



## **APPENDIX A**

### **Existing Synchro and SimTraffic Reports**

# HCM Unsignalized Intersection Capacity Analysis

## 1: Golding St & Whitewood Ave

09/08/2023

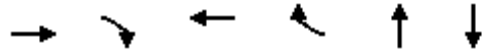


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↘	↙
Traffic Volume (veh/h)	327	16	16	225	16	30
Future Volume (Veh/h)	327	16	16	225	16	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	376	18	18	259	18	34
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	336					
pX, platoon unblocked						
vC, conflicting volume			394		680	385
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			394		680	385
tC, single (s)			4.2		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.4
p0 queue free %			98		96	95
cM capacity (veh/h)			1138		413	652
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	394	277	52			
Volume Left	0	18	18			
Volume Right	18	0	34			
cSH	1700	1138	543			
Volume to Capacity	0.23	0.02	0.10			
Queue Length 95th (m)	0.0	0.4	2.4			
Control Delay (s)	0.0	0.7	12.3			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.7	12.3			
Approach LOS			B			
<b>Intersection Summary</b>						
Average Delay			1.1			
Intersection Capacity Utilization			35.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Queues

2: Edith St/Parking Entrance & Whitewood Ave

09/08/2023



Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	333	15	216	64	80	68
v/c Ratio	0.32	0.01	0.20	0.06	0.22	0.22
Control Delay	7.2	0.0	6.4	2.3	12.4	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	0.0	6.4	2.3	12.4	14.5
Queue Length 50th (m)	14.8	0.0	8.7	0.0	3.2	3.4
Queue Length 95th (m)	27.0	0.1	17.0	3.4	11.0	10.9
Internal Link Dist (m)	312.0		313.1		280.6	74.2
Turn Bay Length (m)		45.0		45.0		
Base Capacity (vph)	1100	1103	1104	1168	792	701
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.01	0.20	0.05	0.10	0.10

Intersection Summary

# HCM Signalized Intersection Capacity Analysis

## 2: Edith St/Parking Entrance & Whitewood Ave

09/08/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		↕	↗		↕	↗		↕↗			↕↗			
Traffic Volume (vph)	15	272	13	9	177	55	25	23	21	38	13	8		
Future Volume (vph)	15	272	13	9	177	55	25	23	21	38	13	8		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)		6.2	6.2		6.2	6.2		6.2			6.2			
Lane Util. Factor		1.00	1.00		1.00	1.00		1.00			1.00			
Frt		1.00	0.85		1.00	0.85		0.96			0.98			
Flt Protected		1.00	1.00		1.00	1.00		0.98			0.97			
Satd. Flow (prot)		1557	1512		1561	1601		1664			1649			
Flt Permitted		0.98	1.00		0.98	1.00		0.85			0.76			
Satd. Flow (perm)		1532	1512		1536	1601		1444			1288			
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86		
Adj. Flow (vph)	17	316	15	10	206	64	29	27	24	44	15	9		
RTOR Reduction (vph)	0	0	6	0	0	26	0	21	0	0	8	0		
Lane Group Flow (vph)	0	333	9	0	216	38	0	59	0	0	60	0		
Heavy Vehicles (%)	7%	11%	8%	0%	11%	2%	16%	0%	10%	14%	8%	0%		
Parking (#/hr)		0			0									
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA			
Protected Phases		2			6			8				4		
Permitted Phases	2		2	6		6	8			4				
Actuated Green, G (s)		26.8	26.8		26.8	26.8		5.9			5.9			
Effective Green, g (s)		26.8	26.8		26.8	26.8		5.9			5.9			
Actuated g/C Ratio		0.59	0.59		0.59	0.59		0.13			0.13			
Clearance Time (s)		6.2	6.2		6.2	6.2		6.2			6.2			
Vehicle Extension (s)		5.0	5.0		5.0	5.0		2.5			2.5			
Lane Grp Cap (vph)		910	898		912	951		188			168			
v/s Ratio Prot														
v/s Ratio Perm		c0.22	0.01		0.14	0.02		0.04			c0.05			
v/c Ratio		0.37	0.01		0.24	0.04		0.31			0.36			
Uniform Delay, d1		4.7	3.7		4.3	3.8		17.8			17.9			
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00			
Incremental Delay, d2		0.5	0.0		0.3	0.0		0.7			1.0			
Delay (s)		5.3	3.7		4.6	3.8		18.5			18.8			
Level of Service		A	A		A	A		B			B			
Approach Delay (s)		5.2			4.4			18.5			18.8			
Approach LOS		A			A			B			B			
<b>Intersection Summary</b>														
HCM 2000 Control Delay			7.5									HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio			0.36											
Actuated Cycle Length (s)			45.1								12.4			
Intersection Capacity Utilization			57.2%										ICU Level of Service	B
Analysis Period (min)			15											

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 3: John ST & Whitewood Ave

09/08/2023

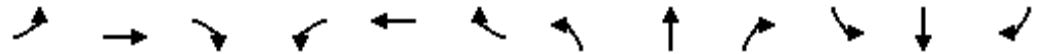


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	15	260	4	4	231	8	4	0	5	11	4	15
Future Volume (Veh/h)	15	260	4	4	231	8	4	0	5	11	4	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	17	295	5	5	262	9	5	0	6	12	5	17
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		337			245							
pX, platoon unblocked												
vC, conflicting volume	271			300			628	612	298	614	610	266
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	271			300			628	612	298	614	610	266
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.2	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.6	4.0	3.4
p0 queue free %	99			100			99	100	99	97	99	98
cM capacity (veh/h)	1264			1273			381	403	747	384	405	744
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	317	276	11	34								
Volume Left	17	5	5	12								
Volume Right	5	9	6	17								
cSH	1264	1273	520	512								
Volume to Capacity	0.01	0.00	0.02	0.07								
Queue Length 95th (m)	0.3	0.1	0.5	1.6								
Control Delay (s)	0.5	0.2	12.1	12.5								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.5	0.2	12.1	12.5								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.2									
Intersection Capacity Utilization			32.3%		ICU Level of Service				A			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 4: Mary St & Whitewood Ave

09/08/2023

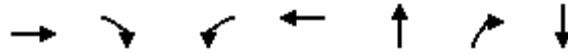


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	23	248	8	4	247	8	2	3	2	8	4	10
Future Volume (Veh/h)	23	248	8	4	247	8	2	3	2	8	4	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	29	310	10	5	309	10	2	4	2	10	5	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					126							
pX, platoon unblocked	0.93						0.93	0.93		0.93	0.93	0.93
vC, conflicting volume	319			320			712	702	315	701	702	314
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	232			320			654	643	315	642	643	227
tC, single (s)	4.3			4.1			7.1	6.5	6.2	7.1	7.2	6.3
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.3	3.5	4.7	3.4
p0 queue free %	98			100			99	99	100	97	98	98
cM capacity (veh/h)	1161			1251			339	357	730	351	281	739
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	349	324	8	27								
Volume Left	29	5	2	10								
Volume Right	10	10	2	12								
cSH	1161	1251	403	432								
Volume to Capacity	0.02	0.00	0.02	0.06								
Queue Length 95th (m)	0.6	0.1	0.5	1.5								
Control Delay (s)	0.9	0.2	14.1	13.9								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.9	0.2	14.1	13.9								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.2									
Intersection Capacity Utilization			36.9%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

5: Paget St #1 & Whitewood Ave

09/08/2023



Lane Group	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	258	38	119	260	87	176	64
v/c Ratio	0.34	0.05	0.36	0.33	0.18	0.27	0.14
Control Delay	12.9	3.7	15.4	12.4	18.1	4.2	16.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.9	3.7	15.4	12.4	18.1	4.2	16.4
Queue Length 50th (m)	20.7	0.0	9.7	20.2	8.4	0.0	5.5
Queue Length 95th (m)	34.7	3.9	21.0	33.9	17.5	10.9	13.0
Internal Link Dist (m)	101.5			191.0	51.6		138.0
Turn Bay Length (m)		40.0					
Base Capacity (vph)	762	741	331	793	475	648	450
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.05	0.36	0.33	0.18	0.27	0.14

Intersection Summary

# HCM Signalized Intersection Capacity Analysis

## 5: Paget St #1 & Whitewood Ave

09/08/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕	↗	↖	↗	↖		↕	↗		↕		
Traffic Volume (vph)	9	218	33	105	215	14	39	38	155	30	21	5	
Future Volume (vph)	9	218	33	105	215	14	39	38	155	30	21	5	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.5	5.5	5.5	5.5			5.5	5.5		5.5		
Lane Util. Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00		
Frt		1.00	0.85	1.00	0.99			1.00	0.85		0.99		
Flt Protected		1.00	1.00	0.95	1.00			0.98	1.00		0.97		
Satd. Flow (prot)		1541	1445	1074	1580			1539	1512		1450		
Flt Permitted		0.99	1.00	0.59	1.00			0.85	1.00		0.85		
Satd. Flow (perm)		1524	1445	664	1580			1346	1512		1265		
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	
Adj. Flow (vph)	10	248	38	119	244	16	44	43	176	34	24	6	
RTOR Reduction (vph)	0	0	19	0	3	0	0	0	114	0	4	0	
Lane Group Flow (vph)	0	258	19	119	257	0	0	87	62	0	60	0	
Heavy Vehicles (%)	12%	12%	13%	70%	9%	0%	13%	6%	8%	17%	10%	20%	
Parking (#/hr)		0			0			0			0		
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA	Perm	Perm	NA		
Protected Phases		2			6			8			4		
Permitted Phases	2		2	6			8		8	4			
Actuated Green, G (s)		37.5	37.5	37.5	37.5			26.5	26.5		26.5		
Effective Green, g (s)		37.5	37.5	37.5	37.5			26.5	26.5		26.5		
Actuated g/C Ratio		0.50	0.50	0.50	0.50			0.35	0.35		0.35		
Clearance Time (s)		5.5	5.5	5.5	5.5			5.5	5.5		5.5		
Lane Grp Cap (vph)		762	722	332	790			475	534		446		
v/s Ratio Prot					0.16								
v/s Ratio Perm		0.17	0.01	c0.18				c0.06	0.04		0.05		
v/c Ratio		0.34	0.03	0.36	0.33			0.18	0.12		0.13		
Uniform Delay, d1		11.3	9.5	11.4	11.2			16.8	16.4		16.5		
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00		
Incremental Delay, d2		1.2	0.1	3.0	1.1			0.8	0.4		0.6		
Delay (s)		12.5	9.6	14.4	12.3			17.6	16.8		17.1		
Level of Service		B	A	B	B			B	B		B		
Approach Delay (s)		12.1			13.0			17.1			17.1		
Approach LOS		B			B			B			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			14.1									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.29										
Actuated Cycle Length (s)			75.0									Sum of lost time (s)	11.0
Intersection Capacity Utilization			70.4%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													



Queues

6: Armstrong St & Whitewood Ave

09/08/2023



Lane Group	EBL	EBT	WBT	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	304	80	76	44	3	77	300
v/c Ratio	0.44	0.09	0.08	0.11	0.01	0.17	0.48
Control Delay	11.5	5.5	6.6	21.6	0.0	22.2	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	5.5	6.6	21.6	0.0	22.2	5.8
Queue Length 50th (m)	22.4	3.1	3.7	4.7	0.0	8.4	0.0
Queue Length 95th (m)	38.9	8.2	8.8	11.9	0.0	18.0	16.1
Internal Link Dist (m)		191.0	154.1	180.0		119.0	
Turn Bay Length (m)					15.0		20.0
Base Capacity (vph)	697	931	937	395	475	452	631
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.09	0.08	0.11	0.01	0.17	0.48

Intersection Summary

# HCM Signalized Intersection Capacity Analysis

## 6: Armstrong St & Whitewood Ave

09/08/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	271	49	22	2	56	10	10	29	3	3	66	267
Future Volume (vph)	271	49	22	2	56	10	10	29	3	3	66	267
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.6			5.6	5.6		5.5	5.5
Lane Util. Factor	1.00	1.00			1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.95			0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00			1.00			0.99	1.00		1.00	1.00
Satd. Flow (prot)	1615	1590			1618			1511	1633		1647	1498
Flt Permitted	0.71	1.00			1.00			0.94	1.00		0.99	1.00
Satd. Flow (perm)	1203	1590			1615			1436	1633		1638	1498
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	304	55	25	2	63	11	11	33	3	3	74	300
RTOR Reduction (vph)	0	11	0	0	5	0	0	0	2	0	0	217
Lane Group Flow (vph)	304	69	0	0	71	0	0	44	1	0	77	83
Heavy Vehicles (%)	13%	3%	5%	50%	4%	0%	10%	14%	0%	0%	5%	9%
Parking (#/hr)		0			0			0			0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		8	4		4
Actuated Green, G (s)	44.0	44.0			43.9			20.9	20.9		21.0	21.0
Effective Green, g (s)	44.0	44.0			43.9			20.9	20.9		21.0	21.0
Actuated g/C Ratio	0.58	0.58			0.58			0.27	0.27		0.28	0.28
Clearance Time (s)	5.5	5.5			5.6			5.6	5.6		5.5	5.5
Lane Grp Cap (vph)	696	920			932			394	449		452	413
v/s Ratio Prot		0.04										
v/s Ratio Perm	c0.25				0.04			0.03	0.00		0.05	c0.06
v/c Ratio	0.44	0.08			0.08			0.11	0.00		0.17	0.20
Uniform Delay, d1	9.0	7.0			7.1			20.6	20.0		20.9	21.1
Progression Factor	1.00	1.00			1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	2.0	0.2			0.2			0.6	0.0		0.8	1.1
Delay (s)	11.0	7.2			7.3			21.2	20.0		21.7	22.2
Level of Service	B	A			A			C	B		C	C
Approach Delay (s)		10.2			7.3			21.1			22.1	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	11.2
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Unsignalized Intersection Capacity Analysis

## 7: Broadwood Ave & Golding St

09/08/2023

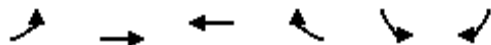


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↘	↙
Traffic Volume (veh/h)	3	1	2	16	33	0
Future Volume (Veh/h)	3	1	2	16	33	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.71	0.71	0.71	0.71	0.71	0.71
Hourly flow rate (vph)	4	1	3	23	46	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	26				24	14
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	26				24	14
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	100				95	100
cM capacity (veh/h)	1601				963	1071
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	5	26	46			
Volume Left	4	0	46			
Volume Right	0	23	0			
cSH	1601	1700	963			
Volume to Capacity	0.00	0.02	0.05			
Queue Length 95th (m)	0.1	0.0	1.1			
Control Delay (s)	5.8	0.0	8.9			
Lane LOS	A		A			
Approach Delay (s)	5.8	0.0	8.9			
Approach LOS			A			
Intersection Summary						
Average Delay			5.7			
Intersection Capacity Utilization		13.3%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 8: Broadwood Ave & Edith St

09/08/2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↗	↖		↘	
Traffic Volume (veh/h)	6	32	22	39	24	2
Future Volume (Veh/h)	6	32	22	39	24	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	8	44	30	53	33	3
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	83				116	56
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	83				116	56
tC, single (s)	4.4				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.5				3.5	3.3
p0 queue free %	99				96	100
cM capacity (veh/h)	1335				879	1016
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	52	83	36			
Volume Left	8	0	33			
Volume Right	0	53	3			
cSH	1335	1700	889			
Volume to Capacity	0.01	0.05	0.04			
Queue Length 95th (m)	0.1	0.0	1.0			
Control Delay (s)	1.2	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s)	1.2	0.0	9.2			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			2.3			
Intersection Capacity Utilization			16.8%	ICU Level of Service	A	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 9: Lakeshore Rd N #1 & Broadwood Ave

09/08/2023



















Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	13	4	46	7	2	3	68	273	4	0	169	9
Future Volume (Veh/h)	13	4	46	7	2	3	68	273	4	0	169	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	15	5	53	8	2	3	78	314	5	0	194	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	676	674	199	727	676	316	204			319		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	676	674	199	727	676	316	204			319		
tC, single (s)	7.2	6.5	6.2	7.2	6.5	6.5	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.6	4.0	3.6	2.2			2.2		
p0 queue free %	96	99	94	97	99	100	94			100		
cM capacity (veh/h)	341	357	834	286	356	656	1362			1252		
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	73	13	397	204								
Volume Left	15	8	78	0								
Volume Right	53	3	5	10								
cSH	601	341	1362	1252								
Volume to Capacity	0.12	0.04	0.06	0.00								
Queue Length 95th (m)	3.1	0.9	1.4	0.0								
Control Delay (s)	11.8	16.0	2.0	0.0								
Lane LOS	B	C	A									
Approach Delay (s)	11.8	16.0	2.0	0.0								
Approach LOS	B	C										
Intersection Summary												
Average Delay			2.7									
Intersection Capacity Utilization			41.6%	ICU Level of Service	A							
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 10: Lakeshore Rd N #1 & Farah Ave

09/08/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	12	15	41	15	15	6	210	83	34	120	6
Future Volume (Veh/h)	8	12	15	41	15	15	6	210	83	34	120	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	9	13	17	46	17	17	7	236	93	38	135	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)											157	
pX, platoon unblocked												
vC, conflicting volume	536	558	138	534	514	282	142			329		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	536	558	138	534	514	282	142			329		
tC, single (s)	7.1	6.5	6.5	7.2	6.6	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.6	4.1	3.3	2.2			2.3		
p0 queue free %	98	97	98	89	96	98	100			97		
cM capacity (veh/h)	423	425	831	416	440	761	1453			1192		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	39	80	336	180								
Volume Left	9	46	7	38								
Volume Right	17	17	93	7								
cSH	539	466	1453	1192								
Volume to Capacity	0.07	0.17	0.00	0.03								
Queue Length 95th (m)	1.8	4.7	0.1	0.8								
Control Delay (s)	12.2	14.3	0.2	1.9								
Lane LOS	B	B	A	A								
Approach Delay (s)	12.2	14.3	0.2	1.9								
Approach LOS	B	B										
Intersection Summary												
Average Delay			3.2									
Intersection Capacity Utilization			41.9%		ICU Level of Service				A			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 11: Armstrong St & Church St


















09/08/2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	5	290	341	90
Future Volume (Veh/h)	0	0	5	290	341	90
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	0	6	337	397	105
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				143	233	
pX, platoon unblocked	0.91	0.87	0.87			
vC, conflicting volume	798	450	502			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	544	293	354			
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	99			
cM capacity (veh/h)	454	654	1059			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	0	343	502			
Volume Left	0	6	0			
Volume Right	0	0	105			
cSH	1700	1059	1700			
Volume to Capacity	0.00	0.01	0.30			
Queue Length 95th (m)	0.0	0.1	0.0			
Control Delay (s)	0.0	0.2	0.0			
Lane LOS	A	A				
Approach Delay (s)	0.0	0.2	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization			26.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 12: Armstrong St & Sharpe St

09/08/2023

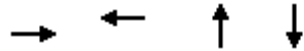
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	2	5	1	0	40	0	298	4	65	411	0
Future Volume (Veh/h)	14	2	5	1	0	40	0	298	4	65	411	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	16	2	6	1	0	47	0	347	5	76	478	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)								192			184	
pX, platoon unblocked	0.95	0.95	0.97	0.95	0.95	0.94	0.97			0.94		
vC, conflicting volume	1026	982	239	748	980	350	478			352		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	889	842	157	596	839	273	403			276		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	7.1	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.2		
p0 queue free %	92	99	99	100	100	93	100			94		
cM capacity (veh/h)	203	270	842	350	271	663	1133			1184		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	24	48	352	235	319							
Volume Left	16	1	0	76	0							
Volume Right	6	47	5	0	0							
cSH	257	651	1700	1184	1700							
Volume to Capacity	0.09	0.07	0.21	0.06	0.19							
Queue Length 95th (m)	2.3	1.8	0.0	1.6	0.0							
Control Delay (s)	20.4	11.0	0.0	3.1	0.0							
Lane LOS	C	B		A								
Approach Delay (s)	20.4	11.0	0.0	1.3								
Approach LOS	C	B										
<b>Intersection Summary</b>												
Average Delay			1.8									
Intersection Capacity Utilization			47.0%		ICU Level of Service				A			
Analysis Period (min)			15									



Queues

13: Armstrong St & Beavis Terr/Elm Ave

09/08/2023



















Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	31	128	403	404
v/c Ratio	0.04	0.22	0.52	0.51
Control Delay	4.1	7.9	15.3	16.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.1	7.9	15.3	16.2
Queue Length 50th (m)	0.2	4.3	12.4	13.4
Queue Length 95th (m)	3.1	12.4	20.7	21.7
Internal Link Dist (m)	111.3	124.3	159.9	149.4
Turn Bay Length (m)				
Base Capacity (vph)	794	586	1266	1312
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.04	0.22	0.32	0.31

Intersection Summary

HCM Signalized Intersection Capacity Analysis  
 13: Armstrong St & Beavis Terr/Elm Ave

09/08/2023

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (vph)	2	3	23	98	2	11	8	305	37	5	345	1		
Future Volume (vph)	2	3	23	98	2	11	8	305	37	5	345	1		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)		6.2			6.2			5.9			5.9			
Lane Util. Factor		1.00			1.00			0.95			0.95			
Frt		0.89			0.99			0.98			1.00			
Flt Protected		1.00			0.96			1.00			1.00			
Satd. Flow (prot)		1698			1613			3181			3320			
Flt Permitted		0.99			0.74			0.94			0.94			
Satd. Flow (perm)		1680			1248			2987			3137			
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87		
Adj. Flow (vph)	2	3	26	113	2	13	9	351	43	6	397	1		
RTOR Reduction (vph)	0	14	0	0	7	0	0	22	0	0	1	0		
Lane Group Flow (vph)	0	17	0	0	121	0	0	381	0	0	403	0		
Heavy Vehicles (%)	0%	0%	0%	13%	0%	10%	13%	13%	11%	0%	10%	0%		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA			
Protected Phases		2			6			8			4			
Permitted Phases	2			6			8			4				
Actuated Green, G (s)		20.0			20.0			10.9			10.9			
Effective Green, g (s)		20.0			20.0			10.9			10.9			
Actuated g/C Ratio		0.47			0.47			0.25			0.25			
Clearance Time (s)		6.2			6.2			5.9			5.9			
Vehicle Extension (s)		5.0			5.0			2.5			2.5			
Lane Grp Cap (vph)		781			580			757			795			
v/s Ratio Prot														
v/s Ratio Perm		0.01			c0.10			0.13			c0.13			
v/c Ratio		0.02			0.21			0.50			0.51			
Uniform Delay, d1		6.2			6.8			13.7			13.7			
Progression Factor		1.00			1.00			1.00			1.00			
Incremental Delay, d2		0.0			0.4			0.4			0.4			
Delay (s)		6.2			7.2			14.1			14.1			
Level of Service		A			A			B			B			
Approach Delay (s)		6.2			7.2			14.1			14.1			
Approach LOS		A			A			B			B			
<b>Intersection Summary</b>														
HCM 2000 Control Delay			12.9									HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio			0.31											
Actuated Cycle Length (s)			43.0								12.1			
Intersection Capacity Utilization			42.2%										ICU Level of Service	A
Analysis Period (min)			15											
c Critical Lane Group														

---

















Intersection Sign configuration not allowed in HCM analysis.

---

# HCM Unsignalized Intersection Capacity Analysis

## 15: Georgina Ave & Main St

09/08/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	215	7	8	114	3	12	7	43	1	0	4
Future Volume (Veh/h)	4	215	7	8	114	3	12	7	43	1	0	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	5	262	9	10	139	4	15	9	52	1	0	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	143			271			442	440	266	494	442	141
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	143			271			442	440	266	494	442	141
tC, single (s)	4.1			4.1			7.4	6.7	6.2	7.1	6.5	7.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.8	4.1	3.3	3.5	4.0	4.2
p0 queue free %	100			99			97	98	93	100	100	99
cM capacity (veh/h)	1452			1304			467	487	765	445	507	701
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	276	153	76	6								
Volume Left	5	10	15	1								
Volume Right	9	4	52	5								
cSH	1452	1304	641	640								
Volume to Capacity	0.00	0.01	0.12	0.01								
Queue Length 95th (m)	0.1	0.2	3.0	0.2								
Control Delay (s)	0.2	0.6	11.4	10.7								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.2	0.6	11.4	10.7								
Approach LOS			B	B								
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			24.4%		ICU Level of Service				A			
Analysis Period (min)			15									

















---

Intersection Sign configuration not allowed in HCM analysis.

---

HCM Unsignalized Intersection Capacity Analysis  
 17: Ferguson Ave #2 & Broadway St

09/08/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	0	1	5	2	23	1	270	0	20	134	10
Future Volume (Veh/h)	6	0	1	5	2	23	1	270	0	20	134	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	7	0	1	6	2	27	1	314	0	23	156	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	552	524	162	525	530	314	168			314		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	552	524	162	525	530	314	168			314		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	99	100	96	100			98		
cM capacity (veh/h)	423	452	888	459	448	731	1422			1229		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	8	35	315	191								
Volume Left	7	6	1	23								
Volume Right	1	27	0	12								
cSH	453	643	1422	1229								
Volume to Capacity	0.02	0.05	0.00	0.02								
Queue Length 95th (m)	0.4	1.3	0.0	0.4								
Control Delay (s)	13.1	10.9	0.0	1.1								
Lane LOS	B	B	A	A								
Approach Delay (s)	13.1	10.9	0.0	1.1								
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			33.1%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis  
 18: Ferguson Ave #2/Lakeshore Rd #2 & Browning St

09/08/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	9	2	0	5	0	1	0	283	1	3	172	5
Future Volume (vph)	9	2	0	5	0	1	0	283	1	3	172	5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	11	2	0	6	0	1	0	333	1	4	202	6
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	13	7	334	212								
Volume Left (vph)	11	6	0	4								
Volume Right (vph)	0	1	1	6								
Hadj (s)	0.47	0.38	0.07	0.09								
Departure Headway (s)	5.6	5.5	4.2	4.4								
Degree Utilization, x	0.02	0.01	0.39	0.26								
Capacity (veh/h)	579	585	835	800								
Control Delay (s)	8.7	8.6	10.0	8.9								
Approach Delay (s)	8.7	8.6	10.0	8.9								
Approach LOS	A	A	A	A								

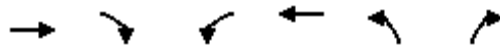
Intersection Summary

Delay			9.5									
Level of Service			A									
Intersection Capacity Utilization			25.0%	ICU Level of Service			A					
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 1: Golding St & Whitewood Ave

09/08/2023



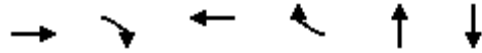
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↔	↔
Traffic Volume (veh/h)	326	30	16	358	15	28
Future Volume (Veh/h)	326	30	16	358	15	28
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	358	33	18	393	16	31
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	336					
pX, platoon unblocked						
vC, conflicting volume			391			374
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			391			374
tC, single (s)			4.1			6.2
tC, 2 stage (s)						
tF (s)			2.2			3.3
p0 queue free %			98			95
cM capacity (veh/h)			1179			676
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	391	411	47			
Volume Left	0	18	16			
Volume Right	33	0	31			
cSH	1700	1179	506			
Volume to Capacity	0.23	0.02	0.09			
Queue Length 95th (m)	0.0	0.4	2.3			
Control Delay (s)	0.0	0.5	12.8			
Lane LOS			A	B		
Approach Delay (s)	0.0	0.5	12.8			
Approach LOS			B			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			41.8%	ICU Level of Service		A
Analysis Period (min)			15			



Queues

2: Edith St/Parking Entrance & Whitewood Ave

09/08/2023



Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	317	42	288	119	91	180
v/c Ratio	0.33	0.04	0.32	0.12	0.24	0.46
Control Delay	8.8	2.0	8.7	2.3	13.3	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.8	2.0	8.7	2.3	13.3	15.8
Queue Length 50th (m)	13.6	0.0	12.2	0.0	4.4	8.9
Queue Length 95th (m)	29.0	2.4	26.7	5.1	12.3	21.3
Internal Link Dist (m)	312.0		313.1		280.6	74.2
Turn Bay Length (m)		45.0		45.0		
Base Capacity (vph)	1030	1002	978	1044	808	801
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.04	0.29	0.11	0.11	0.22

Intersection Summary

# HCM Signalized Intersection Capacity Analysis

## 2: Edith St/Parking Entrance & Whitewood Ave

09/08/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗		↕			↕	
Traffic Volume (vph)	11	258	36	22	223	101	40	24	14	71	42	40
Future Volume (vph)	11	258	36	22	223	101	40	24	14	71	42	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.2	6.2		6.2	6.2		6.2			6.2	
Lane Util. Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		0.98			0.96	
Flt Protected		1.00	1.00		1.00	1.00		0.97			0.98	
Satd. Flow (prot)		1693	1585		1654	1617		1828			1797	
Flt Permitted		0.98	1.00		0.95	1.00		0.81			0.81	
Satd. Flow (perm)		1668	1585		1584	1617		1514			1482	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	13	304	42	26	262	119	47	28	16	84	49	47
RTOR Reduction (vph)	0	0	20	0	0	56	0	13	0	0	29	0
Lane Group Flow (vph)	0	317	22	0	288	63	0	78	0	0	151	0
Heavy Vehicles (%)	0%	2%	3%	5%	4%	1%	0%	0%	0%	0%	0%	3%
Parking (#/hr)		0			0							
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)		23.8	23.8		23.8	23.8		8.7			8.7	
Effective Green, g (s)		23.8	23.8		23.8	23.8		8.7			8.7	
Actuated g/C Ratio		0.53	0.53		0.53	0.53		0.19			0.19	
Clearance Time (s)		6.2	6.2		6.2	6.2		6.2			6.2	
Vehicle Extension (s)		5.0	5.0		5.0	5.0		2.5			2.5	
Lane Grp Cap (vph)		884	840		839	857		293			287	
v/s Ratio Prot												
v/s Ratio Perm		c0.19	0.01		0.18	0.04		0.05			c0.10	
v/c Ratio		0.36	0.03		0.34	0.07		0.27			0.53	
Uniform Delay, d1		6.1	5.0		6.1	5.2		15.4			16.2	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		0.5	0.0		0.5	0.1		0.4			1.3	
Delay (s)		6.6	5.1		6.6	5.2		15.7			17.6	
Level of Service		A	A		A	A		B			B	
Approach Delay (s)		6.5			6.2			15.7			17.6	
Approach LOS		A			A			B			B	

Intersection Summary		
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.40	A
Actuated Cycle Length (s)	44.9	Sum of lost time (s)
Intersection Capacity Utilization	57.4%	12.4
Analysis Period (min)	15	ICU Level of Service
		B

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 3: John ST & Whitewood Ave

09/08/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	14	350	7	5	293	12	4	0	9	11	3	8
Future Volume (Veh/h)	14	350	7	5	293	12	4	0	9	11	3	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	17	417	8	6	349	14	5	0	11	13	4	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		337			245							
pX, platoon unblocked	0.98						0.98	0.98		0.98	0.98	0.98
vC, conflicting volume	363			425			835	830	421	834	827	356
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	344			425			824	819	421	823	816	337
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			98	100	98	95	99	99
cM capacity (veh/h)	1206			1145			278	301	637	281	303	698
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	442	369	16	27								
Volume Left	17	6	5	13								
Volume Right	8	14	11	10								
cSH	1206	1145	454	366								
Volume to Capacity	0.01	0.01	0.04	0.07								
Queue Length 95th (m)	0.3	0.1	0.8	1.8								
Control Delay (s)	0.5	0.2	13.2	15.6								
Lane LOS	A	A	B	C								
Approach Delay (s)	0.5	0.2	13.2	15.6								
Approach LOS			B	C								
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			36.6%		ICU Level of Service				A			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 4: Mary St & Whitewood Ave

09/08/2023

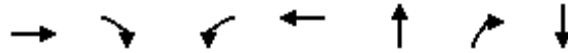


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	22	339	9	7	301	6	1	4	5	8	2	12
Future Volume (Veh/h)	22	339	9	7	301	6	1	4	5	8	2	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	25	381	10	8	338	7	1	4	6	9	2	13
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					126							
pX, platoon unblocked	0.93						0.93	0.93		0.93	0.93	0.93
vC, conflicting volume	345			391			808	797	386	802	798	342
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	262			391			758	747	386	752	748	259
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	98			99			100	99	99	97	99	98
cM capacity (veh/h)	1199			1179			291	312	666	295	311	712
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	416	353	11	24								
Volume Left	25	8	1	9								
Volume Right	10	7	6	13								
cSH	1199	1179	436	435								
Volume to Capacity	0.02	0.01	0.03	0.06								
Queue Length 95th (m)	0.5	0.2	0.6	1.3								
Control Delay (s)	0.7	0.3	13.5	13.8								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.7	0.3	13.5	13.8								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			39.5%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

5: Paget St #1 & Whitewood Ave

09/08/2023



Lane Group	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	319	56	200	255	85	220	70
v/c Ratio	0.38	0.07	0.41	0.30	0.19	0.31	0.14
Control Delay	13.2	3.3	14.9	12.0	18.3	4.0	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.2	3.3	14.9	12.0	18.3	4.0	13.9
Queue Length 50th (m)	26.2	0.0	16.7	19.5	8.2	0.0	4.9
Queue Length 95th (m)	43.5	5.0	32.3	33.6	17.8	12.7	12.9
Internal Link Dist (m)	101.5			191.0	51.6		138.0
Turn Bay Length (m)		40.0					
Base Capacity (vph)	844	844	492	837	443	707	517
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.07	0.41	0.30	0.19	0.31	0.14

Intersection Summary

# HCM Signalized Intersection Capacity Analysis

## 5: Paget St #1 & Whitewood Ave

09/08/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		↕	↗	↖	↗	↖		↕	↗		↕	↖		
Traffic Volume (vph)	5	286	51	182	219	13	67	10	200	28	19	16		
Future Volume (vph)	5	286	51	182	219	13	67	10	200	28	19	16		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)		5.5	5.5	5.5	5.5			5.5	5.5		5.5			
Lane Util. Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00			
Frt		1.00	0.85	1.00	0.99			1.00	0.85		0.97			
Flt Protected		1.00	1.00	0.95	1.00			0.96	1.00		0.98			
Satd. Flow (prot)		1694	1633	1772	1667			1629	1601		1604			
Flt Permitted		1.00	1.00	0.53	1.00			0.74	1.00		0.87			
Satd. Flow (perm)		1689	1633	985	1667			1255	1601		1433			
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91		
Adj. Flow (vph)	5	314	56	200	241	14	74	11	220	31	21	18		
RTOR Reduction (vph)	0	0	28	0	3	0	0	0	142	0	12	0		
Lane Group Flow (vph)	0	319	28	200	252	0	0	85	78	0	58	0		
Heavy Vehicles (%)	0%	2%	0%	3%	3%	0%	2%	0%	2%	0%	0%	7%		
Parking (#/hr)		0			0			0			0			
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA	Perm	Perm	NA			
Protected Phases		2			6			8			4			
Permitted Phases	2		2	6			8		8	4				
Actuated Green, G (s)		37.5	37.5	37.5	37.5			26.5	26.5		26.5			
Effective Green, g (s)		37.5	37.5	37.5	37.5			26.5	26.5		26.5			
Actuated g/C Ratio		0.50	0.50	0.50	0.50			0.35	0.35		0.35			
Clearance Time (s)		5.5	5.5	5.5	5.5			5.5	5.5		5.5			
Lane Grp Cap (vph)		844	816	492	833			443	565		506			
v/s Ratio Prot					0.15									
v/s Ratio Perm		0.19	0.02	c0.20				c0.07	0.05		0.04			
v/c Ratio		0.38	0.03	0.41	0.30			0.19	0.14		0.12			
Uniform Delay, d1		11.6	9.5	11.8	11.0			16.8	16.5		16.3			
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00			
Incremental Delay, d2		1.3	0.1	2.5	0.9			1.0	0.5		0.5			
Delay (s)		12.8	9.6	14.2	12.0			17.8	17.0		16.8			
Level of Service		B	A	B	B			B	B		B			
Approach Delay (s)		12.4			13.0			17.2			16.8			
Approach LOS		B			B			B			B			
<b>Intersection Summary</b>														
HCM 2000 Control Delay			14.1									HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio			0.32											
Actuated Cycle Length (s)			75.0								11.0			
Intersection Capacity Utilization			70.4%										ICU Level of Service	C
Analysis Period (min)			15											
c Critical Lane Group														

Queues

6: Armstrong St & Whitewood Ave

09/08/2023



Lane Group	EBL	EBT	WBT	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	478	73	95	132	2	105	355
v/c Ratio	0.62	0.08	0.10	0.30	0.00	0.23	0.51
Control Delay	15.1	4.8	6.2	24.2	0.0	23.0	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.1	4.8	6.2	24.2	0.0	23.0	5.7
Queue Length 50th (m)	41.1	2.3	4.5	15.0	0.0	11.6	0.0
Queue Length 95th (m)	67.9	7.0	9.9	28.1	0.0	22.8	16.6
Internal Link Dist (m)		191.0	154.1	180.0		119.0	
Turn Bay Length (m)					15.0		20.0
Base Capacity (vph)	765	917	979	434	475	453	690
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.08	0.10	0.30	0.00	0.23	0.51

Intersection Summary

# HCM Signalized Intersection Capacity Analysis

## 6: Armstrong St & Whitewood Ave

09/08/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	421	36	28	1	67	16	24	92	2	14	78	312
Future Volume (vph)	421	36	28	1	67	16	24	92	2	14	78	312
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.6			5.6	5.6		5.5	5.5
Lane Util. Factor	1.00	1.00			1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.93			0.97			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00			1.00			0.99	1.00		0.99	1.00
Satd. Flow (prot)	1807	1563			1684			1685	1633		1716	1570
Flt Permitted	0.70	1.00			1.00			0.93	1.00		0.95	1.00
Satd. Flow (perm)	1323	1563			1683			1580	1633		1642	1570
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	478	41	32	1	76	18	27	105	2	16	89	355
RTOR Reduction (vph)	0	13	0	0	8	0	0	0	1	0	0	257
Lane Group Flow (vph)	478	60	0	0	87	0	0	132	1	0	105	98
Heavy Vehicles (%)	1%	6%	0%	0%	0%	0%	0%	2%	0%	0%	0%	4%
Parking (#/hr)		0			0			0			0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		8	4		4
Actuated Green, G (s)	44.0	44.0			43.9			20.9	20.9		21.0	21.0
Effective Green, g (s)	44.0	44.0			43.9			20.9	20.9		21.0	21.0
Actuated g/C Ratio	0.58	0.58			0.58			0.27	0.27		0.28	0.28
Clearance Time (s)	5.5	5.5			5.6			5.6	5.6		5.5	5.5
Lane Grp Cap (vph)	765	904			972			434	449		453	433
v/s Ratio Prot		0.04										
v/s Ratio Perm	c0.36				0.05			c0.08	0.00		0.06	0.06
v/c Ratio	0.62	0.07			0.09			0.30	0.00		0.23	0.23
Uniform Delay, d1	10.6	7.0			7.2			21.8	20.0		21.3	21.2
Progression Factor	1.00	1.00			1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	3.8	0.1			0.2			1.8	0.0		1.2	1.2
Delay (s)	14.4	7.1			7.3			23.6	20.0		22.5	22.4
Level of Service	B	A			A			C	B		C	C
Approach Delay (s)		13.4			7.3			23.5			22.4	
Approach LOS		B			A			C			C	

### Intersection Summary

HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	11.2
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



# HCM Unsignalized Intersection Capacity Analysis

## 7: Broadwood Ave & Golding St

09/08/2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Volume (veh/h)	0	0	4	41	2	34
Future Volume (Veh/h)	0	0	4	41	2	34
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	0	0	5	51	2	42
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	56				30	30
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	56				30	30
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	96
cM capacity (veh/h)	1562				989	1050
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	0	56	44			
Volume Left	0	0	2			
Volume Right	0	51	42			
cSH	1700	1700	1047			
Volume to Capacity	0.00	0.03	0.04			
Queue Length 95th (m)	0.0	0.0	1.0			
Control Delay (s)	0.0	0.0	8.6			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	8.6			
Approach LOS			A			
Intersection Summary						
Average Delay			3.8			
Intersection Capacity Utilization		13.3%		ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 8: Broadwood Ave & Edith St

09/08/2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Traffic Volume (veh/h)	8	47	41	25	71	5
Future Volume (Veh/h)	8	47	41	25	71	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	11	63	55	33	95	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	88				156	72
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	88				156	72
tC, single (s)	4.1				6.4	6.4
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.5
p0 queue free %	99				89	99
cM capacity (veh/h)	1520				829	943
Direction, Lane #						
	EB 1	WB 1	SB 1			
Volume Total	74	88	102			
Volume Left	11	0	95			
Volume Right	0	33	7			
cSH	1520	1700	836			
Volume to Capacity	0.01	0.05	0.12			
Queue Length 95th (m)	0.2	0.0	3.2			
Control Delay (s)	1.1	0.0	9.9			
Lane LOS	A		A			
Approach Delay (s)	1.1	0.0	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay			4.1			
Intersection Capacity Utilization			20.2%		ICU Level of Service	A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 9: Lakeshore Rd N #1 & Broadwood Ave

















09/08/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	20	4	98	2	0	7	50	260	2	2	300	18
Future Volume (Veh/h)	20	4	98	2	0	7	50	260	2	2	300	18
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	22	4	109	2	0	8	56	289	2	2	333	20
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	757	750	343	860	759	290	353			291		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	757	750	343	860	759	290	353			291		
tC, single (s)	7.1	6.5	6.2	8.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	4.4	4.0	3.3	2.2			2.2		
p0 queue free %	93	99	85	99	100	99	95			100		
cM capacity (veh/h)	311	326	704	154	322	754	1206			1282		
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	135	10	347	355								
Volume Left	22	2	56	2								
Volume Right	109	8	2	20								
cSH	568	424	1206	1282								
Volume to Capacity	0.24	0.02	0.05	0.00								
Queue Length 95th (m)	7.0	0.6	1.1	0.0								
Control Delay (s)	13.3	13.7	1.7	0.1								
Lane LOS	B	B	A	A								
Approach Delay (s)	13.3	13.7	1.7	0.1								
Approach LOS	B	B										
Intersection Summary												
Average Delay			3.0									
Intersection Capacity Utilization			52.6%	ICU Level of Service		A						
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis  
 10: Lakeshore Rd N #1 & Farah Ave

09/08/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	23	23	62	32	18	9	233	47	28	240	9
Future Volume (Veh/h)	3	23	23	62	32	18	9	233	47	28	240	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	3	25	25	67	34	19	10	251	51	30	258	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)											157	
pX, platoon unblocked	0.98	0.98	0.98	0.98	0.98		0.98					
vC, conflicting volume	656	645	263	657	624	276	268			302		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	634	624	232	636	603	276	237			302		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	99	93	97	81	91	98	99			98		
cM capacity (veh/h)	342	382	792	345	393	767	1309			1226		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	53	120	312	298								
Volume Left	3	67	10	30								
Volume Right	25	19	51	10								
cSH	501	393	1309	1226								
Volume to Capacity	0.11	0.31	0.01	0.02								
Queue Length 95th (m)	2.7	9.7	0.2	0.6								
Control Delay (s)	13.0	18.2	0.3	1.0								
Lane LOS	B	C	A	A								
Approach Delay (s)	13.0	18.2	0.3	1.0								
Approach LOS	B	C										
Intersection Summary												
Average Delay			4.2									
Intersection Capacity Utilization			45.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis  
 11: Armstrong St & Church St


















09/08/2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	5	519	410	50
Future Volume (Veh/h)	0	0	5	519	410	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	6	611	482	59
<b>Pedestrians</b>						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				143	233	
pX, platoon unblocked	0.91	0.83	0.83			
vC, conflicting volume	1134	512	541			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	716	314	349			
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	99			
cM capacity (veh/h)	362	609	1017			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	0	617	541			
Volume Left	0	6	0			
Volume Right	0	0	59			
cSH	1700	1017	1700			
Volume to Capacity	0.00	0.01	0.32			
Queue Length 95th (m)	0.0	0.1	0.0			
Control Delay (s)	0.0	0.2	0.0			
Lane LOS	A	A				
Approach Delay (s)	0.0	0.2	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay	0.1					
Intersection Capacity Utilization	34.6%			ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis  
 12: Armstrong St & Sharpe St

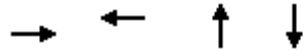
09/08/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	0	10	0	0	93	0	492	14	37	432	0
Future Volume (Veh/h)	36	0	10	0	0	93	0	492	14	37	432	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	41	0	11	0	0	106	0	559	16	42	491	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)								192			184	
pX, platoon unblocked	0.88	0.88	0.95	0.88	0.88	0.86	0.95			0.86		
vC, conflicting volume	1248	1150	246	908	1142	567	491			575		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	998	887	97	612	878	413	356			422		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	7.0	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	70	100	99	100	100	79	100			96		
cM capacity (veh/h)	136	241	898	322	244	502	1152			967		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	52	106	575	206	327							
Volume Left	41	0	0	42	0							
Volume Right	11	106	16	0	0							
cSH	165	502	1700	967	1700							
Volume to Capacity	0.31	0.21	0.34	0.04	0.19							
Queue Length 95th (m)	9.6	6.0	0.0	1.0	0.0							
Control Delay (s)	36.5	14.1	0.0	2.2	0.0							
Lane LOS	E	B		A								
Approach Delay (s)	36.5	14.1	0.0	0.8								
Approach LOS	E	B										
Intersection Summary												
Average Delay			3.0									
Intersection Capacity Utilization			56.3%		ICU Level of Service					B		
Analysis Period (min)			15									

Queues

13: Armstrong St & Beavis Terr/Elm Ave

09/08/2023



















Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	32	84	723	468
v/c Ratio	0.04	0.13	0.71	0.47
Control Delay	5.4	7.9	17.5	14.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.4	7.9	17.5	14.5
Queue Length 50th (m)	0.3	2.8	24.8	15.8
Queue Length 95th (m)	3.9	9.4	37.6	24.8
Internal Link Dist (m)	111.3	124.3	159.9	149.4
Turn Bay Length (m)				
Base Capacity (vph)	751	631	1268	1257
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.04	0.13	0.57	0.37

Intersection Summary

# HCM Signalized Intersection Capacity Analysis

## 13: Armstrong St & Beavis Terr/Elm Ave

09/08/2023

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (vph)	1	5	22	53	1	20	31	503	102	14	397	1		
Future Volume (vph)	1	5	22	53	1	20	31	503	102	14	397	1		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)		6.2			6.2			5.9			5.9			
Lane Util. Factor		1.00			1.00			0.95			0.95			
Frt		0.89			0.96			0.98			1.00			
Flt Protected		1.00			0.97			1.00			1.00			
Satd. Flow (prot)		1716			1714			3509			3540			
Flt Permitted		0.99			0.81			0.91			0.91			
Satd. Flow (perm)		1709			1434			3190			3238			
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88		
Adj. Flow (vph)	1	6	25	60	1	23	35	572	116	16	451	1		
RTOR Reduction (vph)	0	14	0	0	13	0	0	34	0	0	0	0		
Lane Group Flow (vph)	0	18	0	0	71	0	0	689	0	0	468	0		
Heavy Vehicles (%)	0%	0%	0%	4%	0%	5%	0%	1%	3%	0%	3%	0%		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA			
Protected Phases		2			6			8			4			
Permitted Phases	2			6			8			4				
Actuated Green, G (s)		20.1			20.1			14.3			14.3			
Effective Green, g (s)		20.1			20.1			14.3			14.3			
Actuated g/C Ratio		0.43			0.43			0.31			0.31			
Clearance Time (s)		6.2			6.2			5.9			5.9			
Vehicle Extension (s)		5.0			5.0			2.5			2.5			
Lane Grp Cap (vph)		738			619			981			995			
v/s Ratio Prot														
v/s Ratio Perm		0.01			0.05			0.22			0.14			
v/c Ratio		0.02			0.11			0.70			0.47			
Uniform Delay, d1		7.6			7.9			14.2			13.0			
Progression Factor		1.00			1.00			1.00			1.00			
Incremental Delay, d2		0.0			0.2			2.1			0.3			
Delay (s)		7.6			8.1			16.4			13.3			
Level of Service		A			A			B			B			
Approach Delay (s)		7.6			8.1			16.4			13.3			
Approach LOS		A			A			B			B			
<b>Intersection Summary</b>														
HCM 2000 Control Delay			14.5									HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio			0.36											
Actuated Cycle Length (s)			46.5								12.1			
Intersection Capacity Utilization			61.1%										ICU Level of Service	B
Analysis Period (min)			15											
c Critical Lane Group														



---

Intersection Sign configuration not allowed in HCM analysis.

---

# HCM Unsignalized Intersection Capacity Analysis

## 15: Georgina Ave & Main St

09/08/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	4	173	7	32	253	7	12	3	30	4	4	5
Future Volume (Veh/h)	4	173	7	32	253	7	12	3	30	4	4	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	4	194	8	36	284	8	13	3	34	4	4	6
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	292			202			574	570	198	602	570	288
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	292			202			574	570	198	602	570	288
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			97	99	96	99	99	99
cM capacity (veh/h)	1281			1382			417	421	838	387	421	756
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	206	328	50	14								
Volume Left	4	36	13	4								
Volume Right	8	8	34	6								
cSH	1281	1382	634	504								
Volume to Capacity	0.00	0.03	0.08	0.03								
Queue Length 95th (m)	0.1	0.6	1.9	0.7								
Control Delay (s)	0.2	1.1	11.2	12.3								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.2	1.1	11.2	12.3								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.9									
Intersection Capacity Utilization			38.6%	ICU Level of Service	A							
Analysis Period (min)			15									

















---

Intersection Sign configuration not allowed in HCM analysis.

---

















HCM Unsignalized Intersection Capacity Analysis  
 17: Ferguson Ave #2 & Broadway St

09/08/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	4	0	19	3	32	1	224	26	27	278	27
Future Volume (Veh/h)	5	4	0	19	3	32	1	224	26	27	278	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	4	0	20	3	34	1	236	27	28	293	28
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	650	628	307	616	628	250	321			263		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	650	628	307	616	628	250	321			263		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	100	95	99	96	100			98		
cM capacity (veh/h)	360	393	738	395	393	794	1250			1313		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	9	57	264	349								
Volume Left	5	20	1	28								
Volume Right	0	34	27	28								
cSH	374	564	1250	1313								
Volume to Capacity	0.02	0.10	0.00	0.02								
Queue Length 95th (m)	0.6	2.5	0.0	0.5								
Control Delay (s)	14.9	12.1	0.0	0.8								
Lane LOS	B	B	A	A								
Approach Delay (s)	14.9	12.1	0.0	0.8								
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.6									
Intersection Capacity Utilization			44.6%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis  
 18: Ferguson Ave #2/Lakeshore Rd #2 & Browning St

09/08/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	2	0	2	7	3	5	4	261	4	5	311	8
Future Volume (vph)	2	0	2	7	3	5	4	261	4	5	311	8
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	2	0	2	8	3	5	4	287	4	5	342	9
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	4	16	295	356								
Volume Left (vph)	2	8	4	5								
Volume Right (vph)	2	5	4	9								
Hadj (s)	-0.20	-0.09	0.04	0.01								
Departure Headway (s)	5.1	5.2	4.4	4.3								
Degree Utilization, x	0.01	0.02	0.36	0.42								
Capacity (veh/h)	613	605	810	826								
Control Delay (s)	8.2	8.3	9.7	10.3								
Approach Delay (s)	8.2	8.3	9.7	10.3								
Approach LOS	A	A	A	B								
Intersection Summary												
Delay			10.0									
Level of Service			B									
Intersection Capacity Utilization			29.6%	ICU Level of Service	A							
Analysis Period (min)			15									

## Arterial Level of Service: EB Whitewood Ave

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Golding St	1	0.4	14.1	0.2	50
Edith St	2	5.3	27.7	0.3	44
John ST	3	2.2	24.6	0.3	49
Mary St	4	0.8	9.6	0.1	45
Paget St #1	5	10.9	19.7	0.1	23
Armstrong St	6	6.1	17.5	0.2	44
Total		25.8	113.3	1.3	42

## Arterial Level of Service: WB Whitewood Ave

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Armstrong St	6	7.4	20.0	0.2	32
Paget St #1	5	11.0	23.8	0.2	32
Mary St	4	1.9	10.6	0.1	42
John ST	3	0.5	9.2	0.1	46
Parking Entrance	2	5.3	29.2	0.3	42
Golding St	1	1.9	24.1	0.3	50
Total		28.0	117.0	1.3	40

## Arterial Level of Service: NB #1

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Broadwood Ave	9	0.7	16.2	0.2	39
Farah Ave	10	1.3	30.8	0.3	39
	38	0.2	7.7	0.1	38
Whitewood Ave	5	13.7	19.7	0.1	14
Total		15.9	74.4	0.7	32

## Arterial Level of Service: SB #1

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Whitewood Ave	5	18.8	33.2	0.2	18
	38	1.5	8.9	0.1	31
Farah Ave	10	0.4	5.4	0.1	56
Broadwood Ave	9	0.5	29.3	0.3	41
Total		21.2	76.8	0.7	31

Arterial Level of Service: NB Armstrong St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Whitewood Ave	6	19.8	34.2	0.2	22
Church St	11	2.0	11.2	0.1	47
	40	0.1	1.3	0.0	53
Sharpe St	12	0.1	1.9	0.0	58
Elm Ave	13	11.6	25.3	0.2	26
Total		33.6	73.9	0.6	28

Arterial Level of Service: SB Armstrong St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Beavis Terr	13	14.5	26.5	0.2	24
Sharpe St	12	4.2	17.6	0.2	38
	40	0.8	3.0	0.0	36
Church St	11	0.4	1.6	0.0	44
Whitewood Ave	6	19.7	29.8	0.1	17
Total		39.7	78.5	0.5	25

Arterial Level of Service: EB Main St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Rorke Ave	14	6.7	21.0	0.2	35
Georgina Ave	15	2.4	12.7	0.2	49
Ferguson Ave #2	16	0.6	10.0	0.2	61
Total		9.7	43.8	0.5	45

Arterial Level of Service: WB Main St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Ferguson Ave #2	16	8.7	20.7	0.2	28
Georgina Ave	15	1.5	10.5	0.2	59
Rorke Ave	14	0.5	12.2	0.2	51
Total		10.7	43.3	0.5	42

Arterial Level of Service: NB #2

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Main St	16	6.8	15.2	0.1	30
Broadway St	17	2.5	8.2	0.1	40
Browning St	18	6.2	12.0	0.1	25
Total		15.5	35.5	0.3	31

Arterial Level of Service: SB #2

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Browning St	18	6.8	16.1	0.1	31
Broadway St	17	2.7	8.6	0.1	34
Main St	16	7.2	13.7	0.1	24
Total		16.7	38.4	0.3	29



## Arterial Level of Service: EB Whitewood Ave

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Golding St	1	0.6	14.2	0.2	49
Edith St	2	6.0	28.4	0.3	43
John ST	3	2.3	25.3	0.3	48
Mary St	4	0.8	9.6	0.1	45
Paget St #1	5	10.9	19.5	0.1	23
Armstrong St	6	9.0	20.9	0.2	37
Total		29.7	117.9	1.3	41

## Arterial Level of Service: WB Whitewood Ave

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Armstrong St	6	6.8	19.5	0.2	33
Paget St #1	5	13.7	27.4	0.2	29
Mary St	4	1.8	10.3	0.1	44
John ST	3	0.6	9.6	0.1	45
Parking Entrance	2	7.4	30.3	0.3	40
Golding St	1	1.9	22.8	0.3	53
Total		32.1	119.9	1.3	40

## Arterial Level of Service: NB #1

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Broadwood Ave	9	0.7	16.2	0.2	39
Farah Ave	10	1.2	31.1	0.3	39
	38	0.2	7.7	0.1	38
Whitewood Ave	5	12.6	18.3	0.1	15
Total		14.6	73.4	0.7	33

## Arterial Level of Service: SB #1

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Whitewood Ave	5	17.7	32.0	0.2	18
	38	1.3	8.5	0.1	32
Farah Ave	10	0.5	7.3	0.1	41
Broadwood Ave	9	1.4	31.2	0.3	39
Total		20.9	79.0	0.7	30

Arterial Level of Service: NB Armstrong St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Whitewood Ave	6	23.9	38.5	0.2	19
Church St	11	2.0	12.2	0.1	42
	40	0.1	1.3	0.0	51
Sharpe St	12	0.2	1.9	0.0	57
Elm Ave	13	13.2	26.5	0.2	25
Total		39.4	80.5	0.6	26

Arterial Level of Service: SB Armstrong St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Beavis Terr	13	16.4	28.4	0.2	22
Sharpe St	12	4.4	18.1	0.2	37
	40	0.7	2.9	0.0	38
Church St	11	0.3	1.5	0.0	45
Whitewood Ave	6	22.5	32.6	0.1	16
Total		44.3	83.4	0.5	24

Arterial Level of Service: EB Main St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Rorke Ave	14	8.0	22.3	0.2	33
Georgina Ave	15	3.0	14.7	0.2	42
Ferguson Ave #2	16	0.8	12.5	0.2	49
Total		11.8	49.4	0.5	40

Arterial Level of Service: WB Main St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Ferguson Ave #2	16	7.4	18.6	0.2	32
Georgina Ave	15	1.5	9.3	0.2	67
Rorke Ave	14	0.5	11.2	0.2	55
Total		9.4	39.1	0.5	47

Arterial Level of Service: NB #2

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Main St	16	6.9	15.6	0.1	29
Broadway St	17	2.6	8.4	0.1	39
Browning St	18	6.5	12.3	0.1	24
Total		16.0	36.3	0.3	30

Arterial Level of Service: SB #2

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Browning St	18	7.7	17.1	0.1	30
Broadway St	17	2.8	8.9	0.1	33
Main St	16	6.9	13.2	0.1	25
Total		17.4	39.2	0.3	29