

**APPENDIX K**  
**Intersection Capacity Analyses**  
**Saturday Peak Hour**  
**2021 Estimated Traffic Conditions**

# Intersection Capacity Analysis

## 2: Washington St & Revere St/Driveway

08/22/2022

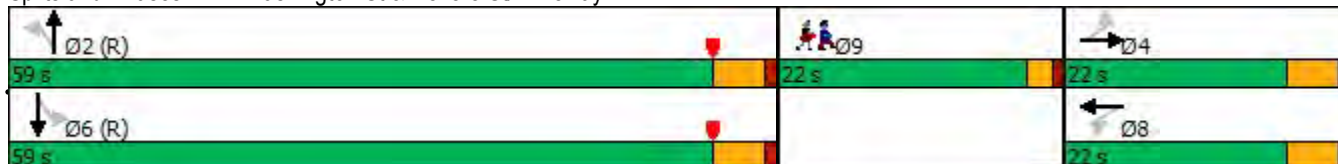


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	44	0	80	2	1	2	66	486	3	4	506	32
Future Volume (vph)	44	0	80	2	1	2	66	486	3	4	506	32
Confl. Peds. (#/hr)	14		10	10		14	26		36	36		26
Peak Hour Factor	0.72	0.72	0.72	0.42	0.42	0.42	0.92	0.92	0.92	0.96	0.96	0.96
Growth Factor	104%	104%	104%	104%	104%	104%	104%	104%	104%	104%	104%	104%
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	2%	2%	2%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	180	0	0	12	0	0	627	0	0	587	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		15.0	15.0		15.0	15.0	
Total Split (s)	22.0	22.0		22.0	22.0		59.0	59.0		59.0	59.0	
Total Split (%)	21.4%	21.4%		21.4%	21.4%		57.3%	57.3%		57.3%	57.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	
v/c Ratio		0.82			0.08			0.54			0.45	
Control Delay		53.0			30.6			13.5			11.1	
Queue Delay		0.0			0.0			0.8			0.0	
Total Delay		53.0			30.6			14.2			11.1	
Queue Length 50th (ft)		67			4			110			92	
Queue Length 95th (ft)		93			8			453			366	
Internal Link Dist (ft)		383			46			533			146	
Turn Bay Length (ft)												
Base Capacity (vph)		296			229			1154			1318	
Starvation Cap Reductn		0			0			245			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.61			0.05			0.69			0.45	

### Intersection Summary

Cycle Length: 103  
 Actuated Cycle Length: 103  
 Offset: 23 (22%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 70  
 Control Type: Actuated-Coordinated

### Splits and Phases: 2: Washington St & Revere St/Driveway



Intersection Capacity Analysis  
 2: Washington St & Revere St/Driveway

08/22/2022

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	22.0
Total Split (s)	22.0
Total Split (%)	21%
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

# Intersection Capacity Analysis

## 2: Washington St & Revere St/Driveway

08/22/2022

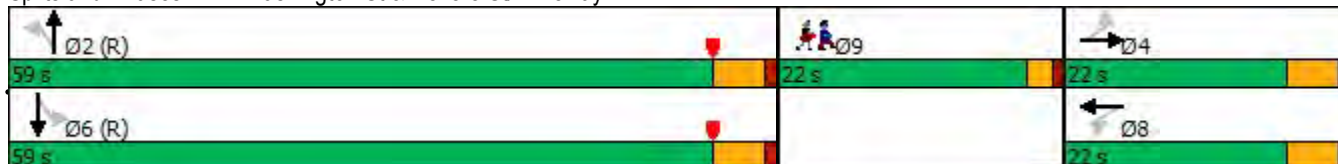


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	44	0	80	2	1	2	66	486	3	4	506	32
Future Volume (vph)	44	0	80	2	1	2	66	486	3	4	506	32
Confl. Peds. (#/hr)	14		10	10		14	26		36	36		26
Peak Hour Factor	0.72	0.72	0.72	0.42	0.42	0.42	0.92	0.92	0.92	0.96	0.96	0.96
Growth Factor	104%	104%	104%	104%	104%	104%	104%	104%	104%	104%	104%	104%
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	2%	2%	2%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	180	0	0	12	0	0	627	0	0	587	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		15.0	15.0		15.0	15.0	
Total Split (s)	22.0	22.0		22.0	22.0		59.0	59.0		59.0	59.0	
Total Split (%)	21.4%	21.4%		21.4%	21.4%		57.3%	57.3%		57.3%	57.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	
v/c Ratio		0.82			0.08			0.54			0.45	
Control Delay		53.0			30.6			13.5			11.1	
Queue Delay		0.0			0.0			0.8			0.0	
Total Delay		53.0			30.6			14.2			11.1	
Queue Length 50th (ft)		67			4			110			92	
Queue Length 95th (ft)		93			8			453			366	
Internal Link Dist (ft)		383			46			533			146	
Turn Bay Length (ft)												
Base Capacity (vph)		296			229			1154			1318	
Starvation Cap Reductn		0			0			245			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.61			0.05			0.69			0.45	

### Intersection Summary

Cycle Length: 103  
 Actuated Cycle Length: 103  
 Offset: 23 (22%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 70  
 Control Type: Actuated-Coordinated

### Splits and Phases: 2: Washington St & Revere St/Driveway



Intersection Capacity Analysis  
 2: Washington St & Revere St/Driveway

08/22/2022

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	22.0
Total Split (s)	22.0
Total Split (%)	21%
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Intersection Capacity Analysis  
3: Washington St & Bolivar St

08/22/2022



Lane Group	NWL	NWR	NET	NER	SWL	SWT	Ø7
Lane Configurations							
Traffic Volume (vph)	197	119	453	161	99	492	
Future Volume (vph)	197	119	453	161	99	492	
Confl. Peds. (#/hr)	14	25		58	58		
Peak Hour Factor	0.83	0.83	0.97	0.97	0.95	0.95	
Growth Factor	104%	104%	104%	104%	104%	104%	
Heavy Vehicles (%)	2%	2%	1%	1%	2%	2%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	247	149	659	0	108	539	
Turn Type	Prot	pt+ov	NA		pm+pt	NA	
Protected Phases	8	8 1	2		1	6	7
Permitted Phases					6		
Detector Phase	8	8 1	2		1	6	
Switch Phase							
Minimum Initial (s)	5.0		10.0		2.0	10.0	7.0
Minimum Split (s)	10.5		15.5		7.5	15.5	20.0
Total Split (s)	21.0		50.0		9.0	59.0	20.0
Total Split (%)	21.0%		50.0%		9.0%	59.0%	20%
Yellow Time (s)	4.0		4.0		4.0	4.0	2.0
All-Red Time (s)	1.5		1.5		1.5	1.5	1.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	5.5		5.5		5.5	5.5	
Lead/Lag	Lag		Lead		Lag		Lead
Lead-Lag Optimize?	Yes		Yes		Yes		Yes
Recall Mode	None		C-Min		None	C-Min	None
v/c Ratio	0.87	0.32	0.71		0.34	0.48	
Control Delay	70.6	5.5	25.7		17.6	14.7	
Queue Delay	0.0	0.0	1.2		0.0	0.0	
Total Delay	70.6	5.5	26.9		17.6	14.7	
Queue Length 50th (ft)	149	0	374		35	234	
Queue Length 95th (ft)	#263	27	#552		60	309	
Internal Link Dist (ft)	291		172			533	
Turn Bay Length (ft)		150			200		
Base Capacity (vph)	293	468	945		319	1149	
Starvation Cap Reductn	0	0	119		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.84	0.32	0.80		0.34	0.47	

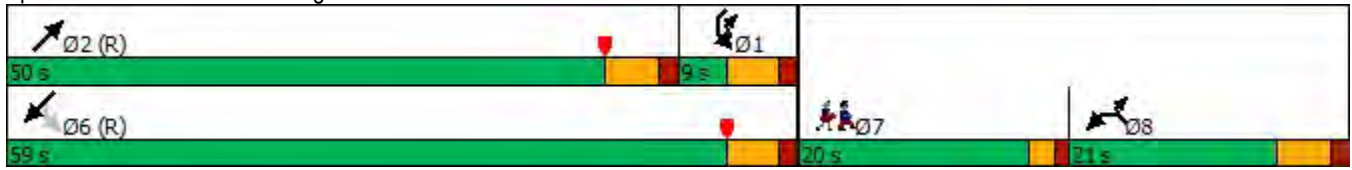
Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 100  
 Offset: 2 (2%), Referenced to phase 2:NET and 6:SWTL, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

# Intersection Capacity Analysis 3: Washington St & Bolivar St

08/22/2022

















Splits and Phases: 3: Washington St & Bolivar St



Intersection Capacity Analysis (HCM 2000 Unsignalized)

4: Washington St & Mechanic St/Wall St

08/22/2022

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	6	0	6	46	2	33	5	553	43	30	664	3
Future Volume (Veh/h)	6	0	6	46	2	33	5	553	43	30	664	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.60	0.60	0.60	0.92	0.92	0.92	0.95	0.95	0.95	0.92	0.92	0.92
Hourly flow rate (vph)	10	0	10	52	2	37	5	605	47	34	751	3
Pedestrians		9			32			10			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		1			3			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								205			252	
pX, platoon unblocked	0.91	0.91	0.83	0.91	0.91	0.82	0.83			0.82		
vC, conflicting volume	1509	1524	772	1511	1502	664	763			684		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1088	1104	622	1090	1080	482	612			507		
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 %	93	100	97	66	99	92	99			96		
cM capacity (veh/h)	149	177	400	154	183	467	800			847		
Direction, Lane #	SE 1	NW 1	NE 1	SW 1								
Volume Total	20	91	657	788								
Volume Left	10	52	5	34								
Volume Right	10	37	47	3								
cSH	218	213	800	847								
Volume to Capacity	0.09	0.43	0.01	0.04								
Queue Length 95th (ft)	8	49	0	3								
Control Delay (s)	23.2	33.9	0.2	1.1								
Lane LOS	C	D	A	A								
Approach Delay (s)	23.2	33.9	0.2	1.1								
Approach LOS	C	D										
<b>Intersection Summary</b>												
Average Delay				2.9								
Intersection Capacity Utilization			70.9%		ICU Level of Service					C		
Analysis Period (min)			15									



Intersection Capacity Analysis  
5: Church St & Washington St

08/22/2022



Lane Group	EBL	EBR	NEL	NET	SWT	SWR	Ø2	Ø3	Ø4	Ø5
Lane Configurations				↕	↕					
Traffic Volume (vph)	0	0	319	601	491	227				
Future Volume (vph)	0	0	319	601	491	227				
Confl. Peds. (#/hr)	4		6			6				
Peak Hour Factor	0.90	0.90	0.96	0.96	0.93	0.93				
Growth Factor	104%	104%	104%	104%	104%	104%				
Heavy Vehicles (%)	0%	0%	2%	2%	1%	1%				
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	0	997	803	0				
Turn Type			pm+pt	NA	NA					
Protected Phases			4 5	2 4 5	6		2	3	4	5
Permitted Phases			2 4 5							
Detector Phase			4 5	2 4 5	6					
Switch Phase										
Minimum Initial (s)					10.0		10.0	7.0	5.0	1.5
Minimum Split (s)					15.5		50.0	21.0	10.5	7.0
Total Split (s)					43.0		50.0	21.0	30.0	7.0
Total Split (%)					42.6%		50%	21%	30%	7%
Yellow Time (s)					4.0		4.0	2.0	4.0	4.0
All-Red Time (s)					1.5		1.5	1.0	1.5	1.0
Lost Time Adjust (s)					0.0					
Total Lost Time (s)					5.5					
Lead/Lag					Lead		Lead	Lag	Lag	
Lead-Lag Optimize?					Yes		Yes	Yes	Yes	
Recall Mode					C-Min		C-Min	None	None	None
v/c Ratio				1.09	1.18					
Control Delay				80.6	127.4					
Queue Delay				6.7	0.7					
Total Delay				87.3	128.0					
Queue Length 50th (ft)				550	~617					
Queue Length 95th (ft)				#1199	#851					
Internal Link Dist (ft)	599			58	125					
Turn Bay Length (ft)										
Base Capacity (vph)				918	678					
Starvation Cap Reductn				160	64					
Spillback Cap Reductn				0	0					
Storage Cap Reductn				0	0					
Reduced v/c Ratio				1.32	1.31					

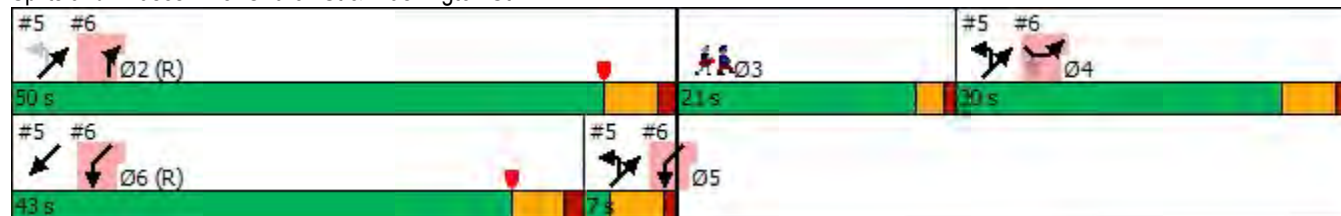
Intersection Summary

Cycle Length: 101  
 Actuated Cycle Length: 101  
 Offset: 0 (0%), Referenced to phase 2:NETL and 6:SWT, Start of Yellow  
 Natural Cycle: 145  
 Control Type: Actuated-Coordinated  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

# Intersection Capacity Analysis 5: Church St & Washington St

08/22/2022

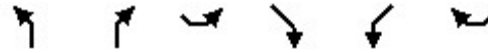
Splits and Phases: 5: Church St & Washington St



# Intersection Capacity Analysis

## 6: Washington St & Neponset St

08/22/2022

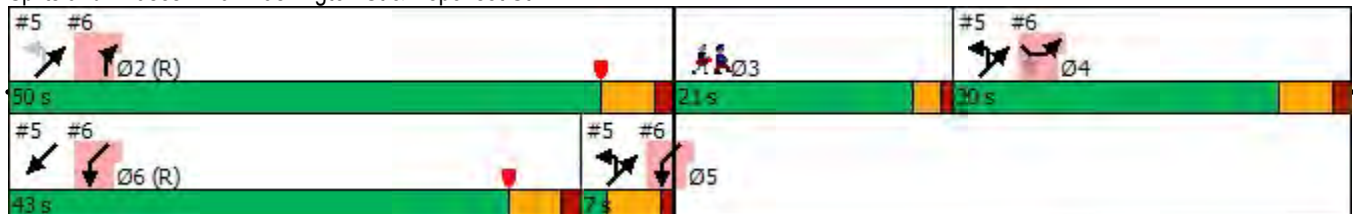


Lane Group	NBL	NBR	SEL	SER	SWL	SWR	Ø3	Ø5	Ø6
Lane Configurations		↗	↖	↗	↖				
Traffic Volume (vph)	0	729	192	360	481	0			
Future Volume (vph)	0	729	192	360	481	0			
Confl. Peds. (#/hr)	2		8	6		2			
Peak Hour Factor	0.91	0.91	0.96	0.96	0.92	0.92			
Growth Factor	104%	104%	104%	104%	104%	104%			
Heavy Vehicles (%)	1%	1%	2%	2%	1%	1%			
Shared Lane Traffic (%)									
Lane Group Flow (vph)	0	833	208	390	544	0			
Turn Type		Prot	Prot	Perm	Prot				
Protected Phases		2	4		5 6		3	5	6
Permitted Phases				4					
Detector Phase		2	4	4	5 6				
Switch Phase									
Minimum Initial (s)		10.0	5.0	5.0			7.0	1.5	10.0
Minimum Split (s)		50.0	10.5	10.5			21.0	7.0	15.5
Total Split (s)		50.0	30.0	30.0			21.0	7.0	43.0
Total Split (%)		49.5%	29.7%	29.7%			21%	7%	43%
Yellow Time (s)		4.0	4.0	4.0			2.0	4.0	4.0
All-Red Time (s)		1.5	1.5	1.5			1.0	1.0	1.5
Lost Time Adjust (s)		0.0	0.0	0.0					
Total Lost Time (s)		5.5	5.5	5.5					
Lead/Lag			Lag	Lag			Lead	Lag	Lead
Lead-Lag Optimize?			Yes	Yes			Yes	Yes	Yes
Recall Mode		C-Min	None	None			None	None	C-Min
v/c Ratio		0.77	0.29	0.46	0.68				
Control Delay		10.4	23.7	4.8	27.8				
Queue Delay		0.0	0.0	0.0	27.6				
Total Delay		10.4	23.7	4.8	55.3				
Queue Length 50th (ft)		71	81	0	272				
Queue Length 95th (ft)		248	188	77	396				
Internal Link Dist (ft)	658		508		153				
Turn Bay Length (ft)									
Base Capacity (vph)		1083	723	857	796				
Starvation Cap Reductn		0	0	0	267				
Spillback Cap Reductn		0	0	0	0				
Storage Cap Reductn		0	0	0	0				
Reduced v/c Ratio		0.77	0.29	0.46	1.03				

### Intersection Summary

Cycle Length: 101  
 Actuated Cycle Length: 101  
 Offset: 0 (0%), Referenced to phase 2:NETL and 6:SWT, Start of Yellow  
 Natural Cycle: 145  
 Control Type: Actuated-Coordinated

### Splits and Phases: 6: Washington St & Neponset St



Intersection Capacity Analysis (HCM 2000 Unsignalized)

7: Washington St & High St

08/22/2022






















Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	29	112	121	676	764	57
Future Volume (Veh/h)	29	112	121	676	764	57
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.71	0.71	0.98	0.98	0.96	0.96
Hourly flow rate (vph)	42	164	128	717	828	62
Pedestrians				1		
Lane Width (ft)				12.0		
Walking Speed (ft/s)				3.5		
Percent Blockage				0		
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1832	860	890			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1832	860	890			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	40	54	83			
cM capacity (veh/h)	70	357	766			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	206	128	717	890		
Volume Left	42	128	0	0		
Volume Right	164	0	0	62		
cSH	195	766	1700	1700		
Volume to Capacity	1.06	0.17	0.42	0.52		
Queue Length 95th (ft)	238	15	0	0		
Control Delay (s)	131.2	10.6	0.0	0.0		
Lane LOS	F	B				
Approach Delay (s)	131.2	1.6		0.0		
Approach LOS	F					
Intersection Summary						
Average Delay			14.6			
Intersection Capacity Utilization			71.5%	ICU Level of Service	C	
Analysis Period (min)			15			

Intersection Capacity Analysis (HCM 2000 Unsignalized)

8: Washington St & Shoppes Village Driveway

















08/22/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	3	32	44	0	216	10	599	63	288	563	25
Future Volume (Veh/h)	13	3	32	44	0	216	10	599	63	288	563	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.96	0.96	0.96	0.98	0.98	0.98	0.91	0.91	0.91
Hourly flow rate (vph)	17	4	42	48	0	234	11	636	67	329	643	29
Pedestrians		1			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								TWLTL				None
Median storage veh								2				
Upstream signal (ft)								872				
pX, platoon unblocked	0.93	0.93		0.93	0.93	0.93				0.93		
vC, conflicting volume	2242	2042	658	2038	2024	670	673			704		
vC1, stage 1 conf vol	1316	1316		692	692							
vC2, stage 2 conf vol	926	726		1345	1331							
vCu, unblocked vol	2301	2086	658	2080	2065	605	673			641		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	95	91	46	100	49	99			63		
cM capacity (veh/h)	9	78	462	88	121	461	917			878		
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1	SB 2						
Volume Total	63	48	234	714	329	672						
Volume Left	17	48	0	11	329	0						
Volume Right	42	0	234	67	0	29						
cSH	30	88	461	917	878	1700						
Volume to Capacity	2.11	0.54	0.51	0.01	0.37	0.40						
Queue Length 95th (ft)	184	60	70	1	44	0						
Control Delay (s)	798.4	86.3	20.6	0.3	11.5	0.0						
Lane LOS	F	F	C	A	B							
Approach Delay (s)	798.4	31.8		0.3	3.8							
Approach LOS	F	D										
Intersection Summary												
Average Delay			30.7									
Intersection Capacity Utilization			89.4%	ICU Level of Service		E						
Analysis Period (min)			15									

Intersection Capacity Analysis (HCM 2000 Unsignalized)

9: Washington St & Plaza Driveway

08/22/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	1	43	74	0	62	17	581	108	41	597	5
Future Volume (Veh/h)	19	1	43	74	0	62	17	581	108	41	597	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.73	0.73	0.73	0.96	0.96	0.96	0.99	0.99	0.99	0.92	0.92	0.92
Hourly flow rate (vph)	27	1	61	80	0	67	18	610	113	46	675	6
Pedestrians		1			3							
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								TWLTL			TWLTL	
Median storage veh								2			2	
Upstream signal (ft)								624				
pX, platoon unblocked	0.88	0.88		0.88	0.88	0.88				0.88		
vC, conflicting volume	1540	1533	679	1537	1480	670	682			726		
vC1, stage 1 conf vol	771	771		706	706							
vC2, stage 2 conf vol	770	762		832	774							
vCu, unblocked vol	1546	1537	679	1542	1477	559	682			623		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	100	87	66	100	86	98			95		
cM capacity (veh/h)	230	271	455	235	290	467	910			847		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	89	147	741	727								
Volume Left	27	80	18	46								
Volume Right	61	67	113	6								
cSH	349	304	910	847								
Volume to Capacity	0.26	0.48	0.02	0.05								
Queue Length 95th (ft)	25	62	2	4								
Control Delay (s)	18.8	27.4	0.5	1.4								
Lane LOS	C	D	A	A								
Approach Delay (s)	18.8	27.4	0.5	1.4								
Approach LOS	C	D										
Intersection Summary												
Average Delay			4.2									
Intersection Capacity Utilization			75.0%		ICU Level of Service					D		
Analysis Period (min)			15									

Intersection Capacity Analysis (HCM 2000 Unsignalized)

10: Washington St & Cobb Corner

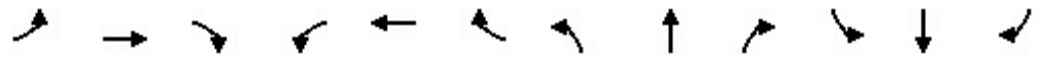
08/22/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	19	4	5	67	5	113	22	559	90	89	582	27
Future Volume (Veh/h)	19	4	5	67	5	113	22	559	90	89	582	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.70	0.70	0.98	0.98	0.98	0.91	0.91	0.91	0.95	0.95	0.95
Hourly flow rate (vph)	28	6	7	71	5	120	25	639	103	97	637	30
Pedestrians		3										2
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								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)								423				
pX, platoon unblocked	0.86	0.86		0.86	0.86	0.86				0.86		
vC, conflicting volume	1714	1641	655	1596	1604	692	670			742		
vC1, stage 1 conf vol	849	849		740	740							
vC2, stage 2 conf vol	865	792		856	864							
vCu, unblocked vol	1749	1664	655	1612	1622	561	670			618		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	79	97	99	69	98	74	97			88		
cM capacity (veh/h)	132	222	468	230	248	456	922			831		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	41	196	767	764								
Volume Left	28	71	25	97								
Volume Right	7	120	103	30								
cSH	162	331	922	831								
Volume to Capacity	0.25	0.59	0.03	0.12								
Queue Length 95th (ft)	24	90	2	10								
Control Delay (s)	34.6	30.5	0.7	2.9								
Lane LOS	D	D	A	A								
Approach Delay (s)	34.6	30.5	0.7	2.9								
Approach LOS	D	D										
<b>Intersection Summary</b>												
Average Delay			5.8									
Intersection Capacity Utilization			94.0%		ICU Level of Service				F			
Analysis Period (min)			15									

Intersection Capacity Analysis  
 11: Bay Rd/Washington St & N Main St/Sharon St

08/22/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←↑			←↑			←↑		←↑	←↑	
Traffic Volume (vph)	183	270	35	90	329	90	33	309	46	249	255	148
Future Volume (vph)	183	270	35	90	329	90	33	309	46	249	255	148
Confl. Peds. (#/hr)			1	1			3					3
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.86	0.86	0.86	0.93	0.93	0.93
Growth Factor	104%	104%	104%	104%	104%	104%	104%	104%	104%	104%	104%	104%
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	552	0	0	564	0	0	470	0	278	451	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	7	4			8			6		5	2	
Permitted Phases	4			8			6			2		
Detector Phase	7	4		8	8		6	6		5	2	
Switch Phase												
Minimum Initial (s)	6.0	15.0		15.0	15.0		15.0	15.0		6.0	15.0	
Minimum Split (s)	11.0	21.0		21.0	21.0		21.0	21.0		11.0	21.0	
Total Split (s)	20.0	56.0		36.0	36.0		26.0	26.0		20.0	46.0	
Total Split (%)	15.6%	43.8%		28.1%	28.1%		20.3%	20.3%		15.6%	35.9%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0			6.0		5.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Recall Mode	None	None		None	None		None	None		None	None	
v/c Ratio		0.93dl			0.70			0.63		0.56	0.52	
Control Delay		34.7			29.7			36.8		24.0	22.3	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		34.7			29.7			36.8		24.0	22.3	
Queue Length 50th (ft)		124			120			104		73	130	
Queue Length 95th (ft)		263			251			#291		#276	#464	
Internal Link Dist (ft)		217			198			180			132	
Turn Bay Length (ft)												
Base Capacity (vph)		1257			938			741		498	861	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.44			0.60			0.63		0.56	0.52	

Intersection Summary

Cycle Length: 128  
 Actuated Cycle Length: 87.1  
 Natural Cycle: 100  
 Control Type: Actuated-Uncoordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

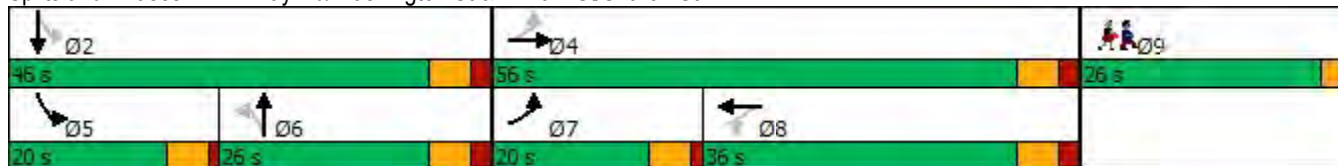


# Intersection Capacity Analysis

## 11: Bay Rd/Washington St & N Main St/Sharon St

08/22/2022

Splits and Phases: 11: Bay Rd/Washington St & N Main St/Sharon St



Lane Group	09
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	26.0
Total Split (s)	26.0
Total Split (%)	20%
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
<b>Intersection Summary</b>	

Intersection Capacity Analysis (HCM 2000 Unsignalized)

12: Washington St & Starbucks Driveway

08/22/2022



















Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	6	1	30	19	0	40	33	579	40	10	577	15
Future Volume (Veh/h)	6	1	30	19	0	40	33	579	40	10	577	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.71	0.71	0.71	0.92	0.92	0.92	0.96	0.96	0.96	0.84	0.84	0.84
Hourly flow rate (vph)	9	1	44	21	0	45	36	627	43	12	714	19
Pedestrians		2										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		3.5										
Percent Blockage		0										
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage (veh)											2	
Upstream signal (ft)								212				
pX, platoon unblocked	0.90	0.90		0.90	0.90	0.90				0.90		
vC, conflicting volume	1180	1492	368	1146	1480	335	735			670		
vC1, stage 1 conf vol	750	750		720	720							
vC2, stage 2 conf vol	430	742		426	759							
vCu, unblocked vol	974	1320	368	936	1307	33	735			406		
tC, single (s)	7.6	6.6	7.0	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)	6.6	5.6		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	93	94	100	95	96			99		
cM capacity (veh/h)	336	323	625	371	313	928	858			1026		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	54	66	350	356	369	376						
Volume Left	9	21	36	0	12	0						
Volume Right	44	45	0	43	0	19						
cSH	538	628	858	1700	1026	1700						
Volume to Capacity	0.10	0.11	0.04	0.21	0.01	0.22						
Queue Length 95th (ft)	8	9	3	0	1	0						
Control Delay (s)	12.4	11.4	1.4	0.0	0.4	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	12.4	11.4	0.7		0.2							
Approach LOS	B	B										
<b>Intersection Summary</b>												
Average Delay			1.3									
Intersection Capacity Utilization			53.0%		ICU Level of Service				A			
Analysis Period (min)			15									

Intersection Capacity Analysis (HCM 2000 Unsignalized)

13: Sharon St & Cobb Corner Dr

08/22/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	34	538	62	15	506	1	44	4	48	29	7	42
Future Volume (Veh/h)	34	538	62	15	506	1	44	4	48	29	7	42
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.94	0.94	0.94	0.85	0.85	0.85	0.84	0.84	0.84
Hourly flow rate (vph)	40	636	73	17	560	1	54	5	59	36	9	52
Pedestrians												1
Lane Width (ft)												12.0
Walking Speed (ft/s)												3.5
Percent Blockage												0
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		278										
pX, platoon unblocked												
vC, conflicting volume	562			709			1404	1348	354	1055	1384	562
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	562			709			1404	1348	354	1055	1384	562
tC, single (s)	4.1			4.1			7.6	6.6	7.0	7.5	6.5	6.9
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 %	96			98			32	96	91	76	93	89
cM capacity (veh/h)	1004			893			80	140	639	153	135	473
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total	358	391	578	118	97							
Volume Left	40	0	17	54	36							
Volume Right	0	73	1	59	52							
cSH	1004	1700	893	146	235							
Volume to Capacity	0.04	0.23	0.02	0.81	0.41							
Queue Length 95th (ft)	3	0	1	128	47							
Control Delay (s)	1.4	0.0	0.5	90.3	30.6							
Lane LOS	A		A	F	D							
Approach Delay (s)	0.6		0.5	90.3	30.6							
Approach LOS				F	D							
Intersection Summary												
Average Delay			9.3									
Intersection Capacity Utilization			55.2%		ICU Level of Service				B			
Analysis Period (min)			15									

Intersection Capacity Analysis (HCM 2000 Unsignalized)

14: Sharon St & Village Shoppes Dr

08/22/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕						↕	↕
Traffic Volume (veh/h)	5	536	40	15	531	151	0	0	0	136	1	105
Future Volume (Veh/h)	5	536	40	15	531	151	0	0	0	136	1	105
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.94	0.94	0.94	0.92	0.92	0.92	0.87	0.87	0.87
Hourly flow rate (vph)	6	633	47	17	587	167	0	0	0	163	1	126
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		591										
pX, platoon unblocked				0.85			0.85	0.85	0.85	0.85	0.85	
vC, conflicting volume	754			680			1500	1456	656	1373	1396	670
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	754			536			1499	1449	509	1351	1378	670
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			98			100	100	100	0	99	73
cM capacity (veh/h)	856			882			60	109	480	107	121	460
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	686	771	164	126								
Volume Left	6	17	163	0								
Volume Right	47	167	0	126								
cSH	856	882	107	460								
Volume to Capacity	0.01	0.02	1.53	0.27								
Queue Length 95th (ft)	1	1	303	28								
Control Delay (s)	0.2	0.5	349.6	15.7								
Lane LOS	A	A	F	C								
Approach Delay (s)	0.2	0.5	204.5									
Approach LOS			F									
Intersection Summary												
Average Delay			34.3									
Intersection Capacity Utilization			63.5%		ICU Level of Service				B			
Analysis Period (min)			15									