

## **BACKGROUND**

HCM Signalized Intersection Capacity Analysis  
1: Livingston Street & Randolph Road

Background AM

08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑↑↑		↔	↑↑↑			↕			↕	
Traffic Volume (vph)	12	964	7	111	1551	5	7	3	42	17	21	18
Future Volume (vph)	12	964	7	111	1551	5	7	3	42	17	21	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.5			6.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			0.98			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.89			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1767	5052		1768	5055			1620			1742	
Flt Permitted	0.12	1.00		0.25	1.00			0.95			0.90	
Satd. Flow (perm)	219	5052		466	5055			1545			1591	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	13	1071	8	123	1723	6	8	3	47	19	23	20
RTOR Reduction (vph)	0	0	0	0	0	0	0	42	0	0	17	0
Lane Group Flow (vph)	13	1079	0	123	1729	0	0	16	0	0	45	0
Confl. Peds. (#/hr)	5		1	1		5	3		6	6		3
Bus Blockages (#/hr)	0	4	0	0	4	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	95.8	95.8		95.8	95.8			11.7			11.7	
Effective Green, g (s)	95.8	95.8		95.8	95.8			11.7			11.7	
Actuated g/C Ratio	0.80	0.80		0.80	0.80			0.10			0.10	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.5			6.5	
Vehicle Extension (s)	0.2	0.2		0.2	0.2			5.0			5.0	
Lane Grp Cap (vph)	174	4033		372	4035			150			155	
v/s Ratio Prot		0.21			c0.34							
v/s Ratio Perm	0.06			0.26				0.01			c0.03	
v/c Ratio	0.07	0.27		0.33	0.43			0.10			0.29	
Uniform Delay, d1	2.6	3.1		3.3	3.7			49.4			50.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.8	0.2		2.4	0.3			0.6			2.2	
Delay (s)	3.4	3.3		5.7	4.0			50.0			52.4	
Level of Service	A	A		A	A			D			D	
Approach Delay (s)		3.3			4.2			50.0			52.4	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

## 2: Georgia Avenue & Randolph Road

Background AM

08/30/2023



Movement	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR	SWR2	
Lane Configurations													
Traffic Volume (vph)	241	39	214	152	931	180	57	1782	225	740	51	137	
Future Volume (vph)	241	39	214	152	931	180	57	1782	225	740	51	137	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	12.0	12.0	12.0	7.0	9.0	9.0	7.0	9.0	9.0	12.0	12.0	12.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.88	1.00	1.00	0.97	1.00	1.00	1.00	
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	0.85	
Flt Protected	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1681	1583	3433	5085	1394	3433	5058	1535	3433	1583	1583	
Flt Permitted	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1681	1583	3433	5085	1394	3433	5058	1535	3433	1583	1583	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	248	40	221	157	960	186	59	1837	232	763	53	141	
RTOR Reduction (vph)	0	0	111	0	0	0	0	0	49	0	0	102	
Lane Group Flow (vph)	144	144	110	157	960	186	59	1837	183	763	53	39	
Confl. Peds. (#/hr)		12	2	8		26	26		8	8	26		
Bus Blockages (#/hr)	0	0	0	0	0	0	0	4	0	0	0	0	
Turn Type	Prot	Prot	pt+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	custom	
Protected Phases	4	4	4 1	1	6		5	2		3	3	3 5	
Permitted Phases						6			2			3	
Actuated Green, G (s)	22.9	22.9	48.6	13.7	67.5	67.5	9.6	63.4	63.4	40.0	40.0	49.6	
Effective Green, g (s)	22.9	22.9	48.6	13.7	67.5	67.5	9.6	63.4	63.4	40.0	40.0	49.6	
Actuated g/C Ratio	0.13	0.13	0.27	0.08	0.38	0.38	0.05	0.35	0.35	0.22	0.22	0.28	
Clearance Time (s)	12.0	12.0		7.0	9.0	9.0	7.0	9.0	9.0	12.0	12.0		
Vehicle Extension (s)	3.5	3.5		4.0	0.2	0.2	4.0	0.2	0.2	3.0	3.0		
Lane Grp Cap (vph)	225	213	427	261	1906	522	183	1781	540	762	351	436	
v/s Ratio Prot	0.08	c0.09	0.07	c0.05	c0.19		0.02	c0.36		c0.22	0.03	0.02	
v/s Ratio Perm						0.13			0.12				
v/c Ratio	0.64	0.68	0.26	0.60	0.50	0.36	0.32	1.03	0.34	1.00	0.15	0.09	
Uniform Delay, d1	74.6	75.0	51.5	80.5	43.3	40.6	82.1	58.3	42.9	70.0	56.3	48.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.83	1.33	1.59	1.00	1.00	1.00	
Incremental Delay, d2	6.4	8.5	0.4	4.5	1.0	1.9	1.1	27.6	1.4	32.9	0.2	0.1	
Delay (s)	81.0	83.5	51.9	85.0	44.3	42.5	69.0	105.5	69.4	102.9	56.5	48.5	
Level of Service	F	F	D	F	D	D	E	F	E	F	E	D	
Approach Delay (s)					48.9			100.5		92.3			
Approach LOS					D			F		F			
<b>Intersection Summary</b>													
HCM 2000 Control Delay			81.9		HCM 2000 Level of Service					F			
HCM 2000 Volume to Capacity ratio			0.93										
Actuated Cycle Length (s)			180.0		Sum of lost time (s)					40.0			
Intersection Capacity Utilization			111.0%		ICU Level of Service					H			
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 3: Glenmont Circle/Shopping Center & Randolph Road

Background AM  
 08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑			↘	↗		↘	↗
Traffic Volume (vph)	18	827	32	19	1990	30	56	9	17	42	7	46
Future Volume (vph)	18	827	32	19	1990	30	56	9	17	42	7	46
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			7.0	7.0		7.0	7.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.86			1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.96	1.00	1.00			1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		0.99	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	5085	1515	1770	6390			1785	1583		1769	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.72	1.00		0.29	1.00
Satd. Flow (perm)	1770	5085	1515	1770	6390			1340	1583		528	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	19	853	33	20	2052	31	58	9	18	43	7	47
RTOR Reduction (vph)	0	0	14	0	1	0	0	0	16	0	0	43
Lane Group Flow (vph)	19	853	19	20	2082	0	0	67	2	0	50	4
Confl. Peds. (#/hr)	5		6	6		5			12	12		
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	Prot	Perm	NA	Prot
Protected Phases	1	6		5	2			4	4		3	3
Permitted Phases			6				4			3		
Actuated Green, G (s)	4.8	87.0	87.0	4.9	87.1			19.1	19.1		13.0	13.0
Effective Green, g (s)	4.8	87.0	87.0	4.9	87.1			19.1	19.1		13.0	13.0
Actuated g/C Ratio	0.03	0.58	0.58	0.03	0.58			0.13	0.13		0.09	0.09
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			7.0	7.0		7.0	7.0
Vehicle Extension (s)	3.0	0.2	0.2	3.0	0.2			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	56	2949	878	57	3710			170	201		45	137
v/s Ratio Prot	0.01	0.17		c0.01	c0.33				0.00			0.00
v/s Ratio Perm			0.01					c0.05			c0.09	
v/c Ratio	0.34	0.29	0.02	0.35	0.56			0.39	0.01		1.11	0.03
Uniform Delay, d1	71.0	15.9	13.4	71.0	19.6			60.1	57.2		68.5	62.7
Progression Factor	1.00	1.00	1.00	1.16	0.62			1.00	1.00		1.00	1.00
Incremental Delay, d2	3.6	0.2	0.0	1.3	0.2			1.5	0.0		168.6	0.1
Delay (s)	74.6	16.1	13.4	84.0	12.3			61.6	57.2		237.1	62.8
Level of Service	E	B	B	F	B			E	E		F	E
Approach Delay (s)		17.3			13.0			60.7			152.7	
Approach LOS		B			B			E			F	

Intersection Summary		
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.58	B
Actuated Cycle Length (s)	150.0	Sum of lost time (s)
Intersection Capacity Utilization	62.9%	26.0
Analysis Period (min)	15	ICU Level of Service
		B
c Critical Lane Group		

# HCM Unsignalized Intersection Capacity Analysis

## 4: Residential Driveway & Randolph Road

Background AM  
08/30/2023



Movement	EBT	EBR	WBL	WBT	NBL	NBR			
Lane Configurations	↑↑↑			↑↑↑		↑			
Traffic Volume (veh/h)	933	2	0	2075	0	32			
Future Volume (Veh/h)	933	2	0	2075	0	32			
Sign Control	Free			Free	Stop				
Grade	0%			0%	0%				
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93			
Hourly flow rate (vph)	1003	2	0	2231	0	34			
Pedestrians						8			
Lane Width (ft)						12.0			
Walking Speed (ft/s)						3.5			
Percent Blockage						1			
Right turn flare (veh)									
Median type	None			None					
Median storage (veh)									
Upstream signal (ft)	462			470					
pX, platoon unblocked				0.92	0.63	0.92			
vC, conflicting volume				1013	1570	343			
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol				711	0	0			
tC, single (s)				4.1	6.8	6.9			
tC, 2 stage (s)									
tF (s)				2.2	3.5	3.3			
p0 queue free %				100	100	97			
cM capacity (veh/h)				807	636	990			
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1	
Volume Total	401	401	203	558	558	558	558	34	
Volume Left	0	0	0	0	0	0	0	0	
Volume Right	0	0	2	0	0	0	0	34	
cSH	1700	1700	1700	1700	1700	1700	1700	990	
Volume to Capacity	0.24	0.24	0.12	0.33	0.33	0.33	0.33	0.03	
Queue Length 95th (ft)	0	0	0	0	0	0	0	3	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	
Lane LOS								A	
Approach Delay (s)	0.0			0.0				8.8	
Approach LOS								A	
Intersection Summary									
Average Delay	0.1								
Intersection Capacity Utilization	33.4%			ICU Level of Service				A	
Analysis Period (min)	15								

# HCM Signalized Intersection Capacity Analysis

## 5: Glenallan Avenue & Randolph Road

Background AM

08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↗	↑↑↑			↑	↗	↗	↕	↘
Traffic Volume (vph)	33	844	35	2	1934	246	55	106	0	352	55	86
Future Volume (vph)	33	844	35	2	1934	246	55	106	0	352	55	86
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.5		5.5	6.5			7.0		7.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00		0.95	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98			1.00		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.95	0.98	
Satd. Flow (prot)	1770	5039		1764	4980			1831		1681	1631	
Flt Permitted	0.06	1.00		0.27	1.00			0.98		0.95	0.98	
Satd. Flow (perm)	103	5039		503	4980			1831		1681	1631	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	34	879	36	2	2015	256	57	110	0	367	57	90
RTOR Reduction (vph)	0	2	0	0	8	0	0	0	0	0	14	0
Lane Group Flow (vph)	34	913	0	2	2263	0	0	167	0	261	239	0
Confl. Peds. (#/hr)	11		17	17		11	4		12	12		4
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA	Prot	Split		NA
Protected Phases	1	6		5	2		3	3	3	4		4
Permitted Phases	6			2								
Actuated Green, G (s)	78.2	72.2		68.6	67.4			22.7		27.9	27.9	
Effective Green, g (s)	78.2	72.2		68.6	67.4			22.7		27.9	27.9	
Actuated g/C Ratio	0.52	0.48		0.46	0.45			0.15		0.19	0.19	
Clearance Time (s)	5.5	6.5		5.5	6.5			7.0		7.0	7.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	120	2425		240	2237			277		312	303	
v/s Ratio Prot	c0.01	c0.18		0.00	c0.45			c0.09		c0.16	0.15	
v/s Ratio Perm	0.14			0.00								
v/c Ratio	0.28	0.38		0.01	1.01			0.60		0.84	0.79	
Uniform Delay, d1	33.3	24.6		22.3	41.3			59.4		58.9	58.2	
Progression Factor	1.67	0.57		0.71	0.47			1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.4		0.0	18.0			3.7		17.4	12.8	
Delay (s)	57.0	14.4		15.8	37.4			63.1		76.2	71.0	
Level of Service	E	B		B	D			E		E	E	
Approach Delay (s)		16.0			37.4			63.1			73.7	
Approach LOS		B			D			E			E	

### Intersection Summary

HCM 2000 Control Delay	38.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
7: Georgia Avenue & Layhill Road

Background AM  
08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↘↗		↗		↕↕↕	↗	↘	↕↕↕	
Traffic Volume (vph)	9	7	15	922	0	30	0	869	412	53	1213	0
Future Volume (vph)	9	7	15	922	0	30	0	869	412	53	1213	0
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5	6.5	6.5		6.5		6.5	6.5	5.5	6.5	
Lane Util. Factor		1.00	1.00	0.97		1.00		0.91	1.00	1.00	0.91	
Frbp, ped/bikes		1.00	1.00	1.00		0.97		1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.97	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1812	1583	3433		1543		5085	1583	1767	5038	
Flt Permitted		0.97	1.00	0.95		1.00		1.00	1.00	0.24	1.00	
Satd. Flow (perm)		1812	1583	3433		1543		5085	1583	455	5038	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	9	7	15	931	0	30	0	878	416	54	1225	0
RTOR Reduction (vph)	0	0	15	0	0	20	0	0	49	0	0	0
Lane Group Flow (vph)	0	16	0	931	0	10	0	878	367	54	1225	0
Confl. Peds. (#/hr)	8		1	1		8	7		22	22		7
Confl. Bikes (#/hr)			1									
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	7	0
Turn Type	Split	NA	Prot	Prot		Perm		NA	Prot	pm+pt	NA	
Protected Phases	3	3	3	4				6	6	5	2	
Permitted Phases						4				2		
Actuated Green, G (s)		4.8	4.8	57.8		57.8		85.7	85.7	97.9	97.9	
Effective Green, g (s)		4.8	4.8	57.8		57.8		85.7	85.7	97.9	97.9	
Actuated g/C Ratio		0.03	0.03	0.32		0.32		0.48	0.48	0.54	0.54	
Clearance Time (s)		6.5	6.5	6.5		6.5		6.5	6.5	5.5	6.5	
Vehicle Extension (s)		3.0	3.0	5.0		5.0		0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		48	42	1102		495		2421	753	296	2740	
v/s Ratio Prot		c0.01	0.00	c0.27				0.17	c0.23	0.01	c0.24	
v/s Ratio Perm						0.01				0.09		
v/c Ratio		0.33	0.01	0.84		0.02		0.36	0.49	0.18	0.45	
Uniform Delay, d1		86.0	85.3	56.9		41.7		29.9	32.2	20.5	24.7	
Progression Factor		1.00	1.00	1.00		1.00		1.52	1.70	1.00	1.00	
Incremental Delay, d2		4.1	0.1	6.7		0.0		0.4	2.0	0.3	0.5	
Delay (s)		90.1	85.4	63.6		41.8		45.7	56.6	20.8	25.3	
Level of Service		F	F	E		D		D	E	C	C	
Approach Delay (s)		87.8			63.0			49.2			25.1	
Approach LOS		F			E			D			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			44.6								HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			180.0							25.0		
Intersection Capacity Utilization			82.1%								ICU Level of Service	E
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
10: Glenallan Avenue & Layhill Road

Background AM  
08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↖↖		↖	↖↖	↖	↖	↖↖		↖	↖	↖
Traffic Volume (vph)	62	385	28	103	850	267	19	362	49	133	302	84
Future Volume (vph)	62	385	28	103	850	267	19	362	49	133	302	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	7.0		6.5	7.0	7.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1769	5027		1767	3539	1555	1752	3468		1768	1863	1511
Flt Permitted	0.12	1.00		0.44	1.00	1.00	0.51	1.00		0.37	1.00	1.00
Satd. Flow (perm)	222	5027		815	3539	1555	944	3468		683	1863	1511
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	418	30	112	924	290	21	393	53	145	328	91
RTOR Reduction (vph)	0	7	0	0	0	200	0	9	0	0	0	55
Lane Group Flow (vph)	67	441	0	112	924	90	21	437	0	145	328	36
Confl. Peds. (#/hr)	5		8	8		5	24		5	5		24
Confl. Bikes (#/hr)			1			1						
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8		8	6			2		2
Actuated Green, G (s)	42.6	35.2		46.6	37.2	37.2	43.3	40.5		55.9	47.1	47.1
Effective Green, g (s)	42.6	35.2		46.6	37.2	37.2	43.3	40.5		55.9	47.1	47.1
Actuated g/C Ratio	0.36	0.29		0.39	0.31	0.31	0.36	0.34		0.47	0.39	0.39
Clearance Time (s)	6.5	7.0		6.5	7.0	7.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	174	1474		391	1097	482	359	1170		403	731	593
v/s Ratio Prot	c0.02	0.09		0.02	c0.26		0.00	0.13		c0.03	c0.18	
v/s Ratio Perm	0.11			0.09		0.06	0.02			0.14		0.02
v/c Ratio	0.39	0.30		0.29	0.84	0.19	0.06	0.37		0.36	0.45	0.06
Uniform Delay, d1	28.2	32.8		24.0	38.7	30.3	24.9	30.1		19.4	26.9	22.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.4	0.2		0.4	6.6	0.4	0.1	0.9		0.6	2.0	0.2
Delay (s)	29.6	33.1		24.4	45.3	30.7	24.9	31.1		19.9	28.9	22.9
Level of Service	C	C		C	D	C	C	C		B	C	C
Approach Delay (s)		32.6			40.3			30.8			25.6	
Approach LOS		C			D			C			C	

Intersection Summary		
HCM 2000 Control Delay	34.5	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.61	
Actuated Cycle Length (s)	120.0	Sum of lost time (s) 25.5
Intersection Capacity Utilization	77.4%	ICU Level of Service D
Analysis Period (min)	15	

c Critical Lane Group



HCM Unsignalized Intersection Capacity Analysis  
 12: Glenallan Avenue & Erskine Avenue

Background AM  
 08/30/2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	0	0	222	115	1
Future Volume (Veh/h)	1	0	0	222	115	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	1	0	0	288	149	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						350
pX, platoon unblocked						
vC, conflicting volume	438	150	150			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	438	150	150			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	576	897	1431			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	1	288	150			
Volume Left	1	0	0			
Volume Right	0	0	1			
cSH	576	1431	1700			
Volume to Capacity	0.00	0.00	0.09			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	11.3	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	11.3	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			21.7%	ICU Level of Service	A	
Analysis Period (min)			15			

# HCM Signalized Intersection Capacity Analysis

## 1: Livingston Street & Randolph Road

Background PM

08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↖	↑↑↑			↕			↕	
Traffic Volume (vph)	29	1571	7	79	1079	12	14	3	37	4	12	8
Future Volume (vph)	29	1571	7	79	1079	12	14	3	37	4	12	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.5			6.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.91			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1762	5054		1769	5048			1639			1747	
Flt Permitted	0.24	1.00		0.13	1.00			0.92			0.95	
Satd. Flow (perm)	444	5054		248	5048			1522			1677	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	30	1603	7	81	1101	12	14	3	38	4	12	8
RTOR Reduction (vph)	0	0	0	0	1	0	0	34	0	0	7	0
Lane Group Flow (vph)	30	1610	0	81	1112	0	0	21	0	0	17	0
Confl. Peds. (#/hr)	6		2	2		6	11		6	6		11
Bus Blockages (#/hr)	0	4	0	0	4	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	93.4	93.4		93.4	93.4			14.1			14.1	
Effective Green, g (s)	93.4	93.4		93.4	93.4			14.1			14.1	
Actuated g/C Ratio	0.78	0.78		0.78	0.78			0.12			0.12	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.5			6.5	
Vehicle Extension (s)	0.2	0.2		0.2	0.2			5.0			5.0	
Lane Grp Cap (vph)	345	3933		193	3929			178			197	
v/s Ratio Prot		0.32			0.22							
v/s Ratio Perm	0.07			c0.33				c0.01			0.01	
v/c Ratio	0.09	0.41		0.42	0.28			0.12			0.09	
Uniform Delay, d1	3.2	4.3		4.4	3.8			47.4			47.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.5	0.3		6.6	0.2			0.6			0.4	
Delay (s)	3.7	4.6		11.0	4.0			48.0			47.6	
Level of Service	A	A		B	A			D			D	
Approach Delay (s)		4.6			4.4			48.0			47.6	
Approach LOS		A			A			D			D	

### Intersection Summary

HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
2: Georgia Avenue & Randolph Road

Background PM  
08/30/2023



Movement	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR	SWR2	
Lane Configurations													
Traffic Volume (vph)	363	48	145	163	1631	354	100	1327	324	349	60	128	
Future Volume (vph)	363	48	145	163	1631	354	100	1327	324	349	60	128	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	12.0	12.0	12.0	7.0	9.0	9.0	7.0	9.0	9.0	12.0	12.0	12.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.83	1.00	1.00	0.96	1.00	1.00	1.00	
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	0.85	
Flt Protected	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1681	1583	3433	5085	1321	3433	5058	1521	3433	1583	1583	
Flt Permitted	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1681	1583	3433	5085	1321	3433	5058	1521	3433	1583	1583	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	382	51	153	172	1717	373	105	1397	341	367	63	135	
RTOR Reduction (vph)	0	0	75	0	0	0	0	0	55	0	0	108	
Lane Group Flow (vph)	218	215	78	172	1717	373	105	1397	287	367	63	27	
Confl. Peds. (#/hr)		9	6	12		38	38		12				
Bus Blockages (#/hr)	0	0	0	0	0	0	0	4	0	0	0	0	
Turn Type	Prot	Prot	pt+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	custom	
Protected Phases	4	4	4 1	1	6		5	2		3	3	3 5	
Permitted Phases						6			2			3	
Actuated Green, G (s)	29.0	29.0	56.3	15.3	74.5	74.5	11.8	71.0	71.0	24.7	24.7	36.5	
Effective Green, g (s)	29.0	29.0	56.3	15.3	74.5	74.5	11.8	71.0	71.0	24.7	24.7	36.5	
Actuated g/C Ratio	0.16	0.16	0.31	0.09	0.41	0.41	0.07	0.39	0.39	0.14	0.14	0.20	
Clearance Time (s)	12.0	12.0		7.0	9.0	9.0	7.0	9.0	9.0	12.0	12.0		
Vehicle Extension (s)	3.5	3.5		4.0	0.2	0.2	4.0	0.2	0.2	3.0	3.0		
Lane Grp Cap (vph)	285	270	495	291	2104	546	225	1995	599	471	217	320	
v/s Ratio Prot	0.12	c0.13	0.05	c0.05	c0.34		0.03	0.28		c0.11	0.04	0.02	
v/s Ratio Perm						0.28			0.19				
v/c Ratio	0.76	0.80	0.16	0.59	0.82	0.68	0.47	0.70	0.48	0.78	0.29	0.09	
Uniform Delay, d1	72.2	72.7	44.7	79.3	46.7	43.1	81.1	45.6	40.7	75.0	69.8	58.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.93	1.23	1.36	1.00	1.00	1.00	
Incremental Delay, d2	11.9	15.3	0.2	3.7	3.6	6.8	1.8	1.8	2.3	8.0	0.7	0.1	
Delay (s)	84.1	88.0	44.9	83.1	50.3	49.9	76.9	57.9	57.7	83.0	70.5	58.3	
Level of Service	F	F	D	F	D	D	E	E	E	F	E	E	
Approach Delay (s)					52.7			59.0		75.7			
Approach LOS					D			E		E			
<b>Intersection Summary</b>													
HCM 2000 Control Delay			59.9		HCM 2000 Level of Service				E				
HCM 2000 Volume to Capacity ratio			0.80										
Actuated Cycle Length (s)			180.0		Sum of lost time (s)				40.0				
Intersection Capacity Utilization			92.9%		ICU Level of Service				F				
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 3: Glenmont Circle/Shopping Center & Randolph Road

Background PM  
 08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑			↗	↗		↗	↗
Traffic Volume (vph)	34	1521	64	28	1018	75	60	19	12	77	26	100
Future Volume (vph)	34	1521	64	28	1018	75	60	19	12	77	26	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			7.0	7.0		7.0	7.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.86			1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.95	1.00	1.00			1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		0.97	1.00
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	5085	1497	1770	6318			1793	1583		1746	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.71	1.00		0.21	1.00
Satd. Flow (perm)	1770	5085	1497	1770	6318			1322	1583		372	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	35	1568	66	29	1049	77	62	20	12	79	27	103
RTOR Reduction (vph)	0	0	35	0	6	0	0	0	10	0	0	91
Lane Group Flow (vph)	35	1568	31	29	1120	0	0	82	2	0	106	12
Confl. Peds. (#/hr)	9		9	9		9	1		44	44		1
Confl. Bikes (#/hr)												1
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	Prot	Perm	NA	Prot
Protected Phases	1	6		5	2			4	4		3	3
Permitted Phases			6				4			3		
Actuated Green, G (s)	7.3	71.1	71.1	5.5	69.3			30.4	30.4		17.0	17.0
Effective Green, g (s)	7.3	71.1	71.1	5.5	69.3			30.4	30.4		17.0	17.0
Actuated g/C Ratio	0.05	0.47	0.47	0.04	0.46			0.20	0.20		0.11	0.11
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			7.0	7.0		7.0	7.0
Vehicle Extension (s)	3.0	0.2	0.2	3.0	0.2			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	86	2410	709	64	2918			267	320		42	179
v/s Ratio Prot	c0.02	c0.31		0.02	0.18				0.00			0.01
v/s Ratio Perm			0.02					c0.06			c0.29	
v/c Ratio	0.41	0.65	0.04	0.45	0.38			0.31	0.01		2.52	0.07
Uniform Delay, d1	69.2	30.0	21.2	70.8	26.4			50.8	47.8		66.5	59.4
Progression Factor	1.00	1.00	1.00	1.12	1.03			1.00	1.00		1.00	1.00
Incremental Delay, d2	3.1	1.4	0.1	4.4	0.3			0.7	0.0		750.6	0.2
Delay (s)	72.4	31.4	21.3	84.0	27.5			51.5	47.8		817.1	59.6
Level of Service	E	C	C	F	C			D	D		F	E
Approach Delay (s)		31.8			28.9			51.0			443.7	
Approach LOS		C			C			D			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			58.9			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			26.0			
Intersection Capacity Utilization			75.8%			ICU Level of Service			D			
Analysis Period (min)			15									

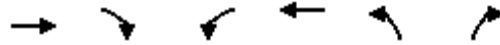
c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 4: Residential Driveway & Randolph Road

Background PM

08/30/2023



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑			↑↑↑		↑		
Traffic Volume (veh/h)	1609	14	0	1162	0	23		
Future Volume (Veh/h)	1609	14	0	1162	0	23		
Sign Control	Free			Free	Stop			
Grade	0%			0%	0%			
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93		
Hourly flow rate (vph)	1730	15	0	1249	0	25		
Pedestrians	2			1				
Lane Width (ft)	12.0			12.0				
Walking Speed (ft/s)	3.5			3.5				
Percent Blockage	0			0				
Right turn flare (veh)								
Median type	None			None				
Median storage (veh)								
Upstream signal (ft)	462			470				
pX, platoon unblocked				0.77	0.77	0.77		
vC, conflicting volume				1746	2053	585		
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol				902	1302	0		
tC, single (s)				4.1	6.8	6.9		
tC, 2 stage (s)								
tF (s)				2.2	3.5	3.3		
p0 queue free %				100	100	97		
cM capacity (veh/h)				573	116	829		
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1
Volume Total	692	692	361	312	312	312	312	25
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	15	0	0	0	0	25
cSH	1700	1700	1700	1700	1700	1700	1700	829
Volume to Capacity	0.41	0.41	0.21	0.18	0.18	0.18	0.18	0.03
Queue Length 95th (ft)	0	0	0	0	0	0	0	2
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.5
Lane LOS								A
Approach Delay (s)	0.0			0.0				9.5
Approach LOS								A
Intersection Summary								
Average Delay	0.1							
Intersection Capacity Utilization	41.4%			ICU Level of Service			A	
Analysis Period (min)	15							

# HCM Signalized Intersection Capacity Analysis

## 5: Glenallan Avenue & Randolph Road

Background PM

08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑		↖	↑↑↑			↑	↗	↖	↕	
Traffic Volume (vph)	76	1518	30	5	1067	296	31	26	5	370	25	64
Future Volume (vph)	76	1518	30	5	1067	296	31	26	5	370	25	64
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.5		5.5	6.5			7.0	7.0	7.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00	0.95	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	0.97			1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00	0.95	0.97	
Satd. Flow (prot)	1770	5068		1770	4873			1814	1583	1681	1639	
Flt Permitted	0.12	1.00		0.11	1.00			0.97	1.00	0.95	0.97	
Satd. Flow (perm)	222	5068		213	4873			1814	1583	1681	1639	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	78	1549	31	5	1089	302	32	27	5	378	26	65
RTOR Reduction (vph)	0	1	0	0	24	0	0	0	5	0	10	0
Lane Group Flow (vph)	78	1579	0	5	1367	0	0	59	0	238	221	0
Confl. Peds. (#/hr)	15		2	2		15	1		2	2		1
Confl. Bikes (#/hr)			1			1						
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA	Prot	Split	NA	
Protected Phases	1	6		5	2		3	3	3	4	4	
Permitted Phases	6			2								
Actuated Green, G (s)	90.3	83.5		77.5	76.2			12.8	12.8	26.4	26.4	
Effective Green, g (s)	90.3	83.5		77.5	76.2			12.8	12.8	26.4	26.4	
Actuated g/C Ratio	0.60	0.56		0.52	0.51			0.09	0.09	0.18	0.18	
Clearance Time (s)	5.5	6.5		5.5	6.5			7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	222	2821		123	2475			154	135	295	288	
v/s Ratio Prot	c0.02	c0.31		0.00	0.28			c0.03	0.00	c0.14	0.13	
v/s Ratio Perm	0.19			0.02								
v/c Ratio	0.35	0.56		0.04	0.55			0.38	0.00	0.81	0.77	
Uniform Delay, d1	15.9	21.4		18.6	25.2			64.9	62.8	59.4	58.9	
Progression Factor	1.03	0.29		1.18	0.87			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.6		0.1	0.8			1.6	0.0	14.8	11.6	
Delay (s)	17.0	6.8		22.2	22.7			66.5	62.8	74.2	70.5	
Level of Service	B	A		C	C			E	E	E	E	
Approach Delay (s)		7.3			22.7			66.2			72.3	
Approach LOS		A			C			E			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			22.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)				26.0		
Intersection Capacity Utilization			69.8%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 7: Georgia Avenue & Layhill Road

Background PM

08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕	↗	↖		↗		↕↕↕	↗	↖	↕↕↕		
Traffic Volume (vph)	13	18	7	600	0	48	0	1386	698	107	1229	0	
Future Volume (vph)	13	18	7	600	0	48	0	1386	698	107	1229	0	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		6.5	6.5	6.5		6.5		6.5	6.5	5.5	6.5		
Lane Util. Factor		1.00	1.00	0.97		1.00		0.91	1.00	1.00	0.91		
Frbp, ped/bikes		1.00	1.00	1.00		0.96		1.00	1.00	1.00	1.00		
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00		
Frt		1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00		
Flt Protected		0.98	1.00	0.95		1.00		1.00	1.00	0.95	1.00		
Satd. Flow (prot)		1824	1583	3433		1524		5085	1583	1769	5038		
Flt Permitted		0.98	1.00	0.95		1.00		1.00	1.00	0.11	1.00		
Satd. Flow (perm)		1824	1583	3433		1524		5085	1583	201	5038		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	14	19	7	638	0	51	0	1474	743	114	1307	0	
RTOR Reduction (vph)	0	0	7	0	0	39	0	0	50	0	0	0	
Lane Group Flow (vph)	0	33	0	638	0	12	0	1474	693	114	1307	0	
Confl. Peds. (#/hr)	15					15	8		25	25		8	
Confl. Bikes (#/hr)									1			1	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	7	0	
Turn Type	Split	NA	Prot	Prot		Perm		NA	Prot	pm+pt	NA		
Protected Phases	3	3	3	4				6	6	5	2		
Permitted Phases						4				2			
Actuated Green, G (s)		7.6	7.6	42.1		42.1		95.1	95.1	110.8	110.8		
Effective Green, g (s)		7.6	7.6	42.1		42.1		95.1	95.1	110.8	110.8		
Actuated g/C Ratio		0.04	0.04	0.23		0.23		0.53	0.53	0.62	0.62		
Clearance Time (s)		6.5	6.5	6.5		6.5		6.5	6.5	5.5	6.5		
Vehicle Extension (s)		3.0	3.0	5.0		5.0		0.2	0.2	3.0	0.2		
Lane Grp Cap (vph)		77	66	802		356		2686	836	212	3101		
v/s Ratio Prot		c0.02	0.00	c0.19				0.29	c0.44	c0.03	0.26		
v/s Ratio Perm						0.01				0.30			
v/c Ratio		0.43	0.00	0.80		0.03		0.55	0.83	0.54	0.42		
Uniform Delay, d1		84.1	82.6	64.9		53.2		28.2	35.6	19.7	18.0		
Progression Factor		1.00	1.00	1.00		1.00		1.77	1.83	1.00	1.00		
Incremental Delay, d2		3.8	0.0	6.3		0.1		0.5	6.2	2.6	0.4		
Delay (s)		87.9	82.6	71.2		53.3		50.5	71.4	22.3	18.4		
Level of Service		F	F	E		D		D	E	C	B		
Approach Delay (s)		87.0			69.9			57.5			18.7		
Approach LOS		F			E			E			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			47.1									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.78										
Actuated Cycle Length (s)			180.0									Sum of lost time (s)	25.0
Intersection Capacity Utilization			74.7%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
10: Glenallan Avenue & Layhill Road

Background PM  
08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↗↗↗		↗	↗↗	↗	↗	↗↗		↗	↗	↗
Traffic Volume (vph)	126	703	50	78	470	127	28	305	72	189	337	139
Future Volume (vph)	126	703	50	78	470	127	28	305	72	189	337	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	7.0		6.5	7.0	7.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1767	5027		1768	3539	1547	1758	3426		1768	1863	1529
Flt Permitted	0.30	1.00		0.27	1.00	1.00	0.51	1.00		0.41	1.00	1.00
Satd. Flow (perm)	564	5027		512	3539	1547	949	3426		759	1863	1529
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	131	732	52	81	490	132	29	318	75	197	351	145
RTOR Reduction (vph)	0	8	0	0	0	100	0	14	0	0	0	85
Lane Group Flow (vph)	131	776	0	81	490	32	29	379	0	197	351	60
Confl. Peds. (#/hr)	11		11	11		11	16		4	4		16
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8		8	6			2		2
Actuated Green, G (s)	44.3	33.0		36.9	29.3	29.3	45.7	41.4		59.9	49.6	49.6
Effective Green, g (s)	44.3	33.0		36.9	29.3	29.3	45.7	41.4		59.9	49.6	49.6
Actuated g/C Ratio	0.37	0.28		0.31	0.24	0.24	0.38	0.34		0.50	0.41	0.41
Clearance Time (s)	6.5	7.0		6.5	7.0	7.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	321	1382		236	864	377	390	1181		483	770	631
v/s Ratio Prot	c0.04	c0.15		0.02	0.14		0.00	0.11		c0.04	c0.19	
v/s Ratio Perm	0.11			0.08		0.02	0.03			0.16		0.04
v/c Ratio	0.41	0.56		0.34	0.57	0.09	0.07	0.32		0.41	0.46	0.09
Uniform Delay, d1	26.5	37.3		30.3	39.8	35.0	23.4	28.9		17.5	25.4	21.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.8	0.9		0.9	1.4	0.2	0.1	0.7		0.6	1.9	0.3
Delay (s)	27.3	38.2		31.2	41.2	35.2	23.5	29.7		18.0	27.4	21.8
Level of Service	C	D		C	D	D	C	C		B	C	C
Approach Delay (s)		36.6			38.9			29.2			23.6	
Approach LOS		D			D			C			C	

Intersection Summary		
HCM 2000 Control Delay	32.8	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.52	
Actuated Cycle Length (s)	120.0	Sum of lost time (s) 25.5
Intersection Capacity Utilization	77.7%	ICU Level of Service D
Analysis Period (min)	15	
c Critical Lane Group		



HCM Unsignalized Intersection Capacity Analysis  
 12: Glenallan Avenue & Erskine Avenue

Background PM  
 08/30/2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	0	0	100	120	1
Future Volume (Veh/h)	2	0	0	100	120	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	3	0	0	130	156	1
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						350
pX, platoon unblocked						
vC, conflicting volume	286	156	157			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	286	156	157			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	704	889	1423			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	3	130	157			
Volume Left	3	0	0			
Volume Right	0	0	1			
cSH	704	1423	1700			
Volume to Capacity	0.00	0.00	0.09			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	10.1	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	10.1	0.0	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization			16.4%	ICU Level of Service	A	
Analysis Period (min)			15			

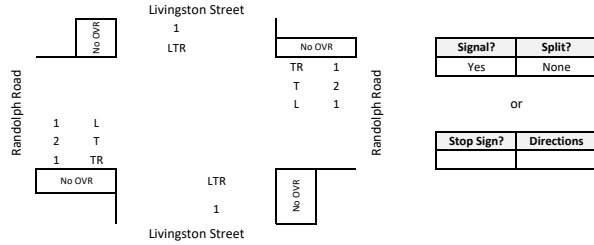
**1**  
Critical Lane Volume  
and  
Level of Service Calculations

Intersection: 01. Randolph Road / Livingston Street

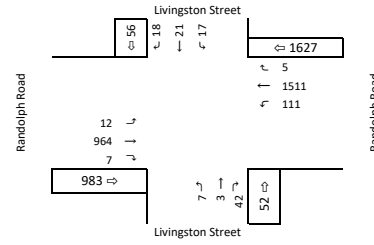
Jurisdiction: Montgomery County, MD  
Scenario/Design Year: Background Conditions  
Computed by: W+A



Intersection Lane Use & Traffic Control

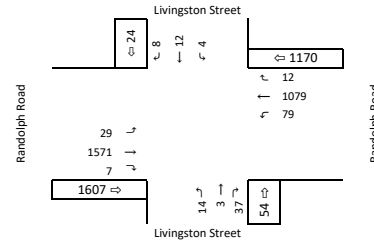


AM Peak Hour Critical Lane Volume Analysis



Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	971		0.37	359	111	1.00	111	470	
	L	12		1.00	12				123	
WB	TR	1516		0.37	561	12	1.00	12	573	*
	L	111		1.00	111				123	
NB	LTR	52		1.00	52	17	1.00	17	69	*
					0				17	
SB	LTR	56		1.00	56	7	1.00	7	63	
					0				7	
Note:									CLV	642
Congestion Equiv.									v/c	0.357
										1800

PM Peak Hour Critical Lane Volume Analysis



Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	1578		0.37	584	79	1.00	79	663	*
	L	29		1.00	29				108	
WB	TR	1091		0.37	404	29	1.00	29	433	
	L	79		1.00	79				108	
NB	LTR	54		1.00	54	4	1.00	4	58	*
					0				4	
SB	LTR	24		1.00	24	14	1.00	14	38	
					0				14	
Note:									CLV	721
Congestion Equiv.									v/c	0.401
										1800

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a		n/a	0	0	
Westbound	No	n/a	n/a		n/a	n/a		n/a	0	0	
Northbound	No	n/a	n/a		n/a	n/a		n/a	0	0	
Southbound	No	n/a	n/a		n/a	n/a		n/a	0	0	

Montgomery County LATR

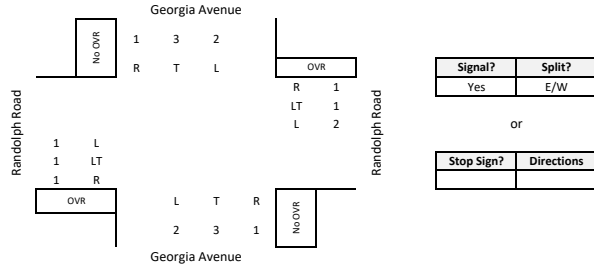
Number of Lanes	Lane Use Factors	
	Left Turn LUF	Through LUF
1	1	1.00
2	0.53	0.53
3	0.37	0.37
4		0.30
5		0.25

**2**  
Critical Lane Volume  
and  
Level of Service Calculations

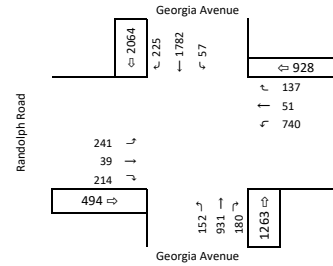
Intersection: **02. Georgia Avenue / Randolph Road**  
Jurisdiction: **Montgomery County, MD**  
Scenario/Design Year: **Background Conditions**  
Computed by: **W+A**



**Intersection Lane Use & Traffic Control**

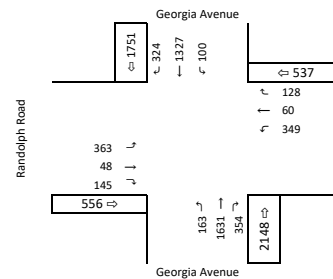


**AM Peak Hour Critical Lane Volume Analysis**



Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT	280		0.37	104			0	104	*
	R	214	81	1.00	133				133	*
WB	LT	791		0.37	293			0	293	*
	R	137	30	1.00	107				107	*
NB	T	931		0.37	344	57	0.53	30	374	*
	R	180	0	1.00	180				210	*
SB	T	1782		0.37	659	152	0.53	81	740	*
	R	225	0	1.00	225				306	*
Note:									CLV	1166
Congestion Equiv.									v/c	0.648
										1800

**PM Peak Hour Critical Lane Volume Analysis**



Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT	411		0.37	152			0	152	*
	R	145	86	1.00	59				59	*
WB	LT	409		0.37	151			0	151	*
	R	128	53	1.00	75				75	*
NB	T	1631		0.37	603	100	0.53	53	656	*
	R	354	0	1.00	354				407	*
SB	T	1327		0.37	491				577	*
	R	324	0	1.00	324	163	0.53	86	410	*
Note:									CLV	959
Congestion Equiv.									v/c	0.533
										1800

**Right Turn Overlap**

Approach	Excl. Right	Right Vol.			Adjacent Overlap Vol.			Overlap	
		AM	PM	LUF	AM	PM	LUF	AM	PM
Eastbound	Yes	214	145	1.00	152	163	0.53	81	86
Westbound	Yes	137	128	1.00	57	100	0.53	30	53
Northbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0
Southbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0

**Montgomery County LATR**

Number of Lanes	Lane Use Factors	
	Left Turn LUF	Through LUF
1	1	1.00
2	0.53	0.53
3	0.37	0.37
4		0.30
5		0.25

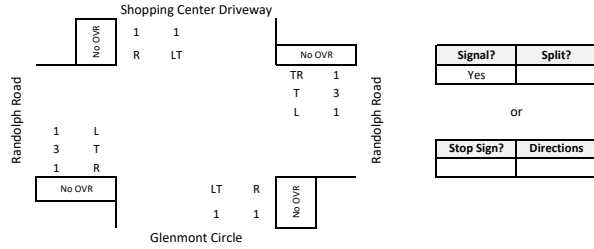
### 3 Critical Lane Volume and Level of Service Calculations

Intersection: 03. Randolph Road / Glenmont Circle

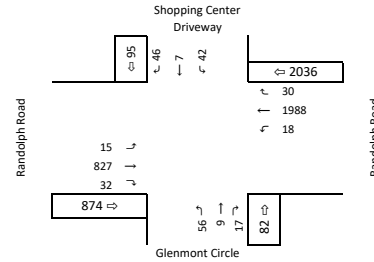
Jurisdiction: Montgomery County, MD  
 Scenario/Design Year: Background Conditions  
 Computed by: W+A



#### Intersection Lane Use & Traffic Control

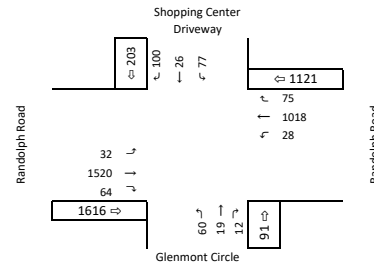


#### AM Peak Hour Critical Lane Volume Analysis



Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT	842		0.30	253				271	
	R	32		1.00	32	18	1.00	18	50	
WB	TR	2018		0.30	605	15	1.00	15	620	*
	L	18		1.00	18				33	
NB	LT	65		1.00	65	42	1.00	42	107	*
	R	17		1.00	17				59	
SB	LT	49		1.00	49	56	1.00	56	105	
	R	46		1.00	46				102	
Note:									CLV v/c	727 / 0.404
					Congestion Equiv.				1800	

#### PM Peak Hour Critical Lane Volume Analysis



Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT	1552		0.30	466	28	1.00	28	494	*
	R	64		1.00	64				92	
WB	TR	1093		0.30	328	32	1.00	32	360	
	L	28		1.00	28				60	
NB	LT	79		1.00	79	77	1.00	77	156	
	R	12		1.00	12				89	
SB	LT	103		1.00	103	60	1.00	60	163	*
	R	100		1.00	100				160	
Note:									CLV v/c	657 / 0.365
					Congestion Equiv.				1800	

#### Right Turn Overlap

Approach	Excl. Right	Right Vol.			Adjacent Overlap Vol.			Overlap	
		AM	PM	LUF	AM	PM	LUF	AM	PM
Eastbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0
Westbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0
Northbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0
Southbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0

#### Montgomery County LATR

	Lane Use Factors		
	Number of Lanes	Left Turn LUF	Through LUF
1	1	1.00	
2	0.53	0.53	
3	0.37	0.37	
4		0.30	
5		0.25	

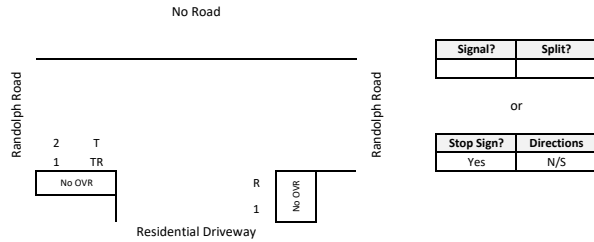
**4**  
Critical Lane Volume  
and  
Level of Service Calculations

Intersection: **04. Randolph Road / Residential Driveway**

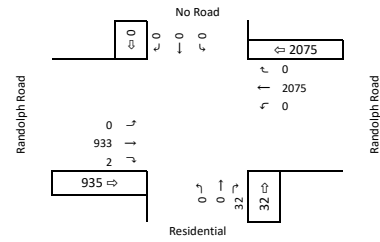
Jurisdiction: Montgomery County, MD  
Scenario/Design Year: Background Conditions  
Computed by: W+A



**Intersection Lane Use & Traffic Control**

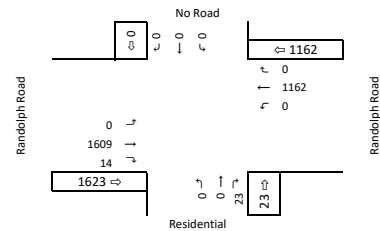


**AM Peak Hour Critical Lane Volume Analysis**



Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	935		0.37	346	0		0	346	*
WB					0	0		0	0	
NB	R	32		1.00	32	0		0	32	*
SB					0	0		0	0	
Note:									CLV	378
Congestion Equiv.									v/c	0.210
										1800

**PM Peak Hour Critical Lane Volume Analysis**



Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	1623		0.37	601	0		0	601	*
WB					0	0		0	0	
NB	R	23		1.00	23	0		0	23	*
SB					0	0		0	0	
Note:									CLV	624
Congestion Equiv.									v/c	0.347
										1800

**Right Turn Overlap**

Approach	Excl. Right	Right Vol.			Adjacent Overlap Vol.			Overlap		
		AM	PM	LUF	AM	PM	LUF	AM	PM	LUF
Eastbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	0
Westbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	0
Northbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	0
Southbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	0

**Montgomery County LATR**

Number of Lanes	Lane Use Factors	
	Left Turn LUF	Through LUF
1	1	1.00
2	0.53	0.53
3	0.37	0.37
4		0.30
5		0.25

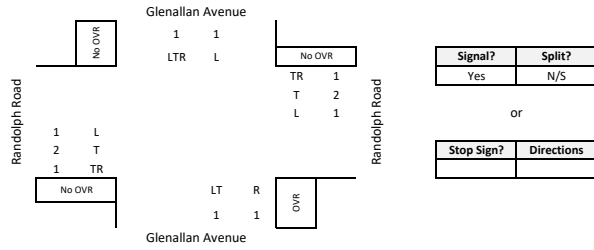
**5**  
**Critical Lane Volume and Level of Service Calculations**

Intersection: **05. Randolph Road / Glenallan Avenue**

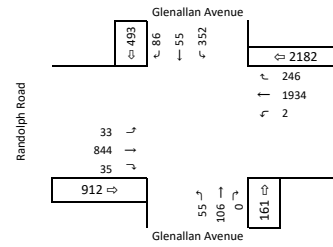
Jurisdiction: **Montgomery County, MD**  
 Scenario/Design Year: **Background Conditions**  
 Computed by: **W+A**



**Intersection Lane Use & Traffic Control**

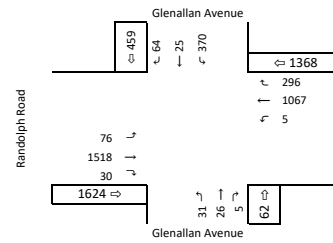


**AM Peak Hour Critical Lane Volume Analysis**



Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	879	0	0.37	325	2	1.00	2	327	
	L	33	0	1.00	33				35	
WB	TR	2180	0	0.37	807	33	1.00	33	840	*
	L	2	0	1.00	2				35	
NB	LT	161	0	1.00	161	0	0.53	187	348	*
	R	0	0	1.00	0	352			187	
SB	LTR	493	0	0.53	261	55	1.00	55	316	*
	L	352	0	1.00	352				407	*
<b>Note:</b>									<b>CLV</b>	<b>1595</b>
					<b>Congestion Equiv.</b>					
					<b>1800</b>					
									<b>v/c</b>	<b>0.886</b>

**PM Peak Hour Critical Lane Volume Analysis**



Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	1548	0	0.37	573	5	1.00	5	578	
	L	76	0	1.00	76				81	
WB	TR	1363	0	0.37	504	76	1.00	76	580	*
	L	5	0	1.00	5				81	
NB	LT	57	0	1.00	57	0	0.53	196	253	*
	R	5	5	1.00	0	370			196	
SB	LTR	459	0	0.53	243	31	1.00	31	274	*
	L	370	0	1.00	370				401	*
<b>Note:</b>									<b>CLV</b>	<b>1234</b>
					<b>Congestion Equiv.</b>					
					<b>1800</b>					
									<b>v/c</b>	<b>0.686</b>

**Right Turn Overlap**

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM	LUF	AM	PM	LUF	AM	PM		
Eastbound	No	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	0	
Westbound	No	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	0	
Northbound	Yes	0	5	1.00	2	5	1.00	0	5	5	
Southbound	No	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	0	

**Montgomery County LATR**

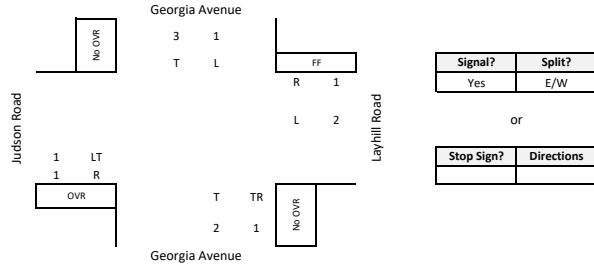
Number of Lanes	Lane Use Factors	
	Left Turn LUF	Through LUF
1	1	1.00
2	0.53	0.53
3	0.37	0.37
4	0.30	0.30
5	0.25	0.25

**7**  
Critical Lane Volume  
and  
Level of Service Calculations

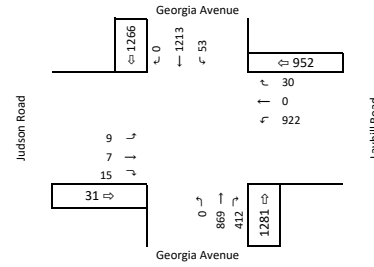
Intersection: **07. Georgia Avenue / Layhill Road**  
Jurisdiction: **Montgomery County, MD**  
Scenario/Design Year: **Background Conditions**  
Computed by: **W+A**



**Intersection Lane Use & Traffic Control**

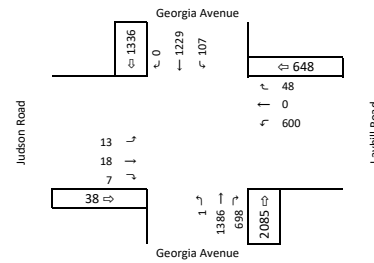


**AM Peak Hour Critical Lane Volume Analysis**



Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT	16		1.00	16	922	0.53	489	505	*
WB	R	15	0	1.00	15	9	1.00	9	504	*
WB	L	922		0.53	489	0	1.00	9	498	*
NB	TR	1281		0.37	474	53	1.00	53	527	*
SB	T	0	0	0.37	0	0	1.00	0	53	
SB	L	1213		0.37	449	0	1.00	0	449	
SB	R	53	0	1.00	53	0	1.00	0	53	
Note:									CLV	1530
Congestion Equiv.									v/c	0.850
										1800

**PM Peak Hour Critical Lane Volume Analysis**



Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT	31		1.00	31	600	0.53	318	349	*
WB	R	7	0	1.00	7	13	1.00	13	325	*
WB	L	600		0.53	318	48	1.00	48	331	*
NB	TR	48	0	1.00	48	107	1.00	107	61	*
NB	TR	2084		0.37	771	0	1.00	107	878	*
SB	T	0	0	0.37	0	1	1.00	1	107	
SB	L	1229		0.37	455	0	1.00	1	456	
SB	R	107	0	1.00	107	0	1.00	1	108	
Note:									CLV	1558
Congestion Equiv.									v/c	0.866
										1800

**Right Turn Overlap**

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM	LUF	AM	PM	LUF	AM	PM		
Eastbound	Yes	15	7	1.00	0	1	0.00	0	0		
Westbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0		
Northbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0		
Southbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0		

**Montgomery County LATR**

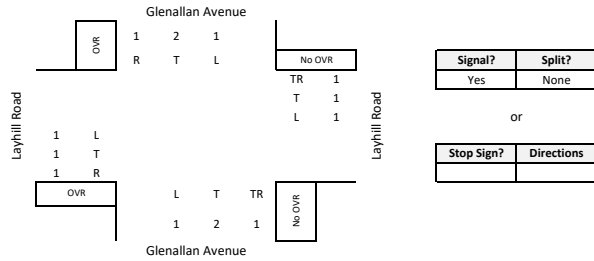
Number of Lanes	Lane Use Factors	
	Left Turn LUF	Through LUF
1	1	1.00
2	0.53	0.53
3	0.37	0.37
4		0.30
5		0.25

**10**  
Critical Lane Volume  
and  
Level of Service Calculations

Intersection: 10. Layhill Road / Glenallan Avenue  
Jurisdiction: Montgomery County, MD  
Scenario/Design Year: Background Conditions  
Computed by: W+A



**Intersection Lane Use & Traffic Control**



**AM Peak Hour Critical Lane Volume Analysis**

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T	385		1.00	385				488	
	R	28	19	1.00	9	103	1.00	103	112	
WB	TR	1117		0.53	592				654	*
	L	103	0	1.00	103	62	1.00	62	165	
NB	TR	415		0.37	154				288	*
	L	19	0	1.00	19	134	1.00	134	153	
SB	T	316		0.53	167				186	
	L	134	62	1.00	72	19	1.00	19	91	
Note:									CLV	942
Congestion Equiv.									v/c	0.523
										1800

**PM Peak Hour Critical Lane Volume Analysis**

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T	703		1.00	703				781	*
	R	50	0	1.00	50	78	1.00	78	128	
WB	TR	597		0.53	316				442	
	L	78	0	1.00	78	126	1.00	126	204	
NB	TR	377		0.37	139				328	*
	L	28	0	1.00	28	189	1.00	189	217	
SB	T	337		0.53	179				207	
	L	189	0	1.00	189	28	1.00	28	217	
Note:									CLV	1109
Congestion Equiv.									v/c	0.616
										1800

**Right Turn Overlap**

Approach	Excl. Right	Right Vol.			Adjacent Overlap Vol.				Overlap	
		AM	PM	LUF	AM	PM	LUF	AM	PM	
Eastbound	Yes	28	50	1.00	19	28	1.00	19	28	
Westbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	
Northbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	
Southbound	Yes	96	139	1.00	62	126	1.00	62	126	

**Montgomery County LATR**

Number of Lanes	Lane Use Factors	
	Left Turn LUF	Through LUF
1	1	1.00
2	0.53	0.53
3	0.37	0.37
4		0.30
5		0.25

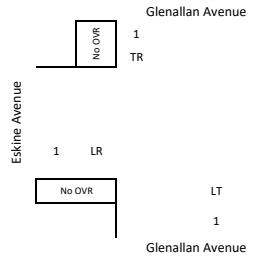


**12**  
**Critical Lane Volume**  
**and**  
**Level of Service Calculations**

Intersection: **12. Glenallan Avenue / Eskine Avenue**  
 Jurisdiction: **Montgomery County, MD**  
 Scenario/Design Year: **Background Conditions**  
 Computed by: **W+A**



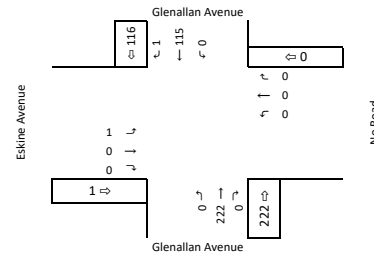
**Intersection Lane Use & Traffic Control**



Signal?	Split?

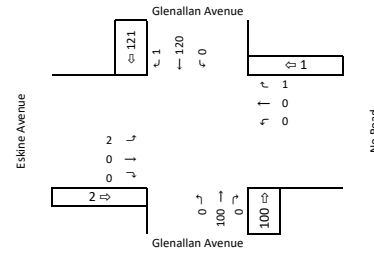
Stop Sign?	Directions
Yes	E/W

**AM Peak Hour Critical Lane Volume Analysis**



Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LR	1		1.00	1			0	1	*
WB					0			0	0	
NB	LT	222		1.00	222			0	222	*
SB	TR	116		1.00	116	0	1.00	0	116	
Note:									CLV	223
Congestion Equiv.									v/c	0.139
1600										

**PM Peak Hour Critical Lane Volume Analysis**



Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LR	2		1.00	2			0	2	*
WB					0			0	0	
NB	LT	100		1.00	100			0	100	
SB	TR	121		1.00	121	0	1.00	0	121	*
Note:									CLV	123
Congestion Equiv.									v/c	0.077
1600										

**Right Turn Overlap**

Approach	Esk. Right	Right Vol.			Adjacent Overlap Vol.			Overlap	
		AM	PM	LUF	AM	PM	LUF	AM	PM
Eastbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0
Westbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0
Northbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0
Southbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0

**Montgomery County LATR**

	Lane Use Factors	
	Number of Lanes	Through LUF
1	1	1.00
2	0.53	0.53
3	0.37	0.37
4		0.30
5		0.25