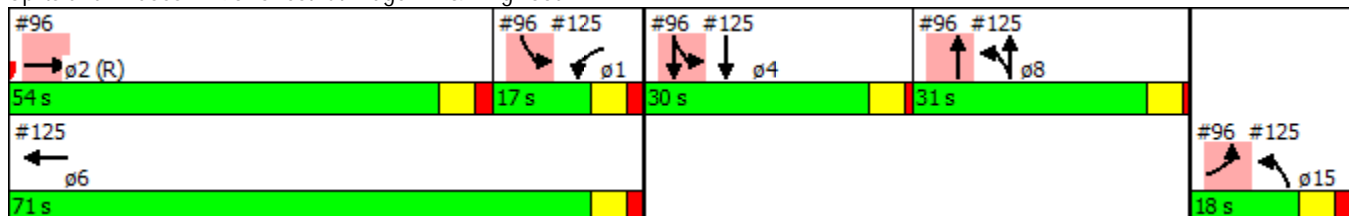


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases												
Detector Phase	15	2						8		1 4	4	
Switch Phase												
Minimum Initial (s)	5.0	4.0						5.0			5.0	
Minimum Split (s)	11.0	20.0						18.0			10.0	
Total Split (s)	18.0	54.0						31.0			30.0	
Total Split (%)	12.0%	36.0%						20.7%			20.0%	
Maximum Green (s)	12.0	48.0						26.0			25.0	
Yellow Time (s)	4.0	4.0						4.0			4.0	
All-Red Time (s)	2.0	2.0						1.0			1.0	
Lost Time Adjust (s)	0.0	0.0						0.0			0.0	
Total Lost Time (s)	6.0	6.0						5.0			5.0	
Lead/Lag		Lead						Lag			Lead	
Lead-Lag Optimize?		Yes						Yes			Yes	
Vehicle Extension (s)	3.0	3.0						3.0			3.0	
Recall Mode	None	C-Max						None			None	
Walk Time (s)		4.0						6.0				
Flash Dont Walk (s)		10.0						7.0				
Pedestrian Calls (#/hr)		0						0				
Act Effct Green (s)	11.7	48.3						26.0		41.0	25.1	
Actuated g/C Ratio	0.08	0.32						0.17		0.27	0.17	
v/c Ratio	0.84	0.90						0.97		0.27	0.49	
Control Delay	109.5	60.3						93.6		9.8	17.3	
Queue Delay	67.9	0.0						15.8		0.0	0.0	
Total Delay	177.4	60.3						109.4		9.8	17.3	
LOS	F	E						F		A	B	
Approach Delay		72.4						109.4			13.9	
Approach LOS		E						F			B	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	95 (63%), Referenced to phase 2:EBT, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.00
Intersection Signal Delay:	70.0
Intersection LOS:	E
Intersection Capacity Utilization	99.4%
ICU Level of Service	F
Analysis Period (min)	15

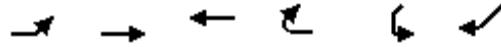
Splits and Phases: 96: Chestnut Ridge Dr. & Kingwood Dr.



Lane Group	ø1	ø6
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	4.0
Minimum Split (s)	11.0	10.0
Total Split (s)	17.0	71.0
Total Split (%)	11%	47%
Maximum Green (s)	11.0	65.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 102: Kingwood Dr.

PM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations			↑			↑↑
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.88
Frt						
Flt Protected						
Satd. Flow (prot)	0	0	1863	0	0	3278
Flt Permitted						
Satd. Flow (perm)	0	0	1863	0	0	3278
Link Speed (mph)		40	40		30	
Link Distance (ft)		383	176		158	
Travel Time (s)		6.5	3.0		3.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Yield		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	69.2%
Analysis Period (min)	15
	ICU Level of Service C

Alternative N: Kingwood Widening + Kingwood Grade Separation
 104: US 59 SBFR & Kingwood Dr.

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↑		↔↔	↑↑					↔	↑↑↑↑	↔
Volume (vph)	0	337	199	859	606	0	0	0	0	189	172	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	0		0	0		0
Storage Lanes	0		2	2		0	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	0.97	0.95	1.00	1.00	1.00	1.00	0.86	0.81	0.86
Frt		0.947									0.989	0.850
Flt Protected				0.950						0.950	0.985	
Satd. Flow (prot)	0	6068	0	3433	3539	0	0	0	0	1522	4410	1362
Flt Permitted				0.950						0.950	0.985	
Satd. Flow (perm)	0	6068	0	3433	3539	0	0	0	0	1522	4410	1362
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		73									7	223
Link Speed (mph)		40			30			30			30	
Link Distance (ft)		1412			321			184			202	
Travel Time (s)		24.1			7.3			4.2			4.6	
Peak Hour Factor	0.92	0.72	0.79	0.80	0.89	0.92	0.92	0.92	0.92	0.91	0.84	0.85
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	529	285	1213	769	0	0	0	0	235	231	136
Shared Lane Traffic (%)										48%		20%
Lane Group Flow (vph)	0	814	0	1213	769	0	0	0	0	122	371	109
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2		1	2					1	2	1
Detector Template		Thru		Left	Thru					Left	Thru	Right
Leading Detector (ft)		100		20	100					20	100	20
Trailing Detector (ft)		0		0	0					0	0	0
Detector 1 Position(ft)		0		0	0					0	0	0
Detector 1 Size(ft)		6		20	6					20	6	20
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0					0.0	0.0	0.0
Detector 1 Queue (s)		0.0		0.0	0.0					0.0	0.0	0.0
Detector 1 Delay (s)		0.0		0.0	0.0					0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type		NA		Prot	NA					Perm	NA	Perm
Protected Phases		2		1 11 21	1 2 11						3 4	
Permitted Phases										3 4		3 4

Alternative N: Kingwood Widening + Kingwood Grade Separation
 104: US 59 SBFR & Kingwood Dr.

PM Peak Hour

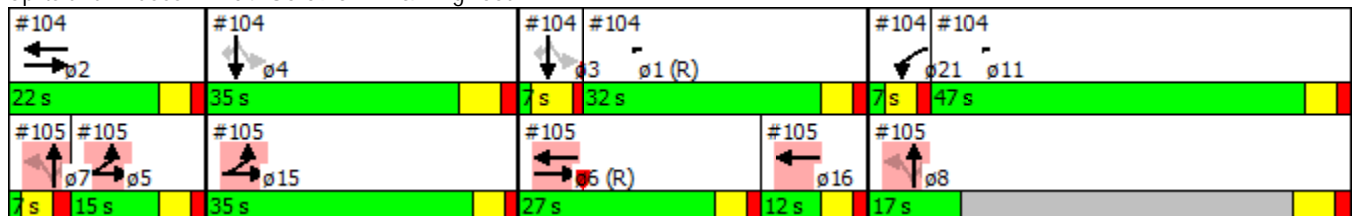


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2		1 11 21	1 2 11					3 4	3 4	3 4
Switch Phase												
Minimum Initial (s)		7.0										
Minimum Split (s)		12.3										
Total Split (s)		22.0										
Total Split (%)		14.7%										
Maximum Green (s)		16.7										
Yellow Time (s)		3.6										
All-Red Time (s)		1.7										
Lost Time Adjust (s)		0.0										
Total Lost Time (s)		5.3										
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0										
Recall Mode		Max										
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effect Green (s)		16.7		85.6	95.3					31.4	31.4	31.4
Actuated g/C Ratio		0.11		0.57	0.64					0.21	0.21	0.21
v/c Ratio		1.17dr		0.62	0.34					0.38	0.40	0.24
Control Delay		118.1		8.3	2.5					43.6	40.8	1.4
Queue Delay		0.0		4.7	0.4					0.0	0.0	0.0
Total Delay		118.1		13.0	2.9					43.6	40.8	1.4
LOS		F		B	A					D	D	A
Approach Delay		118.1			9.1						34.2	
Approach LOS		F			A						C	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	8 (5%), Referenced to phase 1:WBTL and 6:, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.10
Intersection Signal Delay:	39.6
Intersection LOS:	D
Intersection Capacity Utilization:	85.7%
ICU Level of Service:	E
Analysis Period (min):	15
dr	Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 104: US 59 SBFR & Kingwood Dr.



Lane Group	ø1	ø3	ø4	ø5	ø6	ø7	ø8	ø11	ø15	ø16	ø21
Detector Phase											
Switch Phase											
Minimum Initial (s)	3.0	1.0	5.0	3.0	8.0	1.0	1.0	3.0	3.0	4.0	1.0
Minimum Split (s)	8.3	6.7	11.7	8.3	25.3	6.7	26.7	8.3	8.3	9.3	6.3
Total Split (s)	32.0	7.0	35.0	15.0	27.0	7.0	17.0	47.0	35.0	12.0	7.0
Total Split (%)	21%	5%	23%	10%	18%	5%	11%	31%	23%	8%	5%
Maximum Green (s)	26.7	1.3	28.3	9.7	21.7	1.3	10.3	41.7	29.7	6.7	1.7
Yellow Time (s)	3.6	4.7	4.7	3.6	3.6	3.7	4.7	3.6	3.6	3.6	3.6
All-Red Time (s)	1.7	1.0	2.0	1.7	1.7	2.0	2.0	1.7	1.7	1.7	1.7
Lost Time Adjust (s)											
Total Lost Time (s)											
Lead/Lag	Lag	Lead		Lag	Lead	Lead		Lag		Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes		Yes		Yes	Yes
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
Recall Mode	C-Max	None	None	None	C-Max	Max	None	None	None	None	None
Walk Time (s)					5.0		6.0				
Flash Dont Walk (s)					15.0		14.0				
Pedestrian Calls (#/hr)					0		0				
Act Effect Green (s)											
Actuated g/C Ratio											
v/c Ratio											
Control Delay											
Queue Delay											
Total Delay											
LOS											
Approach Delay											
Approach LOS											
Intersection Summary											

Alternative N: Kingwood Widening + Kingwood Grade Separation
 105: US 59 NBFR & Kingwood Dr.

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	222	321	0	0	1070	341	412	592	982	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		400	0		0	0		0
Storage Lanes	2		0	0		1	1		2	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.86	0.86	0.86	0.86	0.88	1.00	1.00	1.00
Frt					0.961				0.850			
Flt Protected	0.950						0.950	0.989				
Satd. Flow (prot)	3433	3539	0	0	6158	0	1522	4753	2787	0	0	0
Flt Permitted	0.950						0.950	0.989				
Satd. Flow (perm)	3433	3539	0	0	6158	0	1522	4753	2787	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					55				749			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		321			1449			195			198	
Travel Time (s)		7.3			32.9			4.4			4.5	
Peak Hour Factor	0.78	0.85	0.92	0.92	0.95	0.86	0.85	0.87	0.89	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	322	427	0	0	1273	448	548	769	1247	0	0	0
Shared Lane Traffic (%)							42%					
Lane Group Flow (vph)	322	427	0	0	1721	0	318	999	1247	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2	1			
Detector Template	Left	Thru			Thru		Left	Thru	Right			
Leading Detector (ft)	20	100			100		20	100	20			
Trailing Detector (ft)	0	0			0		0	0	0			
Detector 1 Position(ft)	0	0			0		0	0	0			
Detector 1 Size(ft)	20	6			6		20	6	20			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	Prot	NA			NA		Perm	NA	Perm			
Protected Phases	5 15	5 6 15			6 16			7 8				
Permitted Phases							7 8		7 8			

Alternative N: Kingwood Widening + Kingwood Grade Separation
 105: US 59 NBFR & Kingwood Dr.

PM Peak Hour

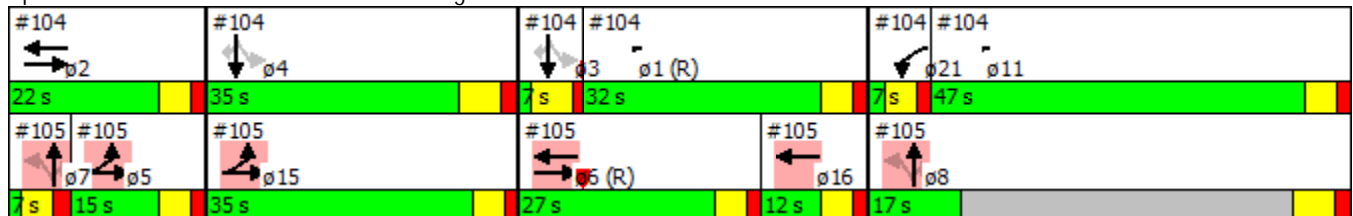


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5 15	5 6 15			6 16		7 8	7 8	7 8			
Switch Phase												
Minimum Initial (s)												
Minimum Split (s)												
Total Split (s)												
Total Split (%)												
Maximum Green (s)												
Yellow Time (s)												
All-Red Time (s)												
Lost Time Adjust (s)												
Total Lost Time (s)												
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)												
Recall Mode												
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	34.6	71.7			43.8		55.3	55.3	55.3			
Actuated g/C Ratio	0.23	0.48			0.29		0.37	0.37	0.37			
v/c Ratio	0.41	0.25			0.94		0.57	0.57	0.83			
Control Delay	8.5	1.7			46.1		42.6	39.4	21.9			
Queue Delay	0.4	1.2			11.7		0.0	0.0	0.0			
Total Delay	8.9	2.8			57.8		42.6	39.4	21.9			
LOS	A	A			E		D	D	C			
Approach Delay		5.4			57.8			31.3				
Approach LOS		A			E			C				

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	8 (5%), Referenced to phase 1:WBTL and 6:, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.10
Intersection Signal Delay:	36.5
Intersection LOS:	D
Intersection Capacity Utilization:	85.7%
ICU Level of Service:	E
Analysis Period (min):	15

Splits and Phases: 105: US 59 NBFR & Kingwood Dr.



Alternative N: Kingwood Widening + Kingwood Grade Separation
 105: US 59 NBFR & Kingwood Dr.

PM Peak Hour

Lane Group	ø1	ø2	ø3	ø4	ø5	ø6	ø7	ø8	ø11	ø15	ø16	ø21				
Detector Phase																
Switch Phase																
Minimum Initial (s)	3.0	7.0	1.0	5.0	3.0	8.0	1.0	1.0	3.0	3.0	4.0	1.0				
Minimum Split (s)	8.3	12.3	6.7	11.7	8.3	25.3	6.7	26.7	8.3	8.3	9.3	6.3				
Total Split (s)	32.0	22.0	7.0	35.0	15.0	27.0	7.0	17.0	47.0	35.0	12.0	7.0				
Total Split (%)	21%	15%	5%	23%	10%	18%	5%	11%	31%	23%	8%	5%				
Maximum Green (s)	26.7	16.7	1.3	28.3	9.7	21.7	1.3	10.3	41.7	29.7	6.7	1.7				
Yellow Time (s)	3.6	3.6	4.7	4.7	3.6	3.6	3.7	4.7	3.6	3.6	3.6	3.6				
All-Red Time (s)	1.7	1.7	1.0	2.0	1.7	1.7	2.0	2.0	1.7	1.7	1.7	1.7				
Lost Time Adjust (s)																
Total Lost Time (s)																
Lead/Lag	Lag		Lead		Lag		Lead		Lead		Lag		Lag		Lead	
Lead-Lag Optimize?	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
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	3.0				
Recall Mode	C-Max	Max	None	None	None	C-Max	Max	None	None	None	None	None				
Walk Time (s)							5.0						6.0			
Flash Dont Walk (s)							15.0						14.0			
Pedestrian Calls (#/hr)							0						0			
Act Effect Green (s)																
Actuated g/C Ratio																
v/c Ratio																
Control Delay																
Queue Delay																
Total Delay																
LOS																
Approach Delay																
Approach LOS																
Intersection Summary																

Alternative N: Kingwood Widening + Kingwood Grade Separation
 107: Kingwood Dr.

PM Peak Hour



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	196	289	375	70	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.918			
Flt Protected	0.950					0.978
Satd. Flow (prot)	1770	1583	1710	0	0	1822
Flt Permitted	0.950					0.978
Satd. Flow (perm)	1770	1583	1710	0	0	1822
Link Speed (mph)	40		35			35
Link Distance (ft)	2029		3577			5784
Travel Time (s)	34.6		69.7			112.7
Peak Hour Factor	0.63	0.77	0.79	0.66	0.92	0.84
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	9	288	413	642	86	109
Shared Lane Traffic (%)						
Lane Group Flow (vph)	9	288	1055	0	0	195
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Stop			Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	65.7%
Analysis Period (min)	15
	ICU Level of Service C

Lane Group	ø1	ø6
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Growth Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	1	6
Permitted Phases		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 111: Lake Houston Parkway & Rustic Woods

PM Peak Hour

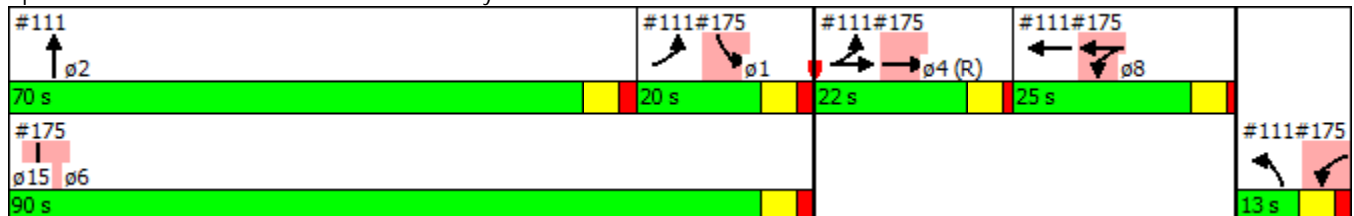


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	1 4	4			8		15	2				
Switch Phase												
Minimum Initial (s)		5.0			5.0		5.0	4.0				
Minimum Split (s)		21.0			25.0		11.0	21.0				
Total Split (s)		22.0			25.0		13.0	70.0				
Total Split (%)		14.7%			16.7%		8.7%	46.7%				
Maximum Green (s)		17.0			20.0		7.0	64.0				
Yellow Time (s)		4.0			4.0		4.0	4.0				
All-Red Time (s)		1.0			1.0		2.0	2.0				
Lost Time Adjust (s)		0.0			0.0		0.0	0.0				
Total Lost Time (s)		5.0			5.0		6.0	6.0				
Lead/Lag		Lead			Lag			Lead				
Lead-Lag Optimize?		Yes			Yes			Yes				
Vehicle Extension (s)		3.0			3.0		3.0	3.0				
Recall Mode		C-Max			None		None	Max				
Walk Time (s)		5.0			5.0			5.0				
Flash Dont Walk (s)		11.0			14.0			6.0				
Pedestrian Calls (#/hr)		0			0			0				
Act Effct Green (s)		33.0			16.1		10.9	68.0				
Actuated g/C Ratio		0.22			0.11		0.07	0.45				
v/c Ratio		0.23			0.59		1.02	1.02				
Control Delay		19.6			42.6		148.9	69.1				
Queue Delay		8.9			0.4		2.3	0.0				
Total Delay		28.6			43.0		151.2	69.1				
LOS		C			D		F	E				
Approach Delay		28.6			43.0			75.2				
Approach LOS		C			D			E				

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	20 (13%), Referenced to phase 4:EBTL, Start of Green
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.02
Intersection Signal Delay:	67.6
Intersection LOS:	E
Intersection Capacity Utilization:	67.4%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 111: Lake Houston Parkway & Rustic Woods



Lane Group	ø1	ø6
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	4.0
Minimum Split (s)	20.0	21.0
Total Split (s)	20.0	90.0
Total Split (%)	13%	60%
Maximum Green (s)	14.0	84.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	Max
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 115: Loop 494 & Kingwood Dr.

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	1353	20	114	949	136	35	203	470	174	120	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		150	150		200	160		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5075	0	1770	5085	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	5075	0	1770	5085	1583	1770	1863	1583	1770	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				149			213			149
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		1449			523			675			922	
Travel Time (s)		24.7			8.9			10.2			14.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	117%	117%	117%	117%	117%	117%	117%	117%	117%	117%	117%	117%
Adj. Flow (vph)	19	1721	25	145	1207	173	45	258	598	221	153	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	19	1746	0	145	1207	173	45	258	598	221	153	95
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		30			30			20			20	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases						2			4			8

Alternative N: Kingwood Widening + Kingwood Grade Separation
 115: Loop 494 & Kingwood Dr.

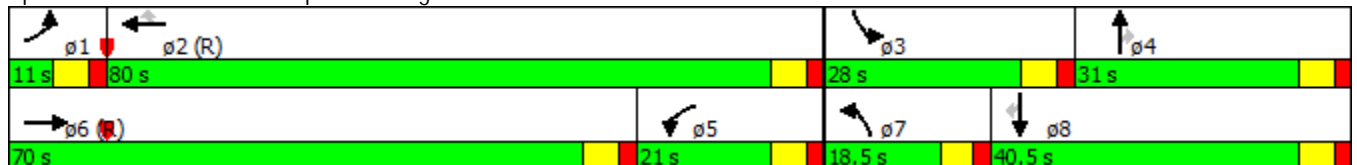
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	1	6		5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	5.0	8.0	8.0	5.0	8.0	8.0
Minimum Split (s)	11.0	22.0		11.0	22.0	22.0	10.5	14.0	14.0	11.0	22.0	22.0
Total Split (s)	11.0	70.0		21.0	80.0	80.0	18.5	31.0	31.0	28.0	40.5	40.5
Total Split (%)	7.3%	46.7%		14.0%	53.3%	53.3%	12.3%	20.7%	20.7%	18.7%	27.0%	27.0%
Maximum Green (s)	5.0	64.0		15.0	74.0	74.0	13.0	25.0	25.0	22.0	34.5	34.5
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.5	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
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	5.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
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
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	5.0	64.0		15.0	78.4	78.4	9.2	25.9	25.9	21.1	40.5	40.5
Actuated g/C Ratio	0.03	0.43		0.10	0.52	0.52	0.06	0.17	0.17	0.14	0.27	0.27
v/c Ratio	0.32	0.81		0.82	0.45	0.19	0.42	0.80	1.33	0.89	0.30	0.18
Control Delay	89.8	30.8		98.8	23.7	4.9	78.4	79.1	193.7	57.5	55.8	18.9
Queue Delay	0.0	0.0		0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	89.8	30.8		98.8	24.3	4.9	78.4	79.1	193.7	57.5	55.8	18.9
LOS	F	C		F	C	A	E	E	F	E	E	B
Approach Delay		31.4			29.2			155.1			49.1	
Approach LOS		C			C			F			D	

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Offset: 90 (60%), Referenced to phase 2:WBT and 6:EBT, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.33
 Intersection Signal Delay: 56.4
 Intersection LOS: E
 Intersection Capacity Utilization 91.4%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 115: Loop 494 & Kingwood Dr.



Alternative N: Kingwood Widening + Kingwood Grade Separation
 118: Royal Forest /Royal Forest & Kingwood Dr.

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	1753	206	91	1113	12	168	26	84	10	13	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		100	150		0	0		0	0		150
Storage Lanes	1		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	0.95	0.95	0.95	1.00
Frt			0.850		0.998			0.955				0.850
Flt Protected	0.950			0.950				0.971			0.979	
Satd. Flow (prot)	1770	5085	1583	1770	5075	0	0	3282	0	0	3465	1583
Flt Permitted	0.950			0.950				0.780			0.758	
Satd. Flow (perm)	1770	5085	1583	1770	5075	0	0	2636	0	0	2683	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			97		2			43				136
Link Speed (mph)		40			40			30				30
Link Distance (ft)		523			323			392				750
Travel Time (s)		8.9			5.5			8.9				17.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	117%	117%	117%	117%	117%	117%	117%	117%	117%	117%	117%	117%
Adj. Flow (vph)	48	2229	262	116	1415	15	214	33	107	13	17	136
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	2229	262	116	1430	0	0	354	0	0	30	136
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		30			30			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2				8		4			4

Alternative N: Kingwood Widening + Kingwood Grade Separation
 121: US 59 SBFR

PM Peak Hour



Lane Group	NBT	NBR	SBU	SBL	SBT	NWL	NWR
Lane Configurations							
Volume (vph)	0	0	149	0	463	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.81	1.00	1.00
Frt							
Flt Protected			0.950				
Satd. Flow (prot)	0	0	1770	0	7544	0	0
Flt Permitted			0.950				
Satd. Flow (perm)	0	0	1770	0	7544	0	0
Link Speed (mph)	30				30	30	
Link Distance (ft)	202				6181	331	
Travel Time (s)	4.6				140.5	7.5	
Peak Hour Factor	0.92	0.92	0.79	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	213	0	569	0	0
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	213	0	569	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No
Lane Alignment	Left	Right	R NA	Left	Left	Left	Right
Median Width(ft)	12				12	0	
Link Offset(ft)	0				0	0	
Crosswalk Width(ft)	16				16	16	
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	9	15		15	9
Sign Control	Stop				Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	33.8%
Analysis Period (min)	15
	ICU Level of Service A

Alternative N: Kingwood Widening + Kingwood Grade Separation
 122: US 59 NBFR

PM Peak Hour



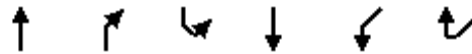
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	149	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	1.00	1.00
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1770	0	0	5085	0	0
Flt Permitted	0.950					
Satd. Flow (perm)	1770	0	0	5085	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	331			198	6159	
Travel Time (s)	7.5			4.5	140.0	
Peak Hour Factor	0.79	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	213	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	213	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Yield			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	27.4%
Analysis Period (min)	15
	ICU Level of Service A

Alternative N: Kingwood Widening + Kingwood Grade Separation
 123: US 59 SBFR

PM Peak Hour



Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations				↑↑↑	↘	
Volume (vph)	0	0	0	1230	198	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	1.00	1.00
Frt						
Flt Protected					0.950	
Satd. Flow (prot)	0	0	0	5085	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	0	0	5085	1770	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	6715			184	342	
Travel Time (s)	152.6			4.2	7.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	1511	243	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1511	243	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Stop			Free	Yield	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	45.9% ICU Level of Service A
Analysis Period (min)	15

Alternative N: Kingwood Widening + Kingwood Grade Separation
 124: US 59 NBFR

PM Peak Hour



Lane Group	NBU	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations	A		B				
Volume (vph)	198	0	1986	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.76	1.00	1.00	1.00	1.00
Frt							
Flt Protected	0.950						
Satd. Flow (prot)	1770	0	8494	0	0	0	0
Flt Permitted	0.950						
Satd. Flow (perm)	1770	0	8494	0	0	0	0
Link Speed (mph)			30	30		30	
Link Distance (ft)			422	195		342	
Travel Time (s)			9.6	4.4		7.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	243	0	2439	0	0	0	0
Shared Lane Traffic (%)							
Lane Group Flow (vph)	243	0	2439	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Left	Right	Left	Right
Median Width(ft)			12	12		0	
Link Offset(ft)			0	0		0	
Crosswalk Width(ft)			16	16		16	
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15			9	15	9
Sign Control			Free	Stop		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	45.9%
Analysis Period (min)	15
	ICU Level of Service A

Lane Group	ø2	ø15
Lane Configurations		
Volume (vph)		
Ideal Flow (vphp)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Growth Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	2	15
Permitted Phases		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 125: Chestnut Ridge Dr. & Kingwood Dr.

PM Peak Hour

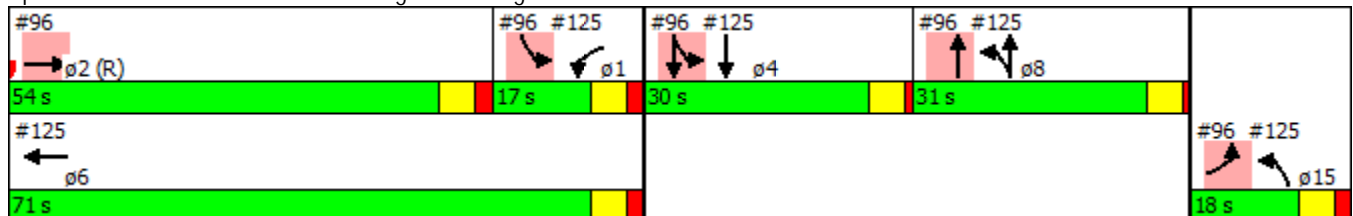


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				1	6		15	8				4
Switch Phase												
Minimum Initial (s)				5.0	4.0			5.0				5.0
Minimum Split (s)				11.0	10.0			18.0				10.0
Total Split (s)				17.0	71.0			31.0				30.0
Total Split (%)				11.3%	47.3%			20.7%				20.0%
Maximum Green (s)				11.0	65.0			26.0				25.0
Yellow Time (s)				4.0	4.0			4.0				4.0
All-Red Time (s)				2.0	2.0			1.0				1.0
Lost Time Adjust (s)				0.0	0.0			0.0				0.0
Total Lost Time (s)				6.0	6.0			5.0				5.0
Lead/Lag				Lag				Lag				Lead
Lead-Lag Optimize?				Yes				Yes				Yes
Vehicle Extension (s)				3.0	3.0			3.0				3.0
Recall Mode				None	None			None				None
Walk Time (s)								6.0				
Flash Dont Walk (s)								7.0				
Pedestrian Calls (#/hr)								0				
Act Effct Green (s)				10.9	65.2			42.7	26.0			25.1
Actuated g/C Ratio				0.07	0.43			0.28	0.17			0.17
v/c Ratio				0.85	0.66			0.16	0.45			1.00
Control Delay				128.7	52.7			9.5	68.6			105.9
Queue Delay				70.2	0.0			0.0	0.0			0.8
Total Delay				198.8	52.7			9.5	68.6			106.7
LOS				F	D			A	E			F
Approach Delay					62.9				47.1			106.7
Approach LOS					E				D			F

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	95 (63%), Referenced to phase 2:EBT, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.00
Intersection Signal Delay:	67.6
Intersection LOS:	E
Intersection Capacity Utilization:	99.4%
ICU Level of Service:	F
Analysis Period (min):	15

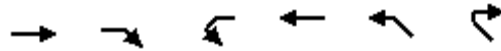
Splits and Phases: 125: Chestnut Ridge Dr. & Kingwood Dr.



Lane Group	ø2	ø15
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	5.0
Minimum Split (s)	20.0	11.0
Total Split (s)	54.0	18.0
Total Split (%)	36%	12%
Maximum Green (s)	48.0	12.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	C-Max	None
Walk Time (s)	4.0	
Flash Dont Walk (s)	10.0	
Pedestrian Calls (#/hr)	0	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 126: Kingwood Dr.

PM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations	↑↑↑			↑↑↑		
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	5085	0	0	5085	0	0
Flt Permitted						
Satd. Flow (perm)	5085	0	0	5085	0	0
Link Speed (mph)	30			30	40	
Link Distance (ft)	983			502	530	
Travel Time (s)	22.3			11.4	9.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9		15	15		9
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0% ICU Level of Service A
Analysis Period (min)	15

Alternative N: Kingwood Widening + Kingwood Grade Separation
 128: Kingwood Dr. & Green Oak Dr.

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↙	↑↑↑	↗	↙	↑			↑↔	
Volume (vph)	0	0	0	39	1066	194	132	76	0	0	357	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		150	0		0	0		0
Storage Lanes	0		0	1		1	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Fr _t						0.850					0.988	
Fl _t Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	1770	5085	1583	1770	1863	0	0	3497	0
Fl _t Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	1770	5085	1583	1770	1863	0	0	3497	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						228						5
Link Speed (mph)		30			30			30				30
Link Distance (ft)		558			1505			89				240
Travel Time (s)		12.7			34.2			2.0				5.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	117%	117%	117%	117%	117%	117%	117%	117%	117%	117%	117%	117%
Adj. Flow (vph)	0	0	0	50	1356	247	168	97	0	0	454	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	50	1356	247	168	97	0	0	495	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2				2
Detector Template				Left	Thru	Right	Left	Thru				Thru
Leading Detector (ft)				20	100	20	20	100				100
Trailing Detector (ft)				0	0	0	0	0				0
Detector 1 Position(ft)				0	0	0	0	0				0
Detector 1 Size(ft)				20	6	20	20	6				6
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex				Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0				0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0				0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0				0.0
Detector 2 Position(ft)					94			94				94
Detector 2 Size(ft)					6			6				6
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type				Prot	NA	Perm	Prot	NA				NA
Protected Phases				1	6		15	8				4
Permitted Phases							6					

Lane Group	ø2	ø15
Lane Configurations		
Volume (vph)		
Ideal Flow (vphp)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Growth Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	2	15
Permitted Phases		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 128: Kingwood Dr. & Green Oak Dr.

PM Peak Hour

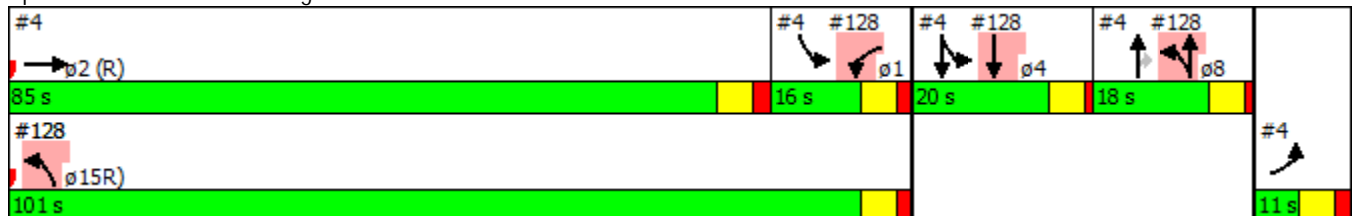


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				1	6	6	15	8				4
Switch Phase												
Minimum Initial (s)				5.0	4.0	4.0		5.0				5.0
Minimum Split (s)				11.0	10.0	10.0		18.0				10.0
Total Split (s)				16.0	101.0	101.0		18.0				20.0
Total Split (%)				10.7%	67.3%	67.3%		12.0%				13.3%
Maximum Green (s)				10.0	95.0	95.0		13.0				15.0
Yellow Time (s)				4.0	4.0	4.0		4.0				4.0
All-Red Time (s)				2.0	2.0	2.0		1.0				1.0
Lost Time Adjust (s)				0.0	0.0	0.0		0.0				0.0
Total Lost Time (s)				6.0	6.0	6.0		5.0				5.0
Lead/Lag				Lag				Lag				Lead
Lead-Lag Optimize?				Yes				Yes				Yes
Vehicle Extension (s)				3.0	3.0	3.0		3.0				3.0
Recall Mode				None	C-Max	C-Max		None				None
Walk Time (s)								6.0				
Flash Dont Walk (s)								7.0				
Pedestrian Calls (#/hr)								0				
Act Effect Green (s)				10.0	95.0	95.0	23.0	13.0				15.0
Actuated g/C Ratio				0.07	0.63	0.63	0.15	0.09				0.10
v/c Ratio				0.42	0.42	0.23	0.62	0.60				1.40
Control Delay				78.7	14.2	2.2	7.3	40.2				241.8
Queue Delay				9.9	0.0	0.0	0.0	0.0				3.9
Total Delay				88.6	14.2	2.2	7.3	40.2				245.7
LOS				F	B	A	A	D				F
Approach Delay					14.7			19.3				245.7
Approach LOS					B			B				F

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Offset: 117 (78%), Referenced to phase 2:EBT and 6:, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.40
 Intersection Signal Delay: 62.6
 Intersection LOS: E
 Intersection Capacity Utilization 106.7%
 ICU Level of Service G
 Analysis Period (min) 15

Splits and Phases: 128: Kingwood Dr. & Green Oak Dr.



Lane Group	ø2	ø15
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	5.0
Minimum Split (s)	20.0	11.0
Total Split (s)	85.0	11.0
Total Split (%)	57%	7%
Maximum Green (s)	79.0	5.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	C-Max	None
Walk Time (s)	4.0	
Flash Dont Walk (s)	10.0	
Pedestrian Calls (#/hr)	0	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 133: Kingwood Dr.

PM Peak Hour



Lane Group	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations		↑↑				↑↑
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.88	1.00	1.00	1.00	0.95
Frt						
Flt Protected						
Satd. Flow (prot)	0	3278	0	0	0	3539
Flt Permitted						
Satd. Flow (perm)	0	3278	0	0	0	3539
Link Speed (mph)	30		30			30
Link Distance (ft)	922		890			1945
Travel Time (s)	21.0		20.2			44.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	100		100			100
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Free		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0%
Analysis Period (min)	15
	ICU Level of Service A

Lane Group	ø2	ø15
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Growth Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	2	15
Permitted Phases		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 136: Kingwood Dr. & Lake Kingwood Trail

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				1	6		15	8				4
Switch Phase												
Minimum Initial (s)				5.0	4.0			5.0				5.0
Minimum Split (s)				11.0	10.0			18.0				10.0
Total Split (s)				14.0	109.0			19.0				11.0
Total Split (%)				9.3%	72.7%			12.7%				7.3%
Maximum Green (s)				8.0	103.0			14.0				6.0
Yellow Time (s)				4.0	4.0			4.0				4.0
All-Red Time (s)				2.0	2.0			1.0				1.0
Lost Time Adjust (s)				0.0	0.0			0.0				0.0
Total Lost Time (s)				6.0	6.0			5.0				5.0
Lead/Lag				Lag				Lag				Lead
Lead-Lag Optimize?				Yes				Yes				Yes
Vehicle Extension (s)				3.0	3.0			3.0				3.0
Recall Mode				None	C-Max			None				None
Walk Time (s)								6.0				
Flash Dont Walk (s)								7.0				
Pedestrian Calls (#/hr)								0				
Act Effct Green (s)				8.0	109.9			18.1				6.0
Actuated g/C Ratio				0.05	0.73			0.12				0.04
v/c Ratio				0.67	0.54			0.16				0.82
Control Delay				101.5	10.3			11.8				102.2
Queue Delay				0.0	0.0			3.9				0.0
Total Delay				101.5	10.3			15.7				102.2
LOS				F	B			B				F
Approach Delay					14.3			15.7				102.2
Approach LOS					B			B				F

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 20.8
 Intersection LOS: C
 Intersection Capacity Utilization 54.6%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 136: Kingwood Dr. & Lake Kingwood Trail



Lane Group	ø2	ø15
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	5.0
Minimum Split (s)	20.0	11.0
Total Split (s)	95.0	11.0
Total Split (%)	63%	7%
Maximum Green (s)	89.0	5.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	C-Max	None
Walk Time (s)	4.0	
Flash Dont Walk (s)	10.0	
Pedestrian Calls (#/hr)	0	
Act Effect Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 139: Kingwood High School & Kingwood Dr.

PM Peak Hour



Lane Group	EBL	EBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR	SWR2	ø2
Lane Configurations				↑↑	↑		↑			↑↑	↑	
Volume (vph)	0	0	0	165	46	0	18	0	0	1158	123	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	0	0		0	0		0	0	150		
Storage Lanes	0	0	0		1	0		0	0	1		
Taper Length (ft)	25		25			25			25			
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.88	1.00	
Frt					0.850					0.850	0.850	
Flt Protected												
Satd. Flow (prot)	0	0	0	3539	1583	0	1863	0	0	2787	1583	
Flt Permitted												
Satd. Flow (perm)	0	0	0	3539	1583	0	1863	0	0	2787	1583	
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)					102							115
Link Speed (mph)	30			30			30		30			
Link Distance (ft)	158			317			110		890			
Travel Time (s)	3.6			7.2			2.5		20.2			
Peak Hour Factor	0.92	0.92	0.92	0.81	0.89	0.92	0.56	0.92	0.92	0.90	0.75	
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	
Adj. Flow (vph)	0	0	0	230	58	0	36	0	0	1454	185	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	230	58	0	36	0	0	1454	185	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right	Right	
Median Width(ft)	60			0			0		60			
Link Offset(ft)	0			0			0		0			
Crosswalk Width(ft)	16			16			16		16			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15		9	15		9	15	9	9	
Turn Type				NA	Perm	Prot	NA			custom	custom	
Protected Phases				4		15	8			6		2
Permitted Phases					4							6
Minimum Split (s)				10.0	10.0		10.0			10.0	10.0	10.0
Total Split (s)				20.0	20.0		11.0			107.0	107.0	107.0
Total Split (%)				13.3%	13.3%		7.3%			71.3%	71.3%	71%
Maximum Green (s)				15.0	15.0		6.0			101.0	101.0	101.0
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			2.0	2.0	2.0
Lost Time Adjust (s)				0.0	0.0		0.0			0.0	0.0	
Total Lost Time (s)				5.0	5.0		5.0			6.0	6.0	
Lead/Lag				Lead	Lead		Lag					
Lead-Lag Optimize?				Yes	Yes		Yes					
Act Effect Green (s)				15.0	15.0		6.0			101.0	101.0	
Actuated g/C Ratio				0.10	0.10		0.04			0.67	0.67	
v/c Ratio				0.65	0.23		0.49			0.78	0.17	
Control Delay				74.4	3.0		157.0			20.4	3.7	
Queue Delay				0.0	0.0		123.7			0.0	0.0	
Total Delay				74.4	3.0		280.7			20.4	3.7	

Lane Group	ø15
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Growth Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	15
Permitted Phases	
Minimum Split (s)	10.0
Total Split (s)	12.0
Total Split (%)	8%
Maximum Green (s)	6.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Alternative N: Kingwood Widening + Kingwood Grade Separation
 139: Kingwood High School & Kingwood Dr.

PM Peak Hour



Lane Group	EBL	EBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR	SWR2	ø2
LOS				E	A		F			C	A	
Approach Delay				60.0			280.7					
Approach LOS				E			F					

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	0 (0%), Referenced to phase 2:NET and 6:, Start of Green
Natural Cycle:	100
Control Type:	Pretimed
Maximum v/c Ratio:	0.96
Intersection Signal Delay:	29.4
Intersection LOS:	C
Intersection Capacity Utilization	117.7%
ICU Level of Service	H
Analysis Period (min)	15

Splits and Phases: 139: Kingwood High School & Kingwood Dr.

#88 ø2 (R)	#88 #139 ø4	#139 ø8	
107 s	20 s	11 s	
#139 ø15 ø6 (R)			#88 #139
107 s			12 s

Lane Group	ø15
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Alternative N: Kingwood Widening + Kingwood Grade Separation
 141: Lake Houston Parkway & Kingwood Dr.

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	336	856	551	169	484	206	527	798	124	322	824	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	150		150	150		150	150		150
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
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
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Fl _t Permitted	0.404			0.250			0.250			0.250		
Satd. Flow (perm)	1460	3539	1583	903	3539	1583	903	3539	1583	903	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			37			43			36			158
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		513			546			450			568	
Travel Time (s)		11.7			12.4			7.7			9.7	
Peak Hour Factor	0.98	0.96	0.96	0.83	0.93	0.82	0.96	0.94	0.82	0.93	0.93	0.85
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	387	1008	649	230	588	284	620	959	171	391	1001	308
Shared Lane Traffic (%)												
Lane Group Flow (vph)	387	1008	649	230	588	284	620	959	171	391	1001	308
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		30			30			75			75	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effect Green (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.66	0.71	0.99	0.64	0.42	0.43	1.72	0.68	0.26	1.08	0.71	0.42

Alternative N: Kingwood Widening + Kingwood Grade Separation
 141: Lake Houston Parkway & Kingwood Dr.

PM Peak Hour

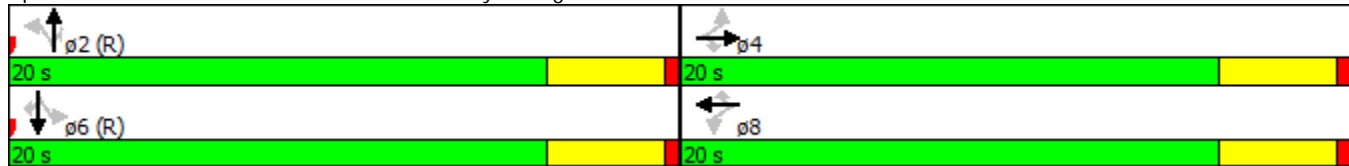


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	17.4	13.5	50.1	14.5	5.6	5.3	353.4	12.9	7.8	91.8	13.4	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.4	13.5	50.1	14.5	5.6	5.3	353.4	12.9	7.8	91.8	13.4	6.5
LOS	B	B	D	B	A	A	F	B	A	F	B	A
Approach Delay	25.8			7.4			133.0			30.2		
Approach LOS	C			A			F			C		

Intersection Summary

Area Type:	Other
Cycle Length:	40
Actuated Cycle Length:	40
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	55
Control Type:	Pretimed
Maximum v/c Ratio:	1.72
Intersection Signal Delay:	52.3
Intersection LOS:	D
Intersection Capacity Utilization	88.2%
ICU Level of Service	E
Analysis Period (min)	15

Splits and Phases: 141: Lake Houston Parkway & Kingwood Dr.



Alternative N: Kingwood Widening + Kingwood Grade Separation
 144: Forest Garden Dr. & Kingwood Dr.

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	166	1172	130	3	702	14	151	126	277	45	18	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.983			0.996			0.924			0.911	
Flt Protected	0.950			0.950				0.990			0.988	
Satd. Flow (prot)	1770	3479	0	1770	3525	0	0	3238	0	0	3186	0
Flt Permitted	0.250			0.250				0.814			0.700	
Satd. Flow (perm)	466	3479	0	466	3525	0	0	2662	0	0	2257	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		40			9			9			53	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		821			549			426			481	
Travel Time (s)		18.7			12.5			9.7			10.9	
Peak Hour Factor	0.92	0.96	0.85	0.75	0.88	0.58	0.84	0.50	0.63	0.80	0.45	0.89
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	204	1380	173	5	901	27	203	285	497	64	45	159
Shared Lane Traffic (%)												
Lane Group Flow (vph)	204	1553	0	5	928	0	0	985	0	0	268	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		40			50			40			40	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40		0.40	0.40	
v/c Ratio	1.10	1.10		0.03	0.66		0.92	0.92		0.29	0.29	

Alternative N: Kingwood Widening + Kingwood Grade Separation
 144: Forest Garden Dr. & Kingwood Dr.

PM Peak Hour

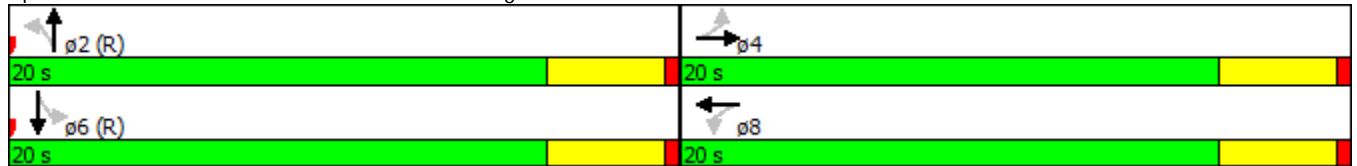


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	105.8	66.4		7.8	12.4			28.8			7.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	105.8	66.4		7.8	12.4			28.8			7.5	
LOS	F	E		A	B			C			A	
Approach Delay		70.9			12.4			28.8			7.5	
Approach LOS		E			B			C			A	

Intersection Summary

Area Type:	Other
Cycle Length:	40
Actuated Cycle Length:	40
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	70
Control Type:	Pretimed
Maximum v/c Ratio:	1.10
Intersection Signal Delay:	42.2
Intersection LOS:	D
Intersection Capacity Utilization	83.5%
ICU Level of Service	E
Analysis Period (min)	15

Splits and Phases: 144: Forest Garden Dr. & Kingwood Dr.



Alternative N: Kingwood Widening + Kingwood Grade Separation
 147: Kingwood Dr. & Timber Shade Dr.

PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1	676	7	29	111	0	0	8	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	0.95	0.95
Frt					0.997							0.873
Flt Protected				0.950				0.987				
Satd. Flow (prot)	0	0	0	1770	3529	0	0	3493	0	0	3090	0
Flt Permitted				0.950				0.987				
Satd. Flow (perm)	0	0	0	1770	3529	0	0	3493	0	0	3090	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					2							99
Link Speed (mph)		30			30			30				30
Link Distance (ft)		833			1635			136				459
Travel Time (s)		18.9			37.2			3.1				10.4
Peak Hour Factor	0.92	0.92	0.92	0.25	0.96	0.58	0.60	0.84	0.92	0.92	0.50	0.83
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	5	796	14	55	149	0	0	18	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	5	810	0	0	204	0	0	117	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Prot	NA		Prot	NA				NA
Protected Phases				1	6		15	8				4
Permitted Phases												
Minimum Split (s)				11.0	10.0			18.0				10.0
Total Split (s)				11.0	93.0			18.0				12.0
Total Split (%)				7.3%	62.0%			12.0%				8.0%
Maximum Green (s)				5.0	87.0			13.0				7.0
Yellow Time (s)				4.0	4.0			4.0				4.0
All-Red Time (s)				2.0	2.0			1.0				1.0
Lost Time Adjust (s)				0.0	0.0			0.0				0.0
Total Lost Time (s)				6.0	6.0			5.0				5.0
Lead/Lag				Lag				Lag				Lead
Lead-Lag Optimize?				Yes				Yes				Yes
Walk Time (s)								6.0				
Flash Dont Walk (s)								7.0				
Pedestrian Calls (#/hr)								0				
Act Effect Green (s)				5.0	87.0			40.0				7.0
Actuated g/C Ratio				0.03	0.58			0.27				0.05
v/c Ratio				0.08	0.40			0.22				0.49

Alternative N: Kingwood Widening + Kingwood Grade Separation
 147: Kingwood Dr. & Timber Shade Dr.

PM Peak Hour

Lane Group	ø2	ø15
Lane Configurations		
Volume (vph)		
Ideal Flow (vphp)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Growth Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	2	15
Permitted Phases		
Minimum Split (s)	20.0	11.0
Total Split (s)	82.0	27.0
Total Split (%)	55%	18%
Maximum Green (s)	76.0	21.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Walk Time (s)	4.0	
Flash Dont Walk (s)	10.0	
Pedestrian Calls (#/hr)	0	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 147: Kingwood Dr. & Timber Shade Dr.

PM Peak Hour

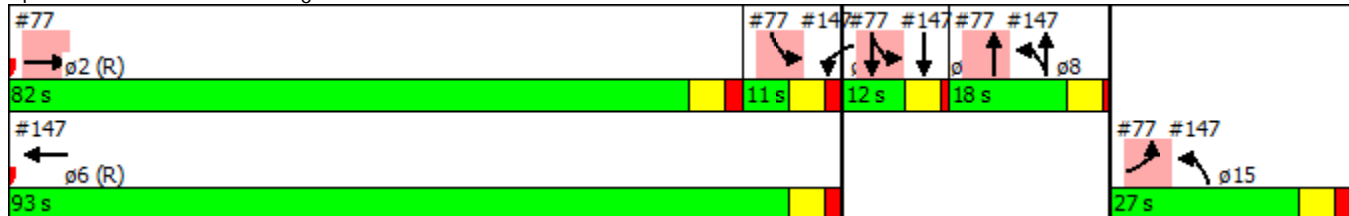


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay				70.0	14.0			2.8			25.0	
Queue Delay				0.0	0.0			1.1			0.0	
Total Delay				70.0	14.0			3.9			25.0	
LOS				E	B			A			C	
Approach Delay					14.4			3.9			25.0	
Approach LOS					B			A			C	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	48 (32%), Referenced to phase 2:EBT and 6:, Start of Green
Natural Cycle:	90
Control Type:	Pretimed
Maximum v/c Ratio:	0.75
Intersection Signal Delay:	13.6
Intersection LOS:	B
Intersection Capacity Utilization	39.0%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 147: Kingwood Dr. & Timber Shade Dr.



Lane Group	ø2	ø15
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 149: Kingwood Dr. & Willtow Terrace

PM Peak Hour



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↑↑		↖	↖					↖	↑↑	
Volume (vph)	0	20	56	299	96	0	0	0	0	34	349	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	150		0
Storage Lanes	0		0	1		0	0		0	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.901										0.996
Flt Protected				0.950	0.980					0.950		
Satd. Flow (prot)	0	3189	0	1681	1734	0	0	0	0	1770	3525	0
Flt Permitted				0.950	0.980					0.950		
Satd. Flow (perm)	0	3189	0	1681	1734	0	0	0	0	1770	3525	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		77										3
Link Speed (mph)		30			30			40				40
Link Distance (ft)		359			105			1385				466
Travel Time (s)		8.2			2.4			23.6				7.9
Peak Hour Factor	0.92	0.56	0.82	0.92	0.71	0.92	0.92	0.92	0.92	0.77	0.77	0.50
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	40	77	367	153	0	0	0	0	50	512	14
Shared Lane Traffic (%)				30%								
Lane Group Flow (vph)	0	117	0	257	263	0	0	0	0	50	526	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA		Prot	NA					Prot	NA	
Protected Phases		4		15 8	8					1	6	
Permitted Phases												
Minimum Split (s)		10.0			18.0					11.0	10.0	
Total Split (s)		12.0			31.0					15.0	84.0	
Total Split (%)		8.0%			20.7%					10.0%	56.0%	
Maximum Green (s)		7.0			26.0					9.0	78.0	
Yellow Time (s)		4.0			4.0					4.0	4.0	
All-Red Time (s)		1.0			1.0					2.0	2.0	
Lost Time Adjust (s)		0.0			0.0					0.0	0.0	
Total Lost Time (s)		5.0			5.0					6.0	6.0	
Lead/Lag		Lead			Lag					Lag		
Lead-Lag Optimize?		Yes			Yes					Yes		
Walk Time (s)					6.0							
Flash Dont Walk (s)					7.0							
Pedestrian Calls (#/hr)					0							
Act Effect Green (s)		7.0		48.0	49.0					9.0	78.0	
Actuated g/C Ratio		0.05		0.32	0.33					0.06	0.52	
v/c Ratio		0.53		0.48	0.46					0.47	0.29	

Lane Group	ø2	ø15
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Growth Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	2	15
Permitted Phases		
Minimum Split (s)	20.0	11.0
Total Split (s)	69.0	23.0
Total Split (%)	46%	15%
Maximum Green (s)	63.0	17.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Walk Time (s)	4.0	
Flash Dont Walk (s)	10.0	
Pedestrian Calls (#/hr)	0	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 149: Kingwood Dr. & Willtow Terrace

PM Peak Hour

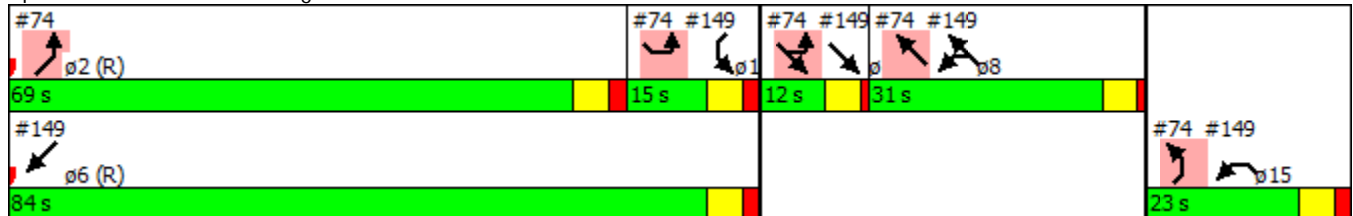


Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Control Delay		35.9		3.5	2.8					77.2	16.5	
Queue Delay		0.0		2.4	2.2					0.0	0.0	
Total Delay		35.9		5.9	5.1					77.2	16.5	
LOS		D		A	A					E	B	
Approach Delay		35.9			5.5						21.7	
Approach LOS		D			A						C	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	48 (32%), Referenced to phase 2:NEL and 6:, Start of Green
Natural Cycle:	80
Control Type:	Pretimed
Maximum v/c Ratio:	0.79
Intersection Signal Delay:	16.1
Intersection LOS:	B
Intersection Capacity Utilization	39.2%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 149: Kingwood Dr. & Willtow Terrace



Lane Group	ø2	ø15
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 151: Kingwood Dr. & High Valley

PM Peak Hour

Lane Group	ø2	ø15
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Growth Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	2	15
Permitted Phases		
Minimum Split (s)	20.0	11.0
Total Split (s)	78.0	18.0
Total Split (%)	52%	12%
Maximum Green (s)	72.0	12.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Walk Time (s)	4.0	
Flash Dont Walk (s)	10.0	
Pedestrian Calls (#/hr)	0	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 151: Kingwood Dr. & High Valley

PM Peak Hour

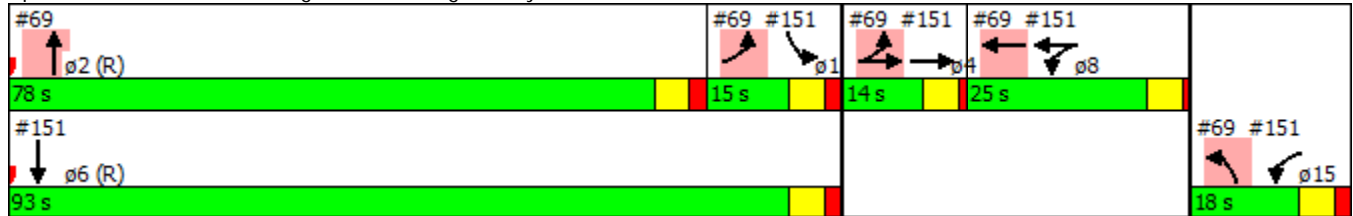


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C		C	C							B
Approach Delay		32.3			21.5							17.2
Approach LOS		C			C							B

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	48 (32%), Referenced to phase 2:NBT and 6:, Start of Green
Natural Cycle:	70
Control Type:	Pretimed
Maximum v/c Ratio:	0.49
Intersection Signal Delay:	19.8
Intersection LOS:	B
Intersection Capacity Utilization	27.7%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 151: Kingwood Dr. & High Valley



Lane Group	ø2	ø15
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 154: Kingwood Dr. & Mills Branch

PM Peak Hour



Lane Group	EBL	EBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR	
Lane Configurations											
Volume (vph)	0	0	0	0	0	0	0	0	0	0	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt											
Flt Protected											
Satd. Flow (prot)	0	0	0	0	0	0	0	0	0	0	
Flt Permitted											
Satd. Flow (perm)	0	0	0	0	0	0	0	0	0	0	
Right Turn on Red	Yes				Yes	Yes			Yes	Yes	Yes
Satd. Flow (RTOR)											
Link Speed (mph)	30		30		40			30			
Link Distance (ft)	8307		71		1448			286			
Travel Time (s)	188.8		1.6		24.7			6.5			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(ft)	0		0		0			0			
Link Offset(ft)	0		0		0			0			
Crosswalk Width(ft)	16		16		16			16			
Two way Left Turn Lane											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15	9	15	9		15	9		
Turn Type											
Protected Phases											
Permitted Phases											
Minimum Split (s)											
Total Split (s)											
Total Split (%)											
Maximum Green (s)											
Yellow Time (s)											
All-Red Time (s)											
Lost Time Adjust (s)											
Total Lost Time (s)											
Lead/Lag											
Lead-Lag Optimize?											
Act Effect Green (s)											
Actuated g/C Ratio											
v/c Ratio											
Control Delay											
Queue Delay											
Total Delay											
LOS											
Approach Delay											
Approach LOS											

Intersection Summary

Area Type: Other

Cycle Length: 3

Actuated Cycle Length: 3

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

Natural Cycle: 40

Control Type: Pretimed

Maximum v/c Ratio: 0.00

Intersection Signal Delay: 0.0

Intersection LOS: A

Intersection Capacity Utilization 0.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 154: Kingwood Dr. & Mills Branch

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Alternative N: Kingwood Widening + Kingwood Grade Separation
 157: US 59 NBFR

PM Peak Hour



Lane Group	NBU	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	A	B					
Volume (vph)	246	2209	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.76	1.00	1.00	1.00	1.00	1.00
Frt							
Flt Protected	0.950						
Satd. Flow (prot)	1770	8494	0	0	0	0	0
Flt Permitted	0.950						
Satd. Flow (perm)	1770	8494	0	0	0	0	0
Link Speed (mph)		30			30	30	
Link Distance (ft)		6159			362	365	
Travel Time (s)		140.0			8.2	8.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	302	2713	0	0	0	0	0
Shared Lane Traffic (%)							
Lane Group Flow (vph)	302	2713	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Right	Left	Left	Left	Right
Median Width(ft)		12			12	0	
Link Offset(ft)		0			0	0	
Crosswalk Width(ft)		16			16	16	
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9		9	15		15	9
Sign Control		Free			Stop	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	47.8%
Analysis Period (min)	15
	ICU Level of Service A

Alternative N: Kingwood Widening + Kingwood Grade Separation
 159: Russel Palmer & Northpark Dr.

PM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø2	ø4
Lane Configurations								
Volume (vph)	0	0	139	1170	158	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Storage Length (ft)		0	150		0	0		
Storage Lanes		0	1		1	0		
Taper Length (ft)			25		25			
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00		
Fr _t								
Fl _t Protected			0.950		0.950			
Satd. Flow (prot)	0	0	1770	3539	1770	0		
Fl _t Permitted			0.950		0.950			
Satd. Flow (perm)	0	0	1770	3539	1770	0		
Right Turn on Red		Yes				Yes		
Satd. Flow (RTOR)								
Link Speed (mph)	30			45	30			
Link Distance (ft)	144			3244	80			
Travel Time (s)	3.3			49.2	1.8			
Peak Hour Factor	0.92	0.92	0.82	0.96	0.78	0.92		
Growth Factor	113%	113%	113%	113%	113%	113%		
Adj. Flow (vph)	0	0	192	1377	229	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	192	1377	229	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Right	Left	Left	Left	Right		
Median Width(ft)	12			12	12			
Link Offset(ft)	0			0	0			
Crosswalk Width(ft)	16			16	16			
Two way Left Turn Lane								
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Turning Speed (mph)		9	15		15	9		
Number of Detectors			1	2	1			
Detector Template			Left	Thru	Left			
Leading Detector (ft)			20	100	20			
Trailing Detector (ft)			0	0	0			
Detector 1 Position(ft)			0	0	0			
Detector 1 Size(ft)			20	6	20			
Detector 1 Type			Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel								
Detector 1 Extend (s)			0.0	0.0	0.0			
Detector 1 Queue (s)			0.0	0.0	0.0			
Detector 1 Delay (s)			0.0	0.0	0.0			
Detector 2 Position(ft)				94				
Detector 2 Size(ft)				6				
Detector 2 Type				Cl+Ex				
Detector 2 Channel								
Detector 2 Extend (s)				0.0				
Turn Type			custom	NA	NA			
Protected Phases				6	8		2	4
Permitted Phases			1					

Alternative N: Kingwood Widening + Kingwood Grade Separation
 159: Russel Palmer & Northpark Dr.

PM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø2	ø4
Detector Phase			1	6	8			
Switch Phase								
Minimum Initial (s)			5.0	15.0	5.0		15.0	5.0
Minimum Split (s)			11.3	21.3	11.2		21.3	11.3
Total Split (s)			24.0	119.0	31.0		95.0	31.0
Total Split (%)			16.0%	79.3%	20.7%		63%	21%
Maximum Green (s)			17.7	112.7	24.8		88.7	24.7
Yellow Time (s)			4.3	4.3	3.6		4.3	4.3
All-Red Time (s)			2.0	2.0	2.6		2.0	2.0
Lost Time Adjust (s)			0.0	0.0	0.0			
Total Lost Time (s)			6.3	6.3	6.2			
Lead/Lag			Lead				Lag	
Lead-Lag Optimize?			Yes				Yes	
Vehicle Extension (s)			3.0	3.0	3.0		3.0	3.0
Recall Mode			None	C-Max	Max		C-Max	None
Act Effect Green (s)			17.6	112.7	24.8			
Actuated g/C Ratio			0.12	0.75	0.17			
v/c Ratio			0.93	0.52	0.78			
Control Delay			110.3	8.4	18.2			
Queue Delay			108.5	0.0	0.0			
Total Delay			218.8	8.4	18.2			
LOS			F	A	B			
Approach Delay				34.2	18.2			
Approach LOS				C	B			

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	25 (17%), Referenced to phase 2:EBT and 6:, Start of Green
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.23
Intersection Signal Delay:	32.1
Intersection LOS:	C
Intersection Capacity Utilization	56.9%
ICU Level of Service	B
Analysis Period (min)	15

Splits and Phases: 159: Russel Palmer & Northpark Dr.



Alternative N: Kingwood Widening + Kingwood Grade Separation
 161: Northpark Dr.

PM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕				
Volume (vph)	23	1930	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00
Frt						
Flt Protected		0.999				
Satd. Flow (prot)	0	3536	0	0	0	0
Flt Permitted		0.999				
Satd. Flow (perm)	0	3536	0	0	0	0
Link Speed (mph)		45	30		30	
Link Distance (ft)		2834	122		98	
Travel Time (s)		42.9	2.8		2.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	28	2371	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	2399	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Stop		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	109.2%
Analysis Period (min)	15
	ICU Level of Service H

Alternative N: Kingwood Widening + Kingwood Grade Separation
 162: Northpark Dr.

PM Peak Hour



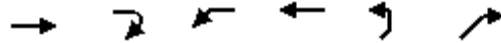
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑	↘	
Volume (vph)	0	0	0	1328	23	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt						
Flt Protected					0.950	
Satd. Flow (prot)	0	0	0	3539	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	0	0	3539	1770	0
Link Speed (mph)	45			30	30	
Link Distance (ft)	2817			144	98	
Travel Time (s)	42.7			3.3	2.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	1631	28	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1631	28	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Yield	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	51.5%
Analysis Period (min)	15
	ICU Level of Service A

Alternative N: Kingwood Widening + Kingwood Grade Separation
 163: Northpark Dr.

PM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations				↑↑		↑↑
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.88
Frt						
Flt Protected						
Satd. Flow (prot)	0	0	0	3539	0	3278
Flt Permitted						
Satd. Flow (perm)	0	0	0	3539	0	3278
Link Speed (mph)	30			45	45	
Link Distance (ft)	1138			981	4384	
Travel Time (s)	25.9			14.9	66.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			40	40	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			40	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9		15	15		9
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0% ICU Level of Service A
Analysis Period (min)	15

Alternative N: Kingwood Widening + Kingwood Grade Separation
 164: Northpark Dr.

PM Peak Hour



Lane Group	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations				↑↑		↑↑
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.88	1.00	0.95
Frt						
Flt Protected						
Satd. Flow (prot)	0	0	0	3278	0	3539
Flt Permitted						
Satd. Flow (perm)	0	0	0	3278	0	3539
Link Speed (mph)	40		40			40
Link Distance (ft)	609		2651			576
Travel Time (s)	10.4		45.2			9.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0%
Analysis Period (min)	15
	ICU Level of Service A

Lane Group	ø1	ø6
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Growth Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	1	6
Permitted Phases		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 165: Northpark Dr. & Rock Springs

PM Peak Hour

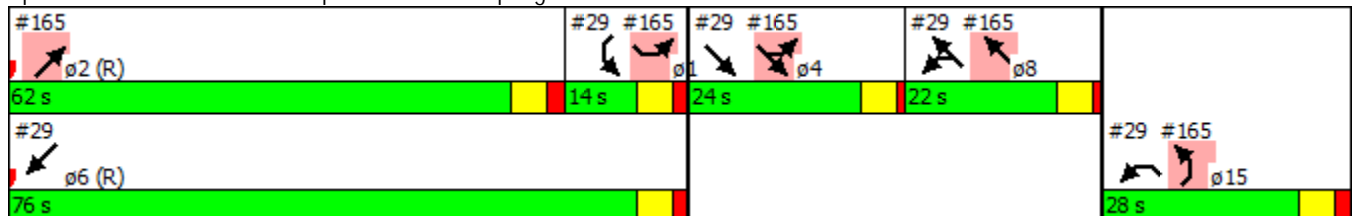


Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	1 4	4			8			15	2			
Switch Phase												
Minimum Initial (s)		5.0			5.0			5.0	4.0			
Minimum Split (s)		22.0			20.0			11.0	18.0			
Total Split (s)		24.0			22.0			28.0	62.0			
Total Split (%)		16.0%			14.7%			18.7%	41.3%			
Maximum Green (s)		19.0			17.0			22.0	56.0			
Yellow Time (s)		4.0			4.0			4.0	4.0			
All-Red Time (s)		1.0			1.0			2.0	2.0			
Lost Time Adjust (s)		0.0			0.0			0.0	0.0			
Total Lost Time (s)		5.0			5.0			6.0	6.0			
Lead/Lag		Lead			Lag			Lead				
Lead-Lag Optimize?		Yes			Yes			Yes				
Vehicle Extension (s)		3.0			3.0			3.0	3.0			
Recall Mode		None			Max			None	C-Max			
Walk Time (s)		5.0			5.0				5.0			
Flash Dont Walk (s)		11.0			10.0				7.0			
Pedestrian Calls (#/hr)		0			0				0			
Act Effct Green (s)	17.4	7.6			28.4			16.4	67.2			
Actuated g/C Ratio	0.12	0.05			0.19			0.11	0.45			
v/c Ratio	0.07	0.23			0.15			0.68	0.57			
Control Delay	20.1	31.6			41.2			81.6	33.7			
Queue Delay	0.0	0.0			0.0			0.0	0.0			
Total Delay	20.1	31.6			41.2			81.6	33.7			
LOS	C	C			D			F	C			
Approach Delay		28.7			41.2				39.9			
Approach LOS		C			D				D			

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	45 (30%), Referenced to phase 2:NET and 6:, Start of Green
Natural Cycle:	95
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	39.5
Intersection LOS:	D
Intersection Capacity Utilization	45.9%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 165: Northpark Dr. & Rock Springs



Lane Group	ø1	ø6
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	4.0
Minimum Split (s)	11.0	18.0
Total Split (s)	14.0	76.0
Total Split (%)	9%	51%
Maximum Green (s)	8.0	70.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	C-Max
Walk Time (s)		5.0
Flash Dont Walk (s)		7.0
Pedestrian Calls (#/hr)		0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 168: Kings Crossing

PM Peak Hour

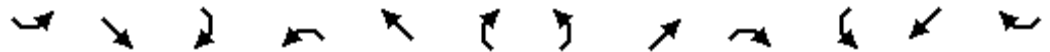


Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations					↕↕			↕↕			↕↕	
Volume (vph)	0	0	0	31	1254	273	134	64	0	0	269	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	0.95	0.95
Frt					0.974						0.976	
Flt Protected					0.999			0.968				
Satd. Flow (prot)	0	0	0	0	3444	0	0	3426	0	0	3454	0
Flt Permitted					0.999			0.968				
Satd. Flow (perm)	0	0	0	0	3444	0	0	3426	0	0	3454	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					26						12	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		963			931			270			813	
Travel Time (s)		16.4			15.9			6.1			18.5	
Peak Hour Factor	0.92	0.92	0.92	0.78	0.96	0.95	0.84	0.80	0.92	0.92	0.76	0.69
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	45	1476	325	180	90	0	0	400	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1846	0	0	270	0	0	477	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2		1	2				2
Detector Template				Left	Thru		Left	Thru				Thru
Leading Detector (ft)				20	100		20	100				100
Trailing Detector (ft)				0	0		0	0				0
Detector 1 Position(ft)				0	0		0	0				0
Detector 1 Size(ft)				20	6		20	6				6
Detector 1 Type				Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex				Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0		0.0	0.0				0.0
Detector 1 Queue (s)				0.0	0.0		0.0	0.0				0.0
Detector 1 Delay (s)				0.0	0.0		0.0	0.0				0.0
Detector 2 Position(ft)					94			94				94
Detector 2 Size(ft)					6			6				6
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type				Prot	NA		Prot	NA				NA
Protected Phases				15	2		14	4				8
Permitted Phases												
Detector Phase				15	2		14	4				8
Switch Phase												
Minimum Initial (s)				5.0	4.0			5.0				5.0

Lane Group	ø1	ø6
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Growth Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	1	6
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	4.0

Alternative N: Kingwood Widening + Kingwood Grade Separation
 168: Kings Crossing

PM Peak Hour

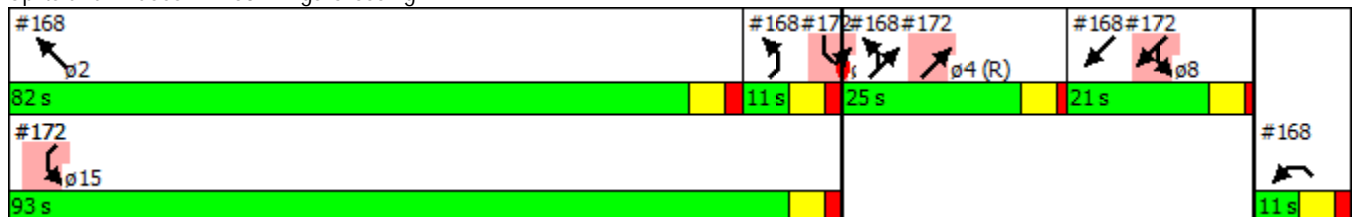


Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Minimum Split (s)				11.0	17.0			21.0			21.0	
Total Split (s)				11.0	82.0			25.0			21.0	
Total Split (%)				7.3%	54.7%			16.7%			14.0%	
Maximum Green (s)				5.0	76.0			20.0			16.0	
Yellow Time (s)				4.0	4.0			4.0			4.0	
All-Red Time (s)				2.0	2.0			1.0			1.0	
Lost Time Adjust (s)					0.0			0.0			0.0	
Total Lost Time (s)					6.0			5.0			5.0	
Lead/Lag					Lead			Lead			Lag	
Lead-Lag Optimize?					Yes			Yes			Yes	
Vehicle Extension (s)				3.0	3.0			3.0			3.0	
Recall Mode				None	Max			C-Max			None	
Walk Time (s)					4.0			5.0			4.0	
Flash Dont Walk (s)					7.0			11.0			12.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effect Green (s)					98.0			20.0			16.0	
Actuated g/C Ratio					0.65			0.13			0.11	
v/c Ratio					12.50dl			0.59			1.26	
Control Delay					344.3			24.8			186.7	
Queue Delay					0.0			0.4			4.2	
Total Delay					344.3			25.2			190.8	
LOS					F			C			F	
Approach Delay					344.3			25.2			190.8	
Approach LOS					F			C			F	

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Offset: 35 (23%), Referenced to phase 4:NETL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.81
 Intersection Signal Delay: 282.8 Intersection LOS: F
 Intersection Capacity Utilization 81.8% ICU Level of Service D
 Analysis Period (min) 15
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.









Splits and Phases: 168: Kings Crossing



Lane Group	ø1	ø6
Minimum Split (s)	11.0	17.0
Total Split (s)	11.0	93.0
Total Split (%)	7%	62%
Maximum Green (s)	5.0	87.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	Max
Walk Time (s)		4.0
Flash Dont Walk (s)		7.0
Pedestrian Calls (#/hr)		0
Act Effect Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		
















Alternative N: Kingwood Widening + Kingwood Grade Separation
 171: Lake Houston Parkway

PM Peak Hour

						
Lane Group	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	0.88
Frt						
Flt Protected						
Satd. Flow (prot)	0	3539	0	0	0	3278
Flt Permitted						
Satd. Flow (perm)	0	3539	0	0	0	3278
Link Speed (mph)		40	40		40	
Link Distance (ft)		568	1309		1311	
Travel Time (s)		9.7	22.3		22.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		120	120		120	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	0.0%			ICU Level of Service A		
Analysis Period (min)	15					

Alternative N: Kingwood Widening + Kingwood Grade Separation
 172: Kings Crossing & Lake Houston Parkway

PM Peak Hour

												
Lane Group	SBL2	SBL	SBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR	ø2
Lane Configurations												
Volume (vph)	50	1414	33	0	0	0	148	25	248	64	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	0.95	0.97	0.95	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	
Frt		0.996					0.967					
Flt Protected		0.954								0.964		
Satd. Flow (prot)	0	3434	0	0	0	0	3422	0	0	3412	0	
Flt Permitted		0.954								0.964		
Satd. Flow (perm)	0	3434	0	0	0	0	3422	0	0	3412	0	
Right Turn on Red			Yes					Yes			Yes	
Satd. Flow (RTOR)		95					20					
Link Speed (mph)		40		40			30			30		
Link Distance (ft)		934		762			472			270		
Travel Time (s)		15.9		13.0			10.7			6.1		
Peak Hour Factor	0.73	0.86	0.69	0.92	0.92	0.92	0.88	0.52	0.80	0.64	0.92	
Growth Factor	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	
Adj. Flow (vph)	77	1858	54	0	0	0	190	54	350	113	0	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1989	0	0	0	0	244	0	0	463	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(ft)		24		0			0			0		
Link Offset(ft)		0		0			0			0		
Crosswalk Width(ft)		16		16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	15	9	15	9	15		9	15		9	
Number of Detectors	1	1					2		1	2		
Detector Template	Left	Left					Thru		Left	Thru		
Leading Detector (ft)	20	20					100		20	100		
Trailing Detector (ft)	0	0					0		0	0		
Detector 1 Position(ft)	0	0					0		0	0		
Detector 1 Size(ft)	20	20					6		20	6		
Detector 1 Type	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex	Cl+Ex		
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0					0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0					0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0					0.0		0.0	0.0		
Detector 2 Position(ft)							94			94		
Detector 2 Size(ft)							6			6		
Detector 2 Type							Cl+Ex			Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)							0.0			0.0		
Turn Type	Prot	NA					NA		Prot	NA		
Protected Phases	1	6					4		15 8	8		2
Permitted Phases												
Detector Phase	1	6					4		15 8	8		
Switch Phase												
Minimum Initial (s)	5.0	4.0					5.0			5.0		4.0

Lane Group	ø15
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Growth Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	15
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0

Alternative N: Kingwood Widening + Kingwood Grade Separation
 172: Kings Crossing & Lake Houston Parkway

PM Peak Hour

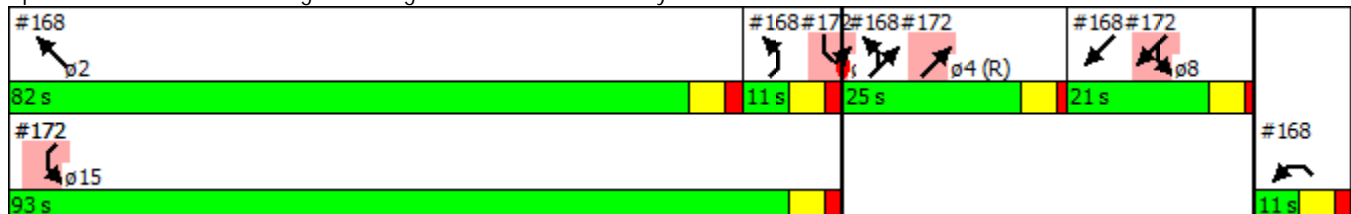


Lane Group	SBL2	SBL	SBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR	ø2
Minimum Split (s)	11.0	17.0					21.0			21.0		17.0
Total Split (s)	11.0	93.0					25.0			21.0		82.0
Total Split (%)	7.3%	62.0%					16.7%			14.0%		55%
Maximum Green (s)	5.0	87.0					20.0			16.0		76.0
Yellow Time (s)	4.0	4.0					4.0			4.0		4.0
All-Red Time (s)	2.0	2.0					1.0			1.0		2.0
Lost Time Adjust (s)		0.0					0.0			0.0		
Total Lost Time (s)		6.0					5.0			5.0		
Lead/Lag	Lag						Lead			Lag		Lead
Lead-Lag Optimize?	Yes						Yes			Yes		Yes
Vehicle Extension (s)	3.0	3.0					3.0			3.0		3.0
Recall Mode	None	Max					C-Max			None		Max
Walk Time (s)		4.0					5.0			4.0		4.0
Flash Dont Walk (s)		7.0					11.0			12.0		7.0
Pedestrian Calls (#/hr)		0					0			0		0
Act Effect Green (s)		98.0					20.0			16.0		
Actuated g/C Ratio		0.65					0.13			0.11		
v/c Ratio		1.81					0.52			1.86dl		
Control Delay		389.4					59.7			168.9		
Queue Delay		0.0					0.0			0.1		
Total Delay		389.4					59.7			169.1		
LOS		F					E			F		
Approach Delay		389.4					59.7			169.1		
Approach LOS		F					E			F		

Intersection Summary

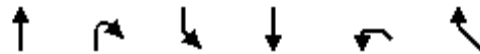
Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Offset: 35 (23%), Referenced to phase 4:NETL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.81
 Intersection Signal Delay: 321.7 Intersection LOS: F
 Intersection Capacity Utilization 82.7% ICU Level of Service E
 Analysis Period (min) 15
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 172: Kings Crossing & Lake Houston Parkway



Lane Group	ø15
Minimum Split (s)	11.0
Total Split (s)	11.0
Total Split (%)	7%
Maximum Green (s)	5.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

174:



Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations				↑↑		↑↑
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.88
Frt						
Flt Protected						
Satd. Flow (prot)	0	0	0	3539	0	3278
Flt Permitted						
Satd. Flow (perm)	0	0	0	3539	0	3278
Link Speed (mph)	40			40	30	
Link Distance (ft)	610			450	549	
Travel Time (s)	10.4			7.7	12.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	80			80	80	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9		15	15		9
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0% ICU Level of Service A
Analysis Period (min)	15

Lane Group	ø2	ø15
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Growth Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	2	15
Permitted Phases		

Alternative N: Kingwood Widening + Kingwood Grade Separation

PM Peak Hour

175: Rustic Woods

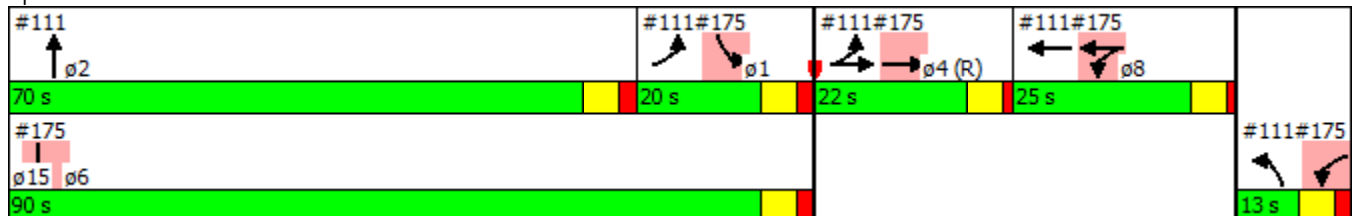


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		4		15	8					1	6	
Switch Phase												
Minimum Initial (s)		5.0			5.0					5.0	4.0	
Minimum Split (s)		21.0			25.0					20.0	21.0	
Total Split (s)		22.0			25.0					20.0	90.0	
Total Split (%)		14.7%			16.7%					13.3%	60.0%	
Maximum Green (s)		17.0			20.0					14.0	84.0	
Yellow Time (s)		4.0			4.0					4.0	4.0	
All-Red Time (s)		1.0			1.0					2.0	2.0	
Lost Time Adjust (s)		0.0			0.0					0.0	0.0	
Total Lost Time (s)		5.0			5.0					6.0	6.0	
Lead/Lag		Lead			Lag					Lag		
Lead-Lag Optimize?		Yes			Yes					Yes		
Vehicle Extension (s)		3.0			3.0					3.0	3.0	
Recall Mode		C-Max			None					None	Max	
Walk Time (s)		5.0			5.0							
Flash Dont Walk (s)		11.0			14.0							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)		17.0			33.0					12.6	84.0	
Actuated g/C Ratio		0.11			0.22					0.08	0.56	
v/c Ratio		0.49			0.36					0.46	0.67	
Control Delay		27.6			20.1					75.1	25.2	
Queue Delay		0.1			6.9					0.0	0.0	
Total Delay		27.7			27.0					75.1	25.2	
LOS		C			C					E	C	
Approach Delay		27.7			27.0						27.7	
Approach LOS		C			C						C	

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Offset: 20 (13%), Referenced to phase 4:EBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.02
 Intersection Signal Delay: 27.6
 Intersection LOS: C
 Intersection Capacity Utilization 59.1%
 ICU Level of Service B
 Analysis Period (min) 15

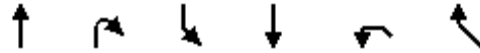
Splits and Phases: 175: Rustic Woods



Lane Group	ø2	ø15
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	5.0
Minimum Split (s)	21.0	11.0
Total Split (s)	70.0	13.0
Total Split (%)	47%	9%
Maximum Green (s)	64.0	7.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	Max	None
Walk Time (s)	5.0	
Flash Dont Walk (s)	6.0	
Pedestrian Calls (#/hr)	0	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Alternative N: Kingwood Widening + Kingwood Grade Separation
 178: Lake Houston Parkway & Lake Houston Pkwy

PM Peak Hour



Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations				↑↑		↑↑
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.88
Frt						
Flt Protected						
Satd. Flow (prot)	0	0	0	3539	0	3278
Flt Permitted						
Satd. Flow (perm)	0	0	0	3539	0	3278
Link Speed (mph)	40			40	40	
Link Distance (ft)	3424			1043	3971	
Travel Time (s)	58.4			17.8	67.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	60			60	60	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9		15	15		9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0%
Analysis Period (min)	15
	ICU Level of Service A

Alternative N: Kingwood Widening + Kingwood Grade Separation
185: Hamblen

PM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	99	8	111	123	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	150		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.990					
Flt Protected			0.950			
Satd. Flow (prot)	1844	0	1770	1863	1863	0
Flt Permitted			0.950			
Satd. Flow (perm)	1844	0	1770	1863	1863	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	123			358	309	
Travel Time (s)	2.8			8.1	7.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	122	10	136	151	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	132	0	136	151	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	20.1%
ICU Level of Service	A
Analysis Period (min)	15

Alternative N: Kingwood Widening + Kingwood Grade Separation
 188: Sorters

PM Peak Hour



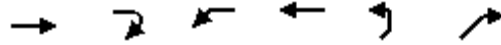
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	326	41	0	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.981			
Flt Protected						
Satd. Flow (prot)	0	0	1827	0	0	1863
Flt Permitted						
Satd. Flow (perm)	0	0	1827	0	0	1863
Link Speed (mph)	40		35			30
Link Distance (ft)	1484		5784			70
Travel Time (s)	25.3		112.7			1.6
Peak Hour Factor	0.92	0.92	0.82	0.64	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	449	72	0	200
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	521	0	0	200
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	0		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	25.5%
Analysis Period (min)	15
	ICU Level of Service A

Alternative N: Kingwood Widening + Kingwood Grade Separation
 189: Northpark Dr.

PM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations				↑↑		↑↑
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.88
Frt						
Flt Protected						
Satd. Flow (prot)	0	0	0	3539	0	3278
Flt Permitted						
Satd. Flow (perm)	0	0	0	3539	0	3278
Link Speed (mph)	40			40	40	
Link Distance (ft)	1488			3872	1484	
Travel Time (s)	25.4			66.0	25.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	113%	113%	113%	113%	113%	113%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			30	50	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9		15		9	
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0% ICU Level of Service A
Analysis Period (min)	15