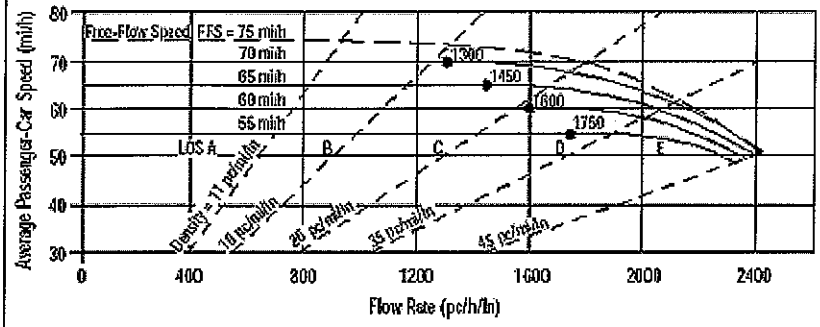
Appendix 4.1-I

Capacity Analysis

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/21/08*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route I-93 South of F.B.P.*
Jurisdiction	*Braintree*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7845*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.943*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*4*	
FFS (measured)	*58.3*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*58.3*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2121*	pc/h/ln
S	*54.8*	mi/h
D = v_p / S	*38.7*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

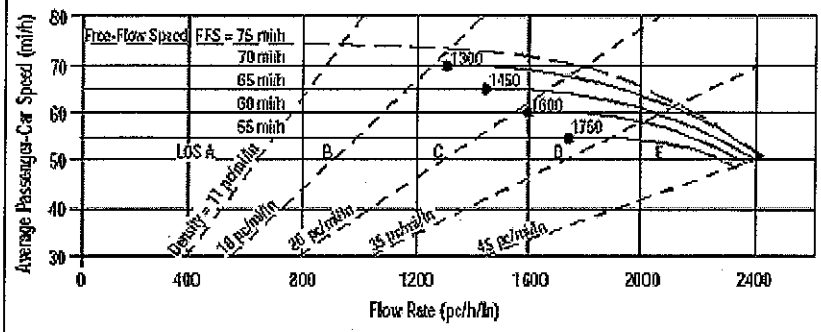
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/21/08*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route I-93 South of F.B.P.*
Jurisdiction	*Braintree*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5310*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*4*	
FFS (measured)	*58.3*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*58.3*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1431*	pc/h/ln
S	*58.3*	mi/h
D = v_p / S	*24.5*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

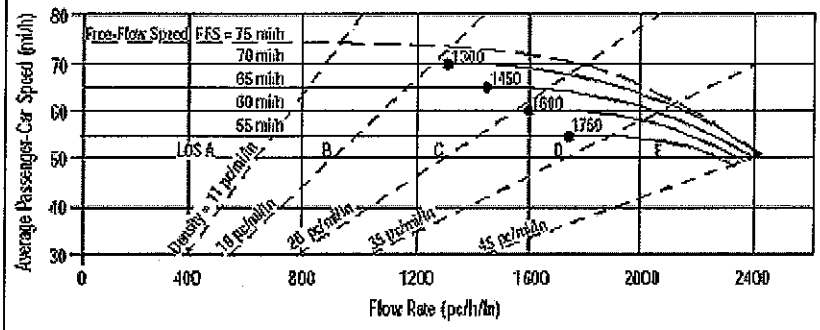
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		Site Information	
Analyst	*JBB*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route I-93 South of F.B.P.*
Date Performed	*11/21/08*	Jurisdiction	*Braintree*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*5085*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

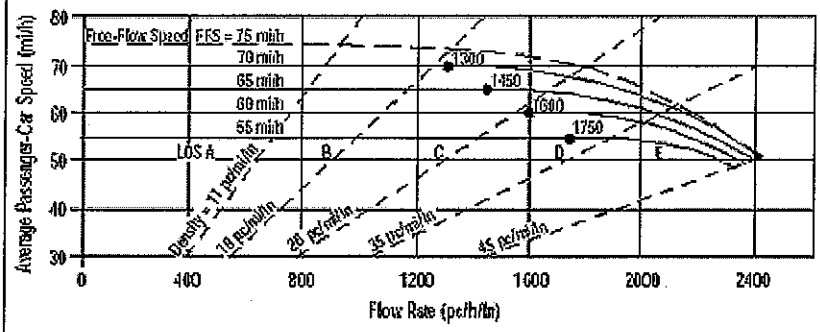
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*4*		f_N		mi/h
FFS (measured)	*59.0*	mi/h	FFS	*59.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			Design (N)		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1385*	pc/h/ln	Design LOS		
S	*59.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*23.5*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		Site Information	
Analyst	*JBB*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route I-93 South of F.B.P.*
Date Performed	*11/21/08*	Jurisdiction	*Braintree*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*7255*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

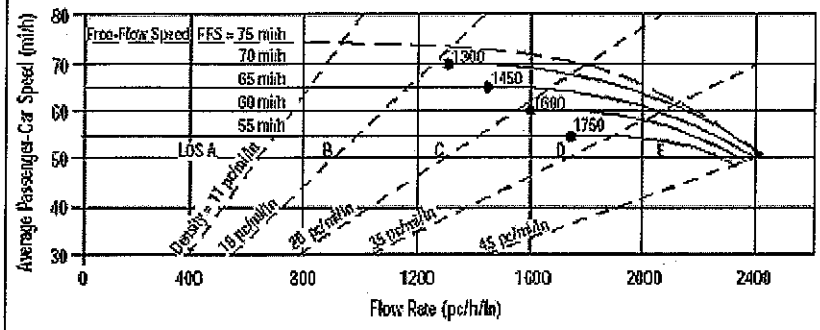
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*4*		f_N		mi/h
FFS (measured)	*59.0*	mi/h	FFS	*59.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			Design (N)		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1935*	pc/h/ln	Design LOS		
			v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S	*57.9*	mi/h	S		mi/h
D = v_p / S	*33.4*	pc/mi/ln	D = v_p / S		pc/mi/ln
LOS	*D*		Required Number of Lanes, N		

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/21/08*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route I-93 South of Route 3*
Jurisdiction	*Braintree*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5955*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*4*	
FFS (measured)	*66.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*66.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1628*	pc/h/ln
S	*65.7*	mi/h
D = v_p / S	*24.8*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

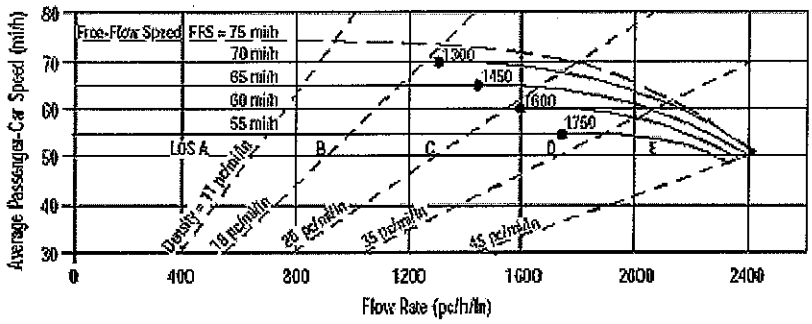
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/18/2008*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route I-93 South of Route 3*
Jurisdiction	*Braintree*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4755*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*4*	
FFS (measured)	*66.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*66.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1275*	pc/h/ln
S	*66.0*	mi/h
D = v_p / S	*19.3*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

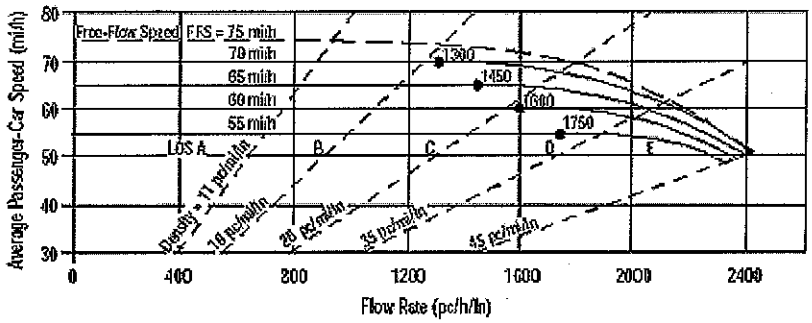
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		Site Information	
Analyst	*JBB*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route I-93 South of Route 3*
Date Performed	*11/21/08*	Jurisdiction	*Braintree*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6985*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*4*	
FFS (measured)	*64.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*64.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1845*	pc/h/ln
S	*62.7*	mi/h
D = v_p / S	*29.4*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

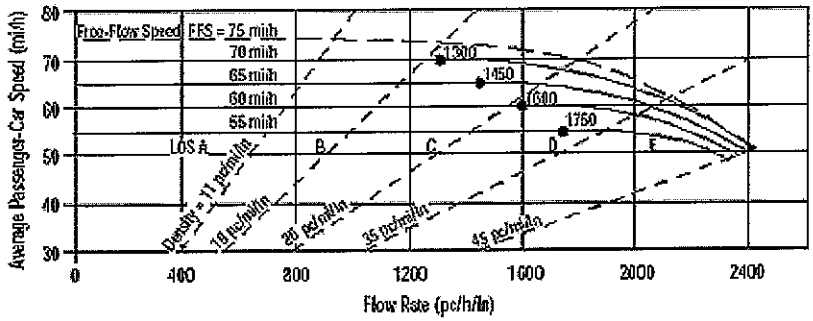
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/21/08*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route I-93 South of Route 3*
Jurisdiction	*Braintree*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7375*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*4*	
FFS (measured)	*64.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*64.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1948*	pc/h/ln
S	*61.5*	mi/h
D = v_p / S	*31.7*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

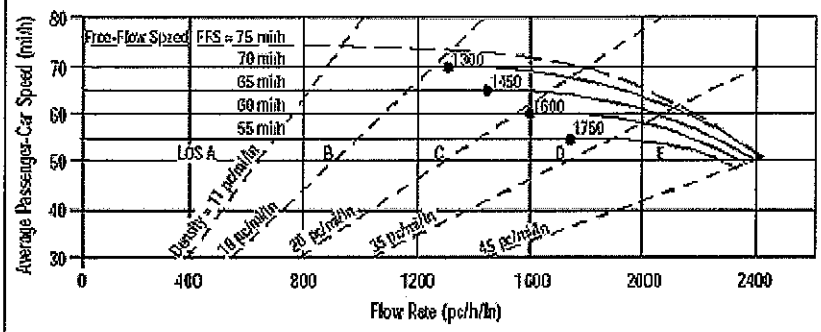
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBC*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/18/08*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 South of Route I-93*
Jurisdiction	*Randolph*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5102*	veh/h	Peak-Hour Factor, PHF	*0.89*
AADT		veh/day	%Trucks and Buses, P_T	*16*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.926*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*63.9*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*63.9*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2064*	pc/h/ln
S	*59.5*	mi/h
D = v_p / S	*34.7*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

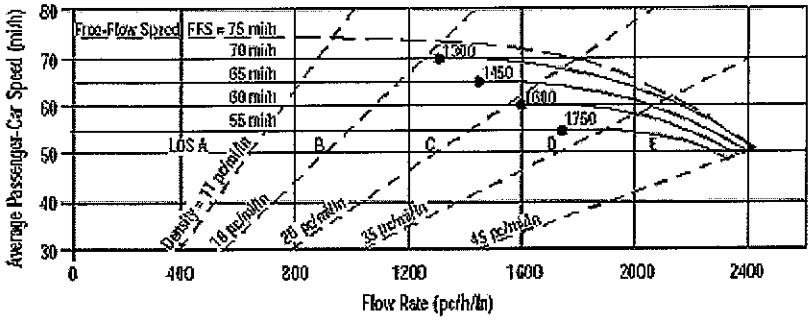
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/18/08*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 South of Route I-93*
Jurisdiction	*Randolph*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2775*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*63.9*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*63.9*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*998*	pc/h/ln
S	*63.9*	mi/h
D = v_p / S	*15.6*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

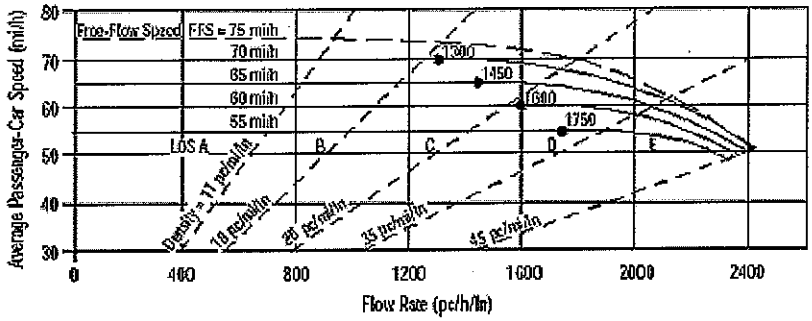
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/18/08*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 South of Route I-93*
Jurisdiction	*Randolph*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3400*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*65.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*65.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1261*	pc/h/ln
S	*65.8*	mi/h
D = v_p / S	*19.2*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

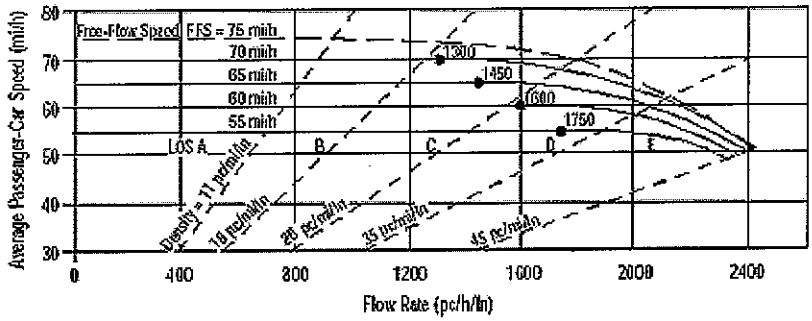
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/18/08*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 South of Route I-93*
Jurisdiction	*Randolph*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6110*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*65.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*65.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2141*	pc/h/ln
S	*59.1*	mi/h
D = v_p / S	*36.2*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

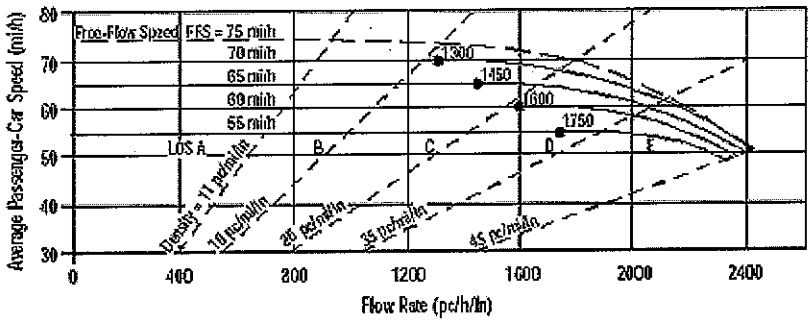
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/21/08*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24, South of Pond St.*
Jurisdiction	*Avon*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5355*	veh/h	Peak-Hour Factor, PHF	*0.99*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*66.4*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*66.4*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1893*	pc/h/ln
S	*64.0*	mi/h
D = v_p / S	*29.6*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

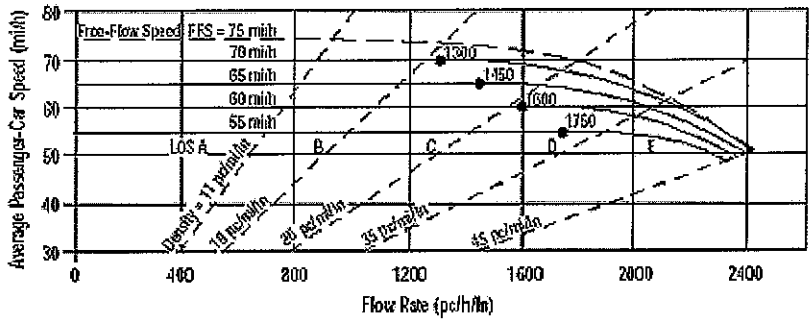
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/21/08*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24, South of Pond St.*
Jurisdiction	*Avon*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3330*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*70.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1184*	pc/h/ln
S	*70.0*	mi/h
D = v_p / S	*16.9*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

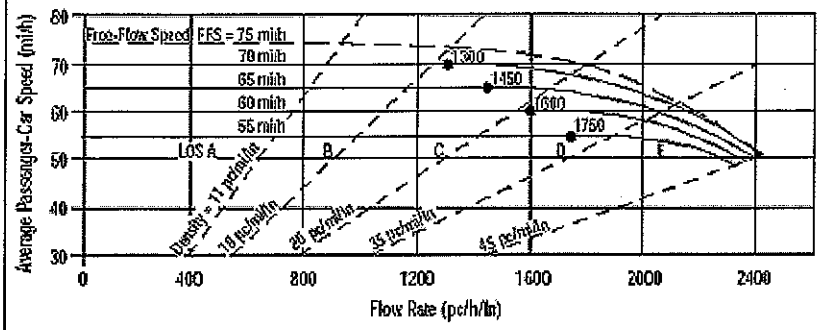
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/21/08*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24, South of Pond St.*
Jurisdiction	*Avon*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3075*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*9*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.957*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*67.1*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*67.1*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1104*	pc/h/ln
S	*67.1*	mi/h
D = v_p / S	*16.5*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

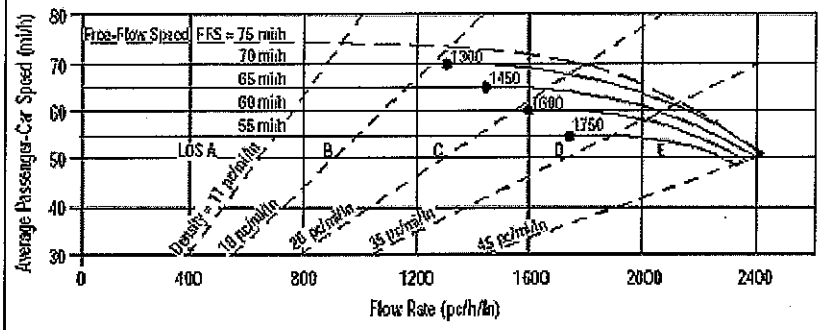
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/21/08*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24, South of Pond St.*
Jurisdiction	*Avon*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6010*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*67.1*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*67.1*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2117*	pc/h/ln
S	*60.5*	mi/h
D = v_p / S	*35.0*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

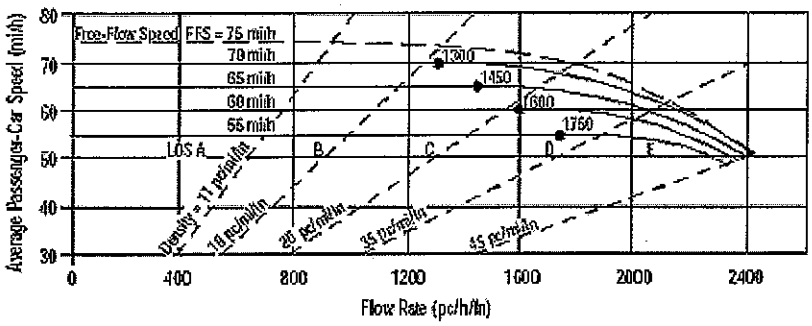
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/21/08*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 123*
Jurisdiction	*Brockton*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5405*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*67.1*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*67.1*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1950*	pc/h/ln
S	*63.7*	mi/h
D = v_p / S	*30.6*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

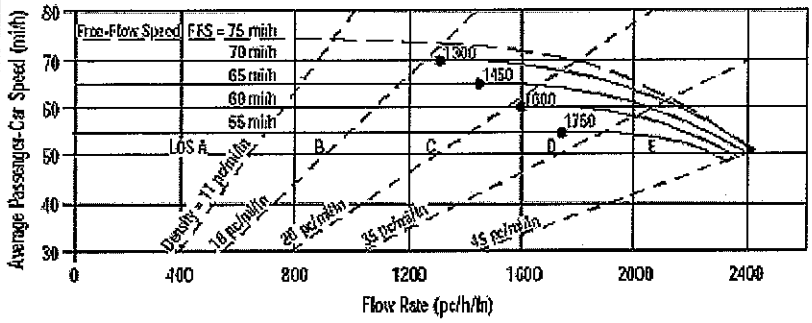
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/21/08*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 123*
Jurisdiction	*Brockton*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3260*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*67.1*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*67.1*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1172*	pc/h/ln
S	*67.1*	mi/h
D = v_p / S	*17.5*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

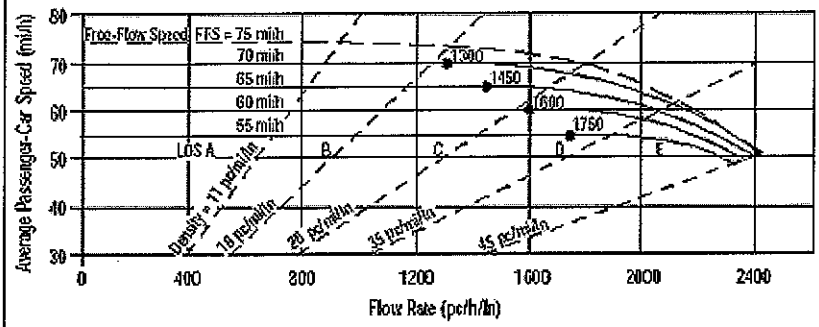
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/21/08*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of Route 123*
Jurisdiction	*Brockton*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2350*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*69.3*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.3*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*858*	pc/h/ln
S	*69.3*	mi/h
D = v_p / S	*12.4*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

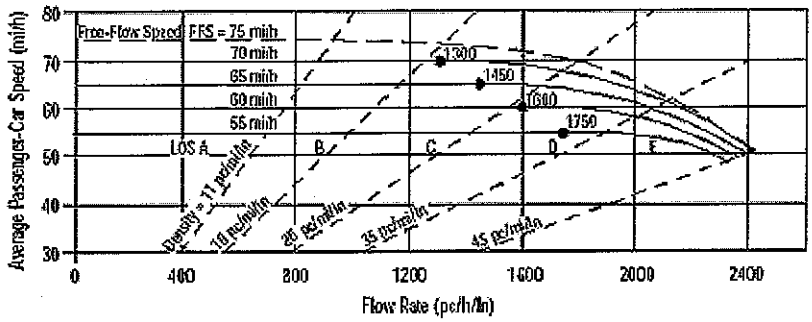
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/21/08*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of Route 123*
Jurisdiction	*Brockton*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5445*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*69.3*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.3*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1889*	pc/h/ln
S	*66.2*	mi/h
D = v_p / S	*28.5*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

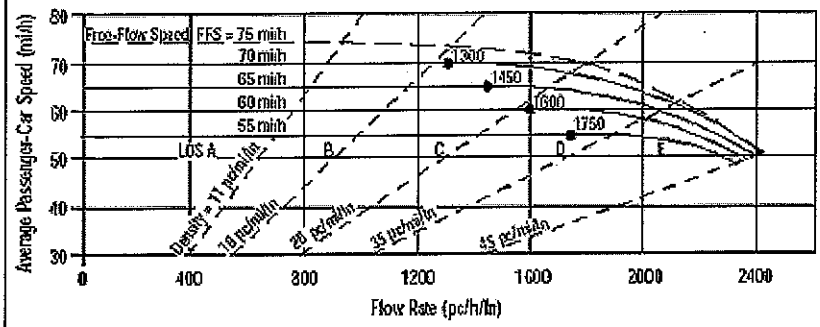
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/21/08*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route I-495*
Jurisdiction	*Raynham*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5260*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*66.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*66.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1881*	pc/h/ln
S	*64.5*	mi/h
D = v_p / S	*29.2*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

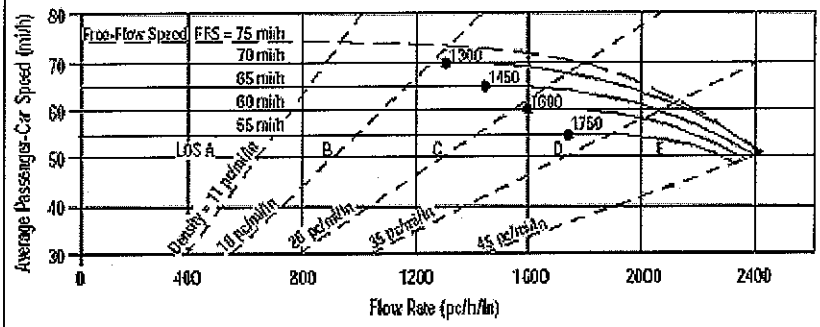
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/21/08*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of I-495*
Jurisdiction	*Raynham*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3435*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*66.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*66.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1241*	pc/h/ln
S	*66.8*	mi/h
D = v_p / S	*18.6*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

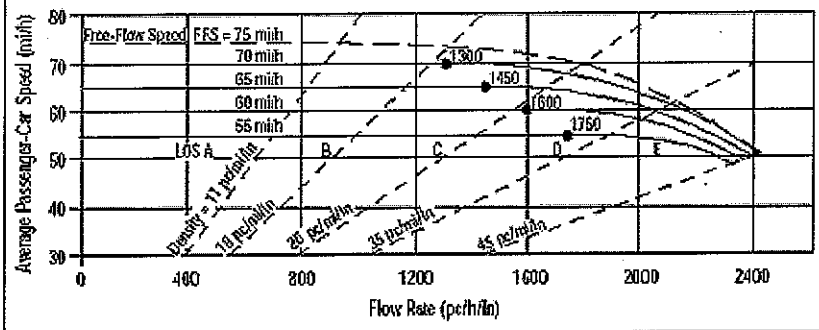
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/21/08*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of I-495*
Jurisdiction	*Raynham*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2630*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*63.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*63.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*949*	pc/h/ln
S	*63.0*	mi/h
D = v_p / S	*15.1*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

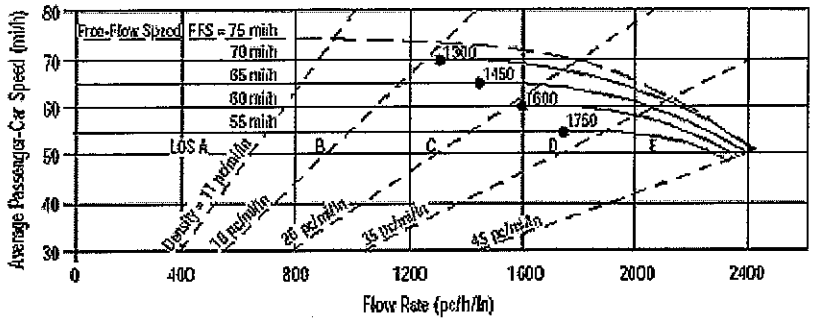
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/21/08*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of I-495*
Jurisdiction	*Raynham*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4755*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*63.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*63.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1666*	pc/h/ln
S	*62.8*	mi/h
D = v_p / S	*26.5*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

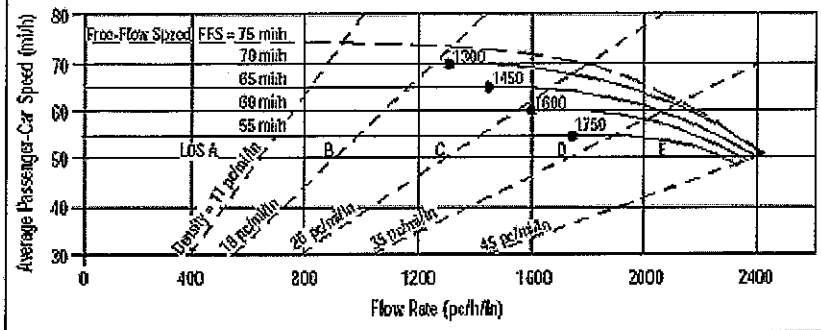
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBC*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/18/2008*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 44*
Jurisdiction	*Taunton*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3930*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*71.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*71.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2137*	pc/h/ln
S	*62.1*	mi/h
D = v_p / S	*34.4*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

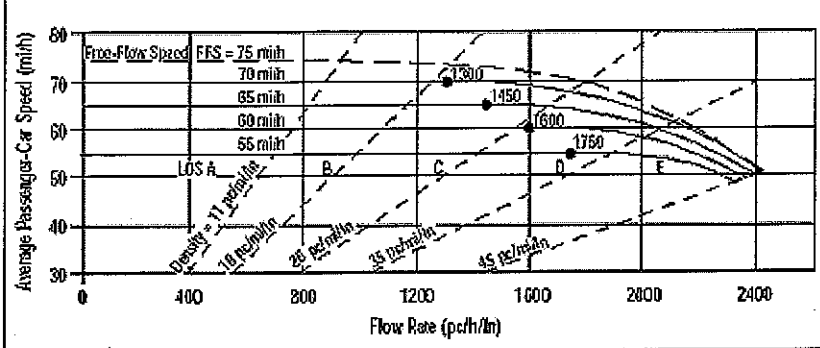
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBC*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/19/2008*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 44*
Jurisdiction	*Taunton*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2475*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*71.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*71.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1397*	pc/h/ln
S	*70.9*	mi/h
D = v_p / S	*19.7*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

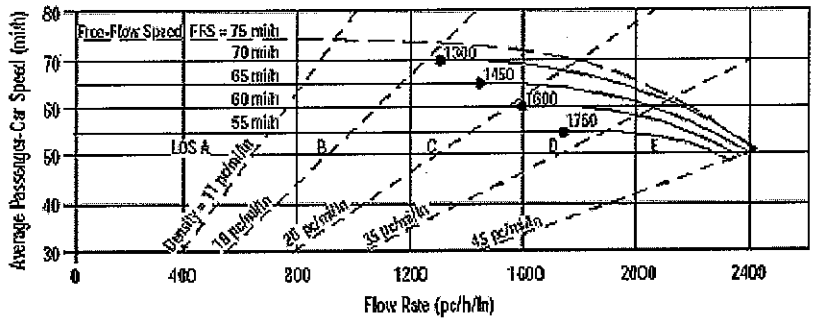
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBC*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/19/2008*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of Route 44*
Jurisdiction	*Taunton*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2110*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*69.7*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.7*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1159*	pc/h/ln
S	*69.7*	mi/h
D = v_p / S	*16.6*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

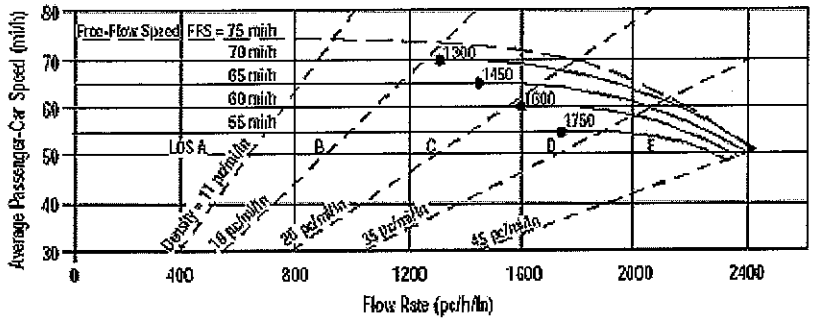
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBC*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/19/2008*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of Route 44*
Jurisdiction	*Taunton*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3860*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.943*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*69.7*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.7*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2088*	pc/h/ln
S	*62.8*	mi/h
D = v_p / S	*33.2*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

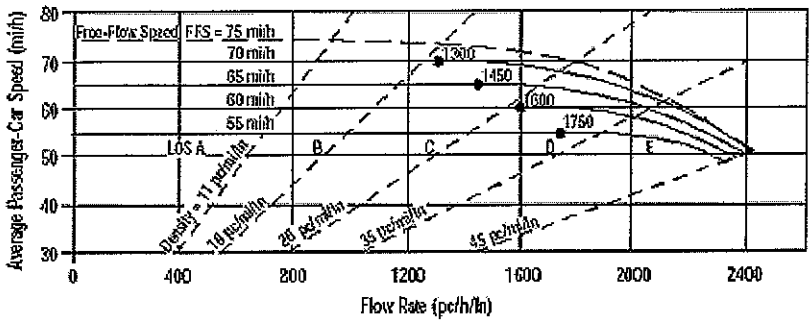
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBC*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/18/2008*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 South of Route 140*
Jurisdiction	*Taunton*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*1110*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*9*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.957*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*70.1*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.1*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*611*	pc/h/ln
S	*70.1*	mi/h
D = v_p / S	*8.7*	pc/mi/ln
LOS	*A*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

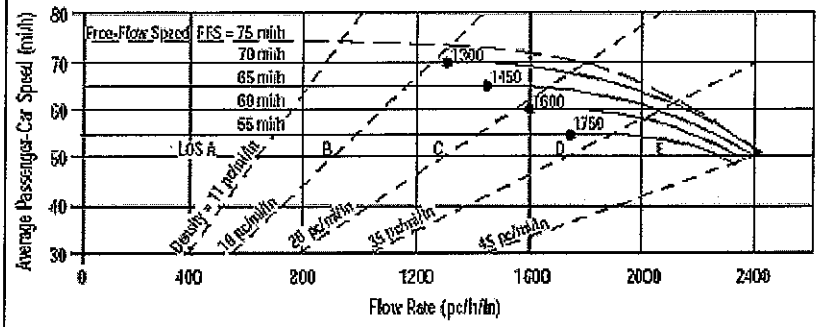
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		Site Information	
Analyst	*JBC*	Highway/Direction of Travel	*Northbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24 South of Route 140*
Date Performed	*11/18/2008*	Jurisdiction	*Taunton*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*1255*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

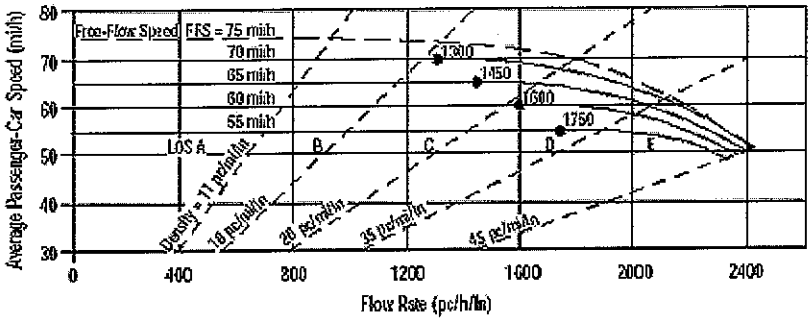
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*70.1*	mi/h	FFS	*70.1*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			Design (N)		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*715*	pc/h/ln	Design LOS		
S	*70.1*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*10.2*	pc/mi/ln	S		mi/h
LOS	*A*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBC*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/18/2008*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 South of Route 140*
Jurisdiction	*Taunton*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*1355*	veh/h	Peak-Hour Factor, PHF	*0.92*
AADT		veh/day	%Trucks and Buses, P_T	*9*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.957*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*70.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*770*	pc/h/ln
S	*70.0*	mi/h
D = v_p / S	*11.0*	pc/mi/ln
LOS	*A*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

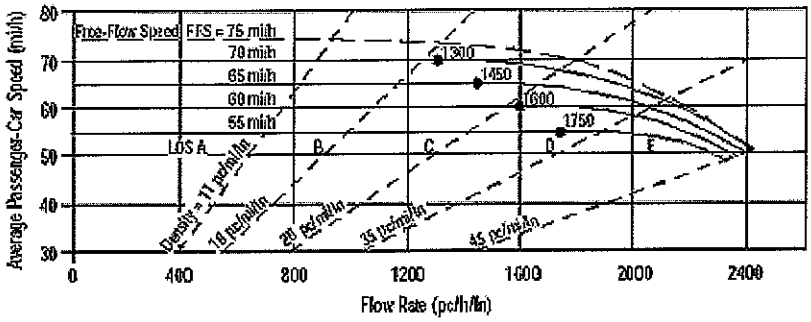
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBC*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/18/2008*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 South of Route 140*
Jurisdiction	*Taunton*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2875*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*70.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1560*	pc/h/ln
S	*69.6*	mi/h
D = v_p / S	*22.4*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

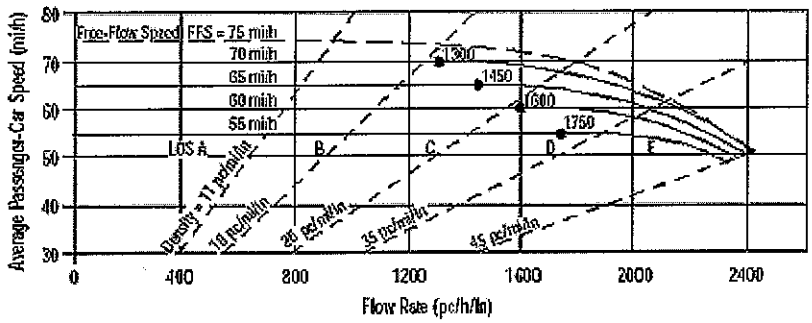
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBC*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/19/08*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Eastbound*
From/To	*Route 140 South of Route 24*
Jurisdiction	*Taunton*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*830*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*65.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*469*	pc/h/ln
S	*65.0*	mi/h
D = v_p / S	*7.2*	pc/mi/ln
LOS	*A*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

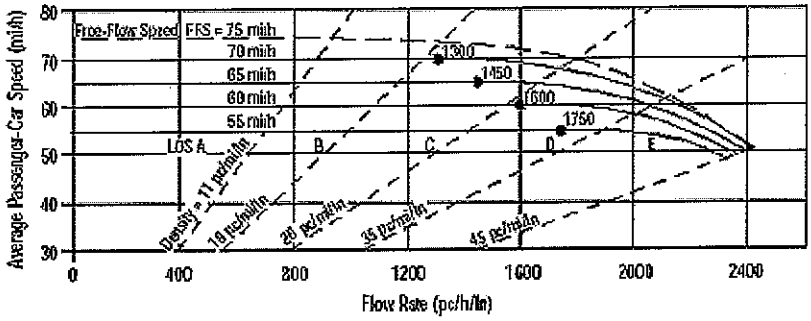
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBC*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/19/08*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Eastbound*
From/To	*Route 140 South of Route 24*
Jurisdiction	*Taunton*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*1740*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*65.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*924*	pc/h/ln
S	*65.0*	mi/h
D = v_p / S	*14.2*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

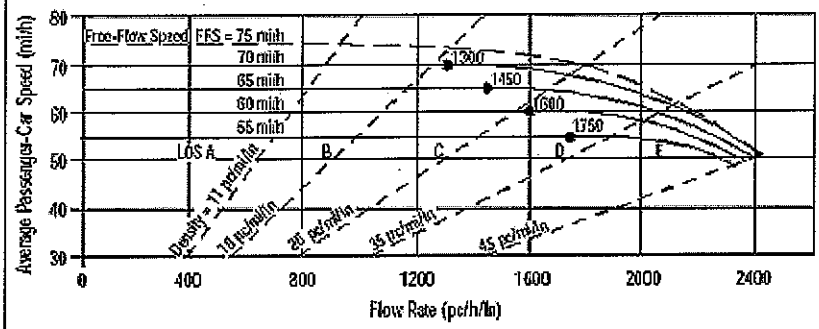
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		Site Information	
Analyst	*JBC*	Highway/Direction of Travel	*Westbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 140 South of Route 24*
Date Performed	*11/18/2008*	Jurisdiction	*Taunton*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*1595*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

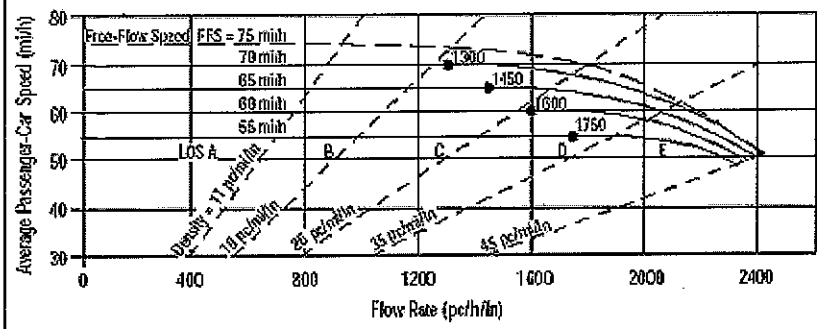
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*66.8*	mi/h	FFS	*66.8*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			Design (N)		
Operational (LOS)			Design (N)		
			Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*883*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S	*66.8*	mi/h	S		mi/h
D = v_p / S	*13.2*	pc/mi/ln	D = v_p / S		pc/mi/ln
LOS	*B*		Required Number of Lanes, N		

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBC*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/18/2008*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Westbound*
From/To	*Route 140 South of Route 24*
Jurisdiction	*Taunton*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*1060*	veh/h	Peak-Hour Factor, PHF	*0.92*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*66.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*66.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*593*	pc/h/ln
S	*66.8*	mi/h
D = v_p / S	*8.9*	pc/mi/ln
LOS	*A*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

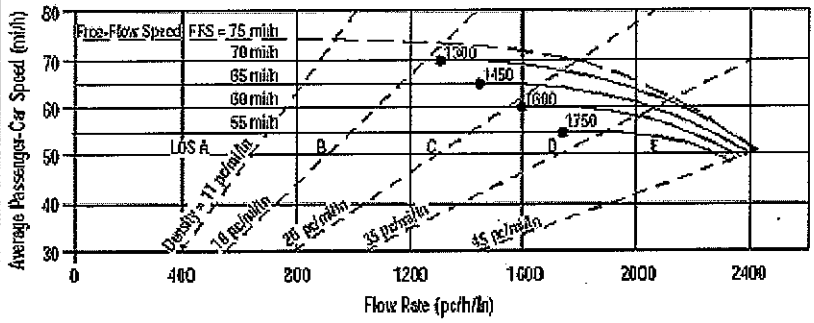
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBC*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/18/2008*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 140 North of Hathaway Rd*
Jurisdiction	*New Bedford*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2015*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*9*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.957*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*69.3*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.3*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1120*	pc/h/ln
S	*69.3*	mi/h
D = v_p / S	*16.2*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

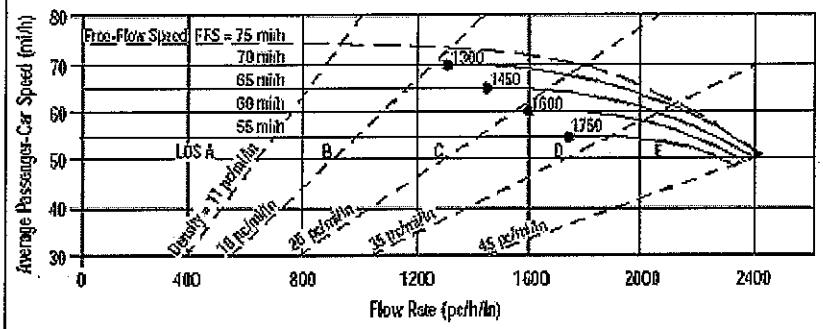
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBC*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/18/2008*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 140 North of Hathaway Rd*
Jurisdiction	*New Bedford*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2085*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*69.3*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.3*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1153*	pc/h/ln
S	*69.3*	mi/h
D = v_p / S	*16.6*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

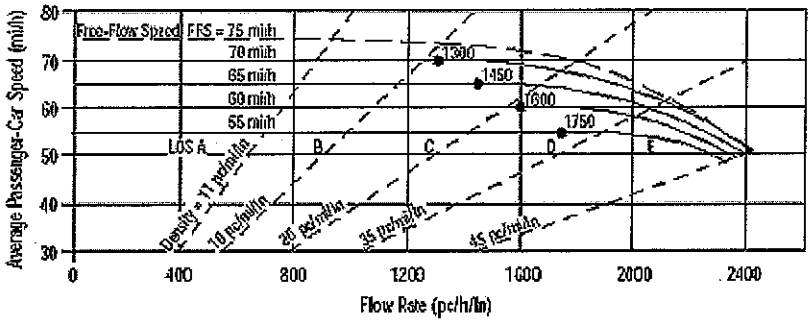
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		Site Information	
Analyst	*JBC*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 140 North of Hathaway Rd*
Date Performed	*11/18/2008*	Jurisdiction	*New Bedford*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*2160*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

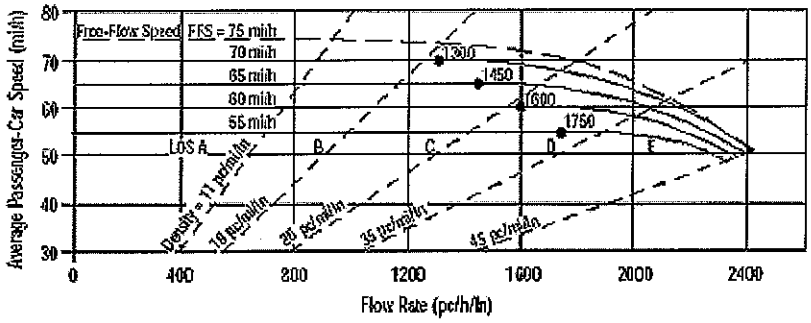
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*62.2*	mi/h	FFS	*62.2*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			Design (N)	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1196*	pc/h/ln	Design LOS	
S	*62.2*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
D = v_p / S	*19.2*	pc/mi/ln	S	mi/h
LOS	*C*		D = v_p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBC*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/18/2008*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 140 North of Hathaway Rd*
Jurisdiction	*New Bedford*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2225*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*62.2*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*62.2*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1194*	pc/h/ln
S	*62.2*	mi/h
D = v_p / S	*19.2*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

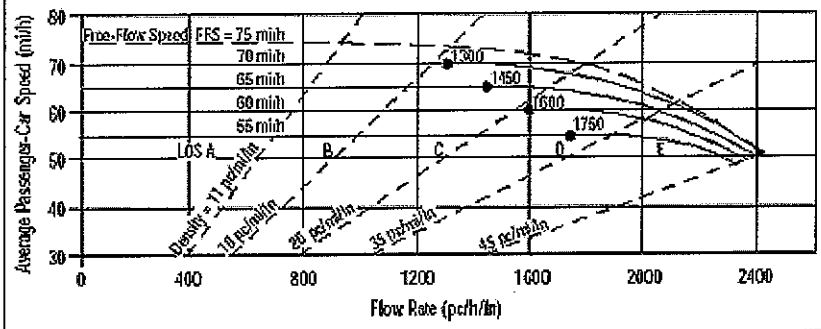
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/19/08*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 at Freetown Line*
Jurisdiction	*Fall River*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2030*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*70.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1162*	pc/h/ln
S	*70.8*	mi/h
D = v_p / S	*16.4*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

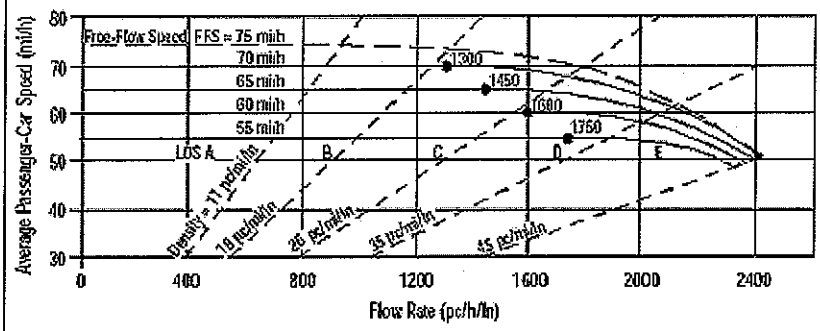
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/19/08*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 at Freetown Line*
Jurisdiction	*Fall River*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*1890*	veh/h	Peak-Hour Factor, PHF	*0.86*
AADT		veh/day	%Trucks and Buses, P_T	*3*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.985*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*70.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1115*	pc/h/ln
S	*70.8*	mi/h
D = v_p / S	*15.7*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

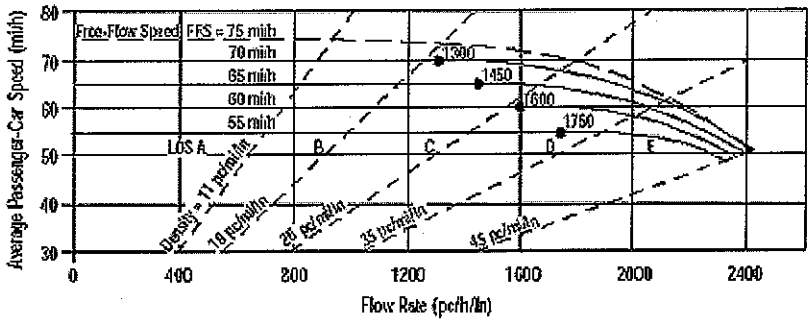
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/19/08*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 at Freetown Line*
Jurisdiction	*Fall River*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*1770*	veh/h	Peak-Hour Factor, PHF	*0.92*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*62.5*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*62.5*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*996*	pc/h/ln
S	*62.5*	mi/h
D = v_p / S	*15.9*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

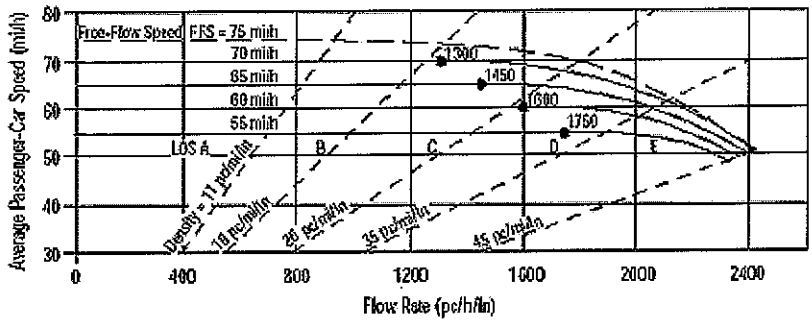
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/19/08*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 at Freetown Line*
Jurisdiction	*Fall River*
Analysis Year	*2008*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2590*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*62.5*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*62.5*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1434*	pc/h/ln
S	*62.5*	mi/h
D = v_p / S	*22.9*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

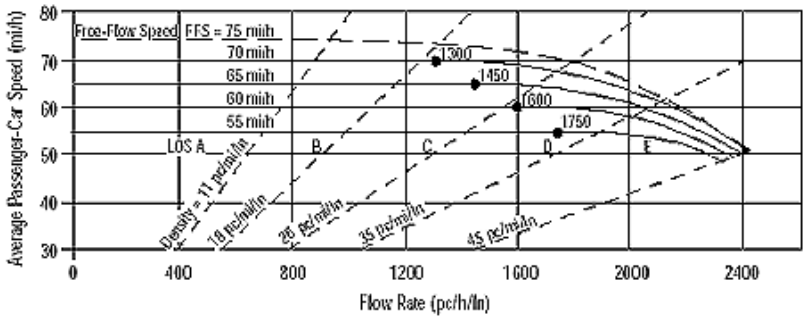
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	*04-30-09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 140*
Jurisdiction	
Analysis Year	*2008 Existing*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3795*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*71.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*71.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1369*	pc/h/ln
S	*71.0*	mi/h
D = v_p / S	*19.3*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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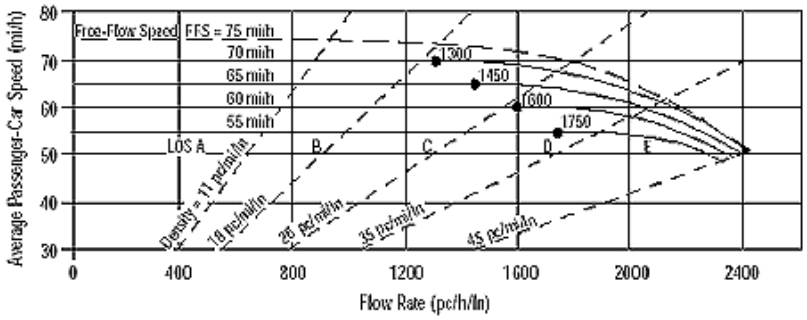

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 140*
Jurisdiction	
Analysis Year	*2008 Existing*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2060*	veh/h	Peak-Hour Factor, PHF	*0.93*	
AADT		veh/day	%Trucks and Buses, P_T	*10*	
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*	
Peak-Hr Direction Prop, D			General Terrain:	*Level*	
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*	
Driver type adjustment	*1.00*		Up/Down %		

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*71.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*71.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*775*	pc/h/ln
S	*71.0*	mi/h
D = v_p / S	*10.9*	pc/mi/ln
LOS	*A*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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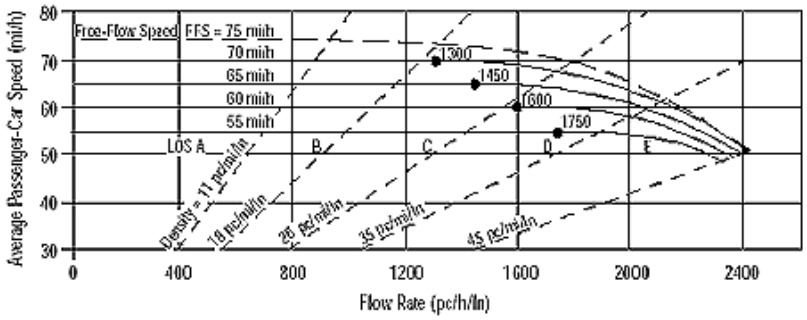
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of Route 140*
Jurisdiction	
Analysis Year	*2008 Existing*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*1860*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*69.7*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.7*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*678*	pc/h/ln
S	*69.7*	mi/h
D = v_p / S	*9.7*	pc/mi/ln
LOS	*A*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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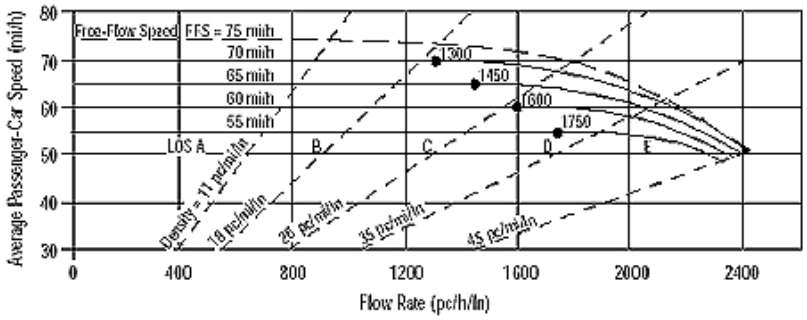
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of Route 140*
Jurisdiction	
Analysis Year	*2008 Existing*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3910*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*69.7*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.7*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1396*	pc/h/ln
S	*69.7*	mi/h
D = v_p / S	*20.0*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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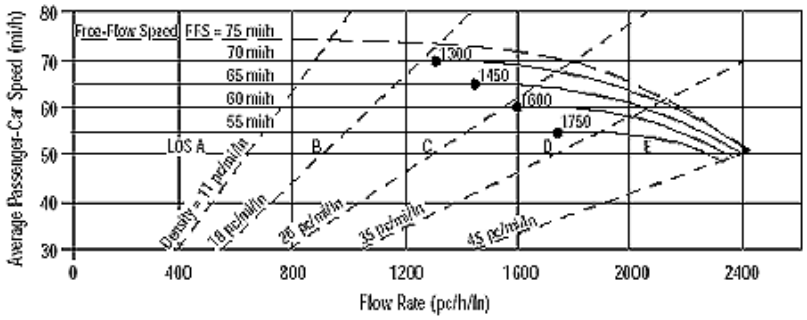
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	*04-30-09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 79*
Jurisdiction	
Analysis Year	*2008 Existing*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*1835*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*70.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*714*	pc/h/ln
S	*70.8*	mi/h
D = v_p / S	*10.1*	pc/mi/ln
LOS	*A*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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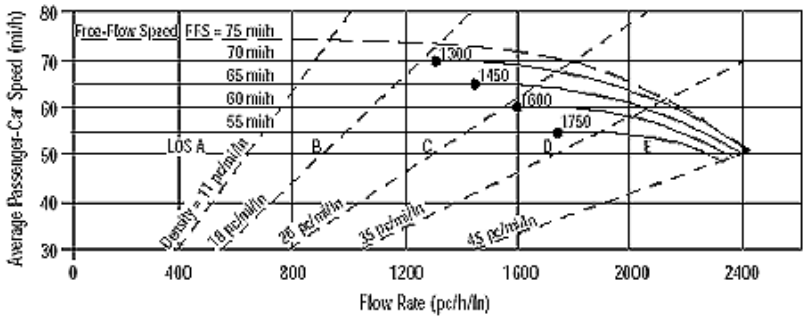
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	*04-30-09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 79*
Jurisdiction	
Analysis Year	*2008 Existing*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*1610*	veh/h	Peak-Hour Factor, PHF	*0.86*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*70.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*983*	pc/h/ln
S	*70.8*	mi/h
D = v_p / S	*13.9*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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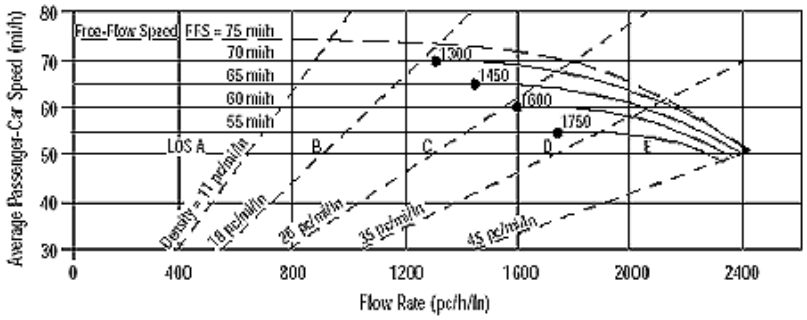
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	*11/21/08*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of Route 79*
Jurisdiction	
Analysis Year	*2008 Existing*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*1430*	veh/h	Peak-Hour Factor, PHF	*0.92*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*62.5*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*62.5*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*816*	pc/h/ln
S	*62.5*	mi/h
D = v_p / S	*13.1*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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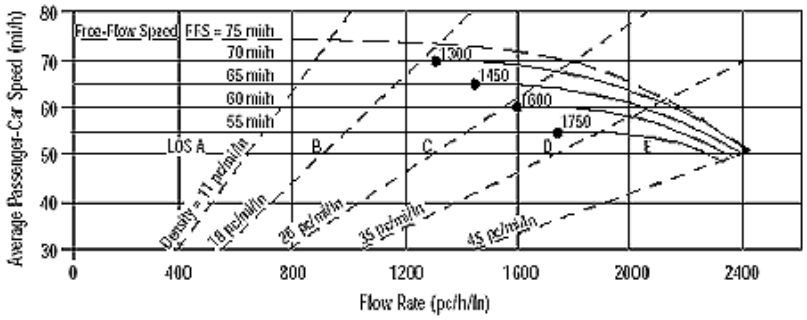

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	*04-30-09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of Route 79*
Jurisdiction	
Analysis Year	*2008 Existing*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2390*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*62.5*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*62.5*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1349*	pc/h/ln
S	*62.5*	mi/h
D = v_p / S	*21.6*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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HCM Unsignalized Intersection Capacity Analysis
3: Elm St & Route 138

Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	30	30	10	15	25	25	1145	15	0	365	40
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.68	0.68	0.68	0.91	0.91	0.91	0.89	0.89	0.89
Hourly flow rate (vph)	107	36	36	15	22	37	27	1258	16	0	410	45
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1802	1762	433	1808	1776	1266	455			1275		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1802	1762	433	1808	1776	1266	455			1275		
tC, single (s)	7.1	6.5	6.2	7.1	6.6	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.1	3.3	2.2			2.2		
p0 queue free %	0	56	94	61	71	82	97			100		
cM capacity (veh/h)	39	82	621	38	75	204	1095			552		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	179	74	1302	455
Volume Left	107	15	27	0
Volume Right	36	37	16	45
cSH	55	85	1095	552
Volume to Capacity	3.26	0.87	0.03	0.00
Queue Length 95th (ft)	Err	115	2	0
Control Delay (s)	Err	149.1	1.0	0.0
Lane LOS	F	F	A	
Approach Delay (s)	Err	149.1	1.0	0.0
Approach LOS	F	F		

Intersection Summary				
Average Delay	894.7			
Intersection Capacity Utilization	103.0%	ICU Level of Service	G	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
10: Lincoln Street & Main Street

Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	430	15	135	100	55	5	55	440	80	35	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.87	0.87	0.87	0.80	0.80	0.80	0.87	0.87	0.87
Hourly flow rate (vph)	5	473	16	155	115	63	6	69	550	92	40	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	115			489			975	917	481	983	957	147
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	115			489			975	917	481	983	957	147
tC, single (s)	4.1			4.1			7.3	6.5	6.2	7.1	6.7	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.7	4.0	3.3	3.5	4.1	3.3
p0 queue free %	100			85			96	70	6	0	81	99
cM capacity (veh/h)	1487			1064			163	231	585	9	208	906

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	495	333	625	138
Volume Left	5	155	6	92
Volume Right	16	63	550	6
cSH	1487	1064	490	14
Volume to Capacity	0.00	0.15	1.28	10.04
Queue Length 95th (ft)	0	13	648	Err
Control Delay (s)	0.1	5.0	164.0	Err
Lane LOS	A	A	F	F
Approach Delay (s)	0.1	5.0	164.0	Err
Approach LOS			F	F

Intersection Summary				
Average Delay	932.5			
Intersection Capacity Utilization	90.1%	ICU Level of Service	E	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
11: Lincoln Street & Barrows Street

Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	135	445	0	0	110	0	0	0	5	0	0	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.92	0.92	0.88	0.88	0.88	0.88	0.88	0.92	0.92	0.59
Hourly flow rate (vph)	141	464	0	0	125	0	0	0	6	0	0	110
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	125			464			980	870	464	875	870	125
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	125			464			980	870	464	875	870	125
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 %	90			100			100	100	99	100	100	88
cM capacity (veh/h)	1462			1098			187	262	599	249	262	928

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	604	125	6	110
Volume Left	141	0	0	0
Volume Right	0	0	6	110
cSH	1462	1700	599	928
Volume to Capacity	0.10	0.07	0.01	0.12
Queue Length 95th (ft)	8	0	1	10
Control Delay (s)	2.6	0.0	11.1	9.4
Lane LOS	A		B	A
Approach Delay (s)	2.6	0.0	11.1	9.4
Approach LOS			B	A

Intersection Summary				
Average Delay	3.1			
Intersection Capacity Utilization	48.2%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
12: Union Street & Route 138

Existing Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	60	85	1010	235	70	335
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.89	0.89	0.81	0.81
Hourly flow rate (vph)	68	97	1135	264	86	414
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1853	1267			1399	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1853	1267			1399	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	52			82	
cM capacity (veh/h)	68	203			485	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	165	1399	500
Volume Left	68	0	86
Volume Right	97	264	0
cSH	111	1700	485
Volume to Capacity	1.48	0.82	0.18
Queue Length 95th (ft)	298	0	16
Control Delay (s)	329.3	0.0	5.2
Lane LOS	F		A
Approach Delay (s)	329.3	0.0	5.2
Approach LOS	F		

Intersection Summary			
Average Delay	27.5		
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
17: Elm Street & Main Street

Existing Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	40	15	140	90	45	140
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.86	0.86	0.73	0.73
Hourly flow rate (vph)	45	17	163	105	62	192
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	530	215			267	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	530	215			267	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	90	98			95	
cM capacity (veh/h)	475	812			1296	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	62	267	253
Volume Left	45	0	62
Volume Right	17	105	0
cSH	536	1700	1296
Volume to Capacity	0.12	0.16	0.05
Queue Length 95th (ft)	10	0	4
Control Delay (s)	12.6	0.0	2.2
Lane LOS	B		A
Approach Delay (s)	12.6	0.0	2.2
Approach LOS	B		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	36.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
47: Roosevelt Circle & Route 138

Existing Condition - AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	10	0	5	830	480	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	0	5	902	522	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				856		
pX, platoon unblocked	0.66					
vC, conflicting volume	1438	524	527			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1405	524	527			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	100	99			
cM capacity (veh/h)	101	553	1040			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	11	908	527
Volume Left	11	5	0
Volume Right	0	0	5
cSH	101	1040	1700
Volume to Capacity	0.11	0.01	0.31
Queue Length 95th (ft)	9	0	0
Control Delay (s)	45.1	0.1	0.0
Lane LOS	E	A	
Approach Delay (s)	45.1	0.1	0.0
Approach LOS	E		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		

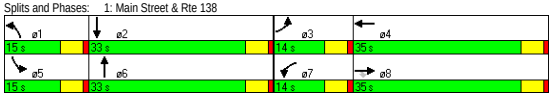
Lanes, Volumes, Timings
1: Main Street & Rte 138

Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	180	200	70	325	80	195	375	45	125	520	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	11	11	11	12	11	11	12	11	11
Storage Length (ft)	150		230	90		140	140		140	115		150
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			35			40			40	
Link Distance (ft)		1725			3218			4952			2928	
Travel Time (s)		26.1			62.7			84.4			49.9	
Peak Hour Factor	0.82	0.82	0.82	0.85	0.85	0.85	0.90	0.90	0.90	0.89	0.89	0.89
Heavy Vehicles (%)	2%	1%	2%	1%	1%	2%	2%	5%	0%	4%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	201	220	244	82	476	0	217	467	0	140	859	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8									
Detector Phase	3	8	8	7	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	15.0		7.0	15.0	
Minimum Split (s)	12.0	12.0	12.0	12.0	21.0		12.0	21.0		12.0	20.0	
Total Split (s)	14.0	35.0	35.0	14.0	35.0	0.0	15.0	33.0	0.0	15.0	33.0	0.0
Total Split (%)	14.4%	36.1%	36.1%	14.4%	36.1%	0.0%	15.5%	34.0%	0.0%	15.5%	34.0%	0.0%
Maximum Green (s)	9.0	30.0	30.0	9.0	30.0		10.0	28.0		10.0	28.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)					5.0			5.0				
Flash Dont Walk (s)					11.0			11.0				
Pedestrian Calls (#/hr)					0			0				
v/c Ratio	1.01	0.51	0.43	0.48	0.72		0.98	0.43		0.69	0.78	
Control Delay	107.0	33.6	6.7	45.8	35.3		95.8	22.5		54.3	28.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	107.0	33.6	6.7	45.8	35.3		95.8	22.5		54.3	28.6	
Queue Length 50th (ft)	~113	105	0	41	114		~115	93		70	184	
Queue Length 95th (ft)	#231	157	41	84	153		#275	149		#160	277	
Internal Link Dist (ft)		1645			3138			4872			2848	
Turn Bay Length (ft)	150		230	90			140			115		
Base Capacity (vph)	199	682	747	195	1275		221	1159		217	1185	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	1.01	0.32	0.33	0.42	0.37		0.98	0.40		0.65	0.72	

Intersection Summary	
Area Type:	Other
Cycle Length: 97	
Actuated Cycle Length: 80.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
~ 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.	

Splits and Phases: 1: Main Street & Rte 138



HCM Signalized Intersection Capacity Analysis
1: Main Street & Rte 138

Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	180	200	70	325	80	195	375	45	125	520	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	11	11	11	12	11	11	12	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.98		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1818	1583	1728	3346		1770	3287		1736	3235	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1818	1583	1728	3346		1770	3287		1736	3235	
Peak-hour factor, PHF	0.82	0.82	0.82	0.85	0.85	0.85	0.90	0.90	0.90	0.89	0.89	0.89
Adj. Flow (vph)	201	220	244	82	382	94	217	417	50	140	584	275
RTOR Reduction (vph)	0	0	187	0	26	0	0	9	0	0	55	0
Lane Group Flow (vph)	201	220	57	82	450	0	217	458	0	140	804	0
Heavy Vehicles (%)	2%	1%	2%	1%	1%	2%	2%	5%	0%	4%	3%	2%
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8									
Actuated Green, G (s)	9.1	19.1	19.1	6.4	16.4		10.1	26.5		9.5	25.9	
Effective Green, g (s)	9.1	19.1	19.1	6.4	16.4		10.1	26.5		9.5	25.9	
Actuated g/C Ratio	0.11	0.23	0.23	0.08	0.20		0.12	0.33		0.12	0.32	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	198	426	371	136	673		219	1069		202	1028	
v/s Ratio Prot	c0.11	c0.12		0.05	c0.13		c0.12	0.14		0.08	c0.25	
v/s Ratio Perm			0.04									
v/c Ratio	1.02	0.52	0.15	0.60	0.67		0.99	0.43		0.69	0.78	
Uniform Delay, d1	36.2	27.2	24.8	36.3	30.0		35.7	21.6		34.6	25.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	67.9	0.4	0.1	5.1	2.0		58.0	0.4		8.0	4.2	
Delay (s)	104.1	27.6	24.9	41.4	32.0		93.6	21.9		42.6	29.4	
Level of Service	F	C	C	D	C		F	C		D	C	
Approach Delay (s)		49.7			33.4			44.7			31.3	
Approach LOS		D			C			D			C	

Intersection Summary					
HCM Average Control Delay	39.1	HCM Level of Service		D	
HCM Volume to Capacity ratio	0.89				
Actuated Cycle Length (s)	81.5	Sum of lost time (s)		25.0	
Intersection Capacity Utilization	70.4%	ICU Level of Service		C	
Analysis Period (min)	15				
c Critical Lane Group					

Lanes, Volumes, Timings
2: Belmont St (Rt. 123) & Route 138

Existing Condition - PM Peak Hour

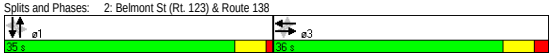
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	25	70	485	35	165	25	365	290	205	580	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	14	12	10	11	12	12	11	12	12	11	12
Storage Length (ft)	0		0	100		0	0		0	200		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		387			2550			908			853	
Travel Time (s)		5.9			38.6			13.8			12.9	
Peak Hour Factor	0.89	0.89	0.89	0.88	0.88	0.88	0.93	0.93	0.93	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	1%	0%	2%	0%	4%	1%	5%	3%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	141	0	551	228	0	0	731	0	0	895	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	14.0	14.0		14.0	14.0		13.0	13.0		13.0	13.0	
Total Split (s)	36.0	36.0	0.0	36.0	36.0	0.0	35.0	35.0	0.0	35.0	35.0	0.0
Total Split (%)	50.7%	50.7%	0.0%	50.7%	50.7%	0.0%	49.3%	49.3%	0.0%	49.3%	49.3%	0.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		None	None		None	None	
v/c Ratio		0.19		1.02	0.29			0.53			1.05	
Control Delay		7.0		69.0	4.6			9.8			66.4	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		7.0		69.0	4.6			9.8			66.4	
Queue Length 50th (ft)		16		~247	10			63			~228	
Queue Length 95th (ft)		46		#427	46			110			#342	
Internal Link Dist (ft)		307			2470			828			773	
Turn Bay Length (ft)				100								
Base Capacity (vph)		754		538	777			1391			856	
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		0.19		1.02	0.29			0.53			1.05	

Intersection Summary	
Area Type:	Other
Cycle Length: 71	
Actuated Cycle Length: 71	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

~ 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.

Splits and Phases: 2: Belmont St (Rt. 123) & Route 138



HCM Signalized Intersection Capacity Analysis
2: Belmont St (Rt. 123) & Route 138

Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	25	70	485	35	165	25	365	290	205	580	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	10	11	12	12	11	12	12	11	12
Total Lost time (s)		6.0		6.0	6.0			5.0			5.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frt		0.92		1.00	0.88			0.94			0.99	
Flt Protected		0.99		0.95	1.00			1.00			0.99	
Satd. Flow (prot)		1851		1668	1583			3178			3315	
Flt Permitted		0.89		0.72	1.00			0.90			0.60	
Satd. Flow (perm)		1677		1273	1583			2867			2016	
Peak-hour factor, PHF	0.89	0.89	0.89	0.88	0.88	0.88	0.93	0.93	0.93	0.91	0.91	0.91
Adj. Flow (vph)	34	28	79	551	40	188	27	392	312	225	637	33
RTOR Reduction (vph)	0	46	0	0	109	0	0	180	0	0	4	0
Lane Group Flow (vph)	0	95	0	551	119	0	0	551	0	0	891	0
Heavy Vehicles (%)	0%	0%	0%	1%	0%	2%	0%	4%	1%	5%	3%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Actuated Green, G (s)		30.0		30.0	30.0			30.0			30.0	
Effective Green, g (s)		30.0		30.0	30.0			30.0			30.0	
Actuated g/C Ratio		0.42		0.42	0.42			0.42			0.42	
Clearance Time (s)		6.0		6.0	6.0			5.0			5.0	
Vehicle Extension (s)		4.0		4.0	4.0			4.0			4.0	
Lane Grp Cap (vph)		709		538	669			1211			852	
v/s Ratio Prot					0.08							
v/s Ratio Perm		0.06		c0.43				0.19			c0.44	
v/c Ratio		0.13		1.02	0.18			0.45			1.05	
Uniform Delay, d1		12.6		20.5	12.8			14.7			20.5	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.1		45.1	0.2			0.4			43.5	
Delay (s)		12.7		65.6	13.0			15.0			64.0	
Level of Service		B		E	B			B			E	
Approach Delay (s)		12.7			50.2			15.0			64.0	
Approach LOS		B			D			B			E	

Intersection Summary					
HCM Average Control Delay	42.9	HCM Level of Service		D	
HCM Volume to Capacity ratio	1.04				
Actuated Cycle Length (s)	71.0	Sum of lost time (s)		11.0	
Intersection Capacity Utilization	90.4%	ICU Level of Service		E	
Analysis Period (min)	15				

c Critical Lane Group

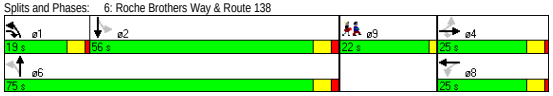
Lanes, Volumes, Timings
6: Roche Brothers Way & Route 138

Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	85	0	270	1	0	0	175	425	5	5	720	130	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	11	12	12	12	11	11	11	12	12	12	
Storage Length (ft)	0		100	0		0	0		0	0		0	
Storage Lanes	0		1	0		0	0		0	0		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		635			332			1623			2417		
Travel Time (s)		14.4			7.5			36.9			54.9		
Confl. Peds. (#/hr)	25		50	15		25	10		25	40		30	
Peak Hour Factor	0.90	0.90	0.90	0.25	0.25	0.25	0.82	0.82	0.82	0.90	0.90	0.90	
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	1%	4%	0%	0%	2%	1%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	94	300	0	4	0	0	737	0	0	950	0	
Turn Type	Perm		pm+ov	Perm			pm+pt			Perm			
Protected Phases		4	1		8		1	6			2		9
Permitted Phases	4		4	8			6			2			
Detector Phase	4	4	1	8	8		1	6		2	2		
Switch Phase													
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		6.0	10.0		10.0	10.0		7.0
Minimum Split (s)	21.0	21.0	11.0	21.0	21.0		11.0	21.0		21.0	21.0		22.0
Total Split (s)	25.0	25.0	19.0	25.0	25.0	0.0	19.0	75.0	0.0	56.0	56.0	0.0	22.0
Total Split (%)	20.5%	20.5%	15.6%	20.5%	20.5%	0.0%	15.6%	61.5%	0.0%	45.9%	45.9%	0.0%	18%
Maximum Green (s)	20.0	20.0	14.0	20.0	20.0		14.0	69.0		50.0	50.0		20.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	2.0		2.0	2.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	5.0	6.0	4.0	6.0	6.0	4.0	
Lead/Lag			Lead				Lead			Lag	Lag		
Lead-Lag Optimize?			Yes				Yes			Yes	Yes		
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None	None	None	None		None	Min		Min	Min		None
Walk Time (s)													7.0
Flash Dont Walk (s)													13.0
Pedestrian Calls (#/hr)													0
v/c Ratio		0.36	0.48		0.02			0.55			0.69		
Control Delay		25.2	5.0		20.0			7.2			15.8		
Queue Delay		0.0	0.0		0.0			0.0			0.0		
Total Delay		25.2	5.0		20.0			7.2			15.8		
Queue Length 50th (ft)		25	0		1			48			118		
Queue Length 95th (ft)		73	45		2			87			208		
Internal Link Dist (ft)		555			252			1543			2337		
Turn Bay Length (ft)			100										
Base Capacity (vph)		580	832		538			1969			2985		
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		0.16	0.36		0.01			0.37			0.32		

Intersection Summary	
Area Type:	Other
Cycle Length: 122	
Actuated Cycle Length: 51	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 6: Roche Brothers Way & Route 138



HCM Signalized Intersection Capacity Analysis
6: Roche Brothers Way & Route 138

Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	0	270	1	0	0	175	425	5	5	720	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	11	12	12	12	11	11	11	12	12	12
Total Lost time (s)		5.0	5.0		5.0			6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00			0.95			0.95	
Frpb, ped/bikes		1.00	0.94		1.00			1.00			0.99	
Flpb, ped/bikes		0.95	1.00		0.96			1.00			1.00	
Frt		1.00	0.85		1.00			1.00			0.98	
Flt Protected		0.95	1.00		0.95			0.99			1.00	
Satd. Flow (prot)		1714	1454		1725			3331			3434	
Flt Permitted		0.76	1.00		0.70			0.54			0.95	
Satd. Flow (perm)		1363	1454		1264			1816			3262	
Peak-hour factor, PHF	0.90	0.90	0.90	0.25	0.25	0.25	0.82	0.82	0.82	0.90	0.90	0.90
Adj. Flow (vph)	94	0	300	4	0	0	213	518	6	6	800	144
RTOR Reduction (vph)	0	0	218	0	0	0	0	0	0	0	12	0
Lane Group Flow (vph)	0	94	82	0	4	0	0	737	0	0	938	0
Confl. Peds. (#/hr)	25		50	15		25	10		25	40		30
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	1%	4%	0%	0%	2%	1%
Turn Type	Perm		pm+ov	Perm			pm+pt			Perm		
Protected Phases		4	1		8		1	6			2	
Permitted Phases	4		4	8			6			2		
Actuated Green, G (s)		7.7	14.2		7.7			33.1			21.6	
Effective Green, g (s)		7.7	14.2		7.7			33.1			21.6	
Actuated g/C Ratio		0.15	0.27		0.15			0.64			0.42	
Clearance Time (s)		5.0	5.0		5.0			6.0			6.0	
Vehicle Extension (s)		2.0	2.0		2.0			2.0			2.0	
Lane Grp Cap (vph)		203	539		188			1351			1360	
v/s Ratio Prot			0.02					c0.07				
v/s Ratio Perm		c0.07	0.04		0.00			0.28			c0.29	
v/c Ratio		0.46	0.15		0.02			0.55			0.69	
Uniform Delay, d1		20.2	14.2		18.8			5.2			12.4	
Progression Factor		1.00	1.00		1.00			1.00			1.00	
Incremental Delay, d2		0.6	0.0		0.0			0.2			1.2	
Delay (s)		20.8	14.3		18.8			5.4			13.5	
Level of Service		C	B		B			A			B	
Approach Delay (s)		15.8			18.8			5.4			13.5	
Approach LOS		B			B			A			B	

Intersection Summary					
HCM Average Control Delay		11.1	HCM Level of Service		B
HCM Volume to Capacity ratio		0.65			
Actuated Cycle Length (s)		51.8	Sum of lost time (s)		17.0
Intersection Capacity Utilization		68.3%	ICU Level of Service		C
Analysis Period (min)		15			

c Critical Lane Group

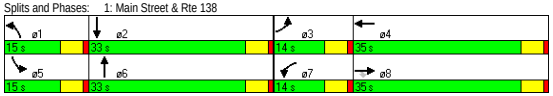
Lanes, Volumes, Timings
1: Main Street & Rte 138

Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	345	330	170	30	130	110	105	665	45	65	285	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	11	11	11	12	11	11	12	11	11
Storage Length (ft)	150		230	90		140	140		140	115		150
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			35			40			40	
Link Distance (ft)		1725			3218			4949			2928	
Travel Time (s)		26.1			62.7			84.4			49.9	
Peak Hour Factor	0.89	0.89	0.89	0.88	0.88	0.88	0.92	0.92	0.92	0.88	0.88	0.88
Heavy Vehicles (%)	11%	1%	4%	10%	6%	6%	4%	5%	2%	5%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	388	371	191	34	273	0	114	772	0	74	392	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8									
Detector Phase	3	8	8	7	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	15.0		7.0	15.0	
Minimum Split (s)	12.0	21.0	21.0	12.0	23.0		12.0	23.0		12.0	21.0	
Total Split (s)	14.0	35.0	35.0	14.0	35.0	0.0	15.0	33.0	0.0	15.0	33.0	0.0
Total Split (%)	14.4%	36.1%	36.1%	14.4%	36.1%	0.0%	15.5%	34.0%	0.0%	15.5%	34.0%	0.0%
Maximum Green (s)	9.0	30.0	30.0	9.0	30.0		10.0	28.0		10.0	28.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)					7.0			7.0				
Flash Dont Walk (s)					8.0			8.0				
Pedestrian Calls (#/hr)					0			0				
v/c Ratio	1.87	0.62	0.30	0.21	0.36		0.54	0.74		0.38	0.38	
Control Delay	438.0	31.6	5.5	42.0	15.6		48.3	30.3		43.6	22.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	438.0	31.6	5.5	42.0	15.6		48.3	30.3		43.6	22.7	
Queue Length 50th (ft)	~337	185	0	17	33		58	183		38	78	
Queue Length 95th (ft)	#576	294	46	49	63		#142	302		86	134	
Internal Link Dist (ft)		1645			3138			4869			2848	
Turn Bay Length (ft)	150		230	90			140			115		
Base Capacity (vph)	207	771	768	202	1371		245	1308		243	1324	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	1.87	0.48	0.25	0.17	0.20		0.47	0.59		0.30	0.30	

Intersection Summary	
Area Type:	Other
Cycle Length: 97	
Actuated Cycle Length: 76.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
~ 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.	

Splits and Phases: 1: Main Street & Rte 138



HCM Signalized Intersection Capacity Analysis
1: Main Street & Rte 138

Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	345	330	170	30	130	110	105	665	45	65	285	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	11	11	11	12	11	11	12	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1626	1818	1553	1586	3066		1736	3298		1719	3305	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1626	1818	1553	1586	3066		1736	3298		1719	3305	
Peak-hour factor, PHF	0.89	0.89	0.89	0.88	0.88	0.88	0.92	0.92	0.92	0.88	0.88	0.88
Adj. Flow (vph)	388	371	191	34	148	125	114	723	49	74	324	68
RTOR Reduction (vph)	0	0	131	0	95	0	0	5	0	0	18	0
Lane Group Flow (vph)	388	371	60	34	178	0	114	767	0	74	374	0
Heavy Vehicles (%)	11%	1%	4%	10%	6%	6%	4%	5%	2%	5%	3%	2%
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8									
Actuated Green, G (s)	9.7	24.9	24.9	3.9	19.1		6.9	24.1		6.4	23.6	
Effective Green, g (s)	9.7	24.9	24.9	3.9	19.1		6.9	24.1		6.4	23.6	
Actuated g/C Ratio	0.12	0.31	0.31	0.05	0.24		0.09	0.30		0.08	0.30	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	199	571	488	78	738		151	1002		139	984	
v/s Ratio Prot	c0.24	c0.20		0.02	0.06		c0.07	c0.23		0.04	0.11	
v/s Ratio Perm			0.04									
v/c Ratio	1.95	0.65	0.12	0.44	0.24		0.75	0.77		0.53	0.38	
Uniform Delay, d1	34.8	23.4	19.4	36.6	24.3		35.4	25.0		35.0	22.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	445.2	1.9	0.0	1.4	0.1		17.2	3.8		2.0	0.3	
Delay (s)	480.0	25.4	19.4	38.0	24.3		52.5	28.8		37.0	22.4	
Level of Service	F	C	B	D	C		D	C		D	C	
Approach Delay (s)		209.9			25.8			31.9			24.7	
Approach LOS		F			C			C			C	

Intersection Summary					
HCM Average Control Delay	94.7	HCM Level of Service		F	
HCM Volume to Capacity ratio	0.82				
Actuated Cycle Length (s)	79.3	Sum of lost time (s)		10.0	
Intersection Capacity Utilization	68.6%	ICU Level of Service		C	
Analysis Period (min)	15				
c Critical Lane Group					

Lanes, Volumes, Timings
2: Belmont St (Rt. 123) & Route 138

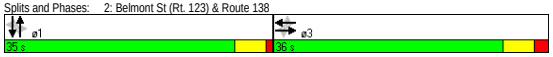
Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	15	5	235	15	180	15	645	410	175	265	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	14	12	10	11	12	12	11	12	12	11	12
Storage Length (ft)	0		0	100		0	0		0	200		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		387			2550			980			856	
Travel Time (s)		5.9			38.6			14.8			13.0	
Peak Hour Factor	0.72	0.72	0.72	0.82	0.82	0.82	0.93	0.93	0.93	0.92	0.92	0.92
Heavy Vehicles (%)	13%	7%	0%	3%	15%	13%	0%	3%	3%	5%	4%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	42	0	287	238	0	0	1151	0	0	483	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	14.0	14.0		14.0	14.0		13.0	13.0		13.0	13.0	
Total Split (s)	36.0	36.0	0.0	36.0	36.0	0.0	35.0	35.0	0.0	35.0	35.0	0.0
Total Split (%)	50.7%	50.7%	0.0%	50.7%	50.7%	0.0%	49.3%	49.3%	0.0%	49.3%	49.3%	0.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		None	None		None	None	
v/c Ratio		0.08		0.68	0.43			0.74			1.48dl	
Control Delay		11.7		26.2	10.1			14.7			15.6	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		11.7		26.2	10.1			14.7			15.6	
Queue Length 50th (ft)		9		91	30			128			60	
Queue Length 95th (ft)		20		142	64			265			132	
Internal Link Dist (ft)		307			2470			900			776	
Turn Bay Length (ft)				100								
Base Capacity (vph)		848		656	790			1691			964	
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		0.05		0.44	0.30			0.68			0.50	

Intersection Summary	
Area Type:	Other
Cycle Length: 71	
Actuated Cycle Length: 59.4	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 2: Belmont St (Rt. 123) & Route 138



HCM Signalized Intersection Capacity Analysis
2: Belmont St (Rt. 123) & Route 138

Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	15	5	235	15	180	15	645	410	175	265	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	10	11	12	12	11	12	12	11	12
Total Lost time (s)		6.0		6.0	6.0			5.0			5.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frt		0.98		1.00	0.86			0.94			1.00	
Flt Protected		0.98		0.95	1.00			1.00			0.98	
Satd. Flow (prot)		1807		1636	1398			3192			3275	
Flt Permitted		0.88		0.73	1.00			0.95			0.55	
Satd. Flow (perm)		1617		1256	1398			3023			1848	
Peak-hour factor, PHF	0.72	0.72	0.72	0.82	0.82	0.82	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	14	21	7	287	18	220	16	694	441	190	288	5
RTOR Reduction (vph)	0	5	0	0	83	0	0	123	0	0	1	0
Lane Group Flow (vph)	0	37	0	287	155	0	0	1028	0	0	482	0
Heavy Vehicles (%)	13%	7%	0%	3%	15%	13%	0%	3%	3%	5%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Actuated Green, G (s)		19.9		19.9	19.9			28.1			28.1	
Effective Green, g (s)		19.9		19.9	19.9			28.1			28.1	
Actuated g/C Ratio		0.34		0.34	0.34			0.48			0.48	
Clearance Time (s)		6.0		6.0	6.0			5.0			5.0	
Vehicle Extension (s)		4.0		4.0	4.0			4.0			4.0	
Lane Grp Cap (vph)		545		424	472			1440			880	
v/s Ratio Prot					0.11							
v/s Ratio Perm		0.02		c0.23				c0.34			0.26	
v/c Ratio		0.07		0.68	0.33			0.71			1.48dl	
Uniform Delay, d1		13.3		16.8	14.6			12.3			10.9	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.1		4.6	0.6			1.8			0.9	
Delay (s)		13.3		21.4	15.1			14.1			11.8	
Level of Service		B		C	B			B			B	
Approach Delay (s)		13.3			18.6			14.1			11.8	
Approach LOS		B			B			B			B	

Intersection Summary					
HCM Average Control Delay	14.6	HCM Level of Service	B		
HCM Volume to Capacity ratio	0.70				
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	11.0		
Intersection Capacity Utilization	77.0%	ICU Level of Service	D		
Analysis Period (min)	15				

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

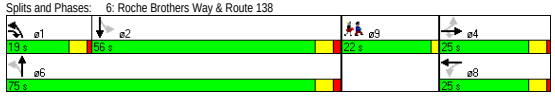
c Critical Lane Group

Lanes, Volumes, Timings
6: Roche Brothers Way & Route 138 — Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	75	0	60	5	0	5	175	915	0	0	310	85	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	11	12	12	12	11	11	11	12	12	12	
Storage Length (ft)	0		100	0		0	0		0	0		0	
Storage Lanes	0		1	0		0	0		0	0		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		635			332			1623			2417		
Travel Time (s)		14.4			7.5			36.9			54.9		
Peak Hour Factor	0.82	0.82	0.82	0.63	0.63	0.63	0.85	0.85	0.85	0.84	0.84	0.84	
Heavy Vehicles (%)	4%	0%	6%	2%	0%	3%	3%	3%	0%	0%	4%	6%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	91	73	0	16	0	0	1282	0	0	470	0	
Turn Type	Perm		pm+ov	Perm			pm+pt			Perm			
Protected Phases		4	1		8		1	6			2		9
Permitted Phases	4		4	8			6			2			
Detector Phase	4	4	1	8	8		1	6		2	2		
Switch Phase													
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		6.0	10.0		10.0	10.0		7.0
Minimum Split (s)	21.0	21.0	11.0	21.0	21.0		11.0	21.0		21.0	21.0		22.0
Total Split (s)	25.0	25.0	19.0	25.0	25.0	0.0	19.0	75.0	0.0	56.0	56.0	0.0	22.0
Total Split (%)	20.5%	20.5%	15.6%	20.5%	20.5%	0.0%	15.6%	61.5%	0.0%	45.9%	45.9%	0.0%	18%
Maximum Green (s)	20.0	20.0	14.0	20.0	20.0		14.0	69.0		50.0	50.0		20.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	2.0		2.0	2.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	5.0	6.0	4.0	6.0	6.0	4.0	
Lead/Lag			Lead				Lead			Lag	Lag		
Lead-Lag Optimize?			Yes				Yes			Yes	Yes		
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None	None	None	None		None	Min		Min	Min		None
Walk Time (s)													7.0
Flash Dont Walk (s)													13.0
Pedestrian Calls (#/hr)													0
v/c Ratio		0.42	0.15		0.07			0.69			0.23		
Control Delay		34.6	7.0		22.4			8.5			8.3		
Queue Delay		0.0	0.0		0.0			0.0			0.0		
Total Delay		34.6	7.0		22.4			8.5			8.3		
Queue Length 50th (ft)		30	0		3			116			47		
Queue Length 95th (ft)		86	26		14			178			74		
Internal Link Dist (ft)		555			252			1543			2337		
Turn Bay Length (ft)			100										
Base Capacity (vph)		455	671		485			2365			2741		
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		0.20	0.11		0.03			0.54			0.17		

Intersection Summary	
Area Type:	Other
Cycle Length: 122	
Actuated Cycle Length: 64.1	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 6: Roche Brothers Way & Route 138



HCM Signalized Intersection Capacity Analysis
6: Roche Brothers Way & Route 138 — Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	0	60	5	0	5	175	915	0	0	310	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	11	12	12	12	11	11	11	12	12	12
Total Lost time (s)		5.0	5.0		5.0			6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00			0.95			0.95	
Frt		1.00	0.85		0.93			1.00			0.97	
Flt Protected		0.95	1.00		0.98			0.99			1.00	
Satd. Flow (prot)		1736	1473		1686			3361			3345	
Flt Permitted		0.75	1.00		0.83			0.72			1.00	
Satd. Flow (perm)		1365	1473		1440			2455			3345	
Peak-hour factor, PHF	0.82	0.82	0.82	0.63	0.63	0.63	0.85	0.85	0.85	0.84	0.84	0.84
Adj. Flow (vph)	91	0	73	8	0	8	206	1076	0	0	369	101
RTOR Reduction (vph)	0	0	58	0	7	0	0	0	0	0	16	0
Lane Group Flow (vph)	0	91	15	0	9	0	0	1282	0	0	454	0
Heavy Vehicles (%)	4%	0%	6%	2%	0%	3%	3%	3%	0%	0%	4%	6%
Turn Type	Perm		pm+ov	Perm			pm+pt			Perm		
Protected Phases		4	1		8		1	6			2	
Permitted Phases	4		4	8			6			2		
Actuated Green, G (s)		8.5	13.2		8.5			46.4			36.7	
Effective Green, g (s)		8.5	13.2		8.5			46.4			36.7	
Actuated g/C Ratio		0.13	0.20		0.13			0.70			0.56	
Clearance Time (s)		5.0	5.0		5.0			6.0			6.0	
Vehicle Extension (s)		2.0	2.0		2.0			2.0			2.0	
Lane Grp Cap (vph)		176	407		186			1793			1863	
v/s Ratio Prot			0.00					c0.05			0.14	
v/s Ratio Perm		c0.07	0.01		0.01			c0.45				
v/c Ratio		0.52	0.04		0.05			0.72			0.24	
Uniform Delay, d1		26.8	21.2		25.2			5.8			7.5	
Progression Factor		1.00	1.00		1.00			1.00			1.00	
Incremental Delay, d2		1.1	0.0		0.0			1.1			0.0	
Delay (s)		27.9	21.2		25.2			7.0			7.5	
Level of Service		C	C		C			A			A	
Approach Delay (s)		24.9			25.2			7.0			7.5	
Approach LOS		C			C			A			A	

Intersection Summary					
HCM Average Control Delay	8.8	HCM Level of Service		A	
HCM Volume to Capacity ratio	0.68				
Actuated Cycle Length (s)	65.9	Sum of lost time (s)		11.0	
Intersection Capacity Utilization	63.2%	ICU Level of Service		B	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis
3: Elm St & Route 138

Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Volume (veh/h)	60	15	30	20	45	35	55	575	25	20	875	150
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.86	0.86	0.86	0.88	0.88	0.88	0.85	0.85	0.85
Hourly flow rate (vph)	71	18	35	23	52	41	62	653	28	24	1029	176
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2024	1972	1118	2001	2046	668	1206			682		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2024	1972	1118	2001	2046	668	1206			682		
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 %	0	68	86	12	0	91	89			97		
cM capacity (veh/h)	0	55	250	26	49	457	579			920		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	124	116	744	1229
Volume Left	71	23	62	24
Volume Right	35	41	28	176
cSH	0	57	579	920
Volume to Capacity	Err	2.03	0.11	0.03
Queue Length 95th (ft)	Err	281	9	2
Control Delay (s)	Err	634.7	3.0	1.0
Lane LOS	F	F	A	A
Approach Delay (s)	Err	634.7	3.0	1.0
Approach LOS	F	F		

Intersection Summary				
Average Delay	Err			
Intersection Capacity Utilization	81.1%	ICU Level of Service	D	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
10: Lincoln Street & Main Street

Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Volume (veh/h)	5	215	25	365	385	90	15	40	185	70	65	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.86	0.86	0.86	0.89	0.89	0.89	0.93	0.93	0.93
Hourly flow rate (vph)	6	253	29	424	448	105	17	45	208	75	70	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	448			282			1674	1576	268	1651	1643	500
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	448			282			1674	1576	268	1651	1643	500
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.6	4.0	3.3
p0 queue free %	99			67			0	38	73	0	0	98
cM capacity (veh/h)	1123			1286			0	73	769	22	66	575

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	288	977	270	156
Volume Left	6	424	17	75
Volume Right	29	105	208	11
cSH	1123	1286	0	35
Volume to Capacity	0.01	0.33	Err	4.51
Queue Length 95th (ft)	0	36	Err	Err
Control Delay (s)	0.2	6.5	Err	Err
Lane LOS	A	A	F	F
Approach Delay (s)	0.2	6.5	Err	Err
Approach LOS			F	F

Intersection Summary				
Average Delay	Err			
Intersection Capacity Utilization	94.6%	ICU Level of Service	F	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
11: Lincoln Street & Barrows Street

Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	230	0	0	405	5	10	5	15	0	0	165
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.92	0.92	0.89	0.89	0.92	0.92	0.92	0.89	0.92	0.89
Hourly flow rate (vph)	71	274	0	0	455	6	11	5	16	0	0	185
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	461			274			1060	877	274	894	875	458
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	461			274			1060	877	274	894	875	458
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 %	94			100			92	98	98	100	100	69
cM capacity (veh/h)	1111			1289			133	268	765	242	269	607

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	345	461	33	185
Volume Left	71	0	11	0
Volume Right	0	6	16	185
cSH	1111	1700	265	607
Volume to Capacity	0.06	0.27	0.12	0.31
Queue Length 95th (ft)	5	0	10	32
Control Delay (s)	2.3	0.0	20.5	13.5
Lane LOS	A		C	B
Approach Delay (s)	2.3	0.0	20.5	13.5
Approach LOS			C	B

Intersection Summary				
Average Delay	3.9			
Intersection Capacity Utilization	57.7%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
12: Union Street & Route 138

Existing Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	165	115	505	145	120	895
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.80	0.80	0.84	0.84	0.92	0.92
Hourly flow rate (vph)	206	144	601	173	130	973
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1921	688			774	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1921	688			774	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	68			85	
cM capacity (veh/h)	63	448			846	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	350	774	1103
Volume Left	206	0	130
Volume Right	144	173	0
cSH	98	1700	846
Volume to Capacity	3.59	0.46	0.15
Queue Length 95th (ft)	Err	0	14
Control Delay (s)	Err	0.0	4.4
Lane LOS	F		A
Approach Delay (s)	Err	0.0	4.4
Approach LOS	F		

Intersection Summary			
Average Delay	1573.6		
Intersection Capacity Utilization	115.3%	ICU Level of Service	H
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
17: Elm Street & Main Street

Existing Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	120	95	150	50	35	160
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.84	0.84	0.92	0.92	0.95	0.95
Hourly flow rate (vph)	143	113	163	54	37	168
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	432	190			217	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	432	190			217	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	75	87			97	
cM capacity (veh/h)	565	854			1364	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	256	217	205
Volume Left	143	0	37
Volume Right	113	54	0
cSH	664	1700	1364
Volume to Capacity	0.39	0.13	0.03
Queue Length 95th (ft)	45	0	2
Control Delay (s)	13.8	0.0	1.6
Lane LOS	B		A
Approach Delay (s)	13.8	0.0	1.6
Approach LOS	B		

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
48: Roosevelt Circle & Route 138

Existing Condition - PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	5	10	30	530	770	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	11	33	576	837	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				853		
pX, platoon unblocked	0.85					
vC, conflicting volume	1489	848	859			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1487	848	859			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	97	96			
cM capacity (veh/h)	112	361	782			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	16	609	859
Volume Left	5	33	0
Volume Right	11	0	22
cSH	207	782	1700
Volume to Capacity	0.08	0.04	0.51
Queue Length 95th (ft)	6	3	0
Control Delay (s)	23.9	1.1	0.0
Lane LOS	C	A	
Approach Delay (s)	23.9	1.1	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Ferry Street & Ponta Delgada

2008 Existing Condition - AM Peak Hour

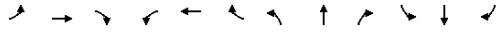
Movement	EBL	EBR	NBL	NBR	SWL	SWR
Lane Configurations						
Volume (veh/h)	245	45	10	60	25	160
Sign Control	Stop		Free		Free	
Grade	1%		1%		1%	
Peak Hour Factor	0.90	0.90	0.62	0.62	0.78	0.78
Hourly flow rate (vph)	272	50	16	97	32	205
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	264	135	237			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	264	135	237			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	62	95	99			
cM capacity (veh/h)	719	920	1342			

Direction, Lane #	EB 1	NB 1	SW 1
Volume Total	322	113	237
Volume Left	272	16	0
Volume Right	50	0	205
cSH	744	1342	1700
Volume to Capacity	0.43	0.01	0.14
Queue Length 95th (ft)	55	1	0
Control Delay (s)	13.5	1.2	0.0
Lane LOS	B	A	
Approach Delay (s)	13.5	1.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		6.7	
Intersection Capacity Utilization		41.8%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
7: Anawan Street & Ponta Delgada

2008 Existing Condition - AM Peak Hour



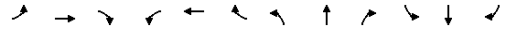
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	20	0	35	10	5	5	10	290	20	150	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.64	0.64	0.64	0.72	0.72	0.72	0.91	0.91	0.91	0.87	0.87	0.87
Hourly flow rate (vph)	0	31	0	49	14	7	5	11	319	23	172	23
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	425	571	184	427	423	170	195			330		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	425	571	184	427	423	170	195			330		
tC, single (s)	7.1	6.6	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.1	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	92	100	90	97	99	100			98		
cM capacity (veh/h)	518	404	864	501	514	879	1390			1213		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	31	69	335	218
Volume Left	0	49	5	23
Volume Right	0	7	319	23
cSH	404	526	1390	1213
Volume to Capacity	0.08	0.13	0.00	0.02
Queue Length 95th (ft)	6	11	0	1
Control Delay (s)	14.7	12.9	0.2	1.0
Lane LOS	B	B	A	A
Approach Delay (s)	14.7	12.9	0.2	1.0
Approach LOS	B	B		

Intersection Summary			
Average Delay		2.5	
Intersection Capacity Utilization		37.0%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
9: Central Street & Davol Street

2008 Existing Condition - AM Peak Hour



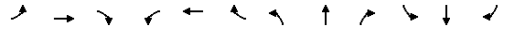
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	70	100	130	0	300	0	0	440	80
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.76	0.76	0.76	0.86	0.86	0.86	0.80	0.80	0.80
Hourly flow rate (vph)	0	0	0	92	132	171	0	349	0	0	550	100
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1186	949	600	949	999	349	650			349		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1186	949	600	949	999	349	650			349		
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 %	100	100	100	61	46	75	100			100		
cM capacity (veh/h)	72	263	505	238	242	690	946			1221		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	158	237	349	650
Volume Left	92	0	0	0
Volume Right	0	171	0	100
cSH	240	455	946	1700
Volume to Capacity	0.66	0.52	0.00	0.38
Queue Length 95th (ft)	103	73	0	0
Control Delay (s)	45.0	21.2	0.0	0.0
Lane LOS	E	C		
Approach Delay (s)	30.7		0.0	0.0
Approach LOS	D			

Intersection Summary				
Average Delay			8.7	
Intersection Capacity Utilization			43.7%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
10: Anawan Street & Davol Street

2008 Existing Condition - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	35	130	170	25	30	20	10	140	70	220	275	30
Peak Hour Factor	0.94	0.94	0.94	0.76	0.76	0.76	0.84	0.84	0.84	0.81	0.81	0.81
Hourly flow rate (vph)	37	138	181	33	39	26	12	167	83	272	340	37

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	356	99	262	648
Volume Left (vph)	37	33	12	272
Volume Right (vph)	181	26	83	37
Hadj (s)	0.04	-0.02	-0.17	0.07
Departure Headway (s)	6.8	7.6	6.6	6.2
Degree Utilization, x	0.67	0.21	0.48	1.12
Capacity (veh/h)	513	419	515	569
Control Delay (s)	22.5	12.6	15.5	98.7
Approach Delay (s)	22.5	12.6	15.5	98.7
Approach LOS	C	B	C	F

Intersection Summary				
Delay			56.6	
HCM Level of Service			F	
Intersection Capacity Utilization			71.0%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
29: Turner Street & Davol Street NB

2008 Existing Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	45	670	155	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.68	0.68	0.91	0.91	0.92	0.92
Hourly flow rate (vph)	0	66	736	170	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	821	453			907	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	821	453			907	
tC, single (s)	6.8	7.1			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	100	88			100	
cM capacity (veh/h)	316	535			759	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	66	491	416
Volume Left	0	0	0
Volume Right	66	0	170
cSH	535	1700	1700
Volume to Capacity	0.12	0.29	0.24
Queue Length 95th (ft)	11	0	0
Control Delay (s)	12.7	0.0	0.0
Lane LOS	B		
Approach Delay (s)	12.7	0.0	
Approach LOS	B		

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		33.5%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
30: Pearce Street & North Davol Street

2008 Existing Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	75	715	0	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.91	0.91	0.92	0.92
Hourly flow rate (vph)	0	82	786	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						475
pX, platoon unblocked						
vC, conflicting volume	786	393			786	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	786	393			786	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	87			100	
cM capacity (veh/h)	333	609			842	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	82	393	393
Volume Left	0	0	0
Volume Right	82	0	0
cSH	609	1700	1700
Volume to Capacity	0.13	0.23	0.23
Queue Length 95th (ft)	12	0	0
Control Delay (s)	11.8	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.8	0.0	
Approach LOS	B		

Intersection Summary			
Average Delay		1.1	
Intersection Capacity Utilization		31.1%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Davol St. SB & U-Turn to SB U-turn to SB Davol St

2008 Existing Condition - AM Peak Hour

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	0	0	0	720	20	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.86	0.86	0.75	0.75
Hourly flow rate (vph)	0	0	0	837	27	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			0		419	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		419	0
tC, single (s)			4.1		7.1	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			100		95	100
cM capacity (veh/h)			1636		533	1091

Direction, Lane #	SB 1	SB 2	SW 1
Volume Total	419	419	27
Volume Left	0	0	27
Volume Right	0	0	0
cSH	1700	1700	533
Volume to Capacity	0.25	0.25	0.05
Queue Length 95th (ft)	0	0	4
Control Delay (s)	0.0	0.0	12.1
Lane LOS			B
Approach Delay (s)	0.0		12.1
Approach LOS			B

Intersection Summary				
Average Delay		0.4		
Intersection Capacity Utilization		46.8%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
88: Davol St. NB & U-turn to NB Davol St

2008 Existing Condition - AM Peak Hour

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	710	0	0	110	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.92	0.92	0.72	0.72
Hourly flow rate (vph)	0	789	0	0	153	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0				394	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				394	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				74	100
cM capacity (veh/h)	1636				585	1091

Direction, Lane #	NB 1	NB 2	NE 1
Volume Total	394	394	153
Volume Left	0	0	153
Volume Right	0	0	0
cSH	1700	1700	585
Volume to Capacity	0.23	0.23	0.26
Queue Length 95th (ft)	0	0	26
Control Delay (s)	0.0	0.0	13.3
Lane LOS			B
Approach Delay (s)	0.0		13.3
Approach LOS			B

Intersection Summary				
Average Delay		2.2		
Intersection Capacity Utilization		51.3%	ICU Level of Service	A
Analysis Period (min)		15		

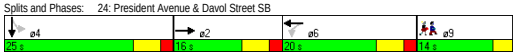
Lanes, Volumes, Timings
24: President Avenue & Davol Street SB

2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	0	0	0	330	5	0	0	0	0	510	500	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	10	12	12	12	12	12	12	12	12	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		238			272			1959			1114		
Travel Time (s)		5.4			6.2			44.5			25.3		
Peak Hour Factor	0.38	0.38	0.38	0.85	0.85	0.85	0.92	0.92	0.92	0.90	0.90	0.90	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%	0%	
Shared Lane Traffic (%)				49%									
Lane Group Flow (vph)	0	0	0	198	196	0	0	0	0	0	1123	0	
Turn Type				Perm						Perm			
Protected Phases		2			6						4		9
Permitted Phases				6						4			
Detector Phase		2		6	6					4	4		
Switch Phase													
Minimum Initial (s)		4.0		12.0	12.0					12.0	12.0		7.0
Minimum Split (s)		10.0		18.0	18.0					18.0	18.0		14.0
Total Split (s)	0.0	16.0	0.0	20.0	20.0	0.0	0.0	0.0	0.0	25.0	25.0	0.0	14.0
Total Split (%)	0.0%	21.3%	0.0%	26.7%	26.7%	0.0%	0.0%	0.0%	0.0%	33.3%	33.3%	0.0%	19%
Maximum Green (s)		10.0		14.0	14.0					19.0	19.0		11.0
Yellow Time (s)		4.0		4.0	4.0					4.0	4.0		3.0
All-Red Time (s)		2.0		2.0	2.0					2.0	2.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.0	
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0		3.0
Recall Mode		None		Min	Min					C-Max	C-Max		None
Walk Time (s)													5.0
Flash Dont Walk (s)													6.0
Pedestrian Calls (#/hr)													5
v/c Ratio				0.52	0.48						0.58		
Control Delay				35.6	34.3						15.2		
Queue Delay				1.5	1.7						0.0		
Total Delay				37.2	36.1						15.2		
Queue Length 50th (ft)				96	95						148		
Queue Length 95th (ft)				152	150						#395		
Internal Link Dist (ft)		158			192			1879			1034		
Turn Bay Length (ft)													
Base Capacity (vph)				391	419						1945		
Starvation Cap Reductn				78	107						0		
Spillback Cap Reductn				0	0						0		
Storage Cap Reductn				0	0						0		
Reduced v/c Ratio				0.63	0.63						0.58		

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 5 (7%), Referenced to phase 4:SBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 24: President Avenue & Davol Street SB



HCM Signalized Intersection Capacity Analysis
24: President Avenue & Davol Street SB

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	330	5	0	0	0	0	510	500	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	12	12	12	12	12	12	12	12
Total Lost time (s)				6.0	6.0						6.0	
Lane Util. Factor				0.95	0.95						0.95	
Frt				1.00	1.00						1.00	
Flt Protected				0.95	0.95						0.98	
Satd. Flow (prot)				1600	1722						3452	
Flt Permitted				0.95	0.95						0.98	
Satd. Flow (perm)				1600	1715						3452	
Peak-hour factor, PHF	0.38	0.38	0.38	0.85	0.85	0.85	0.92	0.92	0.92	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	388	6	0	0	0	0	567	556	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	198	196	0	0	0	0	0	1123	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%	0%
Turn Type				Perm						Perm		
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)				17.9	17.9						39.9	
Effective Green, g (s)				17.9	17.9						39.9	
Actuated g/C Ratio				0.24	0.24						0.53	
Clearance Time (s)				6.0	6.0						6.0	
Vehicle Extension (s)				3.0	3.0						3.0	
Lane Grp Cap (vph)				382	409						1836	
v/s Ratio Prot												
v/s Ratio Perm				c0.12	0.11						0.33	
v/c Ratio				0.52	0.48						0.61	
Uniform Delay, d1				24.8	24.5						12.2	
Progression Factor				1.28	1.29						1.00	
Incremental Delay, d2				1.2	0.9						1.5	
Delay (s)				33.0	32.5						13.7	
Level of Service				C	C						B	
Approach Delay (s)		0.0			32.7			0.0			13.7	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	17.2
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
27: President Avenue & Davol Street NB

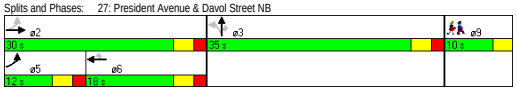
2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	35	475	0	0	270	340	65	580	280	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	11	12	12	11	12	12	11	12	12	12	12	
Storage Length (ft)	0		0	0		165	0		125	0		0	
Storage Lanes	0		0	0		1	0		1	0		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			No			No			No			No	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		272			959			475			333		
Travel Time (s)		6.2			21.8			10.8			7.6		
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.87	0.87	0.87	0.92	0.92	0.92	
Heavy Vehicles (%)	3%	1%	0%	0%	1%	1%	0%	1%	0%	0%	0%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	554	0	0	303	382	0	742	322	0	0	0	
Turn Type	pm+pt					Perm	Perm		Perm				
Protected Phases	5	2			6			3					9
Permitted Phases	2					6	3		3				
Detector Phase	5	2			6	6	3	3	3				
Switch Phase													
Minimum Initial (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0				7.0
Minimum Split (s)	11.0	11.0			11.0	11.0	11.0	11.0	11.0				10.0
Total Split (s)	12.0	30.0	0.0	0.0	18.0	18.0	35.0	35.0	35.0	0.0	0.0	0.0	10.0
Total Split (%)	16.0%	40.0%	0.0%	0.0%	24.0%	24.0%	46.7%	46.7%	46.7%	0.0%	0.0%	0.0%	13%
Maximum Green (s)	7.0	25.0			13.0	13.0	30.0	30.0	30.0				7.0
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0				3.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0				0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	
Lead/Lag	Lead				Lag	Lag							
Lead-Lag Optimize?	Yes				Yes	Yes							
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0				3.0
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None				Ped
Walk Time (s)													4.0
Flash Dont Walk (s)													3.0
Pedestrian Calls (#/hr)													1
v/c Ratio		0.42			0.21	0.57		0.68	0.63				
Control Delay		15.5			15.7	22.8		25.3	27.1				
Queue Delay		0.2			0.0	0.0		0.0	0.0				
Total Delay		15.7			15.7	22.8		25.3	27.1				
Queue Length 50th (ft)		34			45	132		156	126				
Queue Length 95th (ft)		135			82	#252		177	173				
Internal Link Dist (ft)		192			879			395			253		
Turn Bay Length (ft)						165			125				
Base Capacity (vph)		1315			1442	667		1376	646				
Starvation Cap Reductn		250			0	0		0	0				
Spillback Cap Reductn		0			0	0		0	0				
Storage Cap Reductn		0			0	0		0	0				
Reduced v/c Ratio		0.52			0.21	0.57		0.54	0.50				

Intersection Summary

Area Type: Other
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green, Master Intersection
Natural Cycle: 65
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 27: President Avenue & Davol Street NB



HCM Signalized Intersection Capacity Analysis
27: President Avenue & Davol Street NB

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	475	0	0	270	340	65	580	280	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	11	12	12	12	12
Total Lost time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		1.00			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3439			3455	1599		3441	1615			
Flt Permitted		0.91			1.00	1.00		0.99	1.00			
Satd. Flow (perm)		3149			3455	1599		3441	1615			
Peak-hour factor, PHF	0.92	0.92	0.92	0.89	0.89	0.89	0.87	0.87	0.87	0.92	0.92	0.92
Adj. Flow (vph)	38	516	0	0	303	382	75	667	322	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	554	0	0	303	382	0	742	322	0	0	0
Heavy Vehicles (%)	3%	1%	0%	0%	1%	1%	0%	1%	0%	0%	0%	0%
Turn Type	pm+pt					Perm	Perm		Perm			
Protected Phases	5	2			6			3				
Permitted Phases	2					6	3		3			
Actuated Green, G (s)		31.3			31.3	31.3		23.7	23.7			
Effective Green, g (s)		31.3			31.3	31.3		23.7	23.7			
Actuated g/C Ratio		0.42			0.42	0.42		0.32	0.32			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)		1314			1442	667		1087	510			
v/s Ratio Prot					0.09							
v/s Ratio Perm		0.18				c0.24		0.22	0.20			
v/c Ratio		0.42			0.21	0.57		0.68	0.63			
Uniform Delay, d1		15.4			14.0	16.7		22.4	21.9			
Progression Factor		0.87			1.00	1.00		1.00	1.00			
Incremental Delay, d2		0.2			0.3	3.6		1.8	2.5			
Delay (s)		13.6			14.3	20.3		24.2	24.5			
Level of Service		B			B	C		C	C			
Approach Delay (s)		13.6			17.6			24.3			0.0	
Approach LOS		B			B			C			A	

Intersection Summary

HCM Average Control Delay	19.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
35: President Avenue & North Main Street

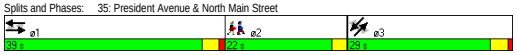
2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR	ø2
Lane Configurations													
Volume (vph)	110	530	110	55	405	55	110	240	70	145	180	85	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	12	12	16	12	12	16	12	12	16	12	
Storage Length (ft)	0		0	125		0	0		0	0		0	
Storage Lanes	1		0	1		0	0		0	0		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			No			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		959			1952			265			1409		
Travel Time (s)		21.8			44.4			6.0			32.0		
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.92	0.92	0.92	0.96	0.96	0.96	
Heavy Vehicles (%)	3%	1%	3%	5%	1%	2%	1%	1%	0%	1%	2%	1%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	0	
Parking (#/hr)			5										
Shared Lane Traffic (%)													
Lane Group Flow (vph)	122	711	0	65	541	0	0	457	0	0	428	0	
Turn Type	Perm			Perm			Perm			Perm			
Protected Phases		1			1			3			3		2
Permitted Phases	1			1			3			3			
Detector Phase	1	1		1	1		3	3		3	3		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0		10.0
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0		22.0
Total Split (s)	39.0	39.0	0.0	39.0	39.0	0.0	29.0	29.0	0.0	29.0	29.0	0.0	22.0
Total Split (%)	43.3%	43.3%	0.0%	43.3%	43.3%	0.0%	32.2%	32.2%	0.0%	32.2%	32.2%	0.0%	24%
Maximum Green (s)	35.0	35.0		35.0	35.0		25.0	25.0		25.0	25.0		19.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lead		Lead	Lead								Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes								Yes
Vehicle Extension (s)	5.0	5.0		5.0	5.0		6.0	6.0		6.0	6.0		3.0
Recall Mode	Min	Min		Min	Min		None	None		None	None		None
Walk Time (s)													10.0
Flash Dont Walk (s)													9.0
Pedestrian Calls (#/hr)													15
v/c Ratio	0.49	0.72		0.55	0.54			0.79			0.89		
Control Delay	24.1	22.0		38.1	16.8			34.2			45.7		
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0		
Total Delay	24.1	22.0		38.1	16.8			34.2			45.7		
Queue Length 50th (ft)	30	203		16	134			160			157		
Queue Length 95th (ft)	#133	#581		#94	328			#462			#467		
Internal Link Dist (ft)		879			1872			185			1329		
Turn Bay Length (ft)				125									
Base Capacity (vph)	264	1046		127	1062			580			483		
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	0.46	0.68		0.51	0.51			0.79			0.89		

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 70.6
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 35: President Avenue & North Main Street



HCM Signalized Intersection Capacity Analysis
35: President Avenue & North Main Street

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	110	530	110	55	405	55	110	240	70	145	180	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	16	12	12	16	12	12	16	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.97		1.00	0.98			0.98			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1752	2070		1719	2091			2061			2027	
Flt Permitted	0.28	1.00		0.14	1.00			0.76			0.64	
Satd. Flow (perm)	523	2070		250	2091			1587			1312	
Peak-hour factor, PHF	0.90	0.90	0.90	0.85	0.85	0.85	0.92	0.92	0.92	0.96	0.96	0.96
Adj. Flow (vph)	122	589	122	65	476	65	120	261	76	151	188	89
RTOR Reduction (vph)	0	0	0	0	5	0	0	7	0	0	10	0
Lane Group Flow (vph)	122	711	0	65	536	0	0	450	0	0	418	0
Heavy Vehicles (%)	3%	1%	3%	5%	1%	2%	1%	1%	0%	1%	2%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	0
Parking (#/hr)			5									
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Actuated Green, G (s)	33.5	33.5		33.5	33.5			25.5			25.5	
Effective Green, g (s)	33.5	33.5		33.5	33.5			25.5			25.5	
Actuated g/C Ratio	0.46	0.46		0.46	0.46			0.35			0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			6.0			6.0	
Lane Grp Cap (vph)	240	950		115	960			554			458	
v/s Ratio Prot		c0.34			0.26							
v/s Ratio Perm	0.23			0.26				0.28			c0.32	
v/c Ratio	0.51	0.75		0.57	0.56			0.81			0.91	
Uniform Delay, d1	13.9	16.3		14.4	14.4			21.6			22.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3.5	3.9		10.1	1.2			10.4			24.2	
Delay (s)	17.4	20.2		24.5	15.6			32.0			46.9	
Level of Service	B	C		C	B			C			D	
Approach Delay (s)		19.8			16.5			32.0			46.9	
Approach LOS		B			B			C			D	

Intersection Summary

HCM Average Control Delay	26.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

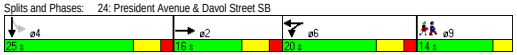
Lanes, Volumes, Timings
24: President Avenue & Davol Street SB

2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	0	10	15	375	15	0	0	0	0	405	450	5	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	10	12	12	12	12	12	12	12	12	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		238			272			1959			1114		
Travel Time (s)		5.4			6.2			44.5			25.3		
Peak Hour Factor	0.57	0.57	0.57	0.88	0.88	0.88	0.92	0.92	0.92	0.88	0.88	0.88	
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	0%	0%	2%	1%	0%	
Shared Lane Traffic (%)				48%									
Lane Group Flow (vph)	0	44	0	222	221	0	0	0	0	0	977	0	
Turn Type				Split						Perm			
Protected Phases		2		6	6						4		9
Permitted Phases										4			
Detector Phase		2		6	6					4	4		
Switch Phase													
Minimum Initial (s)		4.0		12.0	12.0					12.0	12.0		7.0
Minimum Split (s)		10.0		18.0	18.0					18.0	18.0		14.0
Total Split (s)	0.0	16.0	0.0	20.0	20.0	0.0	0.0	0.0	0.0	25.0	25.0	0.0	14.0
Total Split (%)	0.0%	21.3%	0.0%	26.7%	26.7%	0.0%	0.0%	0.0%	0.0%	33.3%	33.3%	0.0%	19%
Maximum Green (s)		10.0		14.0	14.0					19.0	19.0		11.0
Yellow Time (s)		4.0		4.0	4.0					4.0	4.0		3.0
All-Red Time (s)		2.0		2.0	2.0					2.0	2.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.0	
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0		3.0
Recall Mode		None		Min	Min					C-Max	C-Max		None
Walk Time (s)													5.0
Flash Dont Walk (s)													6.0
Pedestrian Calls (#/hr)													5
v/c Ratio		0.25		0.71	0.66						0.57		
Control Delay		21.4		56.5	52.5						19.6		
Queue Delay		0.0		0.1	0.9						0.0		
Total Delay		21.4		56.6	53.4						19.6		
Queue Length 50th (ft)		8		122	121						171		
Queue Length 95th (ft)		18		#203	187						#384		
Internal Link Dist (ft)		158			192			1879			1034		
Turn Bay Length (ft)													
Base Capacity (vph)		256		320	345						1729		
Starvation Cap Reductn		0		2	24						0		
Spillback Cap Reductn		0		0	0						0		
Storage Cap Reductn		0		0	0						0		
Reduced v/c Ratio		0.17		0.70	0.69						0.57		

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 5 (7%), Referenced to phase 4:SBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 24: President Avenue & Davol Street SB



HCM Signalized Intersection Capacity Analysis
24: President Avenue & Davol Street SB

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	10	15	375	15	0	0	0	0	405	450	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	12	12	12	12	12	12	12	12
Total Lost time (s)		6.0		6.0	6.0						6.0	
Lane Util. Factor		1.00		0.95	0.95						0.95	
Frt		0.92		1.00	1.00						1.00	
Flt Protected		1.00		0.95	0.96						0.98	
Satd. Flow (prot)		1748		1569	1694						3473	
Flt Permitted		1.00		0.95	0.96						0.98	
Satd. Flow (perm)		1748		1569	1694						3473	
Peak-hour factor, PHF	0.57	0.57	0.57	0.88	0.88	0.88	0.92	0.92	0.92	0.88	0.88	0.88
Adj. Flow (vph)	0	18	26	426	17	0	0	0	0	460	511	6
RTOR Reduction (vph)	0	24	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	20	0	222	221	0	0	0	0	0	976	0
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	0%	0%	2%	1%	0%
Turn Type				Split						Perm		
Protected Phases		2		6	6						4	
Permitted Phases										4		
Actuated Green, G (s)		4.4		14.9	14.9						32.5	
Effective Green, g (s)		4.4		14.9	14.9						32.5	
Actuated g/C Ratio		0.06		0.20	0.20						0.43	
Clearance Time (s)		6.0		6.0	6.0						6.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		103		312	337						1505	
v/s Ratio Prot		c0.01		c0.14	0.13							
v/s Ratio Perm											0.28	
v/c Ratio		0.19		0.71	0.66						0.65	
Uniform Delay, d1		33.6		28.0	27.7						16.8	
Progression Factor		1.00		1.53	1.53						1.00	
Incremental Delay, d2		0.9		7.3	4.5						2.2	
Delay (s)		34.5		50.3	46.9						18.9	
Level of Service		C		D	D						B	
Approach Delay (s)		34.5			48.6			0.0			18.9	
Approach LOS		C			D			A			B	

Intersection Summary			
HCM Average Control Delay	28.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	23.2
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

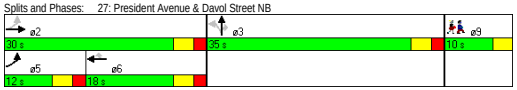
Lanes, Volumes, Timings
27: President Avenue & Davol Street NB

2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	30	385	0	0	310	190	80	440	270	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	11	12	12	11	12	12	11	12	12	12	12	
Storage Length (ft)	0		0	0		165	0		125	0		0	
Storage Lanes	0		0	0		1	0		1	0		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			No			No			No			No	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		272			959			475			333		
Travel Time (s)		6.2			21.8			10.8			7.6		
Peak Hour Factor	0.82	0.82	0.82	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	13%	2%	0%	0%	3%	3%	1%	3%	2%	0%	0%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	507	0	0	352	216	0	565	293	0	0	0	
Turn Type	pm+pt					Perm	Perm		Perm				
Protected Phases	5	2			6			3					9
Permitted Phases	2					6	3		3				
Detector Phase	5	2			6	6	3	3	3				
Switch Phase													
Minimum Initial (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0				7.0
Minimum Split (s)	11.0	11.0			11.0	11.0	11.0	11.0	11.0				10.0
Total Split (s)	12.0	30.0	0.0	0.0	18.0	18.0	35.0	35.0	35.0	0.0	0.0	0.0	10.0
Total Split (%)	16.0%	40.0%	0.0%	0.0%	24.0%	24.0%	46.7%	46.7%	46.7%	0.0%	0.0%	0.0%	13%
Maximum Green (s)	7.0	25.0			13.0	13.0	30.0	30.0	30.0				7.0
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0				3.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0				0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	
Lead/Lag	Lead				Lag	Lag							
Lead-Lag Optimize?	Yes				Yes	Yes							
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0				3.0
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None				Ped
Walk Time (s)													4.0
Flash Dont Walk (s)													3.0
Pedestrian Calls (#/hr)													1
v/c Ratio		0.36			0.23	0.30		0.60	0.67				
Control Delay		18.9			14.3	16.2		25.6	30.9				
Queue Delay		0.2			0.0	0.0		0.1	0.0				
Total Delay		19.2			14.3	16.2		25.7	30.9				
Queue Length 50th (ft)		36			50	61		119	120				
Queue Length 95th (ft)		154			91	128		142	170				
Internal Link Dist (ft)		192			879			395			253		
Turn Bay Length (ft)						165			125				
Base Capacity (vph)		1405			1546	715		1348	633				
Starvation Cap Reductn		346			0	0		0	0				
Spillback Cap Reductn		0			0	0		126	0				
Storage Cap Reductn		0			0	0		0	0				
Reduced v/c Ratio		0.48			0.23	0.30		0.46	0.46				

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green, Master Intersection	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Splits and Phases: 27: President Avenue & Davol Street NB



HCM Signalized Intersection Capacity Analysis
27: President Avenue & Davol Street NB

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	385	0	0	310	190	80	440	270	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	11	12	12	12	12
Total Lost time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		1.00			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3382			3388	1568		3372	1583			
Flt Permitted		0.91			1.00	1.00		0.99	1.00			
Satd. Flow (perm)		3079			3388	1568		3372	1583			
Peak-hour factor, PHF	0.82	0.82	0.82	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	470	0	0	352	216	87	478	293	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	507	0	0	352	216	0	565	293	0	0	0
Heavy Vehicles (%)	13%	2%	0%	0%	3%	3%	1%	3%	2%	0%	0%	0%
Turn Type	pm+pt					Perm	Perm		Perm			
Protected Phases	5	2			6			3				
Permitted Phases	2					6	3		3			
Actuated Green, G (s)		34.2			34.2	34.2		20.8	20.8			
Effective Green, g (s)		34.2			34.2	34.2		20.8	20.8			
Actuated g/C Ratio		0.46			0.46	0.46		0.28	0.28			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)		1404			1545	715		935	439			
v/s Ratio Prot					0.10							
v/s Ratio Perm		c0.16				0.14		0.17	c0.19			
v/c Ratio		0.36			0.23	0.30		0.60	0.67			
Uniform Delay, d1		13.3			12.4	12.9		23.5	24.0			
Progression Factor		1.23			1.00	1.00		1.00	1.00			
Incremental Delay, d2		0.1			0.3	1.1		1.1	3.8			
Delay (s)		16.5			12.7	14.0		24.6	27.9			
Level of Service		B			B	B		C	C			
Approach Delay (s)		16.5			13.2			25.7			0.0	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM Average Control Delay	19.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
35: President Avenue & North Main Street

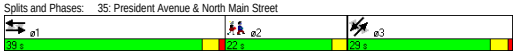
2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR	ø2
Lane Configurations													
Volume (vph)	130	460	65	50	320	65	95	180	70	100	155	75	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	12	12	16	12	12	16	12	12	16	12	
Storage Length (ft)	0		0	125		0	0		0	0		0	
Storage Lanes	1		0	1		0	0		0	0		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			No			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		959			1952			265			1409		
Travel Time (s)		21.8			44.4			6.0			32.0		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.75	0.75	0.75	
Heavy Vehicles (%)	2%	2%	3%	0%	2%	0%	9%	6%	9%	6%	3%	6%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	0	
Parking (#/hr)			5										
Shared Lane Traffic (%)													
Lane Group Flow (vph)	149	604	0	57	443	0	0	396	0	0	440	0	
Turn Type	Perm			Perm			Perm			Perm			
Protected Phases		1			1			3			3		2
Permitted Phases	1			1			3			3			
Detector Phase	1	1		1	1		3	3		3	3		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0		10.0
Minimum Split (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0		22.0
Total Split (s)	39.0	39.0	0.0	39.0	39.0	0.0	29.0	29.0	0.0	29.0	29.0	0.0	22.0
Total Split (%)	43.3%	43.3%	0.0%	43.3%	43.3%	0.0%	32.2%	32.2%	0.0%	32.2%	32.2%	0.0%	24%
Maximum Green (s)	35.0	35.0		35.0	35.0		25.0	25.0		25.0	25.0		19.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lead		Lead	Lead								Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes								Yes
Vehicle Extension (s)	5.0	5.0		5.0	5.0		6.0	6.0		6.0	6.0		3.0
Recall Mode	Min	Min		Min	Min		None	None		None	None		None
Walk Time (s)													10.0
Flash Dont Walk (s)													9.0
Pedestrian Calls (#/hr)													15
v/c Ratio	0.51	0.66		0.34	0.48			0.69			0.77		
Control Delay	22.8	19.9		21.2	15.9			28.4			32.2		
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0		
Total Delay	22.8	19.9		21.2	15.9			28.4			32.2		
Queue Length 50th (ft)	36	160		13	102			127			147		
Queue Length 95th (ft)	129	399		58	265			#373			#335		
Internal Link Dist (ft)		879			1872			185			1329		
Turn Bay Length (ft)				125									
Base Capacity (vph)	355	1114		206	1119			577			574		
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	0.42	0.54		0.28	0.40			0.69			0.77		

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 67.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 35: President Avenue & North Main Street



HCM Signalized Intersection Capacity Analysis
35: President Avenue & North Main Street

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	130	460	65	50	320	65	95	180	70	100	155	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	16	12	12	16	12	12	16	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.97			0.97			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	2069		1805	2064			1923			1966	
Flt Permitted	0.35	1.00		0.20	1.00			0.76			0.74	
Satd. Flow (perm)	659	2069		382	2064			1478			1467	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.75	0.75	0.75
Adj. Flow (vph)	149	529	75	57	368	75	109	207	80	133	207	100
RTOR Reduction (vph)	0	0	0	0	7	0	0	9	0	0	10	0
Lane Group Flow (vph)	149	604	0	57	436	0	0	387	0	0	430	0
Heavy Vehicles (%)	2%	2%	3%	0%	2%	0%	9%	6%	9%	6%	3%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	0
Parking (#/hr)			5									
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Actuated Green, G (s)	29.7	29.7		29.7	29.7			25.8			25.8	
Effective Green, g (s)	29.7	29.7		29.7	29.7			25.8			25.8	
Actuated g/C Ratio	0.43	0.43		0.43	0.43			0.37			0.37	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			6.0			6.0	
Lane Grp Cap (vph)	282	887		164	885			550			546	
v/s Ratio Prot		c0.29			0.21							
v/s Ratio Perm	0.23			0.15				0.26			c0.29	
v/c Ratio	0.53	0.68		0.35	0.49			0.70			0.79	
Uniform Delay, d1	14.6	16.0		13.3	14.3			18.5			19.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3.4	2.8		2.7	0.9			6.0			9.1	
Delay (s)	18.0	18.8		16.0	15.2			24.5			28.4	
Level of Service	B	B		B	B			C			C	
Approach Delay (s)		18.6			15.3			24.5			28.4	
Approach LOS		B			B			C			C	

Intersection Summary

HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	69.3	Sum of lost time (s)	13.8
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Ferry Street & Ponta Delgada

2008 Existing Condition - PM Peak Hour

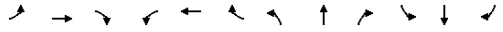
Movement	EBL	EBR	NBL	NBR	SWL	SWR
Lane Configurations						
Volume (veh/h)	145	30	15	15	25	255
Sign Control	Stop		Free		Free	
Grade	1%		1%		1%	
Peak Hour Factor	0.89	0.89	0.91	0.91	0.74	0.74
Hourly flow rate (vph)	163	34	16	16	34	345
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	256	206	378			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	256	206	378			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	78	96	99			
cM capacity (veh/h)	725	839	1191			

Direction, Lane #	EB 1	NB 1	SW 1
Volume Total	197	33	378
Volume Left	163	16	0
Volume Right	34	0	345
cSH	742	1191	1700
Volume to Capacity	0.26	0.01	0.22
Queue Length 95th (ft)	27	1	0
Control Delay (s)	11.6	4.1	0.0
Lane LOS	B	A	
Approach Delay (s)	11.6	4.1	0.0
Approach LOS	B		

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	40.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
7: Anawan Street & Ponta Delgada

2008 Existing Condition - PM Peak Hour



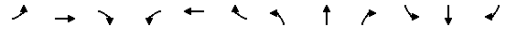
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	25	5	65	0	5	0	10	155	35	215	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.70	0.70	0.67	0.67	0.67	0.91	0.91	0.91	0.78	0.78	0.78
Hourly flow rate (vph)	0	36	7	97	0	7	0	11	170	45	276	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	475	553	282	493	474	96	288			181		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	475	553	282	493	474	96	288			181		
tC, single (s)	7.1	6.6	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.1	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	91	99	78	100	99	100			97		
cM capacity (veh/h)	487	419	762	442	476	966	1285			1388		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	43	104	181	333
Volume Left	0	97	0	45
Volume Right	7	7	170	13
cSH	453	460	1285	1388
Volume to Capacity	0.09	0.23	0.00	0.03
Queue Length 95th (ft)	8	22	0	3
Control Delay (s)	13.8	15.1	0.0	1.3
Lane LOS	B	C		A
Approach Delay (s)	13.8	15.1	0.0	1.3
Approach LOS	B	C		

Intersection Summary				
Average Delay	3.9			
Intersection Capacity Utilization	44.5%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
9: Central Street & Davol Street

2008 Existing Condition - PM Peak Hour



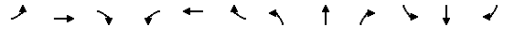
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	120	110	255	5	310	0	0	440	115
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.86	0.86	0.86	0.78	0.78	0.78	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	140	128	297	6	397	0	0	489	128
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1323	963	553	963	1027	397	617			397		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1323	963	553	963	1027	397	617			397		
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 %	100	100	100	40	45	55	99			100		
cM capacity (veh/h)	41	256	537	234	231	657	973			1172		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	203	360	404	617
Volume Left	140	0	6	0
Volume Right	0	297	0	128
cSH	233	495	973	1700
Volume to Capacity	0.87	0.73	0.01	0.36
Queue Length 95th (ft)	177	149	0	0
Control Delay (s)	74.9	29.4	0.2	0.0
Lane LOS	F	D	A	
Approach Delay (s)	45.8		0.2	0.0
Approach LOS	E			

Intersection Summary				
Average Delay			16.4	
Intersection Capacity Utilization			51.6%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
10: Anawan Street & Davol Street

2008 Existing Condition - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	110	85	50	95	40	55	5	150	85	170	355	35
Peak Hour Factor	0.87	0.87	0.87	0.76	0.76	0.76	0.94	0.94	0.94	0.85	0.85	0.85
Hourly flow rate (vph)	126	98	57	125	53	72	5	160	90	200	418	41

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	282	250	255	659
Volume Left (vph)	126	125	5	200
Volume Right (vph)	57	72	90	41
Hadj (s)	0.01	-0.06	-0.19	0.04
Departure Headway (s)	7.4	7.4	7.1	6.7
Degree Utilization, x	0.58	0.51	0.50	1.22
Capacity (veh/h)	463	450	473	534
Control Delay (s)	19.9	18.0	17.1	136.3
Approach Delay (s)	19.9	18.0	17.1	136.3
Approach LOS	C	C	C	F

Intersection Summary				
Delay			72.1	
HCM Level of Service			F	
Intersection Capacity Utilization			70.0%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
29: Turner Street & Davol Street NB

2008 Existing Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	60	785	115	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.56	0.56	0.90	0.90	0.92	0.92
Hourly flow rate (vph)	0	107	872	128	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	936	500			1000	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	936	500			1000	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	79			100	
cM capacity (veh/h)	267	516			700	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	107	581	419
Volume Left	0	0	0
Volume Right	107	0	128
cSH	516	1700	1700
Volume to Capacity	0.21	0.34	0.25
Queue Length 95th (ft)	19	0	0
Control Delay (s)	13.8	0.0	0.0
Lane LOS	B		
Approach Delay (s)	13.8	0.0	
Approach LOS	B		

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	35.7%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
30: Pearce Street & North Davol Street

2008 Existing Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	70	855	0	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.67	0.67	0.86	0.86	0.92	0.92
Hourly flow rate (vph)	0	104	994	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						475
pX, platoon unblocked						
vC, conflicting volume	994	497			994	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	994	497			994	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	80			100	
cM capacity (veh/h)	245	521			704	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	104	497	497
Volume Left	0	0	0
Volume Right	104	0	0
cSH	521	1700	1700
Volume to Capacity	0.20	0.29	0.29
Queue Length 95th (ft)	19	0	0
Control Delay (s)	13.6	0.0	0.0
Lane LOS	B		
Approach Delay (s)	13.6	0.0	
Approach LOS	B		

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	34.6%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
85: Davol St. SB & U-Turn to SB U-turn to SB Davol St

2008 Existing Condition - PM Peak Hour

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	0	0	0	735	20	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	0	0	0	799	40	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			0		399	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		399	0
tC, single (s)			4.1		7.0	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			100		93	100
cM capacity (veh/h)			1636		558	1091

Direction, Lane #	SB 1	SB 2	SW 1
Volume Total	399	399	40
Volume Left	0	0	40
Volume Right	0	0	0
cSH	1700	1700	558
Volume to Capacity	0.23	0.23	0.07
Queue Length 95th (ft)	0	0	6
Control Delay (s)	0.0	0.0	12.0
Lane LOS			B
Approach Delay (s)	0.0		12.0
Approach LOS			B

Intersection Summary				
Average Delay		0.6		
Intersection Capacity Utilization		50.4%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
88: Davol St. NB & U-turn to NB Davol St

2008 Existing Condition - PM Peak Hour

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	825	0	0	75	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.92	0.92	0.89	0.89
Hourly flow rate (vph)	0	927	0	0	84	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0				463	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				463	0
tC, single (s)	4.1				6.9	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				84	100
cM capacity (veh/h)	1636				525	1091

Direction, Lane #	NB 1	NB 2	NE 1
Volume Total	463	463	84
Volume Left	0	0	84
Volume Right	0	0	0
cSH	1700	1700	525
Volume to Capacity	0.27	0.27	0.16
Queue Length 95th (ft)	0	0	14
Control Delay (s)	0.0	0.0	13.2
Lane LOS			B
Approach Delay (s)	0.0		13.2
Approach LOS			B

Intersection Summary				
Average Delay		1.1		
Intersection Capacity Utilization		54.5%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
2: Narrows St & South Main St

2008 Existing Conditions - AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	120	10	10	165	185	85
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.75	0.75	0.79	0.79
Hourly flow rate (vph)	146	12	13	220	234	108
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	535	288	342			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	535	288	342			
tC, single (s)	6.5	6.4	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.5	2.3			
p0 queue free %	70	98	99			
cM capacity (veh/h)	485	710	1174			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	159	233	342
Volume Left	146	13	0
Volume Right	12	0	108
cSH	498	1174	1700
Volume to Capacity	0.32	0.01	0.20
Queue Length 95th (ft)	34	1	0
Control Delay (s)	15.6	0.6	0.0
Lane LOS	C	A	
Approach Delay (s)	15.6	0.6	0.0
Approach LOS	C		

Intersection Summary			
Average Delay		3.5	
Intersection Capacity Utilization		30.8%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
5: Copicut Road & South Main St

2008 Existing Conditions - AM Peak Hour

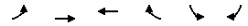
Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Volume (veh/h)	5	5	170	0	5	200
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.56	0.56	0.72	0.72	0.81	0.81
Hourly flow rate (vph)	9	9	236	0	6	247
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	495	236			236	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	495	236			236	
tC, single (s)	6.4	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	98	99			100	
cM capacity (veh/h)	535	774			1343	

Direction, Lane #	WB 1	NE 1	SW 1
Volume Total	18	236	253
Volume Left	9	0	6
Volume Right	9	0	0
cSH	633	1700	1343
Volume to Capacity	0.03	0.14	0.00
Queue Length 95th (ft)	2	0	0
Control Delay (s)	10.9	0.0	0.2
Lane LOS	B		A
Approach Delay (s)	10.9	0.0	0.2
Approach LOS	B		

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		24.5%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
7: South Main St & Route 24 SB Off-Ramp

2008 Existing Conditions - AM Peak Hour



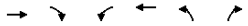
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	70	245	225	350	25	55
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.85	0.85	0.87	0.87	0.91	0.91
Hourly flow rate (vph)	82	288	259	402	27	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	259				913	460
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	259				913	460
tC, single (s)	4.2				6.6	6.4
tC, 2 stage (s)						
tF (s)	2.3				3.6	3.5
p0 queue free %	93				90	89
cM capacity (veh/h)	1266				269	558

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	371	661	88
Volume Left	82	0	27
Volume Right	0	402	60
cSH	1266	1700	418
Volume to Capacity	0.07	0.39	0.21
Queue Length 95th (ft)	5	0	20
Control Delay (s)	2.3	0.0	15.9
Lane LOS	A		C
Approach Delay (s)	2.3	0.0	15.9
Approach LOS			C

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
17: South Main St & Route 24 NB Off-Ramp

2008 Existing Conditions - AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	160	75	85	500	75	280
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.88	0.88	0.80	0.80
Hourly flow rate (vph)	195	91	97	568	94	350
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			195		1002	241
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			195		1002	241
tC, single (s)			4.2		6.5	6.5
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.5
p0 queue free %			93		62	53
cM capacity (veh/h)			1331		244	742

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	287	665	444
Volume Left	0	97	94
Volume Right	91	0	350
cSH	1700	1331	519
Volume to Capacity	0.17	0.07	0.86
Queue Length 95th (ft)	0	6	226
Control Delay (s)	0.0	1.9	40.5
Lane LOS		A	E
Approach Delay (s)	0.0	1.9	40.5
Approach LOS			E

Intersection Summary			
Average Delay	13.8		
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
21: Ridge Hill Rd & South Main St

2008 Existing Conditions - AM Peak Hour

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	15	5	130	15	0	5	30	390	20	15	440	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.76	0.76	0.76	0.59	0.59	0.59	0.84	0.84	0.84	0.95	0.95	0.95
Hourly flow rate (vph)	20	7	171	25	0	8	36	464	24	16	463	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1053	1057	466	1219	1048	476	468			488		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1053	1057	466	1219	1048	476	468			488		
tC, single (s)	7.1	7.0	6.2	7.3	6.5	6.4	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.4	3.3	3.7	4.0	3.5	2.3			2.3		
p0 queue free %	90	96	71	73	100	98	97			98		
cM capacity (veh/h)	195	177	595	96	219	544	1038			1045		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	197	34	524	484
Volume Left	20	25	36	16
Volume Right	171	8	24	5
cSH	463	121	1038	1045
Volume to Capacity	0.43	0.28	0.03	0.02
Queue Length 95th (ft)	52	27	3	1
Control Delay (s)	18.4	46.1	1.0	0.4
Lane LOS	C	E	A	A
Approach Delay (s)	18.4	46.1	1.0	0.4
Approach LOS	C	E		

Intersection Summary				
Average Delay	4.8			
Intersection Capacity Utilization	50.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
30: South Main St & High Street

2008 Existing Conditions - AM Peak Hour

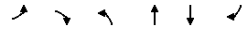
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	5	385	0	5	470	5	0	0	0	5	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.97	0.97	0.97	0.25	0.25	0.25	0.64	0.64	0.64
Hourly flow rate (vph)	5	414	0	5	485	5	0	0	0	8	0	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	490			414			938	922	487	922	925	414
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	490			414			938	922	487	922	925	414
tC, single (s)	4.1			5.1			7.1	6.5	6.2	7.3	6.5	6.4
tC, 2 stage (s)												
tF (s)	2.2			3.1			3.5	4.0	3.3	3.7	4.0	3.5
p0 queue free %	100			99			100	100	100	97	100	97
cM capacity (veh/h)	1084			768			238	269	585	234	268	607

Direction, Lane #	NB 1	SB 1	SE 1	NW 1
Volume Total	419	495	0	23
Volume Left	5	5	0	8
Volume Right	0	5	0	16
cSH	1084	768	1700	396
Volume to Capacity	0.00	0.01	0.00	0.06
Queue Length 95th (ft)	0	1	0	5
Control Delay (s)	0.2	0.2	0.0	14.7
Lane LOS	A	A	A	B
Approach Delay (s)	0.2	0.2	0.0	14.7
Approach LOS			A	B

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	37.9%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
2: Narrows St & South Main St

2008 Existing Conditions - PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	110	15	25	265	240	100
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.89	0.89	0.95	0.95
Hourly flow rate (vph)	134	18	28	298	253	105
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	659	305	358			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	659	305	358			
tC, single (s)	6.5	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.2			
p0 queue free %	67	97	98			
cM capacity (veh/h)	412	712	1212			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	152	326	358
Volume Left	134	28	0
Volume Right	18	0	105
cSH	434	1212	1700
Volume to Capacity	0.35	0.02	0.21
Queue Length 95th (ft)	39	2	0
Control Delay (s)	17.7	0.9	0.0
Lane LOS	C	A	
Approach Delay (s)	17.7	0.9	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Copicut Road & South Main St

2008 Existing Conditions - PM Peak Hour

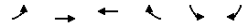
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	10	270	5	5	250
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.46	0.46	0.93	0.93	0.73	0.73
Hourly flow rate (vph)	11	22	290	5	7	342
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	649	293			296	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	649	293			296	
tC, single (s)	6.4	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	98	97			99	
cM capacity (veh/h)	435	721			1277	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	33	296	349
Volume Left	11	0	7
Volume Right	22	5	0
cSH	591	1700	1277
Volume to Capacity	0.06	0.17	0.01
Queue Length 95th (ft)	4	0	0
Control Delay (s)	11.4	0.0	0.2
Lane LOS	B		A
Approach Delay (s)	11.4	0.0	0.2
Approach LOS	B		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	27.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
7: South Main St & Route 24 SB Off-Ramp

2008 Existing Conditions - PM Peak Hour



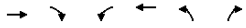
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	95	265	295	250	110	35
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.94	0.94	0.79	0.79
Hourly flow rate (vph)	108	301	314	266	139	44
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	314				964	447
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	314				964	447
tC, single (s)	4.2				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.6	3.4
p0 queue free %	91				45	92
cM capacity (veh/h)	1213				254	589

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	409	580	184
Volume Left	108	0	139
Volume Right	0	266	44
cSH	1213	1700	294
Volume to Capacity	0.09	0.34	0.62
Queue Length 95th (ft)	7	0	97
Control Delay (s)	2.8	0.0	35.6
Lane LOS	A		E
Approach Delay (s)	2.8	0.0	35.6
Approach LOS			E

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
17: South Main St & Route 24 NB Off-Ramp

2008 Existing Conditions - PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	280	95	50	470	85	340
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.94	0.94	0.95	0.95
Hourly flow rate (vph)	329	112	53	500	89	358
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			329		992	385
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			329		992	385
tC, single (s)			4.1		6.6	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			96		64	46
cM capacity (veh/h)			1219		246	662

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	441	553	447
Volume Left	0	53	89
Volume Right	112	0	358
cSH	1700	1219	495
Volume to Capacity	0.26	0.04	0.90
Queue Length 95th (ft)	0	3	258
Control Delay (s)	0.0	1.2	49.3
Lane LOS		A	E
Approach Delay (s)	0.0	1.2	49.3
Approach LOS			E

Intersection Summary			
Average Delay	15.8		
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
21: Ridge Hill Rd & South Main St

2008 Existing Conditions - PM Peak Hour

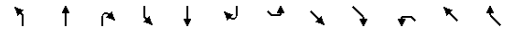
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	10	0	80	35	0	15	35	530	30	5	405	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.92	0.92	0.92	0.87	0.87	0.87
Hourly flow rate (vph)	11	0	87	41	0	17	38	576	33	6	466	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1163	1162	466	1232	1145	592	466			609		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1163	1162	466	1232	1145	592	466			609		
tC, single (s)	7.2	6.5	6.2	7.2	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	93	100	85	66	100	97	97			99		
cM capacity (veh/h)	153	189	599	120	193	510	1106			980		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	98	58	647	471
Volume Left	11	41	38	6
Volume Right	87	17	33	0
cSH	452	156	1106	980
Volume to Capacity	0.22	0.37	0.03	0.01
Queue Length 95th (ft)	20	39	3	0
Control Delay (s)	15.1	41.1	0.9	0.2
Lane LOS	C	E	A	A
Approach Delay (s)	15.1	41.1	0.9	0.2
Approach LOS	C	E		

Intersection Summary				
Average Delay			3.6	
Intersection Capacity Utilization			67.4%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
30: South Main St & High St.

2008 Existing Conditions - PM Peak Hour



Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	0	535	10	15	410	5	0	0	0	0	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.93	0.93	0.93	0.25	0.25	0.25	0.83	0.83	0.83
Hourly flow rate (vph)	0	588	11	16	441	5	0	0	0	0	0	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	446			599			1081	1075	444	1069	1072	593
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	446			599			1081	1075	444	1069	1072	593
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			100	100	100	100	100	98
cM capacity (veh/h)	1125			954			190	218	618	198	219	509

Direction, Lane #	NB 1	SB 1	SE 1	NW 1
Volume Total	599	462	0	12
Volume Left	0	16	0	0
Volume Right	11	5	0	12
cSH	1125	954	1700	509
Volume to Capacity	0.00	0.02	0.00	0.02
Queue Length 95th (ft)	0	1	0	2
Control Delay (s)	0.0	0.5	0.0	12.2
Lane LOS		A	A	B
Approach Delay (s)	0.0	0.5	0.0	12.2
Approach LOS			A	B

Intersection Summary				
Average Delay			0.4	
Intersection Capacity Utilization			44.0%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
2: Jones St & Mt Pleasant St

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	5	0	170	10	530	0	70	220	175	185	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.82	0.82	0.82	0.94	0.94	0.94	0.83	0.83	0.83
Hourly flow rate (vph)	0	6	0	207	12	646	0	74	234	211	223	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1492	956	226	839	842	191	229			309		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1492	956	226	839	842	191	229			309		
tC, single (s)	7.1	6.7	6.2	7.2	6.8	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.2	3.3	3.6	4.2	3.3	2.2			2.2		
p0 queue free %	100	97	100	13	95	23	100			83		
cM capacity (veh/h)	20	200	818	238	229	843	1351			1235		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	6	220	646	309	211	229
Volume Left	0	207	0	0	211	0
Volume Right	0	0	646	234	0	6
cSH	200	237	843	1351	1235	1700
Volume to Capacity	0.03	0.92	0.77	0.00	0.17	0.13
Queue Length 95th (ft)	2	201	189	0	15	0
Control Delay (s)	23.6	84.4	21.8	0.0	8.5	0.0
Lane LOS	C	F	C		A	
Approach Delay (s)	23.6	37.7		0.0	4.1	
Approach LOS	C	E				

Intersection Summary				
Average Delay	21.3			
Intersection Capacity Utilization	63.4%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
9: Tarkiln Hill Rd & Kings Highway

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	10	20	10	540	690	60
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.83	0.83	0.90	0.90
Hourly flow rate (vph)	12	24	12	651	767	67
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				393	611	
pX, platoon unblocked	0.82					
vC, conflicting volume	1475	800	833			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1469	800	833			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	94	99			
cM capacity (veh/h)	113	380	808			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	37	663	833
Volume Left	12	12	0
Volume Right	24	0	67
cSH	213	808	1700
Volume to Capacity	0.17	0.01	0.49
Queue Length 95th (ft)	15	1	0
Control Delay (s)	25.4	0.4	0.0
Lane LOS	D	A	
Approach Delay (s)	25.4	0.4	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: Park Ave. & Church St

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	65	130	20	0	45	0	400	20	10	185	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.84	0.84	0.84	0.85	0.85	0.85	0.76	0.76	0.76
Hourly flow rate (vph)	0	83	167	24	0	54	0	471	24	13	243	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											176	
pX, platoon unblocked	0.93	0.93	0.93	0.93	0.93		0.93					
vC, conflicting volume	806	764	243	960	752	482	243			494		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	751	706	144	918	693	482	144			494		
tC, single (s)	7.1	6.5	6.3	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	75	80	84	100	91	100			99		
cM capacity (veh/h)	275	330	818	150	338	588	1345			1080		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	250	77	494	257
Volume Left	0	24	0	13
Volume Right	167	54	24	0
cSH	548	310	1700	1080
Volume to Capacity	0.46	0.25	0.29	0.01
Queue Length 95th (ft)	59	24	0	1
Control Delay (s)	17.0	20.5	0.0	0.5
Lane LOS	C	C		A
Approach Delay (s)	17.0	20.5	0.0	0.5
Approach LOS	C	C		

Intersection Summary				
Average Delay	5.5			
Intersection Capacity Utilization	47.5%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
17: Irvington Street & Church Street

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	0	5	25	0	20	5	260	0	0	325	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.79	0.79	0.79	0.85	0.85	0.85	0.77	0.77	0.77
Hourly flow rate (vph)	7	0	7	32	0	25	6	306	0	0	422	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	772	746	429	753	753	306	435			306		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	772	746	429	753	753	306	435			306		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	99	90	100	97	99			100		
cM capacity (veh/h)	307	342	631	314	339	739	1135			1266		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	13	57	312	435
Volume Left	7	32	6	0
Volume Right	7	25	0	13
cSH	413	422	1135	1700
Volume to Capacity	0.03	0.14	0.01	0.26
Queue Length 95th (ft)	2	12	0	0
Control Delay (s)	14.0	14.9	0.2	0.0
Lane LOS	B	B	A	
Approach Delay (s)	14.0	14.9	0.2	0.0
Approach LOS	B	B		

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	27.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
32: Coggeshall Street & North Front St

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	50	375	45	85	305	50	25	60	45	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.84	0.84	0.84	0.86	0.86	0.86	0.92	0.92	0.92
Hourly flow rate (vph)	56	421	51	101	363	60	29	70	52	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		546			443							
pX, platoon unblocked	0.98			0.92			0.93	0.93	0.92	0.93	0.93	0.98
vC, conflicting volume	423			472			1154	1184	447	1241	1180	393
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	397			382			1073	1105	355	1167	1100	367
tC, single (s)	4.1			4.1			7.2	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.5	4.0	3.3
p0 queue free %	95			91			82	59	92	100	100	100
cM capacity (veh/h)	1124			1082			160	168	620	90	172	667

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	528	524	151
Volume Left	56	101	29
Volume Right	51	60	52
cSH	1124	1082	222
Volume to Capacity	0.05	0.09	0.68
Queue Length 95th (ft)	4	8	108
Control Delay (s)	1.4	2.5	50.0
Lane LOS	A	A	E
Approach Delay (s)	1.4	2.5	50.0
Approach LOS			E

Intersection Summary				
Average Delay	8.0			
Intersection Capacity Utilization	53.4%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
54: driveway & Purchase St

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	10	235	5	35	0	215	0	0	250	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	11	255	5	38	0	234	0	0	272	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								830				
pX, platoon unblocked												
vC, conflicting volume	546	505	272	516	505	234	272			234		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	546	505	272	516	505	234	272			234		
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 %	100	100	99	45	99	95	100			100		
cM capacity (veh/h)	423	469	767	463	469	805	1292			1334		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	11	299	234	272
Volume Left	0	255	0	0
Volume Right	11	38	0	0
cSH	767	489	1292	1700
Volume to Capacity	0.01	0.61	0.00	0.16
Queue Length 95th (ft)	1	101	0	0
Control Delay (s)	9.8	23.2	0.0	0.0
Lane LOS	A	C		
Approach Delay (s)	9.8	23.2	0.0	0.0
Approach LOS	A	C		

Intersection Summary				
Average Delay	8.6			
Intersection Capacity Utilization	41.9%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
58: Coggeshall St & Purchase Street

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	15	150	35	35	100	90	10	185	60	90	165	15
Peak Hour Factor	0.80	0.80	0.80	0.83	0.83	0.83	0.89	0.89	0.89	0.88	0.88	0.88
Hourly flow rate (vph)	19	188	44	42	120	108	11	208	67	102	188	17

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	250	271	287	307
Volume Left (vph)	19	42	11	102
Volume Right (vph)	44	108	67	17
Hadj (s)	-0.04	-0.09	-0.05	0.19
Departure Headway (s)	6.4	6.3	6.3	6.4
Degree Utilization, x	0.45	0.48	0.50	0.55
Capacity (veh/h)	496	506	523	508
Control Delay (s)	14.5	15.0	15.4	17.0
Approach Delay (s)	14.5	15.0	15.4	17.0
Approach LOS	B	B	C	C

Intersection Summary				
Delay			15.5	
HCM Level of Service			C	
Intersection Capacity Utilization			60.0%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
72: Weld St & Purchase St

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	0	5	115	55	25	55	210	0	0	225	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.89	0.89	0.89	0.89	0.89	0.89	0.83	0.83	0.83
Hourly flow rate (vph)	6	0	6	129	62	28	62	236	0	0	271	30
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	705	646	286	652	661	236	301			236		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	705	646	286	652	661	236	301			236		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.3			2.2		
p0 queue free %	98	100	99	64	83	96	95			100		
cM capacity (veh/h)	286	373	746	361	363	786	1216			1343		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	12	160	59	298	301
Volume Left	6	129	0	62	0
Volume Right	6	0	28	0	30
cSH	413	361	488	1216	1343
Volume to Capacity	0.03	0.44	0.12	0.05	0.00
Queue Length 95th (ft)	2	55	10	4	0
Control Delay (s)	14.0	22.6	13.4	2.1	0.0
Lane LOS	B	C	B	A	
Approach Delay (s)	14.0	20.1		2.1	0.0
Approach LOS	B	C			

Intersection Summary					
Average Delay			6.3		
Intersection Capacity Utilization			49.2%	ICU Level of Service	
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis
74: Logan St & Purchase St

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	35	0	40	0	225	115	90	255	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.84	0.84	0.84	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	42	0	48	0	250	128	100	283	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	845	861	283	797	797	314	283			378		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	845	861	283	797	797	314	283			378		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.3	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.4	2.2			2.3		
p0 queue free %	100	100	100	85	100	93	100			91		
cM capacity (veh/h)	248	270	760	280	294	715	1291			1154		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	89	378	383
Volume Left	0	42	0	100
Volume Right	0	48	128	0
cSH	1700	414	1291	1154
Volume to Capacity	0.00	0.22	0.00	0.09
Queue Length 95th (ft)	0	20	0	7
Control Delay (s)	0.0	16.1	0.0	2.8
Lane LOS	A	C		A
Approach Delay (s)	0.0	16.1	0.0	2.8
Approach LOS	A	C		

Intersection Summary				
Average Delay		3.0		
Intersection Capacity Utilization		51.6%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
75: Logan St & North Front Street

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	135	15	15	5	5	15	5	130	5	55	190	65
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.69	0.69	0.69	0.78	0.78	0.78	0.93	0.93	0.93
Hourly flow rate (vph)	159	18	18	7	7	22	6	167	6	59	204	70
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											720	
pX, platoon unblocked												
vC, conflicting volume	566	543	239	567	575	170	274			173		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	566	543	239	567	575	170	274			173		
tC, single (s)	7.2	6.5	6.4	7.1	6.5	6.4	4.3			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.5	3.5	4.0	3.5	2.4			2.2		
p0 queue free %	59	96	98	98	98	97	99			96		
cM capacity (veh/h)	391	428	762	399	411	827	1207			1404		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	194	36	179	333
Volume Left	159	7	6	59
Volume Right	18	22	6	70
cSH	412	584	1207	1404
Volume to Capacity	0.47	0.06	0.01	0.04
Queue Length 95th (ft)	61	5	0	3
Control Delay (s)	21.3	11.6	0.3	1.7
Lane LOS	C	B	A	A
Approach Delay (s)	21.3	11.6	0.3	1.7
Approach LOS	C	B		

Intersection Summary				
Average Delay		7.0		
Intersection Capacity Utilization		50.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
77: Rt. 140 Ramps & Mt. Pleasant Street

2008 Existing Condition - AM Peak Hour

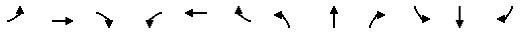
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	155	45	215	385	55	210
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.69	0.69	0.85	0.85	0.75	0.75
Hourly flow rate (vph)	225	65	253	453	73	280
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	906	479			253	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	906	479			253	
tC, single (s)	6.5	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	18	89			94	
cM capacity (veh/h)	276	582			1312	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	290	706	353
Volume Left	225	0	73
Volume Right	65	453	0
cSH	313	1700	1312
Volume to Capacity	0.93	0.42	0.06
Queue Length 95th (ft)	227	0	4
Control Delay (s)	71.4	0.0	2.1
Lane LOS	F		A
Approach Delay (s)	71.4	0.0	2.1
Approach LOS	F		

Intersection Summary			
Average Delay	15.9		
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
126: Logan St & Acushnet Avenue

2008 Existing Condition - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	140	50	20	55	0	20	5	35	0	5	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.90	0.90	0.90	0.88	0.88	0.88	0.67	0.67	0.67
Hourly flow rate (vph)	19	175	62	22	61	0	23	6	40	0	7	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	109	98	7	228	78	26	7			45		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	109	98	7	228	78	26	7			45		
tC, single (s)	7.2	6.5	6.3	7.2	6.6	6.2	4.3			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.6	4.1	3.3	2.3			2.2		
p0 queue free %	98	77	94	96	92	100	99			100		
cM capacity (veh/h)	788	776	1063	545	792	1056	1526			1575		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	256	83	68	7
Volume Left	19	22	23	0
Volume Right	62	0	40	0
cSH	832	707	1526	1575
Volume to Capacity	0.31	0.12	0.01	0.00
Queue Length 95th (ft)	33	10	1	0
Control Delay (s)	11.2	10.8	2.5	0.0
Lane LOS	B	B	A	
Approach Delay (s)	11.2	10.8	2.5	0.0
Approach LOS	B	B		

Intersection Summary			
Average Delay	9.5		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
130: Herman Melville Boulevard & McArthur Drive

2008 Existing Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	115	35	125	95	60	130
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.99	0.99	0.81	0.81
Hourly flow rate (vph)	122	37	126	96	74	160
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	483	174			222	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	483	174			222	
tC, single (s)	6.6	6.4			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.5			2.3	
p0 queue free %	75	96			94	
cM capacity (veh/h)	490	829			1301	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	160	222	235
Volume Left	122	0	74
Volume Right	37	96	0
cSH	542	1700	1301
Volume to Capacity	0.29	0.13	0.06
Queue Length 95th (ft)	31	0	5
Control Delay (s)	14.4	0.0	2.8
Lane LOS	B		A
Approach Delay (s)	14.4	0.0	2.8
Approach LOS	B		

Intersection Summary				
Average Delay		4.8		
Intersection Capacity Utilization		41.0%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
136: Hillman St & McArthur Dr

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	45	160	115	45	30	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.91	0.91	0.82	0.82
Hourly flow rate (vph)	53	188	126	49	37	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	354	52	67			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	354	52	67			
tC, single (s)	6.4	6.3	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.4			
p0 queue free %	91	81	91			
cM capacity (veh/h)	587	1005	1433			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	241	176	67
Volume Left	53	126	0
Volume Right	188	0	30
cSH	869	1433	1700
Volume to Capacity	0.28	0.09	0.04
Queue Length 95th (ft)	28	7	0
Control Delay (s)	10.7	5.8	0.0
Lane LOS	B	A	
Approach Delay (s)	10.7	5.8	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		7.4		
Intersection Capacity Utilization		34.4%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
147: Wamsutta St & McArthur Drive

2008 Existing Condition - AM Peak Hour

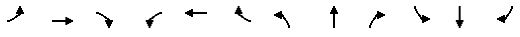
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	20	10	50	15	10	65
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.65	0.65	0.86	0.86	0.76	0.76
Hourly flow rate (vph)	31	15	58	17	13	86
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	179	67			58	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	179	67			58	
tC, single (s)	6.4	6.4			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.3	
p0 queue free %	96	98			99	
cM capacity (veh/h)	808	936			1502	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	46	76	99
Volume Left	31	0	13
Volume Right	15	17	0
cSH	847	1700	1502
Volume to Capacity	0.05	0.04	0.01
Queue Length 95th (ft)	4	0	1
Control Delay (s)	9.5	0.0	1.0
Lane LOS	A		A
Approach Delay (s)	9.5	0.0	1.0
Approach LOS	A		

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	20.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
148: Wamsutta St & North Front St

2008 Existing Condition - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	0	10	5	0	10	5	110	15	10	155	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.64	0.64	0.64	0.58	0.58	0.58	0.93	0.93	0.93	0.89	0.89	0.89
Hourly flow rate (vph)	23	0	16	9	0	17	5	118	16	11	174	28
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	365	356	188	363	362	126	202			134		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	365	356	188	363	362	126	202			134		
tC, single (s)	7.1	6.5	6.2	7.3	6.5	6.3	4.1			4.5		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.7	4.0	3.4	2.2			2.5		
p0 queue free %	96	100	98	98	100	98	100			99		
cM capacity (veh/h)	578	566	859	545	561	900	1382			1265		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	39	26	140	213
Volume Left	23	9	5	11
Volume Right	16	17	16	28
cSH	665	740	1382	1265
Volume to Capacity	0.06	0.03	0.00	0.01
Queue Length 95th (ft)	5	3	0	1
Control Delay (s)	10.8	10.0	0.3	0.5
Lane LOS	B	B	A	A
Approach Delay (s)	10.8	10.0	0.3	0.5
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	23.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
14: Tarkiln Hill Rd & Church Street

2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	505	5	35	435	65	220	200	75	65	265	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	12	11	11	12	11	11	11	11	11	12
Storage Length (ft)	50		0	0		0	0		0	0		145
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		305			1116			176			552	
Travel Time (s)		6.9			25.4			4.0			12.5	
Peak Hour Factor	0.92	0.92	0.92	0.91	0.91	0.91	0.86	0.86	0.86	0.89	0.89	0.89
Heavy Vehicles (%)	3%	1%	0%	7%	2%	0%	1%	2%	4%	1%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	120	554	0	38	549	0	256	320	0	0	371	129
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Minimum Split (s)	35.0	35.0		35.0	35.0		21.0	21.0		21.0	21.0	21.0
Total Split (s)	35.0	35.0	0.0	35.0	35.0	0.0	24.0	24.0	0.0	24.0	24.0	24.0
Total Split (%)	59.3%	59.3%	0.0%	59.3%	59.3%	0.0%	40.7%	40.7%	0.0%	40.7%	40.7%	40.7%
Maximum Green (s)	30.0	30.0		30.0	30.0		19.0	19.0		19.0	19.0	19.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
v/c Ratio	0.40	0.60		0.13	0.61		1.13	0.58			0.79	0.25
Control Delay	14.1	13.7		9.1	14.0		124.3	21.7			33.8	16.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	14.1	13.7		9.1	14.0		124.3	21.7			33.8	16.4
Queue Length 50th (ft)	24	128		7	128		~109	93			118	33
Queue Length 95th (ft)	63	214		21	215		#217	154			#243	68
Internal Link Dist (ft)		225			1036			96			472	
Turn Bay Length (ft)	50											145
Base Capacity (vph)	298	924		294	901		227	553			467	515
Starvation Cap Reductn	0	0		0	0		0	0			0	0
Spillback Cap Reductn	0	0		0	0		0	0			0	0
Storage Cap Reductn	0	0		0	0		0	0			0	0
Reduced v/c Ratio	0.40	0.60		0.13	0.61		1.13	0.58			0.79	0.25

Intersection Summary

Area Type: Other
Cycle Length: 59
Actuated Cycle Length: 59
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green
Natural Cycle: 65
Control Type: Pretimed
~ 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.

Splits and Phases: 14: Tarkiln Hill Rd & Church Street

HCM Signalized Intersection Capacity Analysis
14: Tarkiln Hill Rd & Church Street

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	505	5	35	435	65	220	200	75	65	265	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	12	11	11	12	11	11	11	11	11	12
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)	1636	1816		1631	1770		1728	1718			1787	1599
Flt Permitted	0.34	1.00		0.34	1.00		0.39	1.00			0.80	1.00
Satd. Flow (perm)	587	1816		578	1770		705	1718			1448	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.91	0.91	0.91	0.86	0.86	0.86	0.89	0.89	0.89
Adj. Flow (vph)	120	549	5	38	478	71	256	233	87	73	298	129
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	120	554	0	38	549	0	256	320	0	0	371	129
Heavy Vehicles (%)	3%	1%	0%	7%	2%	0%	1%	2%	4%	1%	2%	1%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Actuated Green, G (s)	30.0	30.0		30.0	30.0		19.0	19.0			19.0	19.0
Effective Green, g (s)	30.0	30.0		30.0	30.0		19.0	19.0			19.0	19.0
Actuated g/C Ratio	0.51	0.51		0.51	0.51		0.32	0.32			0.32	0.32
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lane Grp Cap (vph)	298	923		294	900		227	553			466	515
v/s Ratio Prot		0.31			c0.31			0.19				
v/s Ratio Perm	0.20			0.07			c0.36				0.26	0.08
v/c Ratio	0.40	0.60		0.13	0.61		1.13	0.58			0.80	0.25
Uniform Delay, d1	9.0	10.3		7.6	10.3		20.0	16.7			18.2	14.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	4.0	2.9		0.9	3.1		98.4	4.4			13.2	1.2
Delay (s)	13.0	13.1		8.5	13.4		118.4	21.0			31.4	15.9
Level of Service	B	B		A	B		F	C			C	B
Approach Delay (s)		13.1			13.1			64.3			27.4	
Approach LOS		B			B			E			C	

Intersection Summary

HCM Average Control Delay	28.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	101.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
19: Wood Street & Route 18

2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	15	150	10	45	100	35	15	370	50	110	510	15	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	14	16	16	14	16	11	11	16	11	11	16	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		197			310			393			488		
Travel Time (s)		4.5			7.0			8.9			11.1		
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.83	0.83	0.83	0.86	0.86	0.86	
Heavy Vehicles (%)	0%	1%	0%	0%	3%	0%	0%	3%	2%	1%	2%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	190	0	0	205	0	18	506	0	128	610	0	
Turn Type	Perm			Perm			Perm			Perm			
Protected Phases		3			3			1			1		2
Permitted Phases	3			3			1			1			
Detector Phase	3	3		3	3		1	1		1	1		
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0		15.0
Minimum Split (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0		21.0
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	21.0
Total Split (%)	37.0%	37.0%	0.0%	37.0%	37.0%	0.0%	37.0%	37.0%	0.0%	37.0%	37.0%	0.0%	26%
Maximum Green (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0		15.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	
Lead/Lag							Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		5.0
Recall Mode	None	None		None	None		None	None		None	None		None
Walk Time (s)													7.0
Flash Dont Walk (s)													4.0
Pedestrian Calls (#/hr)													0
v/c Ratio		0.39			0.45		0.06	0.54		0.32	0.64		
Control Delay		16.5			16.9		6.9	10.4		10.0	12.3		
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0		
Total Delay		16.5			16.9		6.9	10.4		10.0	12.3		
Queue Length 50th (ft)		42			43		2	73		16	96		
Queue Length 95th (ft)		83			85		10	150		50	207		
Internal Link Dist (ft)		117			230			313			408		
Turn Bay Length (ft)													
Base Capacity (vph)		1021			931		318	937		396	956		
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		0.19			0.22		0.06	0.54		0.32	0.64		

Intersection Summary	
Area Type:	Other
Cycle Length: 81	
Actuated Cycle Length: 47.1	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 19: Wood Street & Route 18

HCM Signalized Intersection Capacity Analysis
19: Wood Street & Route 18

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	150	10	45	100	35	15	370	50	110	510	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	14	16	16	14	16	11	11	16	11	11	16
Total Lost time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.97		1.00	0.98		1.00	1.00	
Flt Protected		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1985			1917		1745	1753		1728	1794	
Flt Permitted		0.96			0.89		0.33	1.00		0.41	1.00	
Satd. Flow (perm)		1916			1734		597	1753		744	1794	
Peak-hour factor, PHF	0.92	0.92	0.92	0.88	0.88	0.88	0.83	0.83	0.83	0.86	0.86	0.86
Adj. Flow (vph)	16	163	11	51	114	40	18	446	60	128	593	17
RTOR Reduction (vph)	0	3	0	0	12	0	0	4	0	0	1	0
Lane Group Flow (vph)	0	187	0	0	193	0	18	502	0	128	609	0
Heavy Vehicles (%)	0%	1%	0%	0%	3%	0%	0%	3%	2%	1%	2%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Actuated Green, G (s)		12.0			12.0		25.1	25.1		25.1	25.1	
Effective Green, g (s)		12.0			12.0		25.1	25.1		25.1	25.1	
Actuated g/C Ratio		0.25			0.25		0.53	0.53		0.53	0.53	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		488			442		318	934		396	956	
v/s Ratio Prot								0.29			c0.34	
v/s Ratio Perm		0.10			c0.11		0.03			0.17		
v/c Ratio		0.38			0.44		0.06	0.54		0.32	0.64	
Uniform Delay, d1		14.5			14.7		5.3	7.2		6.2	7.8	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.7			0.9		0.1	0.8		0.6	1.6	
Delay (s)		15.2			15.7		5.4	8.0		6.9	9.4	
Level of Service		B			B		A	A		A	A	
Approach Delay (s)		15.2			15.7			7.9			8.9	
Approach LOS		B			B			A			A	

Intersection Summary					
HCM Average Control Delay		10.1	HCM Level of Service		B
HCM Volume to Capacity ratio		0.57			
Actuated Cycle Length (s)		47.1	Sum of lost time (s)		10.0
Intersection Capacity Utilization		69.2%	ICU Level of Service		C
Analysis Period (min)		15			
c Critical Lane Group					

Lanes, Volumes, Timings
24: Nash Road & Church Street

2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	400	75	40	265	55	60	160	30	70	235	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	14	16	16	16	16
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1761			1229			1754			2421	
Travel Time (s)		40.0			27.9			39.9			55.0	
Peak Hour Factor	0.84	0.84	0.84	0.91	0.91	0.91	0.89	0.89	0.89	0.86	0.86	0.86
Heavy Vehicles (%)	1%	3%	1%	3%	3%	0%	0%	3%	3%	0%	4%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	696	0	0	395	0	0	281	0	0	523	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Minimum Split (s)	36.0	36.0		36.0	36.0		29.0	29.0		29.0	29.0	
Total Split (s)	36.0	36.0	0.0	36.0	36.0	0.0	29.0	29.0	0.0	29.0	29.0	0.0
Total Split (%)	55.4%	55.4%	0.0%	55.4%	55.4%	0.0%	44.6%	44.6%	0.0%	44.6%	44.6%	0.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
v/c Ratio		0.87			0.47			0.60			0.87	
Control Delay		30.5			14.3			24.1			38.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		30.5			14.3			24.1			38.1	
Queue Length 50th (ft)		235			102			90			190	
Queue Length 95th (ft)		#388			168			161			#331	
Internal Link Dist (ft)		1681			1149			1674			2341	
Turn Bay Length (ft)												
Base Capacity (vph)		798			846			472			602	
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		0.87			0.47			0.60			0.87	

Intersection Summary	
Area Type:	Other
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 18 (28%), Referenced to phase 2: and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Pretimed	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 24: Nash Road & Church Street

HCM Signalized Intersection Capacity Analysis
24: Nash Road & Church Street

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	400	75	40	265	55	60	160	30	70	235	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	16	14	16	16	16	16
Total Lost time (s)		6.0			6.0			7.0			7.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			0.98			0.98			0.96	
Flt Protected		0.99			0.99			0.99			0.99	
Satd. Flow (prot)		2048			2045			1926			1983	
Flt Permitted		0.84			0.89			0.72			0.89	
Satd. Flow (perm)		1727			1834			1396			1780	
Peak-hour factor, PHF	0.84	0.84	0.84	0.91	0.91	0.91	0.89	0.89	0.89	0.86	0.86	0.86
Adj. Flow (vph)	131	476	89	44	291	60	67	180	34	81	273	169
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	696	0	0	395	0	0	281	0	0	523	0
Heavy Vehicles (%)	1%	3%	1%	3%	3%	0%	0%	3%	3%	0%	4%	3%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Actuated Green, G (s)		30.0			30.0			22.0			22.0	
Effective Green, g (s)		30.0			30.0			22.0			22.0	
Actuated g/C Ratio		0.46			0.46			0.34			0.34	
Clearance Time (s)		6.0			6.0			7.0			7.0	
Lane Grp Cap (vph)		797			846			472			602	
v/s Ratio Prot												
v/s Ratio Perm		c0.40			0.22			0.20			c0.29	
v/c Ratio		0.87			0.47			0.60			0.87	
Uniform Delay, d1		15.8			12.0			17.8			20.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		12.7			1.8			5.4			15.6	
Delay (s)		28.5			13.9			23.3			35.8	
Level of Service		C			B			C			D	
Approach Delay (s)		28.5			13.9			23.3			35.8	
Approach LOS		C			B			C			D	

Intersection Summary					
HCM Average Control Delay	26.7	HCM Level of Service		C	
HCM Volume to Capacity ratio	0.87				
Actuated Cycle Length (s)	65.0	Sum of lost time (s)		13.0	
Intersection Capacity Utilization	91.7%	ICU Level of Service		F	
Analysis Period (min)	15				
c Critical Lane Group					

Lanes, Volumes, Timings
28: Coggeshall Street & Route 18 SB (Ashley Blvd)

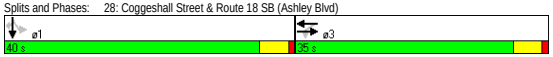
2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	205	90	165	220	0	0	0	0	100	605	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	15	12	12	12	12	12	10	10
Storage Length (ft)	0		0	0		0	0		0	0		130
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			No			No			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		686			474			1008			501	
Travel Time (s)		15.6			10.8			22.9			11.4	
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.92	0.92	0.92	0.96	0.96	0.96
Heavy Vehicles (%)	0%	3%	4%	1%	1%	0%	0%	0%	0%	6%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	321	0	0	448	0	0	0	0	0	734	47
Turn Type				Perm						Perm		Perm
Protected Phases		3			3						1	
Permitted Phases				3						1		1
Minimum Split (s)		35.0		35.0	35.0					40.0	40.0	40.0
Total Split (s)	0.0	35.0	0.0	35.0	35.0	0.0	0.0	0.0	0.0	40.0	40.0	40.0
Total Split (%)	0.0%	46.7%	0.0%	46.7%	46.7%	0.0%	0.0%	0.0%	0.0%	53.3%	53.3%	53.3%
Maximum Green (s)		30.0		30.0	30.0					35.0	35.0	35.0
Yellow Time (s)		4.0		4.0	4.0					4.0	4.0	4.0
All-Red Time (s)		1.0		1.0	1.0					1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	4.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
v/c Ratio		0.44			0.90						0.48	0.06
Control Delay		16.8			45.3						15.1	4.0
Queue Delay		0.0			0.0						0.0	0.0
Total Delay		16.8			45.3						15.1	4.0
Queue Length 50th (ft)		93			190						117	0
Queue Length 95th (ft)		160			#339						163	16
Internal Link Dist (ft)		606			394			928			421	
Turn Bay Length (ft)												130
Base Capacity (vph)		727			499						1522	728
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		0.44			0.90						0.48	0.06

Intersection Summary

Area Type: Other
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 0 (0%), Referenced to phase 2: and 6:, Start of Green
Natural Cycle: 75
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 28: Coggeshall Street & Route 18 SB (Ashley Blvd)



HCM Signalized Intersection Capacity Analysis
28: Coggeshall Street & Route 18 SB (Ashley Blvd)

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	205	90	165	220	0	0	0	0	100	605	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	15	12	12	12	12	12	10	10
Total Lost time (s)		5.0			5.0						5.0	5.0
Lane Util. Factor		1.00			1.00						0.95	1.00
Frt		0.96			1.00						1.00	0.85
Flt Protected		1.00			0.98						0.99	1.00
Satd. Flow (prot)		1763			2026						3262	1507
Flt Permitted		1.00			0.60						0.99	1.00
Satd. Flow (perm)		1763			1247						3262	1507
Peak-hour factor, PHF	0.92	0.92	0.92	0.86	0.86	0.86	0.92	0.92	0.92	0.96	0.96	0.96
Adj. Flow (vph)	0	223	98	192	256	0	0	0	0	104	630	47
RTOR Reduction (vph)	0	21	0	0	0	0	0	0	0	0	0	25
Lane Group Flow (vph)	0	300	0	0	448	0	0	0	0	0	734	22
Heavy Vehicles (%)	0%	3%	4%	1%	1%	0%	0%	0%	0%	6%	2%	0%
Turn Type				Perm						Perm		Perm
Protected Phases		3			3						1	
Permitted Phases				3						1		1
Actuated Green, G (s)		30.0			30.0						35.0	35.0
Effective Green, g (s)		30.0			30.0						35.0	35.0
Actuated g/C Ratio		0.40			0.40						0.47	0.47
Clearance Time (s)		5.0			5.0						5.0	5.0
Lane Grp Cap (vph)		705			499						1522	703
v/s Ratio Prot		0.17										
v/s Ratio Perm					c0.36						0.23	0.01
v/c Ratio		0.43			0.90						0.48	0.03
Uniform Delay, d1		16.3			21.1						13.8	10.8
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		1.9			21.6						1.1	0.1
Delay (s)		18.1			42.6						14.9	10.9
Level of Service		B			D						B	B
Approach Delay (s)		18.1			42.6			0.0			14.6	
Approach LOS		B			D			A			B	

Intersection Summary

HCM Average Control Delay	23.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
31: Coggeshall Street & Acushnet Ave (Rte 18 NB)

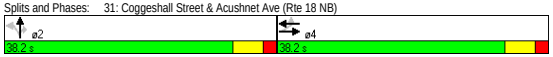
2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	260	0	0	270	80	115	445	280	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	15	12	12	11	11	12	12	12
Storage Length (ft)	0		0	0		0	0		160	0		0
Storage Lanes	0		0	0		0	1		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		474			546			1002			363	
Travel Time (s)		10.8			12.4			22.8			8.3	
Peak Hour Factor	0.93	0.93	0.93	0.94	0.94	0.94	0.93	0.93	0.93	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	0%	0%	1%	1%	0%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	328	0	0	372	0	124	478	301	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			4			2				
Permitted Phases	4						2		2			
Minimum Split (s)	38.2	38.2			38.2		38.2	38.2	38.2			
Total Split (s)	38.2	38.2	0.0	0.0	38.2	0.0	38.2	38.2	38.2	0.0	0.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	0.0%	50.0%	0.0%	50.0%	50.0%	50.0%	0.0%	0.0%	0.0%
Maximum Green (s)	32.0	32.0			32.0		32.0	32.0	32.0			
Yellow Time (s)	4.2	4.2			4.2		4.2	4.2	4.2			
All-Red Time (s)	2.0	2.0			2.0		2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	4.0	4.0	6.2	4.0	6.2	6.2	6.2	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
v/c Ratio		0.43			0.44		0.16	0.63	0.37			
Control Delay		18.0			16.7		14.6	22.2	3.4			
Queue Delay		0.0			0.0		0.0	0.0	0.0			
Total Delay		18.0			16.7		14.6	22.2	3.4			
Queue Length 50th (ft)		107			113		36	174	0			
Queue Length 95th (ft)		174			183		69	273	43			
Internal Link Dist (ft)		394			466			922			283	
Turn Bay Length (ft)									160			
Base Capacity (vph)		763			854		756	754	816			
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		0.43			0.44		0.16	0.63	0.37			

Intersection Summary

Area Type: Other
Cycle Length: 76.4
Actuated Cycle Length: 76.4
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:, Start of Green
Natural Cycle: 80
Control Type: Pretimed

Splits and Phases: 31: Coggeshall Street & Acushnet Ave (Rte 18 NB)



HCM Signalized Intersection Capacity Analysis
31: Coggeshall Street & Acushnet Ave (Rte 18 NB)

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	260	0	0	270	80	115	445	280	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	12	12	15	12	12	11	11	12	12	12
Total Lost time (s)		6.2			6.2		6.2	6.2	6.2			
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00			
Frt		1.00			0.97		1.00	1.00	0.85			
Flt Protected		0.99			1.00		0.95	1.00	1.00			
Satd. Flow (prot)		2012			2005		1805	1801	1531			
Flt Permitted		0.90			1.00		0.95	1.00	1.00			
Satd. Flow (perm)		1822			2005		1805	1801	1531			
Peak-hour factor, PHF	0.93	0.93	0.93	0.94	0.94	0.94	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	48	280	0	0	287	85	124	478	301	0	0	0
RTOR Reduction (vph)	0	0	0	0	14	0	0	0	175	0	0	0
Lane Group Flow (vph)	0	328	0	0	358	0	124	478	126	0	0	0
Heavy Vehicles (%)	4%	3%	0%	0%	1%	1%	0%	2%	2%	0%	0%	0%
Turn Type	Perm						Perm		Perm			
Protected Phases		4			4			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		32.0			32.0		32.0	32.0	32.0			
Effective Green, g (s)		32.0			32.0		32.0	32.0	32.0			
Actuated g/C Ratio		0.42			0.42		0.42	0.42	0.42			
Clearance Time (s)		6.2			6.2		6.2	6.2	6.2			
Lane Grp Cap (vph)		763			840		756	754	641			
v/s Ratio Prot					0.18			c0.27				
v/s Ratio Perm		c0.18					0.07		0.08			
v/c Ratio		0.43			0.43		0.16	0.63	0.20			
Uniform Delay, d1		15.7			15.7		13.9	17.6	14.1			
Progression Factor		1.00			1.00		1.00	1.00	1.00			
Incremental Delay, d2		1.8			1.6		0.5	4.0	0.7			
Delay (s)		17.5			17.3		14.3	21.6	14.7			
Level of Service		B			B		B	C	B			
Approach Delay (s)		17.5			17.3			18.3			0.0	
Approach LOS		B			B			B			A	

Intersection Summary

HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	76.4	Sum of lost time (s)	12.4
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

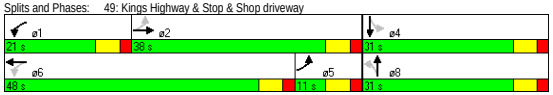
Lanes, Volumes, Timings
49: Kings Highway & Stop & Shop driveway

2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	700	110	160	420	50	85	45	220	155	25	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		515			213			360			359	
Travel Time (s)		11.7			4.8			8.2			8.2	
Peak Hour Factor	0.93	0.93	0.93	0.95	0.95	0.95	0.85	0.85	0.85	0.89	0.89	0.89
Heavy Vehicles (%)	1%	1%	0%	1%	1%	0%	2%	0%	0%	1%	0%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1048	0	0	663	0	0	412	0	0	387	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.0	13.0		11.0	13.0		13.0	13.0		19.0	19.0	
Total Split (s)	11.0	38.0	0.0	21.0	48.0	0.0	31.0	31.0	0.0	31.0	31.0	0.0
Total Split (%)	12.2%	42.2%	0.0%	23.3%	53.3%	0.0%	34.4%	34.4%	0.0%	34.4%	34.4%	0.0%
Maximum Green (s)	5.0	32.0		15.0	42.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)										5.0	5.0	
Flash Dont Walk (s)										8.0	8.0	
Pedestrian Calls (#/hr)										0	0	
v/c Ratio		0.71			0.57			0.59			0.65	
Control Delay		12.4			10.2			11.2			15.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		12.4			10.2			11.2			15.7	
Queue Length 50th (ft)		102			56			22			30	
Queue Length 95th (ft)		231			135			49			65	
Internal Link Dist (ft)		435			133			280			279	
Turn Bay Length (ft)												
Base Capacity (vph)		1480			1525			1289			1144	
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		0.71			0.43			0.32			0.34	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 55.1	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 49: Kings Highway & Stop & Shop driveway



HCM Signalized Intersection Capacity Analysis
49: Kings Highway & Stop & Shop driveway

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	700	110	160	420	50	85	45	220	155	25	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frt		0.98			0.99			0.91			0.93	
Flt Protected		0.99			0.99			0.99			0.98	
Satd. Flow (prot)		3488			3490			3215			3247	
Flt Permitted		0.72			0.56			0.77			0.69	
Satd. Flow (perm)		2517			1986			2515			2288	
Peak-hour factor, PHF	0.93	0.93	0.93	0.95	0.95	0.95	0.85	0.85	0.85	0.89	0.89	0.89
Adj. Flow (vph)	177	753	118	168	442	53	100	53	259	174	28	185
RTOR Reduction (vph)	0	7	0	0	5	0	0	208	0	0	149	0
Lane Group Flow (vph)	0	1041	0	0	658	0	0	204	0	0	238	0
Heavy Vehicles (%)	1%	1%	0%	1%	1%	0%	2%	0%	0%	1%	0%	1%
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		32.2			32.2			10.8			10.8	
Effective Green, g (s)		32.2			32.2			10.8			10.8	
Actuated g/C Ratio		0.59			0.59			0.20			0.20	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		1474			1163			494			449	
v/s Ratio Prot												
v/s Ratio Perm		c0.41			0.33			0.08			c0.10	
v/c Ratio		0.71			0.57			0.41			0.53	
Uniform Delay, d1		8.1			7.1			19.3			19.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.3			0.4			0.2			0.6	
Delay (s)		9.3			7.4			19.5			20.4	
Level of Service		A			A			B			C	
Approach Delay (s)		9.3			7.4			19.5			20.4	
Approach LOS		A			A			B			C	

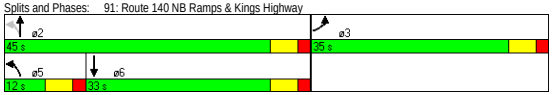
Intersection Summary					
HCM Average Control Delay		12.2	HCM Level of Service		B
HCM Volume to Capacity ratio		0.66			
Actuated Cycle Length (s)		55.0	Sum of lost time (s)		12.0
Intersection Capacity Utilization		86.8%	ICU Level of Service		E
Analysis Period (min)		15			
c Critical Lane Group					

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	465	155	145	510	580	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	12	12	16
Storage Length (ft)	0	100	0			100
Storage Lanes	1	0	0			0
Taper Length (ft)	25	25	25			25
Right Turn on Red		No				No
Link Speed (mph)	30			30	30	
Link Distance (ft)	268			574	515	
Travel Time (s)	6.1			13.0	11.7	
Peak Hour Factor	0.92	0.92	0.83	0.83	0.79	0.79
Heavy Vehicles (%)	2%	0%	3%	1%	2%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	673	0	0	789	848	0
Turn Type			pm+pt			
Protected Phases	3		5	2	6	
Permitted Phases			2			
Detector Phase	3		5	2	6	
Switch Phase						
Minimum Initial (s)	7.0		5.0	7.0	7.0	
Minimum Split (s)	13.0		11.0	13.0	13.0	
Total Split (s)	35.0	0.0	12.0	45.0	33.0	0.0
Total Split (%)	43.8%	0.0%	15.0%	56.3%	41.3%	0.0%
Maximum Green (s)	29.0		6.0	39.0	27.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	4.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	2.0		2.0	2.0	2.0	
Recall Mode	None		None	Min	Min	
v/c Ratio	0.91			0.83	0.54	
Control Delay	41.7			26.1	15.6	
Queue Delay	0.0			0.0	0.0	
Total Delay	41.7			26.1	15.6	
Queue Length 50th (ft)	308			162	144	
Queue Length 95th (ft)	#533			206	161	
Internal Link Dist (ft)	188			494	435	
Turn Bay Length (ft)						
Base Capacity (vph)	808			1150	1654	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.83			0.69	0.51	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 72.7	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 91: Route 140 NB Ramps & Kings Highway



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	465	155	145	510	580	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	12	12	16
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			0.95	0.95	
Frt	0.97			1.00	0.98	
Flt Protected	0.96			0.99	1.00	
Satd. Flow (prot)	1976			3520	3454	
Flt Permitted	0.96			0.59	1.00	
Satd. Flow (perm)	1976			2092	3454	
Peak-hour factor, PHF	0.92	0.92	0.83	0.83	0.79	0.79
Adj. Flow (vph)	505	168	175	614	734	114
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	673	0	0	789	848	0
Heavy Vehicles (%)	2%	0%	3%	1%	2%	5%
Turn Type			pm+pt			
Protected Phases	3		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	27.3			33.1	33.1	
Effective Green, g (s)	27.3			33.1	33.1	
Actuated g/C Ratio	0.38			0.46	0.46	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	2.0			2.0	2.0	
Lane Grp Cap (vph)	745			956	1579	
v/s Ratio Prot	c0.34				0.25	
v/s Ratio Perm				c0.38		
v/c Ratio	0.90			0.83	0.54	
Uniform Delay, d1	21.3			17.1	14.1	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	14.0			5.6	0.2	
Delay (s)	35.3			22.7	14.3	
Level of Service	D			C	B	
Approach Delay (s)	35.3			22.7	14.3	
Approach LOS	D			C	B	

Intersection Summary			
HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	72.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

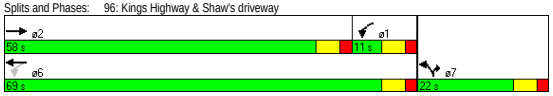
Lanes, Volumes, Timings
96: Kings Highway & Shaw's driveway

2008 Existing Condition - PM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	565	225	140	595	150	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	525			574	347	
Travel Time (s)	11.9			13.0	7.9	
Peak Hour Factor	0.91	0.91	0.96	0.96	0.89	0.89
Heavy Vehicles (%)	2%	0%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	868	0	0	766	169	101
Turn Type			pm+pt			Prot
Protected Phases	2		1	6	7	7
Permitted Phases			6			
Detector Phase	2		1	6	7	7
Switch Phase						
Minimum Initial (s)	7.0		5.0	7.0	7.0	7.0
Minimum Split (s)	13.0		11.0	13.0	13.0	13.0
Total Split (s)	58.0	0.0	11.0	69.0	22.0	22.0
Total Split (%)	63.7%	0.0%	12.1%	75.8%	24.2%	24.2%
Maximum Green (s)	52.0		5.0	63.0	16.0	16.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	2.0		2.0	2.0	2.0	2.0
Recall Mode	Min		None	Min	None	None
v/c Ratio	0.48			0.64	0.47	0.25
Control Delay	6.9			10.6	20.6	6.4
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	6.9			10.6	20.6	6.4
Queue Length 50th (ft)	50			58	32	0
Queue Length 95th (ft)	98			121	91	29
Internal Link Dist (ft)	445			494	267	
Turn Bay Length (ft)						
Base Capacity (vph)	3389			2320	674	666
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	0.26			0.33	0.25	0.15

Intersection Summary	
Area Type:	Other
Cycle Length: 91	
Actuated Cycle Length: 43.4	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 96: Kings Highway & Shaw's driveway



HCM Signalized Intersection Capacity Analysis
96: Kings Highway & Shaw's driveway

2008 Existing Condition - PM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	565	225	140	595	150	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12
Total Lost time (s)	6.0			6.0	6.0	6.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	0.96			1.00	1.00	0.85
Flt Protected	1.00			0.99	0.95	1.00
Satd. Flow (prot)	3407			3541	1787	1599
Flt Permitted	1.00			0.65	0.95	1.00
Satd. Flow (perm)	3407			2321	1787	1599
Peak-hour factor, PHF	0.91	0.91	0.96	0.96	0.89	0.89
Adj. Flow (vph)	621	247	146	620	169	101
RTOR Reduction (vph)	52	0	0	0	0	81
Lane Group Flow (vph)	816	0	0	766	169	20
Heavy Vehicles (%)	2%	0%	1%	1%	1%	1%
Turn Type			pm+pt			Prot
Protected Phases	2		1	6	7	7
Permitted Phases			6			
Actuated Green, G (s)	22.5			22.5	8.7	8.7
Effective Green, g (s)	22.5			22.5	8.7	8.7
Actuated g/C Ratio	0.52			0.52	0.20	0.20
Clearance Time (s)	6.0			6.0	6.0	6.0
Vehicle Extension (s)	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	1774			1209	360	322
v/s Ratio Prot	0.24				c0.09	0.01
v/s Ratio Perm				c0.33		
v/c Ratio	0.46			0.63	0.47	0.06
Uniform Delay, d1	6.5			7.4	15.2	14.0
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.1			0.8	0.4	0.0
Delay (s)	6.6			8.2	15.6	14.0
Level of Service	A			A	B	B
Approach Delay (s)	6.6			8.2	15.0	
Approach LOS	A			A	B	

Intersection Summary			
HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	43.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

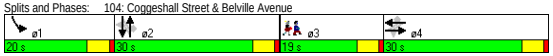
Lanes, Volumes, Timings
104: Coggeshall Street & Belville Avenue

2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations													
Volume (vph)	110	265	70	70	225	255	30	225	315	280	175	140	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	11	16	16	10	10	16	12	14	16	11	16	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		443			1111			850			178		
Travel Time (s)		10.1			25.3			19.3			4.0		
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.90	0.90	0.90	0.92	0.92	0.92	
Heavy Vehicles (%)	1%	3%	6%	1%	1%	4%	3%	4%	1%	3%	3%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	484	0	0	313	271	0	283	350	0	646	0	
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt			
Protected Phases		4			4			2		1	2		3
Permitted Phases	4			4		4	2		2	2			
Detector Phase	4	4		4	4	4	2	2	2	1	2		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0		6.0
Minimum Split (s)	13.0	13.0		13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0		19.0
Total Split (s)	30.0	30.0	0.0	30.0	30.0	30.0	30.0	30.0	30.0	20.0	30.0	0.0	19.0
Total Split (%)	30.3%	30.3%	0.0%	30.3%	30.3%	30.3%	30.3%	30.3%	30.3%	20.2%	30.3%	0.0%	19%
Maximum Green (s)	25.0	25.0		25.0	25.0	25.0	25.0	25.0	25.0	15.0	25.0		14.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	
Lead/Lag	Lag	Lag		Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lag		Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		0.2
Recall Mode	Max	Max		Max	Max	Max	None	None	None	None	None		None
Walk Time (s)													6.0
Flash Dont Walk (s)													8.0
Pedestrian Calls (#/hr)													0
v/c Ratio		0.44			0.52	0.35		0.43	0.39		0.68		
Control Delay		13.3			16.8	3.2		15.0	3.0		17.5		
Queue Delay		0.0			0.0	0.0		0.0	0.0		0.0		
Total Delay		13.3			16.8	3.2		15.0	3.0		17.5		
Queue Length 50th (ft)		60			81	0		69	0		87		
Queue Length 95th (ft)		96			148	37		124	40		140		
Internal Link Dist (ft)		363			1031			770			98		
Turn Bay Length (ft)													
Base Capacity (vph)		1096			602	772		693	927		997		
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		0.44			0.52	0.35		0.41	0.38		0.65		

Intersection Summary	
Area Type:	Other
Cycle Length: 99	
Actuated Cycle Length: 58.8	
Natural Cycle: 80	
Control Type: Semi Act-Uncoord	

Splits and Phases: 104: Coggeshall Street & Belville Avenue



HCM Signalized Intersection Capacity Analysis
104: Coggeshall Street & Belville Avenue

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	265	70	70	225	255	30	225	315	280	175	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	11	16	16	10	10	16	12	14	16	11	16
Total Lost time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Lane Util. Factor		0.95			1.00	1.00		1.00	1.00		0.95	
Frt		0.98			1.00	0.85		1.00	0.85		0.96	
Flt Protected		0.99			0.99	1.00		0.99	1.00		0.98	
Satd. Flow (prot)		3269			1735	1449		1818	1706		3215	
Flt Permitted		0.77			0.80	1.00		0.89	1.00		0.69	
Satd. Flow (perm)		2548			1413	1449		1628	1706		2274	
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.90	0.90	0.90	0.92	0.92	0.92
Adj. Flow (vph)	120	288	76	74	239	271	33	250	350	304	190	152
RTOR Reduction (vph)	0	12	0	0	0	156	0	0	208	0	29	0
Lane Group Flow (vph)	0	472	0	0	313	115	0	283	142	0	617	0
Heavy Vehicles (%)	1%	3%	6%	1%	1%	4%	3%	4%	1%	3%	3%	0%
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt		
Protected Phases		4			4			2		1	2	
Permitted Phases	4			4		4	2		2	2		
Actuated Green, G (s)		25.0			25.0	25.0		23.8	23.8		23.8	
Effective Green, g (s)		25.0			25.0	25.0		23.8	23.8		23.8	
Actuated g/C Ratio		0.43			0.43	0.43		0.40	0.40		0.40	
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Vehicle Extension (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Grp Cap (vph)		1083			601	616		659	691		920	
v/s Ratio Prot												
v/s Ratio Perm		0.19			c0.22	0.08		0.17	0.08		c0.27	
v/c Ratio		0.44			0.52	0.19		0.43	0.21		0.67	
Uniform Delay, d1		11.9			12.5	10.6		12.6	11.4		14.3	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		1.3			3.2	0.7		0.6	0.2		2.1	
Delay (s)		13.2			15.7	11.2		13.2	11.6		16.4	
Level of Service		B			B	B		B	B		B	
Approach Delay (s)		13.2			13.6			12.3			16.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	58.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

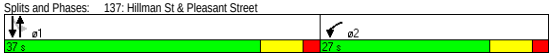
Lanes, Volumes, Timings
137: Hillman St & Pleasant Street

2008 Existing Condition - PM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	95	80	355	550	105	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	14	16	16	14
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		30			30
Link Distance (ft)	693		149			313
Travel Time (s)	15.8		3.4			7.1
Peak Hour Factor	0.77	0.77	0.94	0.94	0.73	0.73
Heavy Vehicles (%)	3%	6%	3%	3%	3%	3%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	227	0	963	0	0	603
Turn Type					Perm	
Protected Phases	2		1			1
Permitted Phases					1	
Minimum Split (s)	27.0		37.0		37.0	37.0
Total Split (s)	27.0	0.0	37.0	0.0	37.0	37.0
Total Split (%)	42.2%	0.0%	57.8%	0.0%	57.8%	57.8%
Maximum Green (s)	20.0		30.0		30.0	30.0
Yellow Time (s)	5.0		5.0		5.0	5.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	4.0	7.0	4.0	7.0	7.0
Lead/Lag	Lag		Lead		Lead	Lead
Lead-Lag Optimize?	Yes		Yes		Yes	Yes
v/c Ratio	0.36		0.51			0.61
Control Delay	13.5		5.3			15.9
Queue Delay	0.0		0.0			0.0
Total Delay	13.5		5.3			15.9
Queue Length 50th (ft)	46		43			86
Queue Length 95th (ft)	76		80			98
Internal Link Dist (ft)	613		69			233
Turn Bay Length (ft)						
Base Capacity (vph)	637		1904			992
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.36		0.51			0.61

Intersection Summary	
Area Type:	Other
Cycle Length: 64	
Actuated Cycle Length: 64	
Offset: 35 (55%), Referenced to phase 2:WBL and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Pretimed	

Splits and Phases: 137: Hillman St & Pleasant Street



HCM Signalized Intersection Capacity Analysis
137: Hillman St & Pleasant Street

2008 Existing Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	95	80	355	550	105	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	14	16	16	14
Total Lost time (s)	7.0		7.0			7.0
Lane Util. Factor	1.00		0.95			0.95
Frt	0.94		0.91			1.00
Flt Protected	0.97		1.00			0.99
Satd. Flow (prot)	1884		3398			3694
Flt Permitted	0.97		1.00			0.57
Satd. Flow (perm)	1884		3398			2115
Peak-hour factor, PHF	0.77	0.77	0.94	0.94	0.73	0.73
Adj. Flow (vph)	123	104	378	585	144	459
RTOR Reduction (vph)	47	0	311	0	0	0
Lane Group Flow (vph)	180	0	652	0	0	603
Heavy Vehicles (%)	3%	6%	3%	3%	3%	3%
Turn Type					Perm	
Protected Phases	2		1			1
Permitted Phases					1	
Actuated Green, G (s)	20.0		30.0			30.0
Effective Green, g (s)	20.0		30.0			30.0
Actuated g/C Ratio	0.31		0.47			0.47
Clearance Time (s)	7.0		7.0			7.0
Lane Grp Cap (vph)	589		1593			991
v/s Ratio Prot	c0.10		0.19			
v/s Ratio Perm						c0.29
v/c Ratio	0.30		0.41			0.61
Uniform Delay, d1	16.7		11.2			12.6
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	1.3		0.8			2.8
Delay (s)	18.1		12.0			15.4
Level of Service	B		B			B
Approach Delay (s)	18.1		12.0			15.4
Approach LOS	B		B			B

Intersection Summary			
HCM Average Control Delay	13.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	64.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

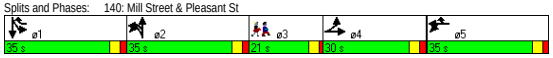
Lanes, Volumes, Timings
140: Mill Street & Pleasant St

2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations													
Volume (vph)	250	185	345	195	230	25	130	430	100	80	310	50	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	16	11	12	10	16	10	12	14	16	14	16	
Storage Length (ft)	0		0		0		100		0	0		0	
Storage Lanes	1		1		1		1		0	0		0	
Taper Length (ft)	25		25		25		25		25	25		25	
Right Turn on Red					No				Yes				
Link Speed (mph)		30		30				30			30		
Link Distance (ft)		168		308				709			499		
Travel Time (s)		3.8		7.0				16.1			11.3		
Peak Hour Factor	0.96	0.96	0.93	0.93	0.93	0.87	0.87	0.87	0.87	0.83	0.83	0.83	
Heavy Vehicles (%)	1%	1%	4%	1%	3%	0%	5%	3%	3%	0%	0%	3%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	260	193	371	210	247	0	178	609	0	0	529	0	
Turn Type	Split		Split		pt+ov	Split	Split			Split			
Protected Phases	4	4	5	5	1 5	2	2	2		1	1		3
Permitted Phases													
Detector Phase	4	4	5	5	1 5	2	2	2		1	1		
Switch Phase													
Minimum Initial (s)	7.0	7.0	7.0	7.0		7.0	7.0	7.0		7.0	7.0		10.0
Minimum Split (s)	12.0	12.0	12.0	12.0		12.0	12.0	12.0		12.0	12.0		21.0
Total Split (s)	30.0	30.0	35.0	35.0	70.0	35.0	35.0	35.0	0.0	35.0	35.0	0.0	21.0
Total Split (%)	19.2%	19.2%	22.4%	22.4%	44.9%	22.4%	22.4%	22.4%	0.0%	22.4%	22.4%	0.0%	13%
Maximum Green (s)	25.0	25.0	30.0	30.0		30.0	30.0	30.0		30.0	30.0		17.0
Yellow Time (s)	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0	
Lead/Lag	Lag	Lag				Lag	Lag	Lag		Lead	Lead		Lead
Lead-Lag Optimize?	Yes	Yes				Yes	Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0		5.0	5.0		0.2
Recall Mode	Max	Max	Max	Max		Max	Max	Max		Max	Max		None
Walk Time (s)													10.0
Flash Dont Walk (s)													7.0
Pedestrian Calls (#/hr)													0
v/c Ratio	0.76	0.49	0.99	0.50	0.35		0.50	0.79			0.64		
Control Delay	67.4	54.1	97.5	50.9	23.6		51.4	56.7			51.6		
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0		
Total Delay	67.4	54.1	97.5	50.9	23.6		51.4	56.7			51.6		
Queue Length 50th (ft)	219	153	328	163	132		138	261			223		
Queue Length 95th (ft)	#339	233	#538	246	199		206	318			259		
Internal Link Dist (ft)		88		228				629			419		
Turn Bay Length (ft)							100						
Base Capacity (vph)	342	395	373	418	704		359	770			831		
Starvation Cap Reductn	0	0	0	0	0		0	0			0		
Spillback Cap Reductn	0	0	0	0	0		0	0			0		
Storage Cap Reductn	0	0	0	0	0		0	0			0		
Reduced v/c Ratio	0.76	0.49	0.99	0.50	0.35		0.50	0.79			0.64		

Intersection Summary	
Area Type:	Other
Cycle Length: 156	
Actuated Cycle Length: 135	
Natural Cycle: 120	
Control Type: Semi Act-Uncoord	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 140: Mill Street & Pleasant St



HCM Signalized Intersection Capacity Analysis
140: Mill Street & Pleasant St

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	185	345	195	230	25	130	430	100	80	310	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	16	11	12	10	16	10	12	14	16	14	16
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0			5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95			0.95	
Frt	1.00	1.00	1.00	1.00	0.85		1.00	0.97			0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1847	2132	1678	1881	1463		1617	3406			3738	
Flt Permitted	0.95	1.00	0.95	1.00	1.00		0.95	1.00			0.99	
Satd. Flow (perm)	1847	2132	1678	1881	1463		1617	3406			3738	
Peak-hour factor, PHF	0.96	0.96	0.93	0.93	0.93	0.87	0.87	0.87	0.87	0.83	0.83	0.83
Adj. Flow (vph)	260	193	371	210	247	29	149	494	115	96	373	60
RTOR Reduction (vph)	0	0	0	0	0	0	0	12	0	0	0	0
Lane Group Flow (vph)	260	193	371	210	247	0	178	597	0	0	529	0
Heavy Vehicles (%)	1%	1%	4%	1%	3%	0%	5%	3%	3%	0%	0%	3%
Turn Type	Split		Split		pt+ov	Split	Split			Split		
Protected Phases	4	4	5	5	1 5	2	2	2		1	1	
Permitted Phases												
Actuated Green, G (s)	25.0	25.0	30.0	30.0	65.0		30.0	30.0			30.0	
Effective Green, g (s)	25.0	25.0	30.0	30.0	65.0		30.0	30.0			30.0	
Actuated g/C Ratio	0.19	0.19	0.22	0.22	0.48		0.22	0.22			0.22	
Clearance Time (s)	5.0	5.0	5.0	5.0			5.0	5.0			5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0			5.0	5.0			5.0	
Lane Grp Cap (vph)	342	395	373	418	704		359	757			831	
v/s Ratio Prot	c0.14	0.09	c0.22	0.11	0.17		0.11	c0.18			c0.14	
v/s Ratio Perm												
v/c Ratio	0.76	0.49	0.99	0.50	0.35		0.50	0.79			0.64	
Uniform Delay, d1	52.2	49.3	52.4	46.0	21.8		45.9	49.5			47.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	14.7	4.3	45.3	4.3	1.4		4.8	8.1			3.7	
Delay (s)	66.8	53.5	97.7	50.2	23.2		50.7	57.6			51.3	
Level of Service	E	D	F	D	C		D	E			D	
Approach Delay (s)		61.2		63.4				56.1			51.3	
Approach LOS		E		E				E			D	

Intersection Summary					
HCM Average Control Delay	58.3	HCM Level of Service		E	
HCM Volume to Capacity ratio	0.80				
Actuated Cycle Length (s)	135.0	Sum of lost time (s)		20.0	
Intersection Capacity Utilization	73.1%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					

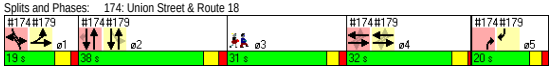
Lanes, Volumes, Timings
174: Union Street & Route 18

2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations													
Volume (vph)	325	30	60	65	35	15	85	940	20	35	1105	140	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	16	16	16	16	16	11	11	11	10	11	11	
Storage Length (ft)	0		0	0		0	150		225	150		225	
Storage Lanes	0		0	0		0	1		1	1		1	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			No			No			No			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		432			82			365			2491		
Travel Time (s)		9.8			1.9			8.3			56.6		
Peak Hour Factor	0.93	0.93	0.93	0.85	0.85	0.85	0.91	0.91	0.91	0.99	0.99	0.99	
Heavy Vehicles (%)	1%	3%	0%	2%	0%	0%	1%	4%	0%	17%	4%	1%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	446	0	0	135	0	93	1033	22	35	1116	141	
Turn Type	Perm			Perm			Prot		custom	Prot		Perm	
Protected Phases		4			4		1	2	5	1	2		3
Permitted Phases	4			4								2	
Detector Phase	4	4		4	4		1	2	5	1	2	2	
Switch Phase													
Minimum Initial (s)	7.0	7.0		7.0	7.0		4.0	7.0	4.0	4.0	7.0	7.0	17.0
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0	13.0	9.0	10.0	13.0	13.0	31.0
Total Split (s)	32.0	32.0	0.0	32.0	32.0	0.0	19.0	38.0	20.0	19.0	38.0	38.0	31.0
Total Split (%)	22.9%	22.9%	0.0%	22.9%	22.9%	0.0%	13.6%	27.1%	14.3%	13.6%	27.1%	27.1%	22%
Maximum Green (s)	27.0	27.0		27.0	27.0		13.0	32.0	15.0	13.0	32.0	32.0	26.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	3.0	4.0	4.0	4.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	6.0	6.0	5.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lag		Lead	Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes
Vehicle Extension (s)	5.0	5.0		5.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0	0.2
Recall Mode	None	None		None	None		None	None	None	None	None	None	None
Walk Time (s)													17.0
Flash Dont Walk (s)													9.0
Pedestrian Calls (#/hr)													0
v/c Ratio		1.22			0.31		0.51	1.02	0.11	0.23	1.10	0.27	
Control Delay		156.0			66.4		55.0	70.0	42.6	47.5	94.9	15.0	
Queue Delay		0.0			0.0		0.0	85.6	0.2	0.0	0.0	0.0	
Total Delay		156.0			66.4		55.0	155.7	42.9	47.5	94.9	15.0	
Queue Length 50th (ft)		~385			90		61	~406	14	22	~470	31	
Queue Length 95th (ft)		#589			153		115	#545	37	54	#611	82	
Internal Link Dist (ft)		352			2			285			2411		
Turn Bay Length (ft)							150		225	150		225	
Base Capacity (vph)		366			433		213	1016	222	177	1016	524	
Starvation Cap Reductn		0			0		0	174	0	0	0	0	
Spillback Cap Reductn		0			0		0	0	59	0	0	0	
Storage Cap Reductn		0			0		0	0	0	0	0	0	
Reduced v/c Ratio		1.22			0.31		0.44	1.23	0.13	0.20	1.10	0.27	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 105.8	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
~ 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.	

Splits and Phases: 174: Union Street & Route 18



HCM Signalized Intersection Capacity Analysis
174: Union Street & Route 18

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	30	60	65	35	15	85	940	20	35	1105	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	11	11	11	10	11	11
Total Lost time (s)		5.0			5.0		6.0	6.0	5.0	6.0	6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.98			0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		2011			2034		1728	3355	1561	1440	3355	1546
Flt Permitted		0.69			0.81		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1433			1694		1728	3355	1561	1440	3355	1546
Peak-hour factor, PHF	0.93	0.93	0.93	0.85	0.85	0.85	0.91	0.91	0.91	0.99	0.99	0.99
Adj. Flow (vph)	349	32	65	76	41	18	93	1033	22	35	1116	141
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	56
Lane Group Flow (vph)	0	446	0	0	135	0	93	1033	22	35	1116	85
Heavy Vehicles (%)	1%	3%	0%	2%	0%	0%	1%	4%	0%	17%	4%	1%
Turn Type	Perm			Perm			Prot		custom	Prot		Perm
Protected Phases		4			4		1	2	5	1	2	
Permitted Phases	4			4								2
Actuated Green, G (s)		27.0			27.0		11.3	32.0	13.4	11.3	32.0	32.0
Effective Green, g (s)		27.0			27.0		11.3	32.0	13.4	11.3	32.0	32.0
Actuated g/C Ratio		0.26			0.26		0.11	0.30	0.13	0.11	0.30	0.30
Clearance Time (s)		5.0			5.0		6.0	6.0	5.0	6.0	6.0	6.0
Vehicle Extension (s)		5.0			5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)		366			433		185	1016	198	154	1016	468
v/s Ratio Prot							c0.05	0.31	c0.01	0.02	c0.33	
v/s Ratio Perm		c0.31			0.08							0.06
v/c Ratio		1.22			0.31		0.50	1.02	0.11	0.23	1.10	0.18
Uniform Delay, d1		39.3			31.8		44.5	36.8	40.9	43.2	36.8	27.2
Progression Factor		1.00			1.94		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		120.7			0.8		2.9	32.5	0.3	1.0	59.1	0.3
Delay (s)		160.1			62.6		47.5	69.3	41.2	44.2	96.0	27.4
Level of Service		F			E		D	E	D	D	F	C
Approach Delay (s)		160.1			62.6			67.0			87.1	
Approach LOS		F			E			E			F	

Intersection Summary			
HCM Average Control Delay	89.1	HCM Level of Service	F
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	105.7	Sum of lost time (s)	22.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

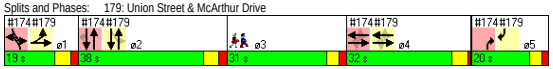
Lanes, Volumes, Timings
179: Union Street & McArthur Drive

2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations													
Volume (vph)	45	5	35	0	15	5	0	190	5	5	235	100	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	16	16	16	15	16	16	16	16	16	12	12	
Storage Length (ft)	0		0	0		0	0		0	0		50	
Storage Lanes	0		0	0		0	0		0	0		1	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			No			Yes			Yes			No	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		82			609			920			687		
Travel Time (s)		1.9			13.8			20.9			15.6		
Peak Hour Factor	0.90	0.90	0.90	0.75	0.75	0.75	0.69	0.69	0.69	0.83	0.83	0.83	
Heavy Vehicles (%)	0%	25%	16%	0%	0%	25%	0%	6%	20%	0%	6%	1%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	95	0	0	27	0	0	282	0	0	289	120	
Turn Type	pm+pt			Perm						Perm		custom	
Protected Phases	1	1 4			4			2			2	5	3
Permitted Phases	1 4			4						2			
Detector Phase	1	1 4		4	4			2		2	2	5	
Switch Phase													
Minimum Initial (s)	4.0			7.0	7.0			7.0		7.0	7.0	4.0	17.0
Minimum Split (s)	10.0			12.0	12.0			13.0		13.0	13.0	9.0	31.0
Total Split (s)	19.0	51.0	0.0	32.0	32.0	0.0	0.0	38.0	0.0	38.0	38.0	20.0	31.0
Total Split (%)	13.6%	36.4%	0.0%	22.9%	22.9%	0.0%	0.0%	27.1%	0.0%	27.1%	27.1%	14.3%	22%
Maximum Green (s)	13.0			27.0	27.0			32.0		32.0	32.0	15.0	26.0
Yellow Time (s)	4.0			4.0	4.0			4.0		4.0	4.0	3.0	3.0
All-Red Time (s)	2.0			1.0	1.0			2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	4.0	6.0	4.0	6.0	6.0	5.0	
Lead/Lag	Lead			Lag	Lag			Lag		Lag	Lag		Lead
Lead-Lag Optimize?	Yes			Yes	Yes			Yes		Yes	Yes		Yes
Vehicle Extension (s)	4.0			5.0	5.0			4.0		4.0	4.0	4.0	0.2
Recall Mode	None			None	None			None		None	None	None	None
Walk Time (s)													17.0
Flash Dont Walk (s)													9.0
Pedestrian Calls (#/hr)													0
v/c Ratio		0.16			0.06			0.46			0.54	0.59	
Control Delay		6.5			25.6			33.4			35.8	56.6	
Queue Delay		0.0			0.0			0.0			0.0	672.4	
Total Delay		6.5			25.6			33.4			35.8	729.0	
Queue Length 50th (ft)		19			11			158			168	78	
Queue Length 95th (ft)		m29			27			176			233	129	
Internal Link Dist (ft)		2			529			840			607		
Turn Bay Length (ft)												50	
Base Capacity (vph)		626			489			612			539	227	
Starvation Cap Reductn		0			0			0			0	0	
Spillback Cap Reductn		0			8			0			0	187	
Storage Cap Reductn		0			0			0			0	0	
Reduced v/c Ratio		0.15			0.06			0.46			0.54	3.00	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 105.8	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 179: Union Street & McArthur Drive



HCM Signalized Intersection Capacity Analysis
179: Union Street & McArthur Drive

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	5	35	0	15	5	0	190	5	5	235	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	15	16	16	16	16	16	12	12
Total Lost time (s)		6.0			5.0			6.0			6.0	5.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frt		0.94			0.96			1.00			1.00	0.85
Flt Protected		0.97			1.00			1.00			1.00	1.00
Satd. Flow (prot)		1833			1894			2018			1793	1599
Flt Permitted		0.87			1.00			1.00			0.99	1.00
Satd. Flow (perm)		1628			1894			2018			1781	1599
Peak-hour factor, PHF	0.90	0.90	0.90	0.75	0.75	0.75	0.69	0.69	0.69	0.83	0.83	0.83
Adj. Flow (vph)	50	6	39	0	20	7	0	275	7	6	283	120
RTOR Reduction (vph)	0	0	0	0	5	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	95	0	0	22	0	0	281	0	0	289	120
Heavy Vehicles (%)	0%	25%	16%	0%	0%	25%	0%	6%	20%	0%	6%	1%
Turn Type	pm+pt			Perm						Perm		custom
Protected Phases	1	1 4			4			2			2	5
Permitted Phases	1 4			4						2		
Actuated Green, G (s)		38.3			27.0			32.0			32.0	13.4
Effective Green, g (s)		38.3			27.0			32.0			32.0	13.4
Actuated g/C Ratio		0.36			0.26			0.30			0.30	0.13
Clearance Time (s)					5.0			6.0			6.0	5.0
Vehicle Extension (s)					5.0			4.0			4.0	4.0
Lane Grp Cap (vph)		612			484			611			539	203
v/s Ratio Prot		c0.02			0.01			0.14				c0.08
v/s Ratio Perm		c0.04									c0.16	
v/c Ratio		0.16			0.05			0.46			0.54	0.59
Uniform Delay, d1		22.8			29.6			29.9			30.7	43.6
Progression Factor		0.46			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.1			0.1			0.8			1.3	5.3
Delay (s)		10.7			29.7			30.6			32.0	48.9
Level of Service		B			C			C			C	D
Approach Delay (s)		10.7			29.7			30.6			36.9	
Approach LOS		B			C			C			D	

Intersection Summary					
HCM Average Control Delay	31.4	HCM Level of Service		C	
HCM Volume to Capacity ratio	0.38				
Actuated Cycle Length (s)	105.7	Sum of lost time (s)		23.0	
Intersection Capacity Utilization	37.9%	ICU Level of Service		A	
Analysis Period (min)	15				
c Critical Lane Group					

Lanes, Volumes, Timings
14: Tarkiln Hill Road & Church St

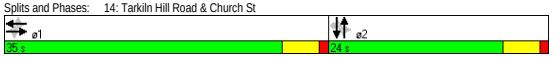
2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	295	0	30	450	60	215	190	40	45	165	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	12	11	11	12	11	11	11	11	11	12
Storage Length (ft)	50		0	0		0	0		0	0		145
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		305			1116			176			552	
Travel Time (s)		6.9			25.4			4.0			12.5	
Peak Hour Factor	0.81	0.81	0.81	0.87	0.87	0.87	0.84	0.84	0.84	0.90	0.90	0.90
Heavy Vehicles (%)	5%	2%	0%	8%	2%	2%	1%	2%	0%	11%	4%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	364	0	34	586	0	256	274	0	0	233	94
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Minimum Split (s)	35.0	35.0		35.0	35.0		12.0	12.0		12.0	12.0	12.0
Total Split (s)	35.0	35.0	0.0	35.0	35.0	0.0	24.0	24.0	0.0	24.0	24.0	24.0
Total Split (%)	59.3%	59.3%	0.0%	59.3%	59.3%	0.0%	40.7%	40.7%	0.0%	40.7%	40.7%	40.7%
Maximum Green (s)	30.0	30.0		30.0	30.0		19.0	19.0		19.0	19.0	19.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
v/c Ratio	0.28	0.40		0.08	0.65		0.75	0.48			0.47	0.18
Control Delay	11.8	10.6		8.1	15.0		35.0	19.6			19.9	15.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	11.8	10.6		8.1	15.0		35.0	19.6			19.9	15.6
Queue Length 50th (ft)	14	73		6	140		80	77			65	24
Queue Length 95th (ft)	34	109		17	223		#166	126			122	53
Internal Link Dist (ft)		225			1036			96			472	
Turn Bay Length (ft)	50											145
Base Capacity (vph)	266	916		434	899		341	567			493	520
Starvation Cap Reductn	0	0		0	0		0	0			0	0
Spillback Cap Reductn	0	0		0	0		0	0			0	0
Storage Cap Reductn	0	0		0	0		0	0			0	0
Reduced v/c Ratio	0.28	0.40		0.08	0.65		0.75	0.48			0.47	0.18

Intersection Summary

Area Type: Other
Cycle Length: 59
Actuated Cycle Length: 59
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green
Natural Cycle: 60
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 14: Tarkiln Hill Road & Church St



HCM Signalized Intersection Capacity Analysis
14: Tarkiln Hill Road & Church St

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	295	0	30	450	60	215	190	40	45	165	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	12	11	11	12	11	11	11	11	11	12
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)	1604	1801		1616	1769		1728	1759			1722	1615
Flt Permitted	0.31	1.00		0.50	1.00		0.58	1.00			0.88	1.00
Satd. Flow (perm)	524	1801		853	1769		1060	1759			1531	1615
Peak-hour factor, PHF	0.81	0.81	0.81	0.87	0.87	0.87	0.84	0.84	0.84	0.90	0.90	0.90
Adj. Flow (vph)	74	364	0	34	517	69	256	226	48	50	183	94
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	74	364	0	34	586	0	256	274	0	0	233	94
Heavy Vehicles (%)	5%	2%	0%	8%	2%	2%	1%	2%	0%	11%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Actuated Green, G (s)	30.0	30.0		30.0	30.0		19.0	19.0			19.0	19.0
Effective Green, g (s)	30.0	30.0		30.0	30.0		19.0	19.0			19.0	19.0
Actuated g/C Ratio	0.51	0.51		0.51	0.51		0.32	0.32			0.32	0.32
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lane Grp Cap (vph)	266	916		434	899		341	566			493	520
v/s Ratio Prot		0.20			c0.33			0.16				
v/s Ratio Perm	0.14			0.04			c0.24				0.15	0.06
v/c Ratio	0.28	0.40		0.08	0.65		0.75	0.48			0.47	0.18
Uniform Delay, d1	8.3	8.9		7.4	10.7		17.9	16.1			16.0	14.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	2.6	1.3		0.4	3.7		14.1	2.9			3.2	0.8
Delay (s)	10.9	10.2		7.8	14.3		32.0	19.0			19.2	15.2
Level of Service	B	B		A	B		C	B			B	B
Approach Delay (s)		10.3			14.0			25.3			18.1	
Approach LOS		B			B			C			B	

Intersection Summary

HCM Average Control Delay	17.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
19: Wood St & Rt 18

2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	25	75	10	55	115	40	10	280	60	60	355	15	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	14	16	16	14	16	11	11	16	11	11	16	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		197			310			393			488		
Travel Time (s)		4.5			7.0			8.9			11.1		
Peak Hour Factor	0.77	0.77	0.77	0.69	0.69	0.69	0.88	0.88	0.88	0.91	0.91	0.91	
Heavy Vehicles (%)	0%	8%	11%	4%	4%	3%	0%	4%	5%	0%	4%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	142	0	0	305	0	11	386	0	66	406	0	
Turn Type	Perm			Perm			Perm			Perm			
Protected Phases		3			3			1			1		2
Permitted Phases	3			3			1			1			
Detector Phase	3	3		3	3		1	1		1	1		
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0		15.0
Minimum Split (s)	17.0	17.0		17.0	17.0		21.0	21.0		21.0	21.0		21.0
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	21.0
Total Split (%)	37.0%	37.0%	0.0%	37.0%	37.0%	0.0%	37.0%	37.0%	0.0%	37.0%	37.0%	0.0%	26%
Maximum Green (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0		15.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	
Lead/Lag							Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		5.0
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													4.0
Pedestrian Calls (#/hr)													0
v/c Ratio		0.20			0.43		0.03	0.53		0.20	0.55		
Control Delay		11.6			14.1		10.9	16.0		13.1	16.7		
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0		
Total Delay		11.6			14.1		10.9	16.0		13.1	16.7		
Queue Length 50th (ft)		30			71		2	96		15	105		
Queue Length 95th (ft)		51			89		10	162		38	181		
Internal Link Dist (ft)		117			230			313			408		
Turn Bay Length (ft)													
Base Capacity (vph)		703			711		318	724		334	734		
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		0.20			0.43		0.03	0.53		0.20	0.55		

Intersection Summary	
Area Type:	Other
Cycle Length: 81	
Actuated Cycle Length: 60	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	

Splits and Phases: 19: Wood St & Rt 18

HCM Signalized Intersection Capacity Analysis
19: Wood St & Rt 18

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	75	10	55	115	40	10	280	60	60	355	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	14	16	16	14	16	11	11	16	11	11	16
Total Lost time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.97		1.00	0.97		1.00	0.99	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1859			1878		1745	1716		1745	1758	
Flt Permitted		0.89			0.89		0.41	1.00		0.44	1.00	
Satd. Flow (perm)		1679			1684		762	1716		801	1758	
Peak-hour factor, PHF	0.77	0.77	0.77	0.69	0.69	0.69	0.88	0.88	0.88	0.91	0.91	0.91
Adj. Flow (vph)	32	97	13	80	167	58	11	318	68	66	390	16
RTOR Reduction (vph)	0	4	0	0	9	0	0	8	0	0	2	0
Lane Group Flow (vph)	0	139	0	0	296	0	11	378	0	66	404	0
Heavy Vehicles (%)	0%	8%	11%	4%	4%	3%	0%	4%	5%	0%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Actuated Green, G (s)		25.0			25.0		25.0	25.0		25.0	25.0	
Effective Green, g (s)		25.0			25.0		25.0	25.0		25.0	25.0	
Actuated g/C Ratio		0.42			0.42		0.42	0.42		0.42	0.42	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		700			702		318	715		334	733	
v/s Ratio Prot								0.22			c0.23	
v/s Ratio Perm		0.08			c0.18		0.01			0.08		
v/c Ratio		0.20			0.42		0.03	0.53		0.20	0.55	
Uniform Delay, d1		11.1			12.4		10.4	13.1		11.1	13.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.6			1.9		0.2	2.8		1.3	3.0	
Delay (s)		11.8			14.2		10.6	15.9		12.4	16.2	
Level of Service		B			B		B	B		B	B	
Approach Delay (s)		11.8			14.2			15.7			15.7	
Approach LOS		B			B			B			B	

Intersection Summary					
HCM Average Control Delay	14.9	HCM Level of Service		B	
HCM Volume to Capacity ratio	0.49				
Actuated Cycle Length (s)	60.0	Sum of lost time (s)		10.0	
Intersection Capacity Utilization	56.7%	ICU Level of Service		B	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	230	25	40	245	40	60	95	25	35	155	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	14	16	16	16	16
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1761			1229			1754			2421	
Travel Time (s)		40.0			27.9			39.9			55.0	
Peak Hour Factor	0.89	0.89	0.89	0.96	0.96	0.96	0.83	0.83	0.83	0.91	0.91	0.91
Heavy Vehicles (%)	15%	6%	12%	7%	2%	0%	2%	2%	8%	8%	10%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	387	0	0	339	0	0	216	0	0	362	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Minimum Split (s)	36.0	36.0		36.0	36.0		29.0	29.0		29.0	29.0	
Total Split (s)	36.0	36.0	0.0	36.0	36.0	0.0	29.0	29.0	0.0	29.0	29.0	0.0
Total Split (%)	55.4%	55.4%	0.0%	55.4%	55.4%	0.0%	44.6%	44.6%	0.0%	44.6%	44.6%	0.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
v/c Ratio		0.52			0.39			0.44			0.60	
Control Delay		15.4			13.1			20.4			22.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		15.4			13.1			20.4			22.9	
Queue Length 50th (ft)		103			83			65			117	
Queue Length 95th (ft)		172			140			110			197	
Internal Link Dist (ft)		1681			1149			1674			2341	
Turn Bay Length (ft)												
Base Capacity (vph)		751			875			486			602	
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		0.52			0.39			0.44			0.60	

Intersection Summary	
Area Type:	Other
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 18 (28%), Referenced to phase 2: and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Pretimed	

Splits and Phases: 24: Nash Road & Church Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	230	25	40	245	40	60	95	25	35	155	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	16	14	16	16	16	16
Total Lost time (s)		6.0			6.0			7.0			7.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.98			0.98			0.94	
Flt Protected		0.99			0.99			0.98			0.99	
Satd. Flow (prot)		1935			2056			1902			1875	
Flt Permitted		0.83			0.92			0.74			0.94	
Satd. Flow (perm)		1628			1898			1436			1777	
Peak-hour factor, PHF	0.89	0.89	0.89	0.96	0.96	0.96	0.83	0.83	0.83	0.91	0.91	0.91
Adj. Flow (vph)	101	258	28	42	255	42	72	114	30	38	170	154
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	387	0	0	339	0	0	216	0	0	362	0
Heavy Vehicles (%)	15%	6%	12%	7%	2%	0%	2%	2%	8%	8%	10%	5%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Actuated Green, G (s)		30.0			30.0			22.0			22.0	
Effective Green, g (s)		30.0			30.0			22.0			22.0	
Actuated g/C Ratio		0.46			0.46			0.34			0.34	
Clearance Time (s)		6.0			6.0			7.0			7.0	
Lane Grp Cap (vph)		751			876			486			601	
v/s Ratio Prot												
v/s Ratio Perm		c0.24			0.18			0.15			c0.20	
v/c Ratio		0.52			0.39			0.44			0.60	
Uniform Delay, d1		12.4			11.5			16.7			17.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.5			1.3			2.9			4.4	
Delay (s)		14.9			12.8			19.7			22.3	
Level of Service		B			B			B			C	
Approach Delay (s)		14.9			12.8			19.7			22.3	
Approach LOS		B			B			B			C	

Intersection Summary					
HCM Average Control Delay	17.2	HCM Level of Service		B	
HCM Volume to Capacity ratio	0.55				
Actuated Cycle Length (s)	65.0	Sum of lost time (s)		13.0	
Intersection Capacity Utilization	67.3%	ICU Level of Service		C	
Analysis Period (min)	15				

c Critical Lane Group

Lanes, Volumes, Timings
28: Coggeshall Street & Ashley Blvd. (Rt 18 SB)

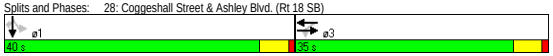
2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	190	90	185	195	0	0	0	0	115	665	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	15	12	12	12	12	12	10	10
Storage Length (ft)	0		0	0		0	0		0	0		130
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			No			No			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		686			474			1008			501	
Travel Time (s)		15.6			10.8			22.9			11.4	
Peak Hour Factor	0.78	0.78	0.78	0.86	0.86	0.86	0.92	0.92	0.92	0.88	0.88	0.88
Heavy Vehicles (%)	0%	5%	2%	2%	8%	0%	0%	0%	0%	7%	3%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	359	0	0	442	0	0	0	0	0	887	45
Turn Type				Perm						Perm		Perm
Protected Phases		3			3						1	
Permitted Phases				3						1		1
Minimum Split (s)		35.0		35.0	35.0					40.0	40.0	40.0
Total Split (s)	0.0	35.0	0.0	35.0	35.0	0.0	0.0	0.0	0.0	40.0	40.0	40.0
Total Split (%)	0.0%	46.7%	0.0%	46.7%	46.7%	0.0%	0.0%	0.0%	0.0%	53.3%	53.3%	53.3%
Maximum Green (s)		30.0		30.0	30.0					35.0	35.0	35.0
Yellow Time (s)		4.0		4.0	4.0					4.0	4.0	4.0
All-Red Time (s)		1.0		1.0	1.0					1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	4.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
v/c Ratio		0.50			1.04						0.59	0.06
Control Delay		17.8			80.4						16.7	4.0
Queue Delay		0.0			0.0						0.0	0.0
Total Delay		17.8			80.4						16.7	4.0
Queue Length 50th (ft)		107			~227						152	0
Queue Length 95th (ft)		148			#370						201	15
Internal Link Dist (ft)		606			394			928			421	
Turn Bay Length (ft)												130
Base Capacity (vph)		722			425						1507	694
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		0.50			1.04						0.59	0.06

Intersection Summary

Area Type: Other
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 0 (0%), Referenced to phase 2: and 6:, Start of Green
Natural Cycle: 80
Control Type: Pretimed
~ 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.

Splits and Phases: 28: Coggeshall Street & Ashley Blvd. (Rt 18 SB)



HCM Signalized Intersection Capacity Analysis
28: Coggeshall Street & Ashley Blvd. (Rt 18 SB)

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	190	90	185	195	0	0	0	0	115	665	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	15	12	12	12	12	12	10	10
Total Lost time (s)		5.0			5.0						5.0	5.0
Lane Util. Factor		1.00			1.00						0.95	1.00
Frt		0.96			1.00						1.00	0.85
Flt Protected		1.00			0.98						0.99	1.00
Satd. Flow (prot)		1747			1942						3229	1436
Flt Permitted		1.00			0.53						0.99	1.00
Satd. Flow (perm)		1747			1062						3229	1436
Peak-hour factor, PHF	0.78	0.78	0.78	0.86	0.86	0.86	0.92	0.92	0.92	0.88	0.88	0.88
Adj. Flow (vph)	0	244	115	215	227	0	0	0	0	131	756	45
RTOR Reduction (vph)	0	23	0	0	0	0	0	0	0	0	0	24
Lane Group Flow (vph)	0	336	0	0	442	0	0	0	0	0	887	21
Heavy Vehicles (%)	0%	5%	2%	2%	8%	0%	0%	0%	0%	7%	3%	5%
Turn Type				Perm						Perm		Perm
Protected Phases		3			3						1	
Permitted Phases				3						1		1
Actuated Green, G (s)		30.0			30.0						35.0	35.0
Effective Green, g (s)		30.0			30.0						35.0	35.0
Actuated g/C Ratio		0.40			0.40						0.47	0.47
Clearance Time (s)		5.0			5.0						5.0	5.0
Lane Grp Cap (vph)		699			425						1507	670
v/s Ratio Prot		0.19										
v/s Ratio Perm					c0.42						0.27	0.01
v/c Ratio		0.48			1.04						0.59	0.03
Uniform Delay, d1		16.7			22.5						14.7	10.8
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		2.4			54.4						1.7	0.1
Delay (s)		19.1			76.9						16.4	10.9
Level of Service		B			E						B	B
Approach Delay (s)		19.1			76.9			0.0			16.1	
Approach LOS		B			E			A			B	

Intersection Summary

HCM Average Control Delay	32.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
31: Coggeshall Street & Acushnet Ave (Rt 18 NB)

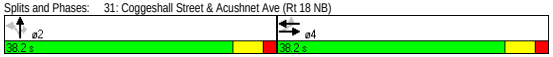
2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	260	0	0	300	50	80	285	220	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	15	12	12	11	11	12	12	12
Storage Length (ft)	0		0	0		0	0		160	0		0
Storage Lanes	0		0	0		0	1		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		474			546			1002			363	
Travel Time (s)		10.8			12.4			22.8			8.3	
Peak Hour Factor	0.95	0.95	0.95	0.86	0.86	0.86	0.84	0.84	0.84	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	0%	0%	4%	4%	12%	10%	4%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	321	0	0	407	0	95	339	262	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			4			2				
Permitted Phases	4						2		2			
Minimum Split (s)	38.2	38.2			38.2		38.2	38.2	38.2			
Total Split (s)	38.2	38.2	0.0	0.0	38.2	0.0	38.2	38.2	38.2	0.0	0.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	0.0%	50.0%	0.0%	50.0%	50.0%	50.0%	0.0%	0.0%	0.0%
Maximum Green (s)	32.0	32.0			32.0		32.0	32.0	32.0			
Yellow Time (s)	4.2	4.2			4.2		4.2	4.2	4.2			
All-Red Time (s)	2.0	2.0			2.0		2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	4.0	4.0	6.2	4.0	6.2	6.2	6.2	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
v/c Ratio		0.44			0.49		0.14	0.48	0.34			
Control Delay		18.2			18.1		14.5	19.1	3.3			
Queue Delay		0.0			0.0		0.0	0.0	0.0			
Total Delay		18.2			18.1		14.5	19.1	3.3			
Queue Length 50th (ft)		105			132		27	114	0			
Queue Length 95th (ft)		172			196		51	169	32			
Internal Link Dist (ft)		394			466			922			283	
Turn Bay Length (ft)									160			
Base Capacity (vph)		731			833		675	699	781			
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			0.49		0.14	0.48	0.34			

Intersection Summary

Area Type: Other
Cycle Length: 76.4
Actuated Cycle Length: 76.4
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:, Start of Green
Natural Cycle: 80
Control Type: Pretimed

Splits and Phases: 31: Coggeshall Street & Acushnet Ave (Rt 18 NB)



HCM Signalized Intersection Capacity Analysis
31: Coggeshall Street & Acushnet Ave (Rt 18 NB)

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	260	0	0	300	50	80	285	220	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	12	12	15	12	12	11	11	12	12	12
Total Lost time (s)		6.2			6.2		6.2	6.2	6.2			
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00			
Frt		1.00			0.98		1.00	1.00	0.85			
Flt Protected		0.99			1.00		0.95	1.00	1.00			
Satd. Flow (prot)		1939			1971		1612	1670	1501			
Flt Permitted		0.89			1.00		0.95	1.00	1.00			
Satd. Flow (perm)		1745			1971		1612	1670	1501			
Peak-hour factor, PHF	0.95	0.95	0.95	0.86	0.86	0.86	0.84	0.84	0.84	0.92	0.92	0.92
Adj. Flow (vph)	47	274	0	0	349	58	95	339	262	0	0	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	0	152	0	0	0
Lane Group Flow (vph)	0	321	0	0	399	0	95	339	110	0	0	0
Heavy Vehicles (%)	7%	7%	0%	0%	4%	4%	12%	10%	4%	0%	0%	0%
Turn Type	Perm						Perm		Perm			
Protected Phases		4			4			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		32.0			32.0		32.0	32.0	32.0			
Effective Green, g (s)		32.0			32.0		32.0	32.0	32.0			
Actuated g/C Ratio		0.42			0.42		0.42	0.42	0.42			
Clearance Time (s)		6.2			6.2		6.2	6.2	6.2			
Lane Grp Cap (vph)		731			826		675	699	629			
v/s Ratio Prot					c0.20			c0.20				
v/s Ratio Perm		0.18					0.06		0.07			
v/c Ratio		0.44			0.48		0.14	0.48	0.17			
Uniform Delay, d1		15.8			16.2		13.7	16.2	13.9			
Progression Factor		1.00			1.00		1.00	1.00	1.00			
Incremental Delay, d2		1.9			2.0		0.4	2.4	0.6			
Delay (s)		17.7			18.2		14.1	18.6	14.5			
Level of Service		B			B		B	B	B			
Approach Delay (s)		17.7			18.2			16.5			0.0	
Approach LOS		B			B			B			A	

Intersection Summary

HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	76.4	Sum of lost time (s)	12.4
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

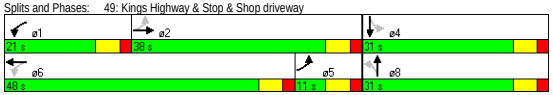
Lanes, Volumes, Timings
49: Kings Highway & Stop & Shop driveway

2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	445	40	100	575	35	25	5	60	45	10	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		515			185			360			359	
Travel Time (s)		11.7			4.2			8.2			8.2	
Peak Hour Factor	0.81	0.81	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.72	0.72	0.72
Heavy Vehicles (%)	6%	6%	3%	1%	4%	0%	12%	29%	2%	0%	13%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	691	0	0	789	0	0	101	0	0	159	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.0	13.0		11.0	13.0		13.0	13.0		19.0	19.0	
Total Split (s)	11.0	38.0	0.0	21.0	48.0	0.0	31.0	31.0	0.0	31.0	31.0	0.0
Total Split (%)	12.2%	42.2%	0.0%	23.3%	53.3%	0.0%	34.4%	34.4%	0.0%	34.4%	34.4%	0.0%
Maximum Green (s)	5.0	32.0		15.0	42.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)										5.0	5.0	
Flash Dont Walk (s)										8.0	8.0	
Pedestrian Calls (#/hr)										0	0	
v/c Ratio		0.50			0.56			0.20			0.29	
Control Delay		7.6			8.2			9.2			10.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		7.6			8.2			9.2			10.5	
Queue Length 50th (ft)		44			52			3			6	
Queue Length 95th (ft)		67			94			21			22	
Internal Link Dist (ft)		435			105			280			279	
Turn Bay Length (ft)												
Base Capacity (vph)		1992			2508			1561			1656	
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		0.35			0.31			0.06			0.10	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 42.2	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 49: Kings Highway & Stop & Shop driveway



HCM Signalized Intersection Capacity Analysis
49: Kings Highway & Stop & Shop driveway

2008 Existing Condition - AM Peak Hour

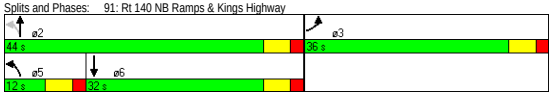
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	445	40	100	575	35	25	5	60	45	10	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frt		0.99			0.99			0.90			0.92	
Flt Protected		0.99			0.99			0.99			0.98	
Satd. Flow (prot)		3354			3442			3014			3227	
Flt Permitted		0.76			0.76			0.83			0.82	
Satd. Flow (perm)		2574			2647			2540			2685	
Peak-hour factor, PHF	0.81	0.81	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.72	0.72	0.72
Adj. Flow (vph)	93	549	49	111	639	39	28	6	67	62	14	83
RTOR Reduction (vph)	0	5	0	0	4	0	0	55	0	0	68	0
Lane Group Flow (vph)	0	686	0	0	785	0	0	46	0	0	91	0
Heavy Vehicles (%)	6%	6%	3%	1%	4%	0%	12%	29%	2%	0%	13%	0%
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		22.5			22.5			7.5			7.5	
Effective Green, g (s)		22.5			22.5			7.5			7.5	
Actuated g/C Ratio		0.54			0.54			0.18			0.18	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		1379			1418			454			479	
v/s Ratio Prot												
v/s Ratio Perm		0.27			c0.30			0.02			c0.03	
v/c Ratio		0.50			0.55			0.10			0.19	
Uniform Delay, d1		6.2			6.4			14.4			14.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.3			0.0			0.1	
Delay (s)		6.3			6.7			14.5			14.7	
Level of Service		A			A			B			B	
Approach Delay (s)		6.3			6.7			14.5			14.7	
Approach LOS		A			A			B			B	

Intersection Summary					
HCM Average Control Delay		7.7	HCM Level of Service		A
HCM Volume to Capacity ratio		0.46			
Actuated Cycle Length (s)		42.0	Sum of lost time (s)		12.0
Intersection Capacity Utilization		59.8%	ICU Level of Service		B
Analysis Period (min)		15			
c Critical Lane Group					

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	305	95	85	255	615	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	12	12	16
Storage Length (ft)	0	100	0			100
Storage Lanes	1	0	0			0
Taper Length (ft)	25	25	25			25
Right Turn on Red		No				No
Link Speed (mph)	30			30	30	
Link Distance (ft)	268			574	515	
Travel Time (s)	6.1			13.0	11.7	
Peak Hour Factor	0.83	0.83	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	3%	4%	7%	5%	5%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	481	0	0	400	777	0
Turn Type			pm+pt			
Protected Phases	3		5	2	6	
Permitted Phases			2			
Detector Phase	3		5	2	6	
Switch Phase						
Minimum Initial (s)	7.0		5.0	7.0	7.0	
Minimum Split (s)	13.0		11.0	13.0	13.0	
Total Split (s)	36.0	0.0	12.0	44.0	32.0	0.0
Total Split (%)	45.0%	0.0%	15.0%	55.0%	40.0%	0.0%
Maximum Green (s)	30.0		6.0	38.0	26.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	4.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		None	Min	Min	
v/c Ratio	0.66			0.51	0.62	
Control Delay	18.3			15.5	15.6	
Queue Delay	0.0			0.0	0.0	
Total Delay	18.3			15.5	15.6	
Queue Length 50th (ft)	104			43	87	
Queue Length 95th (ft)	203			91	161	
Internal Link Dist (ft)	188			494	435	
Turn Bay Length (ft)						
Base Capacity (vph)	1263			1689	1923	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.38			0.24	0.40	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 48.7	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 91: Rt 140 NB Ramps & Kings Highway



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	305	95	85	255	615	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	12	12	16
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			0.95	0.95	
Frt	0.97			1.00	0.99	
Flt Protected	0.96			0.99	1.00	
Satd. Flow (prot)	1945			3380	3414	
Flt Permitted	0.96			0.62	1.00	
Satd. Flow (perm)	1945			2116	3414	
Peak-hour factor, PHF	0.83	0.83	0.85	0.85	0.85	0.85
Adj. Flow (vph)	367	114	100	300	724	53
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	481	0	0	400	777	0
Heavy Vehicles (%)	3%	4%	7%	5%	5%	0%
Turn Type			pm+pt			
Protected Phases	3		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	18.2			17.9	17.9	
Effective Green, g (s)	18.2			17.9	17.9	
Actuated g/C Ratio	0.38			0.37	0.37	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	736			787	1270	
v/s Ratio Prot	c0.25				c0.23	
v/s Ratio Perm				0.19		
v/c Ratio	0.65			0.51	0.61	
Uniform Delay, d1	12.3			11.7	12.3	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	2.1			0.5	0.9	
Delay (s)	14.4			12.2	13.2	
Level of Service	B			B	B	
Approach Delay (s)	14.4			12.2	13.2	
Approach LOS	B			B	B	

Intersection Summary			
HCM Average Control Delay	13.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	48.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

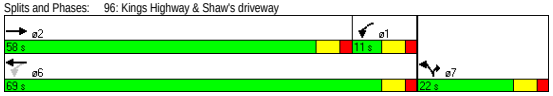
Lanes, Volumes, Timings
96: Kings Highway & Shaw's driveway

2008 Existing Condition - AM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	300	100	85	625	85	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	525			574	347	
Travel Time (s)	11.9			13.0	7.9	
Peak Hour Factor	0.93	0.93	0.92	0.92	0.85	0.85
Heavy Vehicles (%)	6%	2%	5%	4%	7%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	431	0	0	771	100	47
Turn Type			pm+pt			Prot
Protected Phases	2		1	6	7	7
Permitted Phases			6			
Detector Phase	2		1	6	7	7
Switch Phase						
Minimum Initial (s)	7.0		5.0	7.0	7.0	7.0
Minimum Split (s)	13.0		11.0	13.0	13.0	13.0
Total Split (s)	58.0	0.0	11.0	69.0	22.0	22.0
Total Split (%)	63.7%	0.0%	12.1%	75.8%	24.2%	24.2%
Maximum Green (s)	52.0		5.0	63.0	16.0	16.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	2.0		2.0	2.0	2.0	2.0
Recall Mode	Min		None	Min	None	None
v/c Ratio	0.21			0.44	0.29	0.13
Control Delay	4.7			7.2	15.8	6.3
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	4.7			7.2	15.8	6.3
Queue Length 50th (ft)	18			50	17	0
Queue Length 95th (ft)	38			91	45	16
Internal Link Dist (ft)	445			494	267	
Turn Bay Length (ft)						
Base Capacity (vph)	3308			2930	751	711
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	0.13			0.26	0.13	0.07

Intersection Summary	
Area Type:	Other
Cycle Length: 91	
Actuated Cycle Length: 36.8	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 96: Kings Highway & Shaw's driveway



HCM Signalized Intersection Capacity Analysis
96: Kings Highway & Shaw's driveway

2008 Existing Condition - AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	300	100	85	625	85	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12
Total Lost time (s)	6.0			6.0	6.0	6.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	0.96			1.00	1.00	0.85
Flt Protected	1.00			0.99	0.95	1.00
Satd. Flow (prot)	3309			3447	1687	1538
Flt Permitted	1.00			0.84	0.95	1.00
Satd. Flow (perm)	3309			2929	1687	1538
Peak-hour factor, PHF	0.93	0.93	0.92	0.92	0.85	0.85
Adj. Flow (vph)	323	108	92	679	100	47
RTOR Reduction (vph)	39	0	0	0	0	40
Lane Group Flow (vph)	392	0	0	771	100	7
Heavy Vehicles (%)	6%	2%	5%	4%	7%	5%
Turn Type			pm+pt			Prot
Protected Phases	2		1	6	7	7
Permitted Phases			6			
Actuated Green, G (s)	20.4			20.4	5.7	5.7
Effective Green, g (s)	20.4			20.4	5.7	5.7
Actuated g/C Ratio	0.54			0.54	0.15	0.15
Clearance Time (s)	6.0			6.0	6.0	6.0
Vehicle Extension (s)	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	1772			1568	252	230
v/s Ratio Prot	0.12				c0.06	0.00
v/s Ratio Perm				c0.26		
v/c Ratio	0.22			0.49	0.40	0.03
Uniform Delay, d1	4.7			5.6	14.6	13.8
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.0			0.1	0.4	0.0
Delay (s)	4.7			5.7	15.0	13.9
Level of Service	A			A	B	B
Approach Delay (s)	4.7			5.7	14.6	
Approach LOS	A			A	B	

Intersection Summary			
HCM Average Control Delay	6.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	38.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

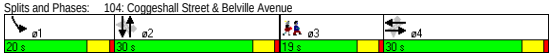
Lanes, Volumes, Timings
104: Coggeshall Street & Belville Avenue

2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations													
Volume (vph)	85	250	85	65	210	130	35	125	160	215	205	180	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	11	16	16	10	10	16	12	14	16	11	16	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		443			1111			850			178		
Travel Time (s)		10.1			25.3			19.3			4.0		
Peak Hour Factor	0.90	0.90	0.90	0.91	0.91	0.91	0.82	0.82	0.82	0.84	0.84	0.84	
Heavy Vehicles (%)	1%	6%	5%	1%	6%	6%	3%	6%	11%	4%	4%	2%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	466	0	0	302	143	0	195	195	0	714	0	
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt			
Protected Phases		4			4			2		1	2		3
Permitted Phases	4			4		4	2		2	2			
Detector Phase	4	4		4	4	4	2	2	2	1	2		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0		6.0
Minimum Split (s)	13.0	13.0		13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0		19.0
Total Split (s)	30.0	30.0	0.0	30.0	30.0	30.0	30.0	30.0	30.0	20.0	30.0	0.0	19.0
Total Split (%)	30.3%	30.3%	0.0%	30.3%	30.3%	30.3%	30.3%	30.3%	30.3%	20.2%	30.3%	0.0%	19%
Maximum Green (s)	25.0	25.0		25.0	25.0	25.0	25.0	25.0	25.0	15.0	25.0		14.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	
Lead/Lag	Lag	Lag		Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lag		Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		3.0
Recall Mode	Max	Max		Max	Max	Max	None	None	None	None	None		None
Walk Time (s)													6.0
Flash Dont Walk (s)													8.0
Pedestrian Calls (#/hr)													0
v/c Ratio		0.40			0.51	0.20		0.35	0.27		0.69		
Control Delay		12.2			16.3	3.3		14.2	3.2		16.9		
Queue Delay		0.0			0.0	0.0		0.0	0.0		0.0		
Total Delay		12.2			16.3	3.3		14.2	3.2		16.9		
Queue Length 50th (ft)		55			78	0		46	0		91		
Queue Length 95th (ft)		88			144	27		79	24		129		
Internal Link Dist (ft)		363			1031			770			98		
Turn Bay Length (ft)													
Base Capacity (vph)		1172			597	698		615	783		1129		
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		0.40			0.51	0.20		0.32	0.25		0.63		

Intersection Summary	
Area Type:	Other
Cycle Length: 99	
Actuated Cycle Length: 57.8	
Natural Cycle: 80	
Control Type: Semi Act-Uncoord	

Splits and Phases: 104: Coggeshall Street & Belville Avenue



HCM Signalized Intersection Capacity Analysis
104: Coggeshall Street & Belville Avenue

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	250	85	65	210	130	35	125	160	215	205	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	11	16	16	10	10	16	12	14	16	11	16
Total Lost time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Lane Util. Factor		0.95			1.00	1.00		1.00	1.00		0.95	
Frt		0.97			1.00	0.85		1.00	0.85		0.96	
Flt Protected		0.99			0.99	1.00		0.99	1.00		0.98	
Satd. Flow (prot)		3197			1672	1422		1784	1552		3166	
Flt Permitted		0.82			0.81	1.00		0.79	1.00		0.77	
Satd. Flow (perm)		2660			1377	1422		1418	1552		2497	
Peak-hour factor, PHF	0.90	0.90	0.90	0.91	0.91	0.91	0.82	0.82	0.82	0.84	0.84	0.84
Adj. Flow (vph)	94	278	94	71	231	143	43	152	195	256	244	214
RTOR Reduction (vph)	0	17	0	0	0	81	0	0	118	0	49	0
Lane Group Flow (vph)	0	449	0	0	302	62	0	195	77	0	665	0
Heavy Vehicles (%)	1%	6%	5%	1%	6%	6%	3%	6%	11%	4%	4%	2%
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt		
Protected Phases		4			4			2		1	2	
Permitted Phases	4			4		4	2		2	2		
Actuated Green, G (s)		25.1			25.1	25.1		22.7	22.7		22.7	
Effective Green, g (s)		25.1			25.1	25.1		22.7	22.7		22.7	
Actuated g/C Ratio		0.43			0.43	0.43		0.39	0.39		0.39	
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Vehicle Extension (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Grp Cap (vph)		1155			598	618		557	610		981	
v/s Ratio Prot												
v/s Ratio Perm		0.17			c0.22	0.04		0.14	0.05		c0.27	
v/c Ratio		0.39			0.51	0.10		0.35	0.13		0.68	
Uniform Delay, d1		11.1			11.8	9.7		12.4	11.2		14.5	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		1.0			3.0	0.3		0.5	0.1		2.0	
Delay (s)		12.1			14.9	10.0		12.9	11.3		16.6	
Level of Service		B			B	A		B	B		B	
Approach Delay (s)		12.1			13.3			12.1			16.6	
Approach LOS		B			B			B			B	

Intersection Summary					
HCM Average Control Delay		14.0	HCM Level of Service		B
HCM Volume to Capacity ratio		0.59			
Actuated Cycle Length (s)		57.8	Sum of lost time (s)		10.0
Intersection Capacity Utilization		69.6%	ICU Level of Service		C
Analysis Period (min)		15			
c Critical Lane Group					

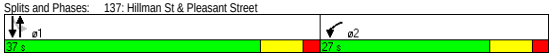
Lanes, Volumes, Timings
137: Hillman St & Pleasant Street

2008 Existing Condition - AM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	50	40	175	400	125	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	14	16	16	14
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		30			30
Link Distance (ft)	693		149			313
Travel Time (s)	15.8		3.4			7.1
Peak Hour Factor	0.84	0.84	0.86	0.86	0.90	0.90
Heavy Vehicles (%)	8%	18%	7%	5%	8%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	108	0	668	0	0	550
Turn Type					Perm	
Protected Phases	2		1			1
Permitted Phases					1	
Minimum Split (s)	27.0		37.0		37.0	37.0
Total Split (s)	27.0	0.0	37.0	0.0	37.0	37.0
Total Split (%)	42.2%	0.0%	57.8%	0.0%	57.8%	57.8%
Maximum Green (s)	20.0		30.0		30.0	30.0
Yellow Time (s)	5.0		5.0		5.0	5.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	4.0	7.0	4.0	7.0	7.0
Lead/Lag	Lag		Lead		Lead	Lead
Lead-Lag Optimize?	Yes		Yes		Yes	Yes
v/c Ratio	0.19		0.38			0.49
Control Delay	10.9		3.9			13.6
Queue Delay	0.0		0.0			0.0
Total Delay	10.9		3.9			13.6
Queue Length 50th (ft)	16		22			73
Queue Length 95th (ft)	43		44			113
Internal Link Dist (ft)	613		69			233
Turn Bay Length (ft)						
Base Capacity (vph)	581		1778			1118
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.19		0.38			0.49

Intersection Summary	
Area Type:	Other
Cycle Length: 64	
Actuated Cycle Length: 64	
Offset: 35 (55%), Referenced to phase 2:WBL and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Pretimed	

Splits and Phases: 137: Hillman St & Pleasant Street



HCM Signalized Intersection Capacity Analysis
137: Hillman St & Pleasant Street

2008 Existing Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	50	40	175	400	125	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	14	16	16	14
Total Lost time (s)	7.0		7.0			7.0
Lane Util. Factor	1.00		0.95			0.95
Frt	0.94		0.90			1.00
Flt Protected	0.97		1.00			0.99
Satd. Flow (prot)	1751		3265			3596
Flt Permitted	0.97		1.00			0.65
Satd. Flow (perm)	1751		3265			2383
Peak-hour factor, PHF	0.84	0.84	0.86	0.86	0.90	0.90
Adj. Flow (vph)	60	48	203	465	139	411
RTOR Reduction (vph)	33	0	247	0	0	0
Lane Group Flow (vph)	75	0	421	0	0	550
Heavy Vehicles (%)	8%	18%	7%	5%	8%	5%
Turn Type					Perm	
Protected Phases	2		1			1
Permitted Phases					1	
Actuated Green, G (s)	20.0		30.0			30.0
Effective Green, g (s)	20.0		30.0			30.0
Actuated g/C Ratio	0.31		0.47			0.47
Clearance Time (s)	7.0		7.0			7.0
Lane Grp Cap (vph)	547		1530			1117
v/s Ratio Prot	c0.04		0.13			
v/s Ratio Perm						c0.23
v/c Ratio	0.14		0.28			0.49
Uniform Delay, d1	15.8		10.4			11.7
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.5		0.4			1.6
Delay (s)	16.3		10.8			13.3
Level of Service	B		B			B
Approach Delay (s)	16.3		10.8			13.3
Approach LOS	B		B			B

Intersection Summary			
HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	64.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

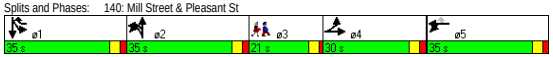
Lanes, Volumes, Timings
140: Mill Street & Pleasant St

2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations														
Volume (vph)	215	135	5	395	175	140	20	55	205	30	50	270	45	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	16	16	11	12	10	16	10	12	14	16	14	16	
Storage Length (ft)	0			0		0		100		0	0		0	
Storage Lanes	1			1		1		1		0	0		0	
Taper Length (ft)	25			25		25		25		25	25		25	
Right Turn on Red			Yes			No				Yes				
Link Speed (mph)		30			30				30			30		
Link Distance (ft)		168			308				709			499		
Travel Time (s)		3.8			7.0				16.1			11.3		
Peak Hour Factor	0.88	0.88	0.88	0.82	0.82	0.82	0.88	0.88	0.88	0.88	0.84	0.84	0.84	
Heavy Vehicles (%)	5%	1%	0%	3%	3%	4%	0%	9%	5%	3%	4%	0%	4%	
Shared Lane Traffic (%)														
Lane Group Flow (vph)	244	159	0	482	213	171	0	85	267	0	0	435	0	
Turn Type	Split			Split		pm+ov	Split	Split			Split			
Protected Phases	4	4		5	5	1	2	2	2		1	1		3
Permitted Phases						5								
Detector Phase	4	4		5	5	1	2	2	2		1	1		
Switch Phase														
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0		4.0
Minimum Split (s)	21.0	21.0		21.0	21.0	21.0	21.0	21.0	21.0		21.0	21.0		21.0
Total Split (s)	30.0	30.0	0.0	35.0	35.0	35.0	35.0	35.0	35.0	0.0	35.0	35.0	0.0	21.0
Total Split (%)	19.2%	19.2%	0.0%	22.4%	22.4%	22.4%	22.4%	22.4%	22.4%	0.0%	22.4%	22.4%	0.0%	13%
Maximum Green (s)	25.0	25.0		30.0	30.0	30.0	30.0	30.0	30.0		30.0	30.0		17.0
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0	
Lead/Lag	Lag	Lag				Lead	Lag	Lag	Lag		Lead	Lead		Lead
Lead-Lag Optimize?	Yes	Yes				Yes	Yes	Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		3.0
Recall Mode	Max	Max		Max	Max	Max	Max	Max	Max		Max	Max		None
Walk Time (s)														10.0
Flash Dont Walk (s)														7.0
Pedestrian Calls (#/hr)														0
v/c Ratio	0.74	0.40		1.28	0.52	0.24		0.24	0.35			0.53		
Control Delay	66.6	51.7		187.9	51.5	21.8		45.4	44.3			49.0		
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0			0.0		
Total Delay	66.6	51.7		187.9	51.5	21.8		45.4	44.3			49.0		
Queue Length 50th (ft)	204	123		~535	166	86		62	101			178		
Queue Length 95th (ft)	#298	189		#655	223	122		108	140			215		
Internal Link Dist (ft)		88			228				629			419		
Turn Bay Length (ft)								100						
Base Capacity (vph)	329	393		376	410	698		351	758			825		
Starvation Cap Reductn	0	0		0	0	0		0	0			0		
Spillback Cap Reductn	0	0		0	0	0		0	0			0		
Storage Cap Reductn	0	0		0	0	0		0	0			0		
Reduced v/c Ratio	0.74	0.40		1.28	0.52	0.24		0.24	0.35			0.53		

Intersection Summary	
Area Type:	Other
Cycle Length: 156	
Actuated Cycle Length: 135	
Natural Cycle: 115	
Control Type: Semi Act-Uncoord	
~ 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.	

Splits and Phases: 140: Mill Street & Pleasant St



HCM Signalized Intersection Capacity Analysis
140: Mill Street & Pleasant St

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Volume (vph)	215	135	5	395	175	140	20	55	205	30	50	270	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	16	16	11	12	10	16	10	12	14	16	14	16
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0			5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	0.95			0.95	
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.98			0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1776	2121		1694	1845	1449		1581	3381			3714	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.95	1.00			0.99	
Satd. Flow (perm)	1776	2121		1694	1845	1449		1581	3381			3714	
Peak-hour factor, PHF	0.88	0.88	0.88	0.82	0.82	0.82	0.88	0.88	0.88	0.88	0.84	0.84	0.84
Adj. Flow (vph)	244	153	6	482	213	171	23	62	233	34	60	321	54
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	7	0	0	0	0
Lane Group Flow (vph)	244	158	0	482	213	171	0	85	260	0	0	435	0
Heavy Vehicles (%)	5%	1%	0%	3%	3%	4%	0%	9%	5%	3%	4%	0%	4%
Turn Type	Split			Split		pm+ov	Split	Split			Split		
Protected Phases	4	4		5	5	1	2	2	2		1	1	
Permitted Phases						5							
Actuated Green, G (s)	25.0	25.0		30.0	30.0	60.0		30.0	30.0			30.0	
Effective Green, g (s)	25.0	25.0		30.0	30.0	60.0		30.0	30.0			30.0	
Actuated g/C Ratio	0.19	0.19		0.22	0.22	0.44		0.22	0.22			0.22	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0			5.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0			5.0	
Lane Grp Cap (vph)	329	393		376	410	698		351	751			825	
v/s Ratio Prot	c0.14	0.07		c0.28	0.12	0.05		0.05	c0.08			c0.12	
v/s Ratio Perm						0.06							
v/c Ratio	0.74	0.40		1.28	0.52	0.24		0.24	0.35			0.53	
Uniform Delay, d1	51.9	48.4		52.5	46.2	23.4		43.2	44.2			46.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	14.0	3.1		145.8	4.6	0.8		1.6	1.3			2.4	
Delay (s)	66.0	51.5		198.3	50.8	24.2		44.8	45.5			48.7	
Level of Service	E	D		F	D	C		D	D			D	
Approach Delay (s)		60.2			127.6				45.3			48.7	
Approach LOS		E			F				D			D	

Intersection Summary			
HCM Average Control Delay	83.6	HCM Level of Service	F
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	135.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

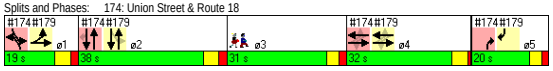
Lanes, Volumes, Timings
174: Union Street & Route 18

2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations													
Volume (vph)	240	50	40	35	15	10	40	855	25	85	820	230	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	11	11	16	16	16	16	11	11	11	10	11	11	
Storage Length (ft)	0		0	0		0	150		225	150		225	
Storage Lanes	1		0	0		0	1		1	1		1	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			No			No			No			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		440			82			328			2491		
Travel Time (s)		10.0			1.9			7.5			56.6		
Peak Hour Factor	0.89	0.89	0.89	0.82	0.82	0.82	0.88	0.88	0.88	0.92	0.92	0.92	
Heavy Vehicles (%)	8%	6%	3%	6%	6%	10%	7%	7%	4%	7%	5%	3%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	270	101	0	0	73	0	45	972	28	92	891	250	
Turn Type	Perm			Perm			Prot		custom	Prot		Perm	
Protected Phases		4			4		1	2	5	1	2		3
Permitted Phases	4			4								2	
Detector Phase	4	4		4	4		1	2	5	1	2	2	
Switch Phase													
Minimum Initial (s)	7.0	7.0		7.0	7.0		4.0	7.0	4.0	4.0	7.0	7.0	17.0
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0	13.0	9.0	10.0	13.0	13.0	31.0
Total Split (s)	32.0	32.0	0.0	32.0	32.0	0.0	19.0	38.0	20.0	19.0	38.0	38.0	31.0
Total Split (%)	22.9%	22.9%	0.0%	22.9%	22.9%	0.0%	13.6%	27.1%	14.3%	13.6%	27.1%	27.1%	22%
Maximum Green (s)	27.0	27.0		27.0	27.0		13.0	32.0	15.0	13.0	32.0	32.0	26.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	3.0	4.0	4.0	4.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	6.0	6.0	5.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lag		Lead	Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes
Vehicle Extension (s)	5.0	5.0		5.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0	3.0
Recall Mode	None	None		None	None		None	None	None	None	None	None	None
Walk Time (s)													17.0
Flash Dont Walk (s)													9.0
Pedestrian Calls (#/hr)													0
v/c Ratio	0.79	0.23			0.17		0.24	0.93	0.18	0.51	0.84	0.41	
Control Delay	54.2	32.6			58.3		45.9	50.4	45.3	54.4	41.4	11.6	
Queue Delay	0.0	0.0			0.0		0.0	100.1	0.9	0.0	0.0	0.0	
Total Delay	54.2	32.6			58.3		45.9	150.5	46.2	54.4	41.4	11.6	
Queue Length 50th (ft)	170	53			43		27	334	17	58	294	35	
Queue Length 95th (ft)	#320	101			75		63	#481	44	114	#429	106	
Internal Link Dist (ft)		360			2			248			2411		
Turn Bay Length (ft)							150		225	150		225	
Base Capacity (vph)	342	443			432		213	1046	226	205	1066	607	
Starvation Cap Reductn	0	0			0		0	254	0	0	0	0	
Spillback Cap Reductn	0	0			0		0	0	99	1	0	0	
Storage Cap Reductn	0	0			0		0	0	0	0	0	0	
Reduced v/c Ratio	0.79	0.23			0.17		0.21	1.23	0.22	0.45	0.84	0.41	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 100.6			
Natural Cycle: 130			
Control Type: Actuated-Uncoordinated			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 174: Union Street & Route 18



HCM Signalized Intersection Capacity Analysis
174: Union Street & Route 18

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	50	40	35	15	10	40	855	25	85	820	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	16	16	16	16	11	11	11	10	11	11
Total Lost time (s)	5.0	5.0			5.0		6.0	6.0	5.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93			0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1616	1638			1918		1631	3261	1501	1574	3323	1516
Flt Permitted	0.74	1.00			0.81		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1261	1638			1595		1631	3261	1501	1574	3323	1516
Peak-hour factor, PHF	0.89	0.89	0.89	0.82	0.82	0.82	0.88	0.88	0.88	0.92	0.92	0.92
Adj. Flow (vph)	270	56	45	43	18	12	45	972	28	92	891	250
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	121
Lane Group Flow (vph)	270	101	0	0	73	0	45	972	28	92	891	129
Heavy Vehicles (%)	8%	6%	3%	6%	6%	10%	7%	7%	4%	7%	5%	3%
Turn Type	Perm			Perm			Prot		custom	Prot		Perm
Protected Phases		4			4		1	2	5	1	2	
Permitted Phases	4			4								2
Actuated Green, G (s)	27.2	27.2			27.2		11.4	32.3	8.7	11.4	32.3	32.3
Effective Green, g (s)	27.2	27.2			27.2		11.4	32.3	8.7	11.4	32.3	32.3
Actuated g/C Ratio	0.27	0.27			0.27		0.11	0.32	0.09	0.11	0.32	0.32
Clearance Time (s)	5.0	5.0			5.0		6.0	6.0	5.0	6.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0			5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	338	439			427		183	1037	129	177	1056	482
v/s Ratio Prot		0.06					0.03	c0.30	c0.02	c0.06	0.27	
v/s Ratio Perm	c0.21				0.05							0.08
v/c Ratio	0.80	0.23			0.17		0.25	0.94	0.22	0.52	0.84	0.27
Uniform Delay, d1	34.7	29.0			28.5		41.2	33.7	43.3	42.5	32.3	25.8
Progression Factor	1.00	1.00			1.84		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.1	0.6			0.4		1.0	15.2	1.2	3.4	6.5	0.4
Delay (s)	48.7	29.6			52.9		42.1	48.9	44.4	45.9	38.8	26.2
Level of Service	D	C			D		D	D	D	D	D	C
Approach Delay (s)		43.5			52.9			48.5			36.8	
Approach LOS		D			D			D			D	

Intersection Summary					
HCM Average Control Delay		42.6	HCM Level of Service		D
HCM Volume to Capacity ratio		0.75			
Actuated Cycle Length (s)		101.6	Sum of lost time (s)		22.0
Intersection Capacity Utilization		62.5%	ICU Level of Service		B
Analysis Period (min)		15			
c Critical Lane Group					

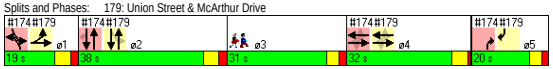
Lanes, Volumes, Timings
179: Union Street & McArthur Drive

2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations													
Volume (vph)	50	20	90	5	10	5	0	155	20	15	170	50	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	16	16	16	15	16	16	16	16	16	12	12	
Storage Length (ft)	0		0	0		0	0		0	0		50	
Storage Lanes	0		0	0		0	0		0	0		1	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			No			Yes			Yes			No	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		82			609			920			687		
Travel Time (s)		1.9			13.8			20.9			15.6		
Peak Hour Factor	0.78	0.78	0.78	0.57	0.57	0.57	0.89	0.89	0.89	0.81	0.81	0.81	
Heavy Vehicles (%)	12%	14%	5%	0%	17%	33%	0%	22%	0%	14%	13%	4%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	205	0	0	36	0	0	196	0	0	229	62	
Turn Type	pm+pt			Perm						Perm		custom	
Protected Phases	1	1 4			4			2			2	5	3
Permitted Phases	1 4			4						2			
Detector Phase	1	1 4		4	4			2		2	2	5	
Switch Phase													
Minimum Initial (s)	4.0			7.0	7.0			7.0		7.0	7.0	4.0	17.0
Minimum Split (s)	10.0			12.0	12.0			13.0		13.0	13.0	9.0	31.0
Total Split (s)	19.0	51.0	0.0	32.0	32.0	0.0	0.0	38.0	0.0	38.0	38.0	20.0	31.0
Total Split (%)	13.6%	36.4%	0.0%	22.9%	22.9%	0.0%	0.0%	27.1%	0.0%	27.1%	27.1%	14.3%	22%
Maximum Green (s)	13.0			27.0	27.0			32.0		32.0	32.0	15.0	26.0
Yellow Time (s)	4.0			4.0	4.0			4.0		4.0	4.0	3.0	3.0
All-Red Time (s)	2.0			1.0	1.0			2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	4.0	6.0	4.0	6.0	6.0	5.0	
Lead/Lag	Lead			Lag	Lag			Lag		Lag	Lag		Lead
Lead-Lag Optimize?	Yes			Yes	Yes			Yes		Yes	Yes		Yes
Vehicle Extension (s)	4.0			5.0	5.0			4.0		4.0	4.0	4.0	3.0
Recall Mode	None			None	None			None		None	None	None	None
Walk Time (s)													17.0
Flash Dont Walk (s)													9.0
Pedestrian Calls (#/hr)													0
v/c Ratio		0.32			0.08			0.34			0.44	0.39	
Control Delay		5.6			25.0			29.5			32.2	50.9	
Queue Delay		0.0			0.0			0.0			0.0	138.0	
Total Delay		5.6			25.0			29.5			32.2	188.9	
Queue Length 50th (ft)		25			14			99			122	39	
Queue Length 95th (ft)		34			24			168			180	73	
Internal Link Dist (ft)		2			529			840			607		
Turn Bay Length (ft)												50	
Base Capacity (vph)		668			440			572			521	234	
Starvation Cap Reductn		0			0			0			0	0	
Spillback Cap Reductn		0			11			0			0	183	
Storage Cap Reductn		0			0			0			0	0	
Reduced v/c Ratio		0.31			0.08			0.34			0.44	1.22	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 100.6	
Natural Cycle: 130	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 179: Union Street & McArthur Drive



HCM Signalized Intersection Capacity Analysis
179: Union Street & McArthur Drive

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	20	90	5	10	5	0	155	20	15	170	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	15	16	16	16	16	16	12	12
Total Lost time (s)		6.0			5.0			6.0			6.0	5.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frt		0.92			0.97			0.98			1.00	0.85
Flt Protected		0.98			0.99			1.00			1.00	1.00
Satd. Flow (prot)		1809			1708			1774			1673	1553
Flt Permitted		0.90			0.93			1.00			0.97	1.00
Satd. Flow (perm)		1661			1603			1774			1623	1553
Peak-hour factor, PHF	0.78	0.78	0.78	0.57	0.57	0.57	0.89	0.89	0.89	0.81	0.81	0.81
Adj. Flow (vph)	64	26	115	9	18	9	0	174	22	19	210	62
RTOR Reduction (vph)	0	0	0	0	7	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	205	0	0	29	0	0	193	0	0	229	62
Heavy Vehicles (%)	12%	14%	5%	0%	17%	33%	0%	22%	0%	14%	13%	4%
Turn Type	pm+pt			Perm						Perm		custom
Protected Phases	1	1 4			4			2			2	5
Permitted Phases	1 4			4						2		
Actuated Green, G (s)		38.6			27.2			32.3			32.3	8.7
Effective Green, g (s)		38.6			27.2			32.3			32.3	8.7
Actuated g/C Ratio		0.38			0.27			0.32			0.32	0.09
Clearance Time (s)					5.0			6.0			6.0	5.0
Vehicle Extension (s)					5.0			4.0			4.0	4.0
Lane Grp Cap (vph)		648			429			564			516	133
v/s Ratio Prot		c0.04						0.11				c0.04
v/s Ratio Perm		c0.08			0.02						c0.14	
v/c Ratio		0.32			0.07			0.34			0.44	0.47
Uniform Delay, d1		22.2			27.8			26.5			27.5	44.2
Progression Factor		0.32			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.4			0.1			0.5			0.8	3.5
Delay (s)		7.4			27.9			27.0			28.3	47.7
Level of Service		A			C			C			C	D
Approach Delay (s)		7.4			27.9			27.0			32.5	
Approach LOS		A			C			C			C	

Intersection Summary					
HCM Average Control Delay	23.7	HCM Level of Service	C		
HCM Volume to Capacity ratio	0.39				
Actuated Cycle Length (s)	101.6	Sum of lost time (s)	23.0		
Intersection Capacity Utilization	45.0%	ICU Level of Service	A		
Analysis Period (min)	15				
c Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis
2: Jones Street & Mt Pleasant St

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	0	5	270	5	470	5	155	385	405	315	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.54	0.54	0.54	0.97	0.97	0.97	0.94	0.94	0.94	0.80	0.80	0.80
Hourly flow rate (vph)	9	0	9	278	5	485	5	165	410	506	394	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2274	1991	394	1796	1787	370	394			574		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2274	1991	394	1796	1787	370	394			574		
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 %	0	100	99	0	87	28	100			50		
cM capacity (veh/h)	4	30	660	37	41	674	1176			1004		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	19	284	485	580	900
Volume Left	9	278	0	5	506
Volume Right	9	0	485	410	0
cSH	9	37	674	1176	1004
Volume to Capacity	2.10	7.67	0.72	0.00	0.50
Queue Length 95th (ft)	83	Err	153	0	73
Control Delay (s)	1330.2	Err	22.8	0.1	10.3
Lane LOS	F	F	C	A	B
Approach Delay (s)	1330.2	3705.3		0.1	10.3
Approach LOS	F	F			

Intersection Summary				
Average Delay	1270.7			
Intersection Capacity Utilization	103.0%	ICU Level of Service	G	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
9: Tarkiln Hill Rd & Kings Highway

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	50	15	30	1045	615	155
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.91	0.91	0.90	0.90
Hourly flow rate (vph)	62	19	33	1148	683	172
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				393	611	
pX, platoon unblocked	0.73					
vC, conflicting volume	1984	769	856			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2159	769	856			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	95	96			
cM capacity (veh/h)	37	402	784			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	81	1181	856
Volume Left	62	33	0
Volume Right	19	0	172
cSH	47	784	1700
Volume to Capacity	1.75	0.04	0.50
Queue Length 95th (ft)	203	3	0
Control Delay (s)	548.7	1.5	0.0
Lane LOS	F	A	
Approach Delay (s)	548.7	1.5	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	21.9		
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: Park Avenue & Church Street

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	160	310	15	0	30	0	460	20	5	300	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.80	0.80	0.80	0.85	0.85	0.85	0.79	0.79	0.79
Hourly flow rate (vph)	5	170	330	19	0	38	0	541	24	6	380	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											176	
pX, platoon unblocked	0.85	0.85	0.85	0.85	0.85		0.85					
vC, conflicting volume	983	957	380	1360	945	553	380			565		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	888	858	174	1335	844	553	174			565		
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 %	97	32	55	32	100	93	100			99		
cM capacity (veh/h)	208	249	734	27	254	531	1195			1017		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	505	56	565	386
Volume Left	5	19	0	6
Volume Right	330	38	24	0
cSH	437	75	1700	1017
Volume to Capacity	1.16	0.75	0.33	0.01
Queue Length 95th (ft)	468	90	0	0
Control Delay (s)	123.2	137.2	0.0	0.2
Lane LOS	F	F		A
Approach Delay (s)	123.2	137.2	0.0	0.2
Approach LOS	F	F		

Intersection Summary				
Average Delay		46.3		
Intersection Capacity Utilization		59.9%	ICU Level of Service	B
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
17: Irvington Street & Church Street

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	0	5	25	5	15	10	365	0	0	455	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.66	0.66	0.66	0.92	0.92	0.92	0.91	0.91	0.91
Hourly flow rate (vph)	7	0	7	38	8	23	11	397	0	0	500	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	948	921	503	928	924	397	505			397		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	948	921	503	928	924	397	505			397		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.3			2.2		
p0 queue free %	97	100	99	84	97	96	99			100		
cM capacity (veh/h)	227	270	573	241	269	642	1014			1173		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	14	68	408	505
Volume Left	7	38	11	0
Volume Right	7	23	0	5
cSH	325	309	1014	1700
Volume to Capacity	0.04	0.22	0.01	0.30
Queue Length 95th (ft)	3	21	1	0
Control Delay (s)	16.6	19.9	0.3	0.0
Lane LOS	C	C	A	
Approach Delay (s)	16.6	19.9	0.3	0.0
Approach LOS	C	C		

Intersection Summary				
Average Delay		1.7		
Intersection Capacity Utilization		37.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
32: Coggeshall Street & North Front St

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	95	390	40	50	315	45	25	130	55	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.79	0.79	0.79	0.92	0.92	0.92
Hourly flow rate (vph)	102	419	43	54	339	48	32	165	70	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		546			443							
pX, platoon unblocked	0.96			0.92			0.94	0.94	0.92	0.94	0.94	0.96
vC, conflicting volume	387			462			1116	1140	441	1267	1137	363
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	342			370			997	1022	347	1159	1020	317
tC, single (s)	4.1			4.1			7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	91			95			83	14	89	100	100	100
cM capacity (veh/h)	1170			1081			189	192	627	37	194	700

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	565	441	266
Volume Left	102	54	32
Volume Right	43	48	70
cSH	1170	1081	234
Volume to Capacity	0.09	0.05	1.14
Queue Length 95th (ft)	7	4	304
Control Delay (s)	2.3	1.5	144.8
Lane LOS	A	A	F
Approach Delay (s)	2.3	1.5	144.8
Approach LOS			F

Intersection Summary				
Average Delay	31.8			
Intersection Capacity Utilization	61.4%	ICU Level of Service		B
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
54: driveway & Purchase St

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	185	5	50	5	430	0	0	255	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	201	5	54	5	467	0	0	277	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								824				
pX, platoon unblocked	0.93	0.93		0.93	0.93	0.93				0.93		
vC, conflicting volume	812	755	277	755	755	467	277			467		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	764	703	277	703	703	394	277			394		
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 %	100	100	100	39	98	91	100			100		
cM capacity (veh/h)	269	337	762	328	337	612	1286			1087		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	261	473	277
Volume Left	0	201	5	0
Volume Right	0	54	0	0
cSH	1700	363	1286	1700
Volume to Capacity	0.00	0.72	0.00	0.16
Queue Length 95th (ft)	0	134	0	0
Control Delay (s)	0.0	36.5	0.1	0.0
Lane LOS	A	E	A	
Approach Delay (s)	0.0	36.5	0.1	0.0
Approach LOS	A	E		

Intersection Summary				
Average Delay	9.5			
Intersection Capacity Utilization	46.8%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
58: Coggeshall St & Purchase Street

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	130	10	20	140	100	20	310	70	105	220	10
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.83	0.83	0.83	0.94	0.94	0.94
Hourly flow rate (vph)	6	148	11	23	159	114	24	373	84	112	234	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	165	295	482	356
Volume Left (vph)	6	23	24	112
Volume Right (vph)	11	114	84	11
Hadj (s)	0.01	-0.20	-0.03	0.12
Departure Headway (s)	7.7	7.0	6.5	6.9
Degree Utilization, x	0.35	0.58	0.87	0.68
Capacity (veh/h)	408	475	536	488
Control Delay (s)	14.8	19.2	38.6	23.6
Approach Delay (s)	14.8	19.2	38.6	23.6
Approach LOS	B	C	E	C

Intersection Summary				
Delay			27.1	
HCM Level of Service			D	
Intersection Capacity Utilization			72.0%	ICU Level of Service
Analysis Period (min)			15	
				C

HCM Unsignalized Intersection Capacity Analysis
72: Weld St & Purchase St

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	0	45	85	115	30	90	340	0	0	230	30
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.86	0.86	0.86	0.94	0.94	0.94	0.90	0.90	0.90
Hourly flow rate (vph)	28	0	51	99	134	35	96	362	0	0	256	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	927	825	272	877	842	362	289			362		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	927	825	272	877	842	362	289			362		
tC, single (s)	7.1	6.5	6.3	7.1	6.5	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.0	3.4	2.2			2.2		
p0 queue free %	79	100	93	58	52	95	93			100		
cM capacity (veh/h)	138	287	755	236	279	663	1279			1208		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	80	166	102	457	289
Volume Left	28	99	0	96	0
Volume Right	51	0	35	0	33
cSH	291	252	348	1279	1208
Volume to Capacity	0.27	0.66	0.29	0.07	0.00
Queue Length 95th (ft)	27	104	30	6	0
Control Delay (s)	22.0	43.0	19.5	2.3	0.0
Lane LOS	C	E	C	A	
Approach Delay (s)	22.0	34.1		2.3	0.0
Approach LOS	C	D			

Intersection Summary				
Average Delay			10.9	
Intersection Capacity Utilization			60.9%	ICU Level of Service
Analysis Period (min)			15	
				B

HCM Unsignalized Intersection Capacity Analysis
74: Logan St & Purchase St

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	60	0	65	0	365	110	60	300	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.85	0.85	0.85	0.96	0.96	0.96	0.94	0.94	0.94
Hourly flow rate (vph)	0	0	0	71	0	76	0	380	115	64	319	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	961	942	319	884	884	438	319			495		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	961	942	319	884	884	438	319			495		
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 %	100	100	100	72	100	88	100			94		
cM capacity (veh/h)	199	249	726	253	269	619	1252			1044		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	147	495	383
Volume Left	0	71	0	64
Volume Right	0	76	115	0
cSH	1700	366	1252	1044
Volume to Capacity	0.00	0.40	0.00	0.06
Queue Length 95th (ft)	0	47	0	5
Control Delay (s)	0.0	21.3	0.0	2.0
Lane LOS	A	C		A
Approach Delay (s)	0.0	21.3	0.0	2.0
Approach LOS	A	C		

Intersection Summary				
Average Delay		3.8		
Intersection Capacity Utilization		62.3%	ICU Level of Service	B
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
75: Logan St & North Front Street

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	135	15	10	10	20	45	5	195	5	10	130	45
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.61	0.61	0.61	0.92	0.92	0.92	0.88	0.88	0.88
Hourly flow rate (vph)	155	17	11	16	33	74	5	212	5	11	148	51
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											720	
pX, platoon unblocked												
vC, conflicting volume	512	424	173	442	447	215	199			217		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	512	424	173	442	447	215	199			217		
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 %	62	97	99	97	93	91	100			99		
cM capacity (veh/h)	404	518	875	505	503	830	1386			1364		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	184	123	223	210
Volume Left	155	16	5	11
Volume Right	11	74	5	51
cSH	427	659	1386	1364
Volume to Capacity	0.43	0.19	0.00	0.01
Queue Length 95th (ft)	53	17	0	1
Control Delay (s)	19.6	11.7	0.2	0.5
Lane LOS	C	B	A	A
Approach Delay (s)	19.6	11.7	0.2	0.5
Approach LOS	C	B		

Intersection Summary				
Average Delay		7.0		
Intersection Capacity Utilization		36.8%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
77: Route 140 Ramps & Mt. Pleasant Street

2008 Existing Condition - PM Peak Hour

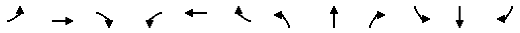
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	245	95	240	390	65	475
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.95	0.95	0.68	0.68
Hourly flow rate (vph)	278	108	253	411	96	699
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1348	458			253	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1348	458			253	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	0	82			93	
cM capacity (veh/h)	153	601			1290	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	386	663	794
Volume Left	278	0	96
Volume Right	108	411	0
cSH	194	1700	1290
Volume to Capacity	2.00	0.39	0.07
Queue Length 95th (ft)	727	0	6
Control Delay (s)	506.0	0.0	1.9
Lane LOS	F		A
Approach Delay (s)	506.0	0.0	1.9
Approach LOS	F		

Intersection Summary			
Average Delay	106.8		
Intersection Capacity Utilization	94.5%	ICU Level of Service	F
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
126: Logan St & Acushnet Avenue

2008 Existing Condition - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	130	25	25	80	0	40	15	25	0	5	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.61	0.61	0.61	0.93	0.93	0.93	0.75	0.75	0.75
Hourly flow rate (vph)	16	140	27	41	131	0	43	16	27	0	7	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	191	139	10	222	129	30	13			43		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	191	139	10	222	129	30	13			43		
tC, single (s)	7.1	6.5	6.3	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	81	97	93	82	100	97			100		
cM capacity (veh/h)	654	732	1054	594	739	1051	1599			1579		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	183	172	86	13
Volume Left	16	41	43	0
Volume Right	27	0	27	7
cSH	758	699	1599	1579
Volume to Capacity	0.24	0.25	0.03	0.00
Queue Length 95th (ft)	24	24	2	0
Control Delay (s)	11.3	11.8	3.8	0.0
Lane LOS	B	B	A	
Approach Delay (s)	11.3	11.8	3.8	0.0
Approach LOS	B	B		

Intersection Summary			
Average Delay	9.7		
Intersection Capacity Utilization	29.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
130: Herman Melville Boulevard & McArthur Drive

2008 Existing Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	135	65	145	90	30	170
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.76	0.76	0.95	0.95	0.73	0.73
Hourly flow rate (vph)	178	86	153	95	41	233
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	515	200			247	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	515	200			247	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	64	90			97	
cM capacity (veh/h)	500	821			1273	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	263	247	274
Volume Left	178	0	41
Volume Right	86	95	0
cSH	572	1700	1273
Volume to Capacity	0.46	0.15	0.03
Queue Length 95th (ft)	60	0	3
Control Delay (s)	16.5	0.0	1.4
Lane LOS	C		A
Approach Delay (s)	16.5	0.0	1.4
Approach LOS	C		

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
136: Hillman St & McArthur Dr

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	45	145	180	30	55	55
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.87	0.87	0.77	0.77
Hourly flow rate (vph)	54	175	207	34	71	71
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	555	107	143			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	555	107	143			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	87	81	85			
cM capacity (veh/h)	424	936	1422			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	229	241	143
Volume Left	54	207	0
Volume Right	175	0	71
cSH	728	1422	1700
Volume to Capacity	0.31	0.15	0.08
Queue Length 95th (ft)	34	13	0
Control Delay (s)	12.2	7.0	0.0
Lane LOS	B	A	
Approach Delay (s)	12.2	7.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	7.3		
Intersection Capacity Utilization	36.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
147: Wamsutta St & McArthur Drive

2008 Existing Condition - PM Peak Hour

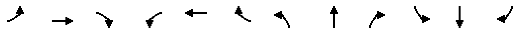
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	15	15	65	15	5	50
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.81	0.81	0.72	0.72	0.63	0.63
Hourly flow rate (vph)	19	19	90	21	8	79
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	196	101			90	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	196	101			90	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	98			99	
cM capacity (veh/h)	793	960			1518	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	37	111	87
Volume Left	19	0	8
Volume Right	19	21	0
cSH	869	1700	1518
Volume to Capacity	0.04	0.07	0.01
Queue Length 95th (ft)	3	0	0
Control Delay (s)	9.3	0.0	0.7
Lane LOS	A		A
Approach Delay (s)	9.3	0.0	0.7
Approach LOS	A		

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	16.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
148: Wamsutta St & North Front St

2008 Existing Condition - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	0	5	10	0	20	10	170	10	5	150	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.68	0.68	0.63	0.63	0.63	0.90	0.90	0.90	0.82	0.82	0.82
Hourly flow rate (vph)	22	0	7	16	0	32	11	189	11	6	183	24
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	456	430	195	431	436	194	207			200		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	456	430	195	431	436	194	207			200		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.4	4.1			4.1		
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 %	96	100	99	97	100	96	99			100		
cM capacity (veh/h)	493	515	851	528	510	812	1376			1384		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	29	48	211	213
Volume Left	22	16	11	6
Volume Right	7	32	11	24
cSH	551	689	1376	1384
Volume to Capacity	0.05	0.07	0.01	0.00
Queue Length 95th (ft)	4	6	1	0
Control Delay (s)	11.9	10.6	0.5	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	11.9	10.6	0.5	0.3
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	24.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: Route 123 & N. Worcester Street

2008 Existing Condition - AM Pek Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		✣			✣			✣			✣	
Volume (veh/h)	15	325	125	45	285	45	65	55	10	160	105	110
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.81	0.81	0.81	0.79	0.79	0.79	0.67	0.67	0.67
Hourly flow rate (vph)	16	357	137	56	352	56	82	70	13	239	157	164
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	407			495			1192	1018	380	997	977	426
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	407			495			1192	1018	380	997	977	426
tC, single (s)	4.2			4.1			7.1	6.6	6.2	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.6	4.1	3.4
p0 queue free %	98			95			0	68	98	0	31	73
cM capacity (veh/h)	1094			1080			51	219	661	150	228	614

Direction, Lane #	EB 1	WB 1	SE 1	NW 1
Volume Total	511	463	165	560
Volume Left	16	56	82	239
Volume Right	137	56	13	164
cSH	1094	1080	85	220
Volume to Capacity	0.02	0.05	1.94	2.55
Queue Length 95th (ft)	1	4	357	1175
Control Delay (s)	0.4	1.5	545.6	744.6
Lane LOS	A	A	F	F
Approach Delay (s)	0.4	1.5	545.6	744.6
Approach LOS			F	F

Intersection Summary				
Average Delay			298.8	
Intersection Capacity Utilization			70.1%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
2: S Worcester St & S. Worcerster Street

2008 Existing Condition - AM Pek Hour

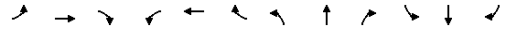
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		✣			✣			✣			✣	
Volume (veh/h)	30	205	0	0	330	70	0	0	5	10	0	45
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.56	0.56	0.56	0.69	0.69	0.69
Hourly flow rate (vph)	33	228	0	0	367	78	0	0	9	14	0	65
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	444			228			765	739	228	709	700	406
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	444			228			765	739	228	709	700	406
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.3	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.7	4.0	3.3
p0 queue free %	97			100			100	100	99	95	100	90
cM capacity (veh/h)	1110			1352			283	337	817	313	355	645

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	261	444	9	80
Volume Left	33	0	0	14
Volume Right	0	78	9	65
cSH	1110	1352	817	541
Volume to Capacity	0.03	0.00	0.01	0.15
Queue Length 95th (ft)	2	0	1	13
Control Delay (s)	1.3	0.0	9.5	12.8
Lane LOS	A		A	B
Approach Delay (s)	1.3	0.0	9.5	12.8
Approach LOS			A	B

Intersection Summary				
Average Delay			1.8	
Intersection Capacity Utilization			52.8%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
9: John B. Scott Blvd & Harvey Street

2008 Existing Condition - AM Pek Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	170	5	5	200	0	15	0	10	5	0	5
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.75	0.75	0.75	0.69	0.69	0.69
Hourly flow rate (vph)	0	185	5	5	211	0	20	0	13	7	0	7

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	190	216	33	14
Volume Left (vph)	0	5	20	7
Volume Right (vph)	5	0	13	7
Hadj (s)	0.11	0.06	0.32	0.23
Departure Headway (s)	4.4	4.3	5.2	5.1
Degree Utilization, x	0.23	0.26	0.05	0.02
Capacity (veh/h)	807	814	643	644
Control Delay (s)	8.7	8.8	8.4	8.2
Approach Delay (s)	8.7	8.8	8.4	8.2
Approach LOS	A	A	A	A

Intersection Summary				
Delay			8.7	
HCM Level of Service			A	
Intersection Capacity Utilization			24.5%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
14: Barrows St & S. Worcester St

2008 Existing Condition - AM Pek Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	35	80	180	55	30	40
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.72	0.72	0.72	0.72	0.70	0.70
Hourly flow rate (vph)	49	111	250	76	43	57
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	431	288			326	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	431	288			326	
tC, single (s)	6.5	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	91	85			97	
cM capacity (veh/h)	551	746			1245	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	160	326	100
Volume Left	49	0	43
Volume Right	111	76	0
cSH	673	1700	1245
Volume to Capacity	0.24	0.19	0.03
Queue Length 95th (ft)	23	0	3
Control Delay (s)	12.0	0.0	3.6
Lane LOS	B		A
Approach Delay (s)	12.0	0.0	3.6
Approach LOS	B		

Intersection Summary				
Average Delay			3.9	
Intersection Capacity Utilization			33.4%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis

16: John B. Scott Blvd & Dean Stret

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	155	20	5	150	10	55	140	5	10	35	0
Peak Hour Factor	0.86	0.86	0.86	0.75	0.75	0.75	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	180	23	7	200	13	61	156	6	11	39	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	209	220	222	50
Volume Left (vph)	6	7	61	11
Volume Right (vph)	23	13	6	0
Hadj (s)	-0.03	0.11	0.16	0.25
Departure Headway (s)	4.9	5.1	5.2	5.6
Degree Utilization, x	0.29	0.31	0.32	0.08
Capacity (veh/h)	679	668	633	571
Control Delay (s)	9.9	10.3	10.7	9.1
Approach Delay (s)	9.9	10.3	10.7	9.1
Approach LOS	A	B	B	A

Intersection Summary					
Delay		10.3			
HCM Level of Service		B			
Intersection Capacity Utilization		33.7%	ICU Level of Service		A
Analysis Period (min)		15			

HCM Unsignalized Intersection Capacity Analysis
1: Route 123 & N. Worcester Street

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	15	270	225	135	390	70	60	140	20	140	65	105
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.89	0.89	0.89	0.88	0.88	0.88	0.93	0.93	0.93
Hourly flow rate (vph)	15	278	232	152	438	79	68	159	23	151	70	113
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	517			510			1354	1322	478	1308	1245	394
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	517			510			1354	1322	478	1308	1245	394
tC, single (s)	4.1			4.1			7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	99			86			0	0	96	0	52	83
cM capacity (veh/h)	1059			1060			59	133	580	0	147	657

Direction, Lane #	EB 1	WB 1	SE 1	NW 1
Volume Total	526	669	250	333
Volume Left	15	152	68	151
Volume Right	232	79	23	113
cSH	1059	1060	105	0
Volume to Capacity	0.01	0.14	2.39	Err
Queue Length 95th (ft)	1	12	559	Err
Control Delay (s)	0.4	3.5	717.1	Err
Lane LOS	A	A	F	F
Approach Delay (s)	0.4	3.5	717.1	Err
Approach LOS			F	F

Intersection Summary				
Average Delay		Err		
Intersection Capacity Utilization	100.5%	ICU Level of Service	G	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
2: S Worcester St & S. Worcerster Street

2008 Existing Condition - PM Peak Hour

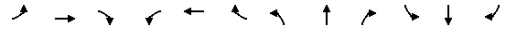
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	70	435	5	5	230	30	0	0	5	35	0	80
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.88	0.88	0.88	0.44	0.44	0.44	0.67	0.67	0.67
Hourly flow rate (vph)	77	478	5	6	261	34	0	0	11	52	0	119
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	295			484			1044	941	481	936	927	278
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	295			484			1044	941	481	936	927	278
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 %	94			99			100	100	98	77	100	84
cM capacity (veh/h)	1278			1090			167	248	589	228	253	763

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	560	301	11	172
Volume Left	77	6	0	52
Volume Right	5	34	11	119
cSH	1278	1090	589	445
Volume to Capacity	0.06	0.01	0.02	0.39
Queue Length 95th (ft)	5	0	1	45
Control Delay (s)	1.7	0.2	11.2	18.1
Lane LOS	A	A	B	C
Approach Delay (s)	1.7	0.2	11.2	18.1
Approach LOS			B	C

Intersection Summary				
Average Delay		4.1		
Intersection Capacity Utilization	64.8%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
9: John B. Scott Blvd & Harvey Street

2008 Existing Condition - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	285	15	10	175	0	5	5	5	0	0	5
Peak Hour Factor	0.87	0.87	0.87	0.88	0.88	0.88	0.75	0.75	0.75	0.42	0.42	0.42
Hourly flow rate (vph)	6	328	17	11	199	0	7	7	7	0	0	12

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	351	210	20	12
Volume Left (vph)	6	11	7	0
Volume Right (vph)	17	0	7	12
Hadj (s)	0.00	0.04	-0.02	-0.60
Departure Headway (s)	4.2	4.4	5.1	4.5
Degree Utilization, x	0.41	0.26	0.03	0.02
Capacity (veh/h)	845	799	629	693
Control Delay (s)	10.1	8.9	8.3	7.6
Approach Delay (s)	10.1	8.9	8.3	7.6
Approach LOS	B	A	A	A

Intersection Summary				
Delay			9.5	
HCM Level of Service			A	
Intersection Capacity Utilization			29.3%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
14: Barrows St & S. Worcester St

2008 Existing Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	100	50	95	50	40	130
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.86	0.86	0.79	0.79
Hourly flow rate (vph)	118	59	110	58	51	165
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	405	140			169	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	405	140			169	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	80	93			96	
cM capacity (veh/h)	582	903			1421	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	176	169	215
Volume Left	118	0	51
Volume Right	59	58	0
cSH	660	1700	1421
Volume to Capacity	0.27	0.10	0.04
Queue Length 95th (ft)	27	0	3
Control Delay (s)	12.4	0.0	2.0
Lane LOS	B		A
Approach Delay (s)	12.4	0.0	2.0
Approach LOS	B		

Intersection Summary				
Average Delay			4.7	
Intersection Capacity Utilization			35.7%	ICU Level of Service
Analysis Period (min)			15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	185	85	15	150	15	30	60	10	10	120	5
Peak Hour Factor	0.86	0.86	0.86	0.88	0.88	0.88	0.86	0.86	0.86	0.96	0.96	0.96
Hourly flow rate (vph)	6	215	99	17	170	17	35	70	12	10	125	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	320	205	116	141
Volume Left (vph)	6	17	35	10
Volume Right (vph)	99	17	12	5
Hadj (s)	-0.16	-0.01	0.04	0.01
Departure Headway (s)	4.8	5.1	5.5	5.4
Degree Utilization, x	0.42	0.29	0.18	0.21
Capacity (veh/h)	716	665	579	598
Control Delay (s)	11.2	10.1	9.7	9.9
Approach Delay (s)	11.2	10.1	9.7	9.9
Approach LOS	B	B	A	A

Intersection Summary				
Delay		10.4		
HCM Level of Service		B		
Intersection Capacity Utilization		37.5%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
13: Dog Track driveway & Route 138

2008 Existing Condition- AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	5	25	40	1145	330	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.68	0.68	0.91	0.91	0.79	0.79
Hourly flow rate (vph)	7	37	44	1258	418	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1764	418	418			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1764	418	418			
tC, single (s)	7.2	6.7	4.2			
tC, 2 stage (s)						
tF (s)	4.2	3.8	2.3			
p0 queue free %	87	93	96			
cM capacity (veh/h)	59	544	1095			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	44	1302	418
Volume Left	7	44	0
Volume Right	37	0	0
cSH	228	1095	1700
Volume to Capacity	0.19	0.04	0.25
Queue Length 95th (ft)	17	3	0
Control Delay (s)	24.5	1.5	0.0
Lane LOS	C	A	
Approach Delay (s)	24.5	1.5	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	93.2%	ICU Level of Service	F
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
14: I-495 SB Off-Ramp & Route 138

2008 Existing Condition- AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	235	0	45	0	0	0	0	1310	210	60	395	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.92	0.92	0.92	0.25	0.96	0.96	0.79	0.79	0.25
Hourly flow rate (vph)	305	0	58	0	0	0	0	1365	219	76	500	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1334	2016	250	1876	2126	792	500			1365		
vC1, stage 1 conf vol	652	652		1474	1474							
vC2, stage 2 conf vol	682	1365		402	652							
vCu, unblocked vol	1334	2016	250	1876	2126	792	500			1365		
tC, single (s)	7.6	6.6	7.0	7.5	6.5	6.9	4.1			4.3		
tC, 2 stage (s)	6.6	5.6		6.5	5.5							
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	0	100	92	100	100	100	100			84		
cM capacity (veh/h)	246	122	735	126	168	332	1075			469		

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	364	910	674	76	250	250
Volume Left	305	0	0	76	0	0
Volume Right	58	0	219	0	0	0
cSH	275	1700	1700	469	1700	1700
Volume to Capacity	1.32	0.54	0.40	0.16	0.15	0.15
Queue Length 95th (ft)	461	0	0	14	0	0
Control Delay (s)	204.6	0.0	0.0	14.1	0.0	0.0
Lane LOS	F			B		
Approach Delay (s)	204.6	0.0		1.9		
Approach LOS	F					

Intersection Summary			
Average Delay	29.9		
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
15: I-495 NB On-Ramp & Route 138

2008 Existing Condition- AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	100	0	165	295	1240	0	0	340	245
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.91	0.91	0.91	0.91	0.91	0.25	0.25	0.80	0.80
Hourly flow rate (vph)	0	0	0	110	0	181	324	1363	0	0	425	306
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			None	
Median storage veh)								2				
Upstream signal (ft)											1195	
pX, platoon unblocked												
vC, conflicting volume	1908	2589	366	2223	2436	681	425			1363		
vC1, stage 1 conf vol	578	578		2011	2011							
vC2, stage 2 conf vol	1330	2011		212	425							
vCu, unblocked vol	1908	2589	366	2223	2436	681	425			1363		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.1		
tC, 2 stage (s)	6.5	5.5		6.6	5.6							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	0	100	53	71			100		
cM capacity (veh/h)	61	72	637	41	67	388	1124			511		

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	291	324	681	681	283	448
Volume Left	110	324	0	0	0	0
Volume Right	181	0	0	0	0	306
cSH	93	1124	1700	1700	1700	1700
Volume to Capacity	3.15	0.29	0.40	0.40	0.17	0.26
Queue Length 95th (ft)	Err	30	0	0	0	0
Control Delay (s)	Err	9.5	0.0	0.0	0.0	0.0
Lane LOS	F	A				
Approach Delay (s)	Err	1.8			0.0	
Approach LOS	F					

Intersection Summary				
Average Delay	1075.9			
Intersection Capacity Utilization	72.0%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
23: Center Street & Route 138

2008 Existing Condition- AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	15	0	130	0	1045	35	85	410	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.90	0.92	0.90	0.92	0.93	0.93	0.86	0.86	0.92
Hourly flow rate (vph)	0	0	0	17	0	144	0	1124	38	99	477	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1961	1836	477	1817	1817	1142	477			1161		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1961	1836	477	1817	1817	1142	477			1161		
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 %	100	100	100	68	100	40	100			83		
cM capacity (veh/h)	17	63	588	52	65	243	1085			580		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	161	1161	576
Volume Left	0	17	0	99
Volume Right	0	144	38	0
cSH	1700	176	1700	580
Volume to Capacity	0.00	0.92	0.68	0.17
Queue Length 95th (ft)	0	173	0	15
Control Delay (s)	0.0	100.4	0.0	4.6
Lane LOS	A	F		A
Approach Delay (s)	0.0	100.4	0.0	4.6
Approach LOS	A	F		

Intersection Summary				
Average Delay	9.9			
Intersection Capacity Utilization	Err%	ICU Level of Service	H	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
24: Britton Street & Route 138

2008 Existing Condition- AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	25	25	1055	15	5	415
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.57	0.57	0.88	0.88	0.96	0.96
Hourly flow rate (vph)	44	44	1199	17	5	432
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1650	1207			1216	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1650	1207			1216	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	60	81			99	
cM capacity (veh/h)	109	225			556	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	88	1216	438
Volume Left	44	0	5
Volume Right	44	17	0
cSH	147	1700	556
Volume to Capacity	0.60	0.72	0.01
Queue Length 95th (ft)	78	0	1
Control Delay (s)	60.6	0.0	0.3
Lane LOS	F		A
Approach Delay (s)	60.6	0.0	0.3
Approach LOS	F		

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
27: Britton Street & Route 138

2008 Existing Condition- AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	30	5	5	1040	425	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	0.89	0.89
Hourly flow rate (vph)	30	5	5	1040	478	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1530	480	483			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1530	480	483			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	77	99	100			
cM capacity (veh/h)	128	586	1069			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	35	1045	483
Volume Left	30	5	0
Volume Right	5	0	6
cSH	144	1069	1700
Volume to Capacity	0.24	0.00	0.28
Queue Length 95th (ft)	23	0	0
Control Delay (s)	37.8	0.1	0.0
Lane LOS	E	A	
Approach Delay (s)	37.8	0.1	0.0
Approach LOS	E		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
50: Wilbur Street & Route 138

2008 Existing Condition- AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	5	1160	5	0	350
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.63	0.94	0.94	0.85	0.85
Hourly flow rate (vph)	8	8	1234	5	0	412
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1648	1237			1239	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1648	1237			1239	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	93	96			100	
cM capacity (veh/h)	110	217			529	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	16	1239	412
Volume Left	8	0	0
Volume Right	8	5	0
cSH	146	1700	529
Volume to Capacity	0.11	0.73	0.00
Queue Length 95th (ft)	9	0	0
Control Delay (s)	32.6	0.0	0.0
Lane LOS	D		
Approach Delay (s)	32.6	0.0	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
52: Robinson Street & Route 138

2008 Existing Condition- AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	20	1165	0	5	350
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.56	0.56	0.91	0.91	0.79	0.79
Hourly flow rate (vph)	0	36	1280	0	6	443
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1736	1280			1280	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1736	1280			1280	
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	83			99	
cM capacity (veh/h)	96	204			549	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	36	1280	449
Volume Left	0	0	6
Volume Right	36	0	0
cSH	204	1700	549
Volume to Capacity	0.17	0.75	0.01
Queue Length 95th (ft)	15	0	1
Control Delay (s)	26.3	0.0	0.3
Lane LOS	D		A
Approach Delay (s)	26.3	0.0	0.3
Approach LOS	D		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Carver Street & Route 138

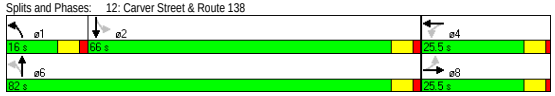
2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	80	80	55	65	35	50	670	40	100	1245	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12	12	11	12	12	11	12
Storage Length (ft)	250		70	0		0	0		175	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			737			2001			1020	
Travel Time (s)		5.7			16.8			45.5			23.2	
Confl. Peds. (#/hr)						5	2					
Peak Hour Factor	0.92	0.92	0.92	0.79	0.79	0.79	0.88	0.88	0.88	0.98	0.98	0.98
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	4%	4%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	158	174	0	0	196	0	0	863	0	0	1581	0
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		8			4		1	6			2	
Permitted Phases	8			4			6			2		
Detector Phase	8	8		4	4		1	6		2	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Total Split (s)	25.5	25.5	0.0	25.5	25.5	0.0	16.0	82.0	0.0	66.0	66.0	0.0
Total Split (%)	23.7%	23.7%	0.0%	23.7%	23.7%	0.0%	14.9%	76.3%	0.0%	61.4%	61.4%	0.0%
Maximum Green (s)	20.0	20.0		20.0	20.0		10.0	76.0		60.0	60.0	
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.2	1.2		1.2	1.2		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.0	5.5	5.5	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	Min		Min	Min	
v/c Ratio	0.75	0.45			0.70			0.55			0.88	
Control Delay	56.4	27.7			45.7			9.6			19.9	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	56.4	27.7			45.7			9.6			19.9	
Queue Length 50th (ft)	85	66			98			125			355	
Queue Length 95th (ft)	#177	127			146			167			#534	
Internal Link Dist (ft)		171			657			1921			940	
Turn Bay Length (ft)	250											
Base Capacity (vph)	233	420			306			1992			1795	
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	0.68	0.41			0.64			0.43			0.88	

Intersection Summary

Area Type: Other
Cycle Length: 107.5
Actuated Cycle Length: 89.7
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 12: Carver Street & Route 138



HCM Signalized Intersection Capacity Analysis
12: Carver Street & Route 138

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	80	80	55	65	35	50	670	40	100	1245	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	13	12	12	11	12	12	11	12
Total Lost time (s)	5.5	5.5			5.5			6.0			6.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	
Frt	1.00	0.92			0.97			0.99			0.98	
Flt Protected	0.95	1.00			0.98			1.00			1.00	
Satd. Flow (prot)	1787	1740			1826			3318			3343	
Flt Permitted	0.55	1.00			0.71			0.71			0.80	
Satd. Flow (perm)	1043	1740			1328			2349			2668	
Peak-hour factor, PHF	0.92	0.92	0.92	0.79	0.79	0.79	0.88	0.88	0.88	0.98	0.98	0.98
Adj. Flow (vph)	158	87	87	70	82	44	57	761	45	102	1270	209
RTOR Reduction (vph)	0	33	0	0	10	0	0	4	0	0	8	0
Lane Group Flow (vph)	158	141	0	0	186	0	0	859	0	0	1573	0
Confl. Peds. (#/hr)						5	2					
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	4%	4%	4%	2%	2%	2%
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		8			4		1	6			2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	18.2	18.2			18.2			60.1			60.1	
Effective Green, g (s)	18.2	18.2			18.2			60.1			60.1	
Actuated g/C Ratio	0.20	0.20			0.20			0.67			0.67	
Clearance Time (s)	5.5	5.5			5.5			6.0			6.0	
Vehicle Extension (s)	2.0	2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)	211	353			269			1572			1786	
v/s Ratio Prot		0.08										
v/s Ratio Perm	c0.15				0.14			0.37			c0.59	
v/c Ratio	0.75	0.40			0.69			0.55			0.88	
Uniform Delay, d1	33.7	31.1			33.2			7.7			12.0	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	12.0	0.3			6.1			0.2			5.3	
Delay (s)	45.6	31.3			39.3			8.0			17.3	
Level of Service	D	C			D			A			B	
Approach Delay (s)		38.1			39.3			8.0			17.3	
Approach LOS		D			D			A			B	

Intersection Summary

HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	89.8	Sum of lost time (s)	11.5
Intersection Capacity Utilization	102.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

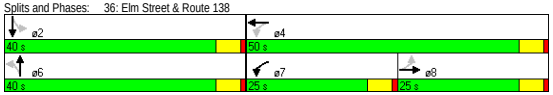
Lanes, Volumes, Timings
36: Elm Street & Route 138

2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	10	35	320	15	25	30	550	295	40	960	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	160		0	0		0	0		205
Storage Lanes	0		0	1		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		820			1216			1195			808	
Travel Time (s)		18.6			27.6			27.2			18.4	
Peak Hour Factor	0.75	0.75	0.75	0.88	0.88	0.88	0.91	0.91	0.91	0.95	0.95	0.95
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	73	0	364	45	0	0	961	0	0	1069	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		8		7	4			6			2	
Permitted Phases	8			4			6			2		
Detector Phase	8	8		7	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		15.0	15.0		15.0	15.0	
Total Split (s)	25.0	25.0	0.0	25.0	50.0	0.0	40.0	40.0	0.0	40.0	40.0	0.0
Total Split (%)	27.8%	27.8%	0.0%	27.8%	55.6%	0.0%	44.4%	44.4%	0.0%	44.4%	44.4%	0.0%
Maximum Green (s)	20.0	20.0		20.0	45.0		35.0	35.0		35.0	35.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
v/c Ratio		0.37		0.62	0.07			0.72			0.74	
Control Delay		37.6		21.7	13.4			21.2			21.7	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		37.6		21.7	13.4			21.2			21.7	
Queue Length 50th (ft)		34		124	13			199			225	
Queue Length 95th (ft)		60		191	30			297			331	
Internal Link Dist (ft)		740			1136			1115			728	
Turn Bay Length (ft)				160								
Base Capacity (vph)		450		645	1072			1415			1526	
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		0.16		0.56	0.04			0.68			0.70	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 73.3	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 36: Elm Street & Route 138



HCM Signalized Intersection Capacity Analysis
36: Elm Street & Route 138

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	10	35	320	15	25	30	550	295	40	960	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frt		0.91		1.00	0.91			0.95			1.00	
Flt Protected		0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1709		1770	1689			3259			3524	
Flt Permitted		0.93		0.55	1.00			0.88			0.88	
Satd. Flow (perm)		1598		1030	1689			2868			3095	
Peak-hour factor, PHF	0.75	0.75	0.75	0.88	0.88	0.88	0.91	0.91	0.91	0.95	0.95	0.95
Adj. Flow (vph)	13	13	47	364	17	28	33	604	324	42	1011	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	73	0	364	45	0	0	961	0	0	1069	0
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		8		7	4			6			2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)		7.1		29.9	29.9			34.3			34.3	
Effective Green, g (s)		7.1		29.9	29.9			34.3			34.3	
Actuated g/C Ratio		0.10		0.40	0.40			0.46			0.46	
Clearance Time (s)		5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0			4.0			4.0	
Lane Grp Cap (vph)		153		593	681			1326			1431	
v/s Ratio Prot				c0.15	0.03							
v/s Ratio Perm		0.05		c0.10				0.34			c0.35	
v/c Ratio		0.48		0.61	0.07			0.72			0.75	
Uniform Delay, d1		31.8		16.9	13.6			16.1			16.4	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		2.3		1.9	0.0			2.1			2.3	
Delay (s)		34.1		18.8	13.6			18.3			18.7	
Level of Service		C		B	B			B			B	
Approach Delay (s)		34.1			18.3			18.3			18.7	
Approach LOS		C			B			B			B	

Intersection Summary					
HCM Average Control Delay	18.9	HCM Level of Service		B	
HCM Volume to Capacity ratio	0.68				
Actuated Cycle Length (s)	74.2	Sum of lost time (s)		10.0	
Intersection Capacity Utilization	89.1%	ICU Level of Service		E	
Analysis Period (min)	15				
c Critical Lane Group					

Lanes, Volumes, Timings
44: Route 106 & Route 138

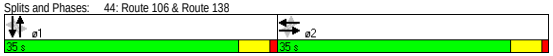
2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	245	45	390	380	110	65	300	210	135	595	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1742			2236			4525			923	
Travel Time (s)		39.6			50.8			102.8			21.0	
Confl. Peds. (#/hr)												1
Peak Hour Factor	0.79	0.79	0.79	0.94	0.94	0.94	0.89	0.89	1.00	0.94	0.94	0.94
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	5%	5%	5%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	462	0	0	936	0	0	620	0	0	894	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Detector Phase	2	2		2	2		1	1		1	1	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0		13.0	13.0	
Total Split (s)	35.0	35.0	0.0	35.0	35.0	0.0	35.0	35.0	0.0	35.0	35.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lead		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
v/c Ratio		0.49			1.08dl			0.58			0.88	
Control Delay		15.6			45.9			13.4			29.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		15.6			45.9			13.4			29.8	
Queue Length 50th (ft)		67			197			72			171	
Queue Length 95th (ft)		90			#334			118			#289	
Internal Link Dist (ft)		1662			2156			4445			843	
Turn Bay Length (ft)												
Base Capacity (vph)		944			956			1100			1044	
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		0.49			0.98			0.56			0.86	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 69.2
Natural Cycle: 55
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.

Splits and Phases: 44: Route 106 & Route 138



HCM Signalized Intersection Capacity Analysis
44: Route 106 & Route 138

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	245	45	390	380	110	65	300	210	135	595	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.98			0.95			0.98	
Flt Protected		0.99			0.98			0.99			0.99	
Satd. Flow (prot)		3438			3300			3244			3403	
Flt Permitted		0.62			0.64			0.71			0.69	
Satd. Flow (perm)		2144			2170			2325			2369	
Peak-hour factor, PHF	0.79	0.79	0.79	0.94	0.94	0.94	0.89	0.89	1.00	0.94	0.94	0.94
Adj. Flow (vph)	95	310	57	415	404	117	73	337	210	144	633	117
RTOR Reduction (vph)	0	16	0	0	16	0	0	94	0	0	17	0
Lane Group Flow (vph)	0	446	0	0	920	0	0	526	0	0	877	0
Confl. Peds. (#/hr)												1
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	5%	5%	5%	3%	3%	3%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		30.0			30.0			29.2			29.2	
Effective Green, g (s)		30.0			30.0			29.2			29.2	
Actuated g/C Ratio		0.43			0.43			0.42			0.42	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		929			941			981			1000	
v/s Ratio Prot												
v/s Ratio Perm		0.21			c0.42			0.23			c0.37	
v/c Ratio		0.48			1.08dl			0.54			0.88	
Uniform Delay, d1		14.0			19.3			14.9			18.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.5			23.8			0.7			9.0	
Delay (s)		14.6			43.1			15.7			27.4	
Level of Service		B			D			B			C	
Approach Delay (s)		14.6			43.1			15.7			27.4	
Approach LOS		B			D			B			C	

Intersection Summary

HCM Average Control Delay	27.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	69.2	Sum of lost time (s)	10.0
Intersection Capacity Utilization	93.2%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

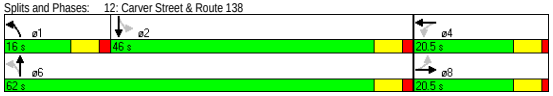
Lanes, Volumes, Timings
12: Carver Street & Route 138

2008 Existing Condition- AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	210	25	30	15	40	160	35	1140	5	45	455	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12	12	11	12	12	11	12
Storage Length (ft)	250		70	0		0	0		175	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			737			2001			1020	
Travel Time (s)		5.7			16.8			45.5			23.2	
Peak Hour Factor	0.84	0.84	0.84	0.92	0.92	0.92	0.95	0.95	0.95	0.88	0.88	0.88
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	7%	7%	7%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	250	66	0	0	233	0	0	1242	0	0	619	0
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		8			4		1	6			2	
Permitted Phases	8			4			6			2		
Detector Phase	8	8		4	4		1	6		2	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Total Split (s)	20.5	20.5	0.0	20.5	20.5	0.0	16.0	62.0	0.0	46.0	46.0	0.0
Total Split (%)	24.8%	24.8%	0.0%	24.8%	24.8%	0.0%	19.4%	75.2%	0.0%	55.8%	55.8%	0.0%
Maximum Green (s)	15.0	15.0		15.0	15.0		10.0	56.0		40.0	40.0	
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.2	1.2		1.2	1.2		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.0	5.5	5.5	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	Min		Min	Min	
v/c Ratio	0.74	0.13			0.41			0.82			0.52	
Control Delay	36.2	10.6			12.5			16.3			10.4	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	36.2	10.6			12.5			16.3			10.4	
Queue Length 50th (ft)	69	7			30			154			60	
Queue Length 95th (ft)	#189	32			96			222			90	
Internal Link Dist (ft)		171			657			1921			940	
Turn Bay Length (ft)	250											
Base Capacity (vph)	338	527			571			3114			1870	
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	0.74	0.13			0.41			0.40			0.33	

Intersection Summary	
Area Type:	Other
Cycle Length: 82.5	
Actuated Cycle Length: 52.4	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 12: Carver Street & Route 138



HCM Signalized Intersection Capacity Analysis
12: Carver Street & Route 138

2008 Existing Condition- AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	210	25	30	15	40	160	35	1140	5	45	455	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	13	12	12	11	12	12	11	12
Total Lost time (s)	5.5	5.5			5.5			6.0			6.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.92			0.90			1.00			0.99	
Flt Protected	0.95	1.00			1.00			1.00			1.00	
Satd. Flow (prot)	1787	1727			1742			3381			3208	
Flt Permitted	0.62	1.00			0.98			0.92			0.75	
Satd. Flow (perm)	1166	1727			1712			3116			2411	
Peak-hour factor, PHF	0.84	0.84	0.84	0.92	0.92	0.92	0.95	0.95	0.95	0.88	0.88	0.88
Adj. Flow (vph)	250	30	36	16	43	174	37	1200	5	51	517	51
RTOR Reduction (vph)	0	26	0	0	74	0	0	1	0	0	8	0
Lane Group Flow (vph)	250	40	0	0	159	0	0	1241	0	0	611	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	7%	7%	7%
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		8			4		1	6			2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	15.2	15.2			15.2			25.5			25.5	
Effective Green, g (s)	15.2	15.2			15.2			25.5			25.5	
Actuated g/C Ratio	0.29	0.29			0.29			0.49			0.49	
Clearance Time (s)	5.5	5.5			5.5			6.0			6.0	
Vehicle Extension (s)	2.0	2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)	340	503			499			1522			1178	
v/s Ratio Prot		0.02										
v/s Ratio Perm	c0.21				0.09			c0.40			0.25	
v/c Ratio	0.74	0.08			0.32			0.82			0.52	
Uniform Delay, d1	16.7	13.4			14.5			11.4			9.1	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	6.9	0.0			0.1			3.3			0.2	
Delay (s)	23.6	13.5			14.6			14.7			9.3	
Level of Service	C	B			B			B			A	
Approach Delay (s)		21.5			14.6			14.7			9.3	
Approach LOS		C			B			B			A	

Intersection Summary					
HCM Average Control Delay	14.2	HCM Level of Service	B		
HCM Volume to Capacity ratio	0.79				
Actuated Cycle Length (s)	52.2	Sum of lost time (s)	11.5		
Intersection Capacity Utilization	91.6%	ICU Level of Service	F		
Analysis Period (min)	15				
c Critical Lane Group					

Lanes, Volumes, Timings
36: Elm Street & Route 138

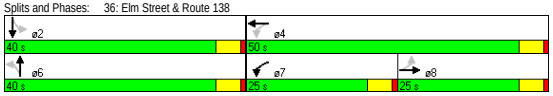
2008 Existing Condition- AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	20	25	205	5	55	5	1050	190	35	310	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	160		0	0		0	0		205
Storage Lanes	0		0	1		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		820			1216			1195			808	
Travel Time (s)		18.6			27.6			27.2			18.4	
Confl. Peds. (#/hr)			1	1								
Peak Hour Factor	0.83	0.83	0.83	0.69	0.69	0.69	0.94	0.94	0.94	0.82	0.82	0.82
Heavy Vehicles (%)	2%	2%	2%	7%	7%	7%	3%	3%	3%	13%	13%	13%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	96	0	297	87	0	0	1324	0	0	451	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		8		7	4			6			2	
Permitted Phases	8			4			6			2		
Detector Phase	8	8		7	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		15.0	15.0		15.0	15.0	
Total Split (s)	25.0	25.0	0.0	25.0	50.0	0.0	40.0	40.0	0.0	40.0	40.0	0.0
Total Split (%)	27.8%	27.8%	0.0%	27.8%	55.6%	0.0%	44.4%	44.4%	0.0%	44.4%	44.4%	0.0%
Maximum Green (s)	20.0	20.0		20.0	45.0		35.0	35.0		35.0	35.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
v/c Ratio		0.47		0.55	0.15			0.85			0.43	
Control Delay		39.9		20.1	14.1			26.8			16.8	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		39.9		20.1	14.1			26.8			16.8	
Queue Length 50th (ft)		45		98	25			306			77	
Queue Length 95th (ft)		84		113	38			#511			118	
Internal Link Dist (ft)		740			1136			1115			728	
Turn Bay Length (ft)				160								
Base Capacity (vph)		411		613	942			1564			1061	
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		0.23		0.48	0.09			0.85			0.43	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 74.8
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 36: Elm Street & Route 138



HCM Signalized Intersection Capacity Analysis
36: Elm Street & Route 138

2008 Existing Condition- AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	20	25	205	5	55	5	1050	190	35	310	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.96		1.00	0.86			0.98			0.99	
Flt Protected		0.98		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1796		1686	1531			3424			3148	
Flt Permitted		0.82		0.58	1.00			0.95			0.70	
Satd. Flow (perm)		1501		1034	1531			3266			2217	
Peak-hour factor, PHF	0.83	0.83	0.83	0.69	0.69	0.69	0.94	0.94	0.94	0.82	0.82	0.82
Adj. Flow (vph)	42	24	30	297	7	80	5	1117	202	43	378	30
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	96	0	297	87	0	0	1324	0	0	451	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	2%	2%	2%	7%	7%	7%	3%	3%	3%	13%	13%	13%
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		8		7	4			6			2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)		8.3		30.0	30.0			35.8			35.8	
Effective Green, g (s)		8.3		30.0	30.0			35.8			35.8	
Actuated g/C Ratio		0.11		0.40	0.40			0.47			0.47	
Clearance Time (s)		5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0			4.0			4.0	
Lane Grp Cap (vph)		164		553	606			1543			1047	
v/s Ratio Prot				c0.12	0.06							
v/s Ratio Perm		0.06		c0.09				c0.41			0.20	
v/c Ratio		0.59		0.54	0.14			0.86			0.43	
Uniform Delay, d1		32.1		17.2	14.7			17.7			13.2	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		5.2		1.0	0.1			5.2			0.4	
Delay (s)		37.4		18.2	14.8			22.9			13.6	
Level of Service		D		B	B			C			B	
Approach Delay (s)		37.4			17.4			22.9			13.6	
Approach LOS		D			B			C			B	

Intersection Summary

HCM Average Control Delay	20.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	75.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		

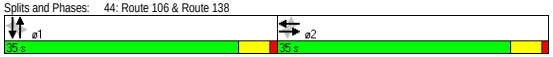
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	340	25	165	330	155	55	705	350	80	160	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1742			2236			4568			923	
Travel Time (s)		39.6			50.8			103.8			21.0	
Confl. Peds. (#/hr)			3									
Peak Hour Factor	0.88	0.88	0.88	0.89	0.89	0.89	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	3%	3%	3%	9%	9%	9%	3%	3%	3%	10%	10%	10%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	511	0	0	730	0	0	1206	0	0	371	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Detector Phase	2	2		2	2		1	1		1	1	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0		13.0	13.0	
Total Split (s)	35.0	35.0	0.0	35.0	35.0	0.0	35.0	35.0	0.0	35.0	35.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lead		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
v/c Ratio		0.53			0.78			0.85			0.44	
Control Delay		16.7			21.8			23.1			11.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		16.7			21.8			23.1			11.1	
Queue Length 50th (ft)		79			119			215			37	
Queue Length 95th (ft)		117			182			#350			72	
Internal Link Dist (ft)		1662			2156			4488			843	
Turn Bay Length (ft)												
Base Capacity (vph)		1101			1061			1485			891	
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		0.46			0.69			0.81			0.42	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 65.6
Natural Cycle: 50
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 44: Route 106 & Route 138



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	340	25	165	330	155	55	705	350	80	160	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.96			0.95			0.95	
Flt Protected		0.99			0.99			1.00			0.99	
Satd. Flow (prot)		3439			3154			3331			3096	
Flt Permitted		0.68			0.69			0.91			0.57	
Satd. Flow (perm)		2362			2200			3045			1793	
Peak-hour factor, PHF	0.88	0.88	0.88	0.89	0.89	0.89	0.92	0.92	0.92	0.93	0.93	0.93
Adj. Flow (vph)	97	386	28	185	371	174	60	766	380	86	172	113
RTOR Reduction (vph)	0	6	0	0	44	0	0	75	0	0	63	0
Lane Group Flow (vph)	0	505	0	0	686	0	0	1131	0	0	308	0
Confl. Peds. (#/hr)			3									
Heavy Vehicles (%)	3%	3%	3%	9%	9%	9%	3%	3%	3%	10%	10%	10%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		26.7			26.7			28.8			28.8	
Effective Green, g (s)		26.7			26.7			28.8			28.8	
Actuated g/C Ratio		0.41			0.41			0.44			0.44	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		963			897			1339			788	
v/s Ratio Prot												
v/s Ratio Perm		0.21			c0.31			c0.37			0.17	
v/c Ratio		0.52			0.76			0.84			0.39	
Uniform Delay, d1		14.6			16.7			16.4			12.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.7			4.2			5.3			0.4	
Delay (s)		15.3			20.9			21.6			12.9	
Level of Service		B			C			C			B	
Approach Delay (s)		15.3			20.9			21.6			12.9	
Approach LOS		B			C			C			B	

Intersection Summary					
HCM Average Control Delay		19.1	HCM Level of Service		B
HCM Volume to Capacity ratio		0.81			
Actuated Cycle Length (s)		65.5	Sum of lost time (s)		10.0
Intersection Capacity Utilization		90.7%	ICU Level of Service		E
Analysis Period (min)		15			
c Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis
10: Dog Track driveway & Route 138

2008 Existing Condition - PM Peak Hour

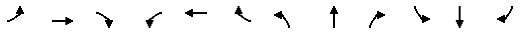
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	5	60	30	555	1000	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.68	0.68	0.90	0.90	0.91	0.91
Hourly flow rate (vph)	7	88	33	617	1099	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1782	1099	1099			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1782	1099	1099			
tC, single (s)	6.7	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.8	3.3	2.3			
p0 queue free %	90	66	95			
cM capacity (veh/h)	71	261	620			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	96	650	1099
Volume Left	7	33	0
Volume Right	88	0	0
cSH	216	620	1700
Volume to Capacity	0.44	0.05	0.65
Queue Length 95th (ft)	52	4	0
Control Delay (s)	34.2	1.5	0.0
Lane LOS	D	A	
Approach Delay (s)	34.2	1.5	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
14: I-495 SB Off-Ramp & Route 138

2008 Existing Condition - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	205	0	440	0	0	0	0	740	125	95	1125	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.25	0.25	0.25	0.25	0.95	0.95	0.98	0.98	0.25
Hourly flow rate (vph)	253	0	543	0	0	0	0	779	132	97	1148	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1731	2121	574	1613	2187	455	1148			779		
vC1, stage 1 conf vol	1342	1342		845	845							
vC2, stage 2 conf vol	389	779		768	1342							
vCu, unblocked vol	1731	2121	574	1613	2187	455	1148			779		
tC, single (s)	7.6	6.6	7.0	7.5	6.5	6.9	4.1			4.1		
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 %	0	100	0	0	100	100	100			88		
cM capacity (veh/h)	133	161	457	0	173	558	616			834		

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	796	519	391	97	574	574
Volume Left	253	0	0	97	0	0
Volume Right	543	0	132	0	0	0
cSH	258	1700	1700	834	1700	1700
Volume to Capacity	3.09	0.31	0.23	0.12	0.34	0.34
Queue Length 95th (ft)	Err	0	0	10	0	0
Control Delay (s)	Err	0.0	0.0	9.9	0.0	0.0
Lane LOS	F			A		
Approach Delay (s)	Err	0.0		0.8		
Approach LOS	F					

Intersection Summary			
Average Delay	2697.8		
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
15: I-495 NB On-Ramp & Route 138

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	125	0	75	100	825	0	0	1095	230
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.78	0.78	0.78	0.92	0.92	0.25	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	0	160	0	96	109	897	0	0	1141	240
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			None	
Median storage veh)								2				
Upstream signal (ft)											1195	
pX, platoon unblocked	0.80	0.80	0.80	0.80	0.80		0.80					
vC, conflicting volume	1926	2375	690	1684	2255	448	1141			897		
vC1, stage 1 conf vol	1260	1260		1114	1114							
vC2, stage 2 conf vol	666	1114		570	1141							
vCu, unblocked vol	1655	2217	107	1353	2067	448	672			897		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.2			4.1		
tC, 2 stage (s)	6.5	5.5		6.6	5.6							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	11	100	83	85			100		
cM capacity (veh/h)	196	186	745	180	170	555	720			753		

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	256	109	448	448	760	620
Volume Left	160	109	0	0	0	0
Volume Right	96	0	0	0	0	240
cSH	241	720	1700	1700	1700	1700
Volume to Capacity	1.07	0.15	0.26	0.26	0.45	0.36
Queue Length 95th (ft)	271	13	0	0	0	0
Control Delay (s)	120.6	10.9	0.0	0.0	0.0	0.0
Lane LOS	F	B				
Approach Delay (s)	120.6	1.2			0.0	
Approach LOS	F					

Intersection Summary				
Average Delay	12.1			
Intersection Capacity Utilization	78.1%	ICU Level of Service	D	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
23: Center Street & Route 138

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	5	25	0	100	0	670	35	290	1125	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.38	0.38	0.38	0.82	0.82	0.82	0.90	0.90	0.90	0.98	0.98	0.98
Hourly flow rate (vph)	0	0	13	30	0	122	0	744	39	296	1148	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2626	2523	1148	2517	2504	764	1148			783		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2626	2523	1148	2517	2504	764	1148			783		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.2			2.2		
p0 queue free %	100	100	95	0	100	69	100			65		
cM capacity (veh/h)	8	18	244	13	18	396	605			835		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	13	152	783	1444
Volume Left	0	30	0	296
Volume Right	13	122	39	0
cSH	244	56	1700	835
Volume to Capacity	0.05	2.74	0.46	0.35
Queue Length 95th (ft)	4	394	0	40
Control Delay (s)	20.6	945.9	0.0	11.7
Lane LOS	C	F		B
Approach Delay (s)	20.6	945.9	0.0	11.7
Approach LOS	C	F		

Intersection Summary				
Average Delay	67.4			
Intersection Capacity Utilization	Err%	ICU Level of Service	H	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
24: Britton Street & Route 138

2008 Existing Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	30	20	695	25	25	1140
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.75	0.75	0.85	0.85	0.97	0.97
Hourly flow rate (vph)	40	27	818	29	26	1175
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2059	832			847	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2059	832			847	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	32	93			97	
cM capacity (veh/h)	58	369			790	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	67	847	1201
Volume Left	40	0	26
Volume Right	27	29	0
cSH	88	1700	790
Volume to Capacity	0.76	0.50	0.03
Queue Length 95th (ft)	96	0	3
Control Delay (s)	121.1	0.0	1.2
Lane LOS	F		A
Approach Delay (s)	121.1	0.0	1.2
Approach LOS	F		

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	90.1%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
27: Britton Street & Route 138

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	15	5	5	680	1100	35
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.88	0.88	0.96	0.96
Hourly flow rate (vph)	18	6	6	773	1146	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1948	1164	1182			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1948	1164	1182			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	74	97	99			
cM capacity (veh/h)	71	239	587			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	778	1182
Volume Left	18	6	0
Volume Right	6	0	36
cSH	86	587	1700
Volume to Capacity	0.28	0.01	0.70
Queue Length 95th (ft)	26	1	0
Control Delay (s)	62.4	0.3	0.0
Lane LOS	F	A	
Approach Delay (s)	62.4	0.3	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
50: Wilbur Street & Route 138

2008 Existing Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	5	565	10	10	1040
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.39	0.39	0.97	0.97	0.96	0.96
Hourly flow rate (vph)	13	13	582	10	10	1083
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1692	588			593	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1692	588			593	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	87	98			99	
cM capacity (veh/h)	102	513			983	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	26	593	1094
Volume Left	13	0	10
Volume Right	13	10	0
cSH	171	1700	983
Volume to Capacity	0.15	0.35	0.01
Queue Length 95th (ft)	13	0	1
Control Delay (s)	29.8	0.0	0.3
Lane LOS	D		A
Approach Delay (s)	29.8	0.0	0.3
Approach LOS	D		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
52: Robinson Street & Route 138

2008 Existing Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	15	570	0	10	1050
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.63	0.90	0.90	0.91	0.91
Hourly flow rate (vph)	0	24	633	0	11	1154
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1809	633			633	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1809	633			633	
tC, single (s)	6.4	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	100	95			99	
cM capacity (veh/h)	87	469			959	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	24	633	1165
Volume Left	0	0	11
Volume Right	24	0	0
cSH	469	1700	959
Volume to Capacity	0.05	0.37	0.01
Queue Length 95th (ft)	4	0	1
Control Delay (s)	13.1	0.0	0.4
Lane LOS	B		A
Approach Delay (s)	13.1	0.0	0.4
Approach LOS	B		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
66: Cohannet Street & Taunton Green

2008 Existing Condition - AM Peak Hour

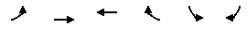
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL	NER
Lane Configurations											
Volume (veh/h)	0	130	10	0	0	0	565	220	85	0	415
Sign Control		Stop			Stop		Free			Free	
Grade		0%			0%		0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93	0.83	0.83
Hourly flow rate (vph)	0	140	11	0	0	0	608	237	91	0	500
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type							Raised			None	
Median storage veh)							1				
Upstream signal (ft)											
pX, platoon unblocked											
vC, conflicting volume	1747	1997	282	1532	1543	0	500				
vC1, stage 1 conf vol	1497	1497		0	0						
vC2, stage 2 conf vol	250	500		1532	1543						
vCu, unblocked vol	1747	1997	282	1532	1543	0	500				
tC, single (s)	7.1	6.6	6.2	7.1	6.5	6.2	4.2				
tC, 2 stage (s)	6.1	5.6		6.1	5.5						
tF (s)	3.5	4.1	3.3	3.5	4.0	3.3	2.3				
p0 queue free %	100	0	99	0	100	100	42				
cM capacity (veh/h)	54	24	761	0	67	1091	1044				

Direction, Lane #	EB 1	EB 2	SB 1	SB 2	SB 3	NE 1
Volume Total	140	11	304	304	328	500
Volume Left	0	0	304	304	0	0
Volume Right	0	11	0	0	91	500
cSH	24	761	1044	1044	1700	1700
Volume to Capacity	5.81	0.01	0.58	0.58	0.19	0.29
Queue Length 95th (ft)	Err	1	97	97	0	0
Control Delay (s)	Err	9.8	13.1	13.1	0.0	0.0
Lane LOS	F	A	B	B		
Approach Delay (s)	9285.5		8.5			0.0
Approach LOS	F					

Intersection Summary				
Average Delay	886.4			
Intersection Capacity Utilization	39.2%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
67: Taunton Green & Broadway

2008 Existing Condition - AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	0	670	695	0	380
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.91	0.91	0.96	0.96
Hourly flow rate (vph)	0	0	736	764	0	396
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			302			
pX, platoon unblocked						
vC, conflicting volume	1500				736	368
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1500				736	368
tC, single (s)	4.1				6.8	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.4
p0 queue free %	100				100	36
cM capacity (veh/h)	453				358	620

Direction, Lane #	WB 1	WB 2	WB 3	SB 1
Volume Total	368	368	764	396
Volume Left	0	0	0	0
Volume Right	0	0	764	396
cSH	1700	1700	1700	620
Volume to Capacity	0.22	0.22	0.45	0.64
Queue Length 95th (ft)	0	0	0	114
Control Delay (s)	0.0	0.0	0.0	20.5
Lane LOS				C
Approach Delay (s)	0.0			20.5
Approach LOS				C

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	48.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
70: Post Office Square & Court Street

2008 Existing Condition - AM Peak Hour

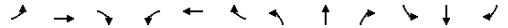
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	10	600	55	380	0	0	0	0	265	0
Sign Control		Free			Free			Yield			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.46	0.46	0.46	0.94	0.94	0.94	0.92	0.92	0.92	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	22	638	59	404	0	0	0	0	298	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					565							
pX, platoon unblocked												
vC, conflicting volume	59			22			1484	1335	0	1346	1357	59
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	59			22			1484	1335	0	1346	1357	59
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.1	3.3
p0 queue free %	100			59			0	100	100	100	0	100
cM capacity (veh/h)	1558			1562			0	92	1091	88	86	1013

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1
Volume Total	22	426	271	404	298
Volume Left	0	426	213	0	0
Volume Right	22	0	0	404	0
cSH	1700	1562	1562	1700	86
Volume to Capacity	0.01	0.41	0.41	0.24	3.44
Queue Length 95th (ft)	0	51	51	0	Err
Control Delay (s)	0.0	8.9	7.8	0.0	Err
Lane LOS		A	A		F
Approach Delay (s)	0.0	5.4			Err
Approach LOS					F

Intersection Summary					
Average Delay	2100.0				
Intersection Capacity Utilization	45.3%	ICU Level of Service	A		
Analysis Period (min)	15				

HCM Unsignalized Intersection Capacity Analysis
75: Driveway & Washington Street

2008 Existing Condition - AM Peak Hour



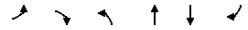
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	0	0	90	0	130	0	700	150	100	625	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.42	0.42	0.42	0.87	0.87	0.87	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	12	0	0	103	0	149	0	795	170	114	710	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								574			260	
pX, platoon unblocked	0.91	0.91	0.89	0.91	0.91	0.96	0.89			0.96		
vC, conflicting volume	1487	1906	713	1818	1824	483	716			966		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1331	1793	614	1696	1702	385	617			887		
tC, single (s)	7.5	6.5	6.9	7.7	6.5	7.0	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	82	100	100	0	100	75	100			84		
cM capacity (veh/h)	68	62	391	44	71	588	864			713		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	12	103	149	398	568	114	716
Volume Left	12	103	0	0	0	114	0
Volume Right	0	0	149	0	170	0	6
cSH	68	44	588	864	1700	713	1700
Volume to Capacity	0.18	2.33	0.25	0.00	0.33	0.16	0.42
Queue Length 95th (ft)	15	273	25	0	0	14	0
Control Delay (s)	68.8	801.8	13.2	0.0	0.0	11.0	0.0
Lane LOS	F	F	B			B	
Approach Delay (s)	68.8	335.8		0.0		1.5	
Approach LOS	F	F					

Intersection Summary					
Average Delay	42.2				
Intersection Capacity Utilization	72.0%	ICU Level of Service	C		
Analysis Period (min)	15				

HCM Unsignalized Intersection Capacity Analysis
78: Kilmer Street & Oak Street

2008 Existing Condition - AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	95	10	20	330	165	95
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.79	0.79
Hourly flow rate (vph)	119	12	25	412	209	120
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	731	269	329			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	731	269	329			
tC, single (s)	6.4	6.4	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.5	2.3			
p0 queue free %	69	98	98			
cM capacity (veh/h)	379	728	1197			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	131	438	329
Volume Left	119	25	0
Volume Right	12	0	120
cSH	397	1197	1700
Volume to Capacity	0.33	0.02	0.19
Queue Length 95th (ft)	35	2	0
Control Delay (s)	18.5	0.7	0.0
Lane LOS	C	A	
Approach Delay (s)	18.5	0.7	0.0
Approach LOS	C		

Intersection Summary				
Average Delay	3.0			
Intersection Capacity Utilization	46.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
87: Purchase Street & School Street

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	35	220	10	15	120	5	25	65	20	10	65	55
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.69	0.69	0.69	0.90	0.90	0.90
Hourly flow rate (vph)	41	259	12	17	136	6	36	94	29	11	72	61
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	142			271			618	523	265	596	526	139
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	142			271			618	523	265	596	526	139
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			99			89	78	96	97	83	93
cM capacity (veh/h)	1417			1305			319	438	767	325	436	914

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	312	159	159	144
Volume Left	41	17	36	11
Volume Right	12	6	29	61
cSH	1417	1305	435	542
Volume to Capacity	0.03	0.01	0.37	0.27
Queue Length 95th (ft)	2	1	41	27
Control Delay (s)	1.2	0.9	18.0	14.0
Lane LOS	A	A	C	B
Approach Delay (s)	1.2	0.9	18.0	14.0
Approach LOS			C	B

Intersection Summary				
Average Delay	7.0			
Intersection Capacity Utilization	39.0%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
88: Purchase Street & Washington Street

2008 Existing Condition - AM Peak Hour

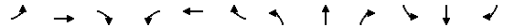
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	100	5	20	125	35	5	60	40	100	45	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.68	0.68	0.68	0.68	0.68	0.68	0.70	0.70	0.70
Hourly flow rate (vph)	0	145	7	29	184	51	7	88	59	143	64	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	235			152			463	443	149	520	421	210
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	235			152			463	443	149	520	421	210
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			98			98	82	93	62	88	98
cM capacity (veh/h)	1344			1441			446	499	903	374	516	836

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	152	265	154	221
Volume Left	0	29	7	143
Volume Right	7	51	59	14
cSH	1344	1441	597	423
Volume to Capacity	0.00	0.02	0.26	0.52
Queue Length 95th (ft)	0	2	26	74
Control Delay (s)	0.0	1.0	13.1	22.5
Lane LOS		A	B	C
Approach Delay (s)	0.0	1.0	13.1	22.5
Approach LOS			B	C

Intersection Summary					
Average Delay	9.2				
Intersection Capacity Utilization	38.3%	ICU Level of Service	A		
Analysis Period (min)	15				

HCM Unsignalized Intersection Capacity Analysis
89: Winter Street & School Street

2008 Existing Condition - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	210	10	70	355	20	25	35	60	20	40	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.63	0.63	0.63	0.84	0.84	0.84	0.56	0.56	0.56
Hourly flow rate (vph)	11	226	11	111	563	32	30	42	71	36	71	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	595			237			1108	1070	231	1147	1060	579
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	595			237			1108	1070	231	1147	1060	579
tC, single (s)	4.2			4.1			7.1	6.6	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.1	3.3	3.6	4.0	3.3
p0 queue free %	99			92			76	79	91	70	65	97
cM capacity (veh/h)	952			1336			122	197	801	118	205	518

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	247	706	143	125
Volume Left	11	111	30	36
Volume Right	11	32	71	18
cSH	952	1336	262	183
Volume to Capacity	0.01	0.08	0.54	0.68
Queue Length 95th (ft)	1	7	75	103
Control Delay (s)	0.5	2.1	34.0	59.1
Lane LOS	A	A	D	F
Approach Delay (s)	0.5	2.1	34.0	59.1
Approach LOS			D	F

Intersection Summary					
Average Delay	11.3				
Intersection Capacity Utilization	54.3%	ICU Level of Service	A		
Analysis Period (min)	15				

Lanes, Volumes, Timings
10: Route 140 On/Off Ramps & Stevens St

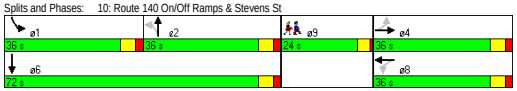
2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	40	80	5	30	40	45	5	165	305	180	175	35	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	14	13	16	12	12	16	12	12	16	12	12	12	
Storage Length (ft)	0		0	0		0	0		0	200		0	
Storage Lanes	0		0	0		0	0		0	1		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		819			376			787			471		
Travel Time (s)		18.6			8.5			17.9			10.7		
Peak Hour Factor	0.76	0.76	0.76	0.84	0.84	0.84	0.89	0.89	0.89	0.80	0.80	0.80	
Heavy Vehicles (%)	0%	0%	0%	10%	0%	2%	0%	8%	0%	1%	1%	3%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	165	0	0	138	0	0	534	0	225	263	0	
Turn Type	Perm			Perm			Perm			Prot			
Protected Phases		4			8			2		1	6		9
Permitted Phases	4			8			2						
Detector Phase	4	4		8	8		2	2		1	6		
Switch Phase													
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0		4.0
Minimum Split (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0		24.0
Total Split (s)	36.0	36.0	0.0	36.0	36.0	0.0	36.0	36.0	0.0	36.0	72.0	0.0	24.0
Total Split (%)	27.3%	27.3%	0.0%	27.3%	27.3%	0.0%	27.3%	27.3%	0.0%	27.3%	54.5%	0.0%	18%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	66.0		20.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		3.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	
Lead/Lag							Lag	Lag		Lead			
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None		None	None		None	None		None	None		None
Walk Time (s)													7.0
Flash Dont Walk (s)													13.0
Pedestrian Calls (#/hr)													0
v/c Ratio		0.31			0.26			0.62		0.35	0.27		
Control Delay		17.4			12.2			9.9		17.3	6.0		
Queue Delay		0.0			0.0			0.0		0.0	0.0		
Total Delay		17.4			12.2			9.9		17.3	6.0		
Queue Length 50th (ft)		17			8			22		23	27		
Queue Length 95th (ft)		35			27			60		46	52		
Internal Link Dist (ft)		739			296			707			391		
Turn Bay Length (ft)										200			
Base Capacity (vph)		2328			2102			2369		2641	1828		
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		0.07			0.07			0.23		0.09	0.14		

Intersection Summary

Area Type: Other
Cycle Length: 132
Actuated Cycle Length: 41.8
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 10: Route 140 On/Off Ramps & Stevens St



HCM Signalized Intersection Capacity Analysis
10: Route 140 On/Off Ramps & Stevens St

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	80	5	30	40	45	5	165	305	180	175	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	13	16	12	12	16	12	12	16	12	12	12
Total Lost time (s)		6.0			6.0			6.0		6.0	6.0	
Lane Util. Factor		0.95			0.95			0.95		0.97	1.00	
Frt		0.99			0.94			0.90		1.00	0.97	
Flt Protected		0.98			0.99			1.00		0.95	1.00	
Satd. Flow (prot)		3648			3244			3172		3467	1828	
Flt Permitted		0.82			0.84			0.95		0.95	1.00	
Satd. Flow (perm)		3053			2745			3009		3467	1828	
Peak-hour factor, PHF	0.76	0.76	0.76	0.84	0.84	0.84	0.89	0.89	0.89	0.80	0.80	0.80
Adj. Flow (vph)	53	105	7	36	48	54	6	185	343	225	219	44
RTOR Reduction (vph)	0	2	0	0	44	0	0	254	0	0	5	0
Lane Group Flow (vph)	0	163	0	0	94	0	0	280	0	225	258	0
Heavy Vehicles (%)	0%	0%	0%	10%	0%	2%	0%	8%	0%	1%	1%	3%
Turn Type	Perm			Perm			Perm			Prot		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		7.4			7.4			8.5		7.7	22.2	
Effective Green, g (s)		7.4			7.4			8.5		7.7	22.2	
Actuated g/C Ratio		0.18			0.18			0.20		0.19	0.53	
Clearance Time (s)		6.0			6.0			6.0		6.0	6.0	
Vehicle Extension (s)		2.0			2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		543			488			615		642	976	
v/s Ratio Prot										0.06	c0.14	
v/s Ratio Perm		c0.05			0.03			c0.09				
v/c Ratio		0.30			0.19			0.46		0.35	0.26	
Uniform Delay, d1		14.8			14.6			14.5		14.8	5.3	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.1			0.1			0.2		0.1	0.1	
Delay (s)		15.0			14.6			14.7		14.9	5.3	
Level of Service		B			B			B		B	A	
Approach Delay (s)		15.0			14.6			14.7			9.7	
Approach LOS		B			B			B			A	

Intersection Summary

HCM Average Control Delay	12.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	41.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

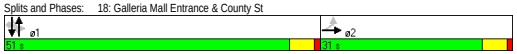
Lanes, Volumes, Timings
18: Galleria Mall Entrance & County St

2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	150	45	0	0	0	25	60	0	135	135	435
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	14	12	12	12	12	12	16	12	12	16
Storage Length (ft)	0		0	0		0	200		0	0		0
Storage Lanes	0		0	0		0	1		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		396			269			674			311	
Travel Time (s)		9.0			6.1			15.3			7.1	
Peak Hour Factor	0.94	0.94	0.94	0.79	0.79	0.79	0.76	0.76	0.76	0.90	0.90	0.90
Heavy Vehicles (%)	1%	4%	0%	0%	0%	11%	0%	0%	0%	3%	1%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	527	0	0	0	0	0	112	0	0	300	483
Turn Type	Perm						Perm			Perm		Perm
Protected Phases		2						1			1	
Permitted Phases	2						1			1		1
Detector Phase	2	2					1	1		1	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0					8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	13.0	13.0					13.0	13.0		13.0	13.0	13.0
Total Split (s)	31.0	31.0	0.0	0.0	0.0	0.0	51.0	51.0	0.0	51.0	51.0	51.0
Total Split (%)	37.8%	37.8%	0.0%	0.0%	0.0%	0.0%	62.2%	62.2%	0.0%	62.2%	62.2%	62.2%
Maximum Green (s)	26.0	26.0					46.0	46.0		46.0	46.0	46.0
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag					Lead	Lead		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes					Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0					2.0	2.0		2.0	2.0	2.0
Recall Mode	None	None					Min	Min		Min	Min	Min
v/c Ratio		0.45						0.11			0.33	0.53
Control Delay		9.3						6.9			8.2	3.3
Queue Delay		0.0						0.0			0.0	0.0
Total Delay		9.3						6.9			8.2	3.3
Queue Length 50th (ft)		27						5			14	0
Queue Length 95th (ft)		60						12			33	31
Internal Link Dist (ft)		316			189			594			231	
Turn Bay Length (ft)												
Base Capacity (vph)		3474						2942			2764	1794
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		0.15						0.04			0.11	0.27

Intersection Summary	
Area Type:	Other
Cycle Length: 82	
Actuated Cycle Length: 28.2	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 18: Galleria Mall Entrance & County St



HCM Signalized Intersection Capacity Analysis
18: Galleria Mall Entrance & County St

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	150	45	0	0	0	25	60	0	135	135	435
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	14	12	12	12	12	12	16	12	12	16
Total Lost time (s)		5.0						5.0			5.0	5.0
Lane Util. Factor		0.95						0.95			0.95	1.00
Frt		0.99						1.00			1.00	0.85
Flt Protected		0.97						0.99			0.98	1.00
Satd. Flow (prot)		3734						3558			3453	1794
Flt Permitted		0.97						0.82			0.78	1.00
Satd. Flow (perm)		3734						2943			2763	1794
Peak-hour factor, PHF	0.94	0.94	0.94	0.79	0.79	0.79	0.76	0.76	0.76	0.90	0.90	0.90
Adj. Flow (vph)	319	160	48	0	0	0	33	79	0	150	150	483
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	0	321
Lane Group Flow (vph)	0	518	0	0	0	0	0	112	0	0	300	162
Heavy Vehicles (%)	1%	4%	0%	0%	0%	11%	0%	0%	0%	3%	1%	2%
Turn Type	Perm						Perm			Perm		Perm
Protected Phases		2						1			1	
Permitted Phases	2						1			1		1
Actuated Green, G (s)		8.7						9.4			9.4	9.4
Effective Green, g (s)		8.7						9.4			9.4	9.4
Actuated g/C Ratio		0.31						0.33			0.33	0.33
Clearance Time (s)		5.0						5.0			5.0	5.0
Vehicle Extension (s)		2.0						2.0			2.0	2.0
Lane Grp Cap (vph)		1156						984			924	600
v/s Ratio Prot												
v/s Ratio Perm		0.14						0.04			c0.11	0.09
v/c Ratio		0.45						0.11			0.32	0.27
Uniform Delay, d1		7.8						6.5			7.0	6.8
Progression Factor		1.00						1.00			1.00	1.00
Incremental Delay, d2		0.1						0.0			0.1	0.1
Delay (s)		7.9						6.5			7.1	6.9
Level of Service		A						A			A	A
Approach Delay (s)		7.9			0.0			6.5			7.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	28.1	Sum of lost time (s)	10.0
Intersection Capacity Utilization	43.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
22: Route 24 On/Off Ramps & Route 140 (Exit 12B)

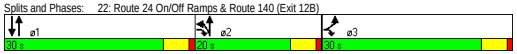
2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	240	1340	205	790	1000	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	12	12	12	12	12
Storage Length (ft)	0	50	250			100
Storage Lanes	1	1	1			1
Taper Length (ft)	25	25	25			25
Right Turn on Red		No				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	729			870	522	
Travel Time (s)	16.6			19.8	11.9	
Peak Hour Factor	0.96	0.96	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	0%	3%	2%	2%
Shared Lane Traffic (%)		42%				
Lane Group Flow (vph)	836	810	223	859	1435	0
Turn Type		pt+ov	Prot			
Protected Phases	3	2 3	2	1 2	1	
Permitted Phases						
Detector Phase	3	2 3	2	1 2	1	
Switch Phase						
Minimum Initial (s)	10.0		8.0		10.0	
Minimum Split (s)	15.0		13.0		15.0	
Total Split (s)	30.0	50.0	20.0	50.0	30.0	0.0
Total Split (%)	37.5%	62.5%	25.0%	62.5%	37.5%	0.0%
Maximum Green (s)	25.0		15.0		25.0	
Yellow Time (s)	4.0		4.0		4.0	
All-Red Time (s)	1.0		1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	4.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	4.0		3.0		4.0	
Recall Mode	None		None		Min	
v/c Ratio	1.50	0.98	0.66	0.44	1.30	
Control Delay	260.3	45.3	40.8	11.0	167.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	260.3	45.3	40.8	11.0	167.2	
Queue Length 50th (ft)	~589	381	104	120	~484	
Queue Length 95th (ft)	#804	#664	#190	162	#616	
Internal Link Dist (ft)	649			790	442	
Turn Bay Length (ft)		50	250			
Base Capacity (vph)	557	830	338	1972	1105	
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	1.50	0.98	0.66	0.44	1.30	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	

~ 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.

Splits and Phases: 22: Route 24 On/Off Ramps & Route 140 (Exit 12B)



HCM Signalized Intersection Capacity Analysis
22: Route 24 On/Off Ramps & Route 140 (Exit 12B)

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	240	1340	205	790	1000	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	15	12	12	12	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	
Frt	0.89	0.85	1.00	1.00	0.96	
Flt Protected	0.99	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1782	1475	1805	3505	3410	
Flt Permitted	0.99	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1782	1475	1805	3505	3410	
Peak-hour factor, PHF	0.96	0.96	0.92	0.92	0.92	0.92
Adj. Flow (vph)	250	1396	223	859	1087	348
RTOR Reduction (vph)	0	0	0	0	39	0
Lane Group Flow (vph)	836	810	223	859	1397	0
Heavy Vehicles (%)	2%	4%	0%	3%	2%	2%
Turn Type		pt+ov	Prot			
Protected Phases	3	2 3	2	1 2	1	
Permitted Phases						
Actuated Green, G (s)	25.0	45.0	15.0	45.0	25.0	
Effective Green, g (s)	25.0	45.0	15.0	45.0	25.0	
Actuated g/C Ratio	0.31	0.56	0.19	0.56	0.31	
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	4.0		3.0		4.0	
Lane Grp Cap (vph)	557	830	338	1972	1066	
v/s Ratio Prot	c0.47	c0.55	0.12	0.25	c0.41	
v/s Ratio Perm						
v/c Ratio	1.50	0.98	0.66	0.44	1.31	
Uniform Delay, d1	27.5	17.0	30.1	10.1	27.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	234.7	25.2	4.6	0.2	146.3	
Delay (s)	262.2	42.1	34.7	10.4	173.8	
Level of Service	F	D	C	B	F	
Approach Delay (s)	153.9			15.4	173.8	
Approach LOS	F			B	F	

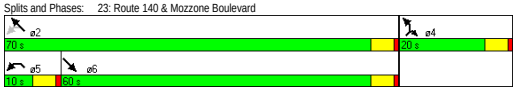
Intersection Summary			
HCM Average Control Delay	124.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	102.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (vph)	1110	180	215	815	165	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		150	0		0	0
Storage Lanes		0	0		1	1
Taper Length (ft)		25	25		25	25
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	1786			342	1096	
Travel Time (s)	40.6			7.8	24.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1403	0	0	1120	179	228
Turn Type			pm+pt			Prot
Protected Phases	6		5	2	4	4
Permitted Phases			2			
Detector Phase	6		5	2	4	4
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	15.0		10.0	10.0	15.0	15.0
Total Split (s)	60.0	0.0	10.0	70.0	20.0	20.0
Total Split (%)	66.7%	0.0%	11.1%	77.8%	22.2%	22.2%
Maximum Green (s)	55.0		5.0	65.0	15.0	15.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	4.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	Min		None	Min	None	None
v/c Ratio	0.58			1.18dl	0.62	0.58
Control Delay	6.6			19.4	42.2	17.6
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	6.6			19.4	42.2	17.6
Queue Length 50th (ft)	145			185	84	29
Queue Length 95th (ft)	204			#337	164	104
Internal Link Dist (ft)	1706			262	1016	
Turn Bay Length (ft)						
Base Capacity (vph)	2812			1551	378	466
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	0.50			0.72	0.47	0.49

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 74.3
Natural Cycle: 60
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.

Splits and Phases: 23: Route 140 & Mozzone Boulevard



Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (vph)	1110	180	215	815	165	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	0.98			1.00	1.00	0.85
Flt Protected	1.00			0.99	0.95	1.00
Satd. Flow (prot)	3465			3503	1770	1583
Flt Permitted	1.00			0.51	0.95	1.00
Satd. Flow (perm)	3465			1822	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1207	196	234	886	179	228
RTOR Reduction (vph)	11	0	0	0	0	136
Lane Group Flow (vph)	1392	0	0	1120	179	92
Turn Type			pm+pt			Prot
Protected Phases	6		5	2	4	4
Permitted Phases			2			
Actuated Green, G (s)	51.5			51.5	12.2	12.2
Effective Green, g (s)	51.5			51.5	12.2	12.2
Actuated g/C Ratio	0.70			0.70	0.17	0.17
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2421			1273	293	262
v/s Ratio Prot	0.40				c0.10	0.06
v/s Ratio Perm				c0.61		
v/c Ratio	0.57			1.18dl	0.61	0.35
Uniform Delay, d1	5.6			8.7	28.5	27.2
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.3			7.2	3.7	0.8
Delay (s)	5.9			15.9	32.3	28.1
Level of Service	A			B	C	C
Approach Delay (s)	5.9			15.9	29.9	
Approach LOS	A			B	C	

Intersection Summary

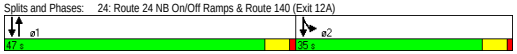
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	73.7	Sum of lost time (s)	10.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	235	740	715	160	2215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	12	12
Storage Length (ft)	0	0		300	250	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		30			30
Link Distance (ft)	736		624			870
Travel Time (s)	16.7		14.2			19.8
Peak Hour Factor	0.94	0.94	0.98	0.98	0.97	0.97
Heavy Vehicles (%)	0%	2%	3%	6%	6%	3%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	250	755	730	165	2284
Turn Type		Free		Free	Prot	
Protected Phases			1		2	1 2
Permitted Phases		Free		Free		
Detector Phase			1		2	1 2
Switch Phase						
Minimum Initial (s)			16.0		8.0	
Minimum Split (s)			21.0		13.0	
Total Split (s)	0.0	0.0	47.0	0.0	35.0	82.0
Total Split (%)	0.0%	0.0%	57.3%	0.0%	42.7%	100.0%
Maximum Green (s)			42.0		30.0	
Yellow Time (s)			4.0		4.0	
All-Red Time (s)			1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	5.0	4.0	5.0	5.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?						
Vehicle Extension (s)			2.0		2.0	
Recall Mode			Min		None	
v/c Ratio		0.14	0.44	0.48	0.27	0.65
Control Delay		0.2	12.4	1.1	17.8	1.0
Queue Delay		0.0	0.0	0.0	0.0	0.0
Total Delay		0.2	12.4	1.1	17.8	1.0
Queue Length 50th (ft)		0	94	0	44	0
Queue Length 95th (ft)		0	161	0	105	0
Internal Link Dist (ft)	656		544			790
Turn Bay Length (ft)				300	250	
Base Capacity (vph)		1772	2183	1524	758	3465
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		0.14	0.35	0.48	0.22	0.66

Intersection Summary	
Area Type:	Other
Cycle Length: 82	
Actuated Cycle Length: 68.9	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 24: Route 24 NB On/Off Ramps & Route 140 (Exit 12A)



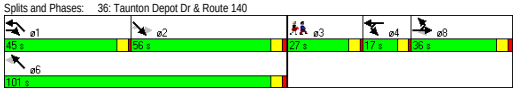
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	235	740	715	160	2215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	15	12	12	12	12
Total Lost time (s)		4.0	5.0	4.0	5.0	5.0
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95
Frt		0.86	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1772	3505	1524	1703	3505
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1772	3505	1524	1703	3505
Peak-hour factor, PHF	0.94	0.94	0.98	0.98	0.97	0.97
Adj. Flow (vph)	0	250	755	730	165	2284
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	250	755	730	165	2284
Heavy Vehicles (%)	0%	2%	3%	6%	6%	3%
Turn Type		Free		Free	Prot	
Protected Phases			1		2	1 2
Permitted Phases		Free		Free		
Actuated Green, G (s)		68.6	33.9	68.6	24.7	68.6
Effective Green, g (s)		68.6	33.9	68.6	24.7	68.6
Actuated g/C Ratio		1.00	0.49	1.00	0.36	1.00
Clearance Time (s)			5.0		5.0	
Vehicle Extension (s)			2.0		2.0	
Lane Grp Cap (vph)		1772	1732	1524	613	3505
v/s Ratio Prot			0.22		0.10	c0.65
v/s Ratio Perm		0.14		0.48		
v/c Ratio		0.14	0.44	0.48	0.27	0.65
Uniform Delay, d1		0.0	11.2	0.0	15.6	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2	0.1	1.1	0.1	0.3
Delay (s)		0.2	11.2	1.1	15.6	0.3
Level of Service		A	B	A	B	A
Approach Delay (s)	0.2		6.3			1.4
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	3.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	68.6	Sum of lost time (s)	0.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR	ø3
Lane Configurations													
Volume (vph)	225	5	220	5	0	0	0	810	250	185	755	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	12	12	
Storage Length (ft)	0		100	0		0	180		130	320		350	
Storage Lanes	1		1	0		0	1		1	1		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		846			205			2224			1786		
Travel Time (s)		19.2			4.7			50.5			40.6		
Peak Hour Factor	0.93	0.93	0.93	0.63	0.63	0.63	0.98	0.98	0.98	0.94	0.94	0.94	
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	0%	2%	2%	0%	1%	0%	
Shared Lane Traffic (%)	49%												
Lane Group Flow (vph)	123	124	237	0	8	0	0	827	255	197	803	0	
Turn Type	Split		pm+ov	Split			Perm		Perm	pm+pt			
Protected Phases	8	8	1	4	4			2		1	6		3
Permitted Phases			8				2		2	6			
Detector Phase	8	8	1	4	4		2	2	2	1	6		
Switch Phase													
Minimum Initial (s)	6.0	6.0	6.0	4.0	4.0		6.0	6.0	6.0	6.0	20.0		4.0
Minimum Split (s)	12.0	12.0	11.0	9.0	9.0		12.0	12.0	12.0	11.0	26.0		27.0
Total Split (s)	36.0	36.0	45.0	17.0	17.0	0.0	56.0	56.0	56.0	45.0	101.0	0.0	27.0
Total Split (%)	19.9%	19.9%	24.9%	9.4%	9.4%	0.0%	30.9%	30.9%	30.9%	24.9%	55.8%	0.0%	15%
Maximum Green (s)	30.0	30.0	40.0	12.0	12.0		50.0	50.0	50.0	40.0	95.0		22.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0		2.0	2.0	2.0	1.0	2.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	5.0	5.0	5.0	4.0	6.0	6.0	6.0	5.0	6.0	4.0	
Lead/Lag			Lead	Lag	Lag		Lag	Lag	Lag	Lead			Lead
Lead-Lag Optimize?				Yes	Yes		Yes	Yes	Yes				Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		4.0	4.0	4.0	2.0	4.0		3.0
Recall Mode	None	None	None	None	None		Min	Min	Min	None	Min		None
Walk Time (s)													7.0
Flash Dont Walk (s)													15.0
Pedestrian Calls (#/hr)													0
v/c Ratio	0.44	0.45	0.31		0.05			0.56	0.35	0.43	0.35		
Control Delay	37.1	37.1	4.0		41.8			18.4	11.1	8.6	7.0		
Queue Delay	0.0	0.0	0.0		0.0			0.0	0.0	0.0	0.0		
Total Delay	37.1	37.1	4.0		41.8			18.4	11.1	8.6	7.0		
Queue Length 50th (ft)	46	46	0		3			123	37	25	65		
Queue Length 95th (ft)	144	145	49		15			284	130	83	167		
Internal Link Dist (ft)		766			125			2144			1706		
Turn Bay Length (ft)			100						130	320			
Base Capacity (vph)	760	765	1383		370			2652	1211	1128	3490		
Starvation Cap Reductn	0	0	0		0			0	0	0	0		
Spillback Cap Reductn	0	0	0		0			0	0	0	0		
Storage Cap Reductn	0	0	0		0			0	0	0	0		
Reduced v/c Ratio	0.16	0.16	0.17		0.02			0.31	0.21	0.17	0.23		

Intersection Summary	
Area Type:	Other
Cycle Length: 181	
Actuated Cycle Length: 71.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 36: Taunton Depot Dr & Route 140



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	225	5	220	5	0	0	0	810	250	185	755	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)	6.0	6.0	5.0		5.0			6.0	6.0	5.0	6.0	
Lane Util. Factor	0.95	0.95	1.00		1.00			0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85		1.00			1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00		0.95			1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1690	1599		2046			3539	1583	1805	3574	
Flt Permitted	0.95	0.95	1.00		0.95			1.00	1.00	0.21	1.00	
Satd. Flow (perm)	1681	1690	1599		2046			3539	1583	405	3574	
Peak-hour factor, PHF	0.93	0.93	0.93	0.63	0.63	0.63	0.98	0.98	0.98	0.94	0.94	0.94
Adj. Flow (vph)	242	5	237	8	0	0	0	827	255	197	803	0
RTOR Reduction (vph)	0	0	168	0	0	0	0	0	59	0	0	0
Lane Group Flow (vph)	123	124	69	0	8	0	0	827	196	197	803	0
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	0%	2%	2%	0%	1%	0%
Turn Type	Split		pm+ov	Split			Perm		Perm	pm+pt		
Protected Phases	8	8	1	4	4			2		1	6	
Permitted Phases			8				2		2	6		
Actuated Green, G (s)	11.8	11.8	21.8		0.8			30.4	30.4	45.4	45.4	
Effective Green, g (s)	11.8	11.8	21.8		0.8			30.4	30.4	45.4	45.4	
Actuated g/C Ratio	0.16	0.16	0.29		0.01			0.41	0.41	0.61	0.61	
Clearance Time (s)	6.0	6.0	5.0		5.0			6.0	6.0	5.0	6.0	
Vehicle Extension (s)	2.0	2.0	2.0		2.0			4.0	4.0	2.0	4.0	
Lane Grp Cap (vph)	264	266	465		22			1434	642	432	2163	
v/s Ratio Prot	0.07	c0.07	0.02		c0.00			c0.23		c0.06	0.22	
v/s Ratio Perm			0.02						0.12	0.22		
v/c Ratio	0.47	0.47	0.15		0.36			0.58	0.30	0.46	0.37	
Uniform Delay, d1	28.7	28.7	19.7		36.8			17.3	15.1	8.2	7.5	
Progression Factor	1.00	1.00	1.00		1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	0.5	0.1		3.7			0.7	0.4	0.3	0.1	
Delay (s)	29.2	29.2	19.8		40.5			18.0	15.5	8.5	7.7	
Level of Service	C	C	B		D			B	B	A	A	
Approach Delay (s)		24.6			40.5			17.4			7.8	
Approach LOS		C			D			B			A	

Intersection Summary			
HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
40: Honorable Gordon M. Owen Riverway & Route 140

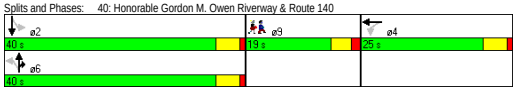
2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	0	0	0	450	0	5	0	500	325	15	645	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	13	12	12	11	12	12	13	12	
Storage Length (ft)	0		0	0		0	0		175	0		0	
Storage Lanes	0		0	0		0	0		1	0		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		220			991			547			1888		
Travel Time (s)		5.0			22.5			12.4			42.9		
Peak Hour Factor	0.92	0.92	0.92	0.82	0.82	0.82	0.96	0.96	0.96	0.89	0.89	0.89	
Heavy Vehicles (%)	2%	2%	2%	1%	0%	100%	0%	3%	1%	0%	2%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	0	0	0	555	0	0	521	339	0	742	0	
Turn Type				Perm			Perm		Prot	Perm			
Protected Phases					4			6	6		2		9
Permitted Phases				4			6			2			
Detector Phase				4	4		6	6	6	2	2		
Switch Phase													
Minimum Initial (s)				6.0	6.0		6.0	6.0	6.0	6.0	6.0		1.0
Minimum Split (s)				11.0	11.0		11.0	11.0	11.0	11.0	11.0		19.0
Total Split (s)	0.0	0.0	0.0	25.0	25.0	0.0	40.0	40.0	40.0	40.0	40.0	0.0	19.0
Total Split (%)	0.0%	0.0%	0.0%	29.8%	29.8%	0.0%	47.6%	47.6%	47.6%	47.6%	47.6%	0.0%	23%
Maximum Green (s)				20.0	20.0		35.0	35.0	35.0	35.0	35.0		14.0
Yellow Time (s)				4.0	4.0		4.0	4.0	4.0	4.0	4.0		3.5
All-Red Time (s)				1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0	
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)				4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0
Recall Mode				None	None		None	None	None	None	None		None
Walk Time (s)													7.0
Flash Dont Walk (s)													7.0
Pedestrian Calls (#/hr)													0
v/c Ratio					0.94			0.57	0.34		0.76		
Control Delay					48.8			13.1	2.1		18.0		
Queue Delay					0.0			0.0	0.0		0.0		
Total Delay					48.8			13.1	2.1		18.0		
Queue Length 50th (ft)					215			122	0		203		
Queue Length 95th (ft)					#350			202	32		323		
Internal Link Dist (ft)		140			911			467			1808		
Turn Bay Length (ft)									175				
Base Capacity (vph)					593			1010	1053		1074		
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					0.94			0.52	0.32		0.69		

Intersection Summary

Area Type: Other
Cycle Length: 84
Actuated Cycle Length: 62.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 40: Honorable Gordon M. Owen Riverway & Route 140



HCM Signalized Intersection Capacity Analysis
40: Honorable Gordon M. Owen Riverway & Route 140

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	450	0	5	0	500	325	15	645	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	13	12	12	11	12	12	13	12
Total Lost time (s)					5.0			5.0	5.0		5.0	
Lane Util. Factor					1.00			1.00	1.00		1.00	
Frt					1.00			1.00	0.85		1.00	
Flt Protected					0.95			1.00	1.00		1.00	
Satd. Flow (prot)					1830			1783	1599		1923	
Flt Permitted					0.95			1.00	1.00		0.99	
Satd. Flow (perm)					1830			1783	1599		1898	
Peak-hour factor, PHF	0.92	0.92	0.92	0.82	0.82	0.82	0.96	0.96	0.96	0.89	0.89	0.89
Adj. Flow (vph)	0	0	0	549	0	6	0	521	339	17	725	0
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	165	0	0	0
Lane Group Flow (vph)	0	0	0	0	554	0	0	521	174	0	742	0
Heavy Vehicles (%)	2%	2%	2%	1%	0%	100%	0%	3%	1%	0%	2%	0%
Turn Type				Perm			Perm		Prot	Perm		
Protected Phases					4			6	6		2	
Permitted Phases				4			6			2		
Actuated Green, G (s)					20.1			31.9	31.9		31.9	
Effective Green, g (s)					20.1			31.9	31.9		31.9	
Actuated g/C Ratio					0.32			0.51	0.51		0.51	
Clearance Time (s)					5.0			5.0	5.0		5.0	
Vehicle Extension (s)					4.0			4.0	4.0		4.0	
Lane Grp Cap (vph)					593			917	823		977	
v/s Ratio Prot								0.29	0.11			
v/s Ratio Perm					0.30						c0.39	
v/c Ratio					0.93			0.57	0.21		0.76	
Uniform Delay, d1					20.3			10.3	8.2		12.0	
Progression Factor					1.00			1.00	1.00		1.00	
Incremental Delay, d2					22.3			1.0	0.2		3.7	
Delay (s)					42.6			11.3	8.4		15.7	
Level of Service					D			B	A		B	
Approach Delay (s)		0.0			42.6			10.2			15.7	
Approach LOS		A			D			B			B	

Intersection Summary

HCM Average Control Delay	20.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	62.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
43: Route 44/Dean Street & Longmeadow Street

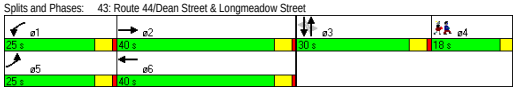
2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø4
Lane Configurations													
Volume (vph)	10	780	335	385	730	210	70	315	210	145	225	10	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	16	10	12	13	12	11	16	12	11	12	
Storage Length (ft)	100		70	100		70	0		50	0		100	
Storage Lanes	1		1	1		1	0		1	0		1	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		1663			1440			2994			1249		
Travel Time (s)		37.8			32.7			68.0			28.4		
Peak Hour Factor	0.93	0.93	0.93	0.96	0.96	0.96	0.92	0.92	0.92	0.84	0.84	0.84	
Heavy Vehicles (%)	0%	3%	3%	2%	3%	3%	1%	2%	1%	1%	1%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	11	1199	0	401	979	0	0	646	0	0	453	0	
Turn Type	Prot			Prot			Perm			Perm			
Protected Phases	5	2		1	6			3			3		4
Permitted Phases							3			3			
Detector Phase	5	2		1	6		3	3		3	3		
Switch Phase													
Minimum Initial (s)	9.0	12.0		9.0	12.0		8.0	8.0		8.0	8.0		8.0
Minimum Split (s)	14.0	17.0		14.0	17.0		13.0	13.0		13.0	13.0		18.0
Total Split (s)	25.0	40.0	0.0	25.0	40.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	18.0
Total Split (%)	22.1%	35.4%	0.0%	22.1%	35.4%	0.0%	26.5%	26.5%	0.0%	26.5%	26.5%	0.0%	16%
Maximum Green (s)	20.0	35.0		20.0	35.0		25.0	25.0		25.0	25.0		15.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	4.0	5.0		4.0	5.0		4.0	4.0		4.0	4.0		3.0
Recall Mode	None	Min		None	Min		None	None		None	None		None
Walk Time (s)													8.0
Flash Dont Walk (s)													7.0
Pedestrian Calls (#/hr)													0
v/c Ratio	0.07	0.94		1.15	0.48			0.94			1.71dl		
Control Delay	40.4	43.2		132.3	11.9			53.8			56.9		
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0		
Total Delay	40.4	43.2		132.3	11.9			53.8			56.9		
Queue Length 50th (ft)	6	347		~287	140			178			138		
Queue Length 95th (ft)	23	#493		#468	270			#293			#207		
Internal Link Dist (ft)		1583			1360			2914			1169		
Turn Bay Length (ft)	100			100									
Base Capacity (vph)	355	1272		348	2052			686			503		
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	0.03	0.94		1.15	0.48			0.94			0.90		

Intersection Summary

Area Type: Other
Cycle Length: 113
Actuated Cycle Length: 95
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
~ 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 43: Route 44/Dean Street & Longmeadow Street



HCM Signalized Intersection Capacity Analysis
43: Route 44/Dean Street & Longmeadow Street

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	780	335	385	730	210	70	315	210	145	225	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	16	10	12	13	12	11	16	12	11	12
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frt	1.00	0.95		1.00	0.97			0.95			1.00	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1685	3347		1652	3387			3236			3378	
Flt Permitted	0.95	1.00		0.95	1.00			0.73			0.55	
Satd. Flow (perm)	1685	3347		1652	3387			2374			1904	
Peak-hour factor, PHF	0.93	0.93	0.93	0.96	0.96	0.96	0.92	0.92	0.92	0.84	0.84	0.84
Adj. Flow (vph)	11	839	360	401	760	219	76	342	228	173	268	12
RTOR Reduction (vph)	0	37	0	0	14	0	0	62	0	0	1	0
Lane Group Flow (vph)	11	1162	0	401	965	0	0	584	0	0	452	0
Heavy Vehicles (%)	0%	3%	3%	2%	3%	3%	1%	2%	1%	1%	1%	0%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			3			3	
Permitted Phases							3			3		
Actuated Green, G (s)	1.8	39.0		20.0	57.2			25.0			25.0	
Effective Green, g (s)	1.8	39.0		20.0	57.2			25.0			25.0	
Actuated g/C Ratio	0.02	0.39		0.20	0.58			0.25			0.25	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	4.0	5.0		4.0	5.0			4.0			4.0	
Lane Grp Cap (vph)	31	1319		334	1957			599			481	
v/s Ratio Prot	0.01	c0.35		c0.24	0.28							
v/s Ratio Perm								c0.25			0.24	
v/c Ratio	0.35	0.88		1.20	0.49			0.97			1.71dl	
Uniform Delay, d1	48.0	27.8		39.5	12.3			36.7			36.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	9.3	7.7		115.5	0.4			30.3			26.4	
Delay (s)	57.3	35.6		155.0	12.7			67.0			62.7	
Level of Service	E	D		F	B			E			E	
Approach Delay (s)		35.8			54.1			67.0			62.7	
Approach LOS		D			D			E			E	

Intersection Summary

HCM Average Control Delay	51.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	99.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	98.5%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

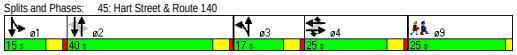
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2	ø9
Lane Configurations														
Volume (vph)	35	95	155	100	145	100	220	630	110	95	815	10		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	11	11	12	12	12	11	11	11	12	12	12		
Storage Length (ft)	0		50	0		50	50		0	50		0		
Storage Lanes	0		1	0		1	1		0	1		0		
Taper Length (ft)	25		25	25		25	25		25	25		25		
Right Turn on Red			Yes			Yes			Yes			Yes		
Link Speed (mph)		30			30			35			35			
Link Distance (ft)		1373			971			2224			3692			
Travel Time (s)		31.2			22.1			43.3			71.9			
Peak Hour Factor	0.68	0.68	0.68	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96	0.96		
Heavy Vehicles (%)	0%	1%	2%	2%	1%	1%	1%	1%	1%	2%	3%	0%		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	191	228	0	258	105	0	1011	0	0	958	0		
Turn Type	Perm		Prot	Perm		Prot	pm+pt			pm+pt				
Protected Phases		4	4		4	4	3	2 3		1	1 2		2	9
Permitted Phases	4			4			2 3			1 2				
Detector Phase	4	4	4	4	4	4	3	2 3		1	1 2			
Switch Phase														
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	4.0			4.0			8.0	1.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	9.0			9.0			13.0	25.0
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	17.0	57.0	0.0	15.0	55.0	0.0	40.0	25.0
Total Split (%)	20.5%	20.5%	20.5%	20.5%	20.5%	20.5%	13.9%	46.7%	0.0%	12.3%	45.1%	0.0%	33%	20%
Maximum Green (s)	20.0	20.0	20.0	20.0	20.0	20.0	12.0			10.0			35.0	23.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0			4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0			1.0			1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0		
Lead/Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead			Lead			Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes			Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0			3.0	3.0
Recall Mode	Max	Max	Max	Max	Max	Max	None			None			None	None
Walk Time (s)														7.0
Flash Dont Walk (s)														16.0
Pedestrian Calls (#/hr)														0
v/c Ratio		0.85	0.55		1.08	0.29		0.87			0.84			
Control Delay		70.0	21.1		118.2	22.4		30.4			27.5			
Queue Delay		0.0	0.0		0.0	0.0		0.0			0.0			
Total Delay		70.0	21.1		118.2	22.4		30.4			27.5			
Queue Length 50th (ft)		114	54		~178	32		203			197			
Queue Length 95th (ft)		139	72		#332	78		#279			#257			
Internal Link Dist (ft)		1293			891			2144			3612			
Turn Bay Length (ft)			50			50								
Base Capacity (vph)		225	416		240	364		1165			1135			
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		0.85	0.55		1.08	0.29		0.87			0.84			

Intersection Summary	
Area Type:	Other
Cycle Length: 122	
Actuated Cycle Length: 97	
Natural Cycle: 150	
Control Type: Semi Act-Uncoord	

~ 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.

Splits and Phases: 45: Hart Street & Route 140



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	95	155	100	145	100	220	630	110	95	815	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12	11	11	11	12	12	12
Total Lost time (s)		5.0	5.0		5.0	5.0		5.0			5.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.95			0.95	
Frt		1.00	0.85		1.00	0.85		0.98			1.00	
Flt Protected		0.99	1.00		0.98	1.00		0.99			0.99	
Satd. Flow (prot)		1799	1531		1836	1599		3357			3486	
Flt Permitted		0.60	1.00		0.62	1.00		0.61			0.61	
Satd. Flow (perm)		1092	1531		1163	1599		2059			2150	
Peak-hour factor, PHF	0.68	0.68	0.68	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96	0.96
Adj. Flow (vph)	51	140	228	105	153	105	232	663	116	99	849	10
RTOR Reduction (vph)	0	0	100	0	0	34	0	7	0	0	1	0
Lane Group Flow (vph)	0	191	128	0	258	71	0	1004	0	0	957	0
Heavy Vehicles (%)	0%	1%	2%	2%	1%	1%	1%	1%	1%	2%	3%	0%
Turn Type	Perm		Prot	Perm		Prot	pm+pt			pm+pt		
Protected Phases		4	4		4	4	3	2 3		1	1 2	
Permitted Phases	4			4			2 3			1 2		
Actuated Green, G (s)		20.0	20.0		20.0	20.0		47.0			45.0	
Effective Green, g (s)		20.0	20.0		20.0	20.0		47.0			45.0	
Actuated g/C Ratio		0.21	0.21		0.21	0.21		0.48			0.46	
Clearance Time (s)		5.0	5.0		5.0	5.0						
Vehicle Extension (s)		3.0	3.0		3.0	3.0						
Lane Grp Cap (vph)		225	316		240	330		1158			1135	
v/s Ratio Prot			0.08			0.04		c0.11			c0.09	
v/s Ratio Perm		0.17			c0.22			c0.31			0.30	
v/c Ratio		0.85	0.40		1.08	0.21		0.87			0.84	
Uniform Delay, d1		37.0	33.3		38.5	32.0		22.2			22.9	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		30.9	3.8		79.4	1.5		7.0			5.9	
Delay (s)		67.9	37.2		117.9	33.5		29.3			28.8	
Level of Service		E	D		F	C		C			C	
Approach Delay (s)		51.2			93.5			29.3			28.8	
Approach LOS		D			F			C			C	

Intersection Summary			
HCM Average Control Delay	40.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	97.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
52: Route 44/Dean Street & Arlington Street

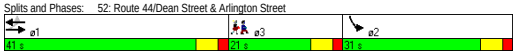
2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	ø3
Lane Configurations							
Volume (vph)	20	760	715	80	370	65	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	16	12	14	12	
Storage Length (ft)	150			0	0	0	
Storage Lanes	1			0	1	0	
Taper Length (ft)	25			25	25	25	
Right Turn on Red				Yes		No	
Link Speed (mph)		30	30		30		
Link Distance (ft)		1036	1663		418		
Travel Time (s)		23.5	37.8		9.5		
Peak Hour Factor	0.89	0.89	0.98	0.98	0.97	0.97	
Heavy Vehicles (%)	0%	3%	3%	0%	1%	5%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	22	854	812	0	448	0	
Turn Type	Perm						
Protected Phases		1	1		2		3
Permitted Phases	1						
Detector Phase	1	1	1		2		
Switch Phase							
Minimum Initial (s)	9.0	9.0	9.0		4.0		5.0
Minimum Split (s)	15.0	15.0	15.0		10.0		21.0
Total Split (s)	41.0	41.0	41.0	0.0	31.0	0.0	21.0
Total Split (%)	44.1%	44.1%	44.1%	0.0%	33.3%	0.0%	23%
Maximum Green (s)	35.0	35.0	35.0		25.0		15.0
Yellow Time (s)	4.0	4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0	2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0	4.0	
Lead/Lag	Lead	Lead	Lead				Lag
Lead-Lag Optimize?	Yes	Yes	Yes				Yes
Vehicle Extension (s)	3.0	3.0	3.0		3.0		1.0
Recall Mode	None	None	None		None		None
Walk Time (s)							5.0
Flash Dont Walk (s)							10.0
Pedestrian Calls (#/hr)							0
v/c Ratio	0.18	0.91	0.77		0.75		
Control Delay	15.2	33.5	21.0		29.8		
Queue Delay	0.0	0.0	0.0		0.0		
Total Delay	15.2	33.5	21.0		29.8		
Queue Length 50th (ft)	5	328	273		168		
Queue Length 95th (ft)	21	#581	#459		267		
Internal Link Dist (ft)		956	1583		338		
Turn Bay Length (ft)	150						
Base Capacity (vph)	121	935	1052		679		
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	0.18	0.91	0.77		0.66		

Intersection Summary

Area Type: Other
Cycle Length: 93
Actuated Cycle Length: 69.2
Natural Cycle: 110
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 52: Route 44/Dean Street & Arlington Street



HCM Signalized Intersection Capacity Analysis
52: Route 44/Dean Street & Arlington Street

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	760	715	80	370	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	16	12	14	12
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.99		0.98	
Flt Protected	0.95	1.00	1.00		0.96	
Satd. Flow (prot)	1685	1845	2068		1875	
Flt Permitted	0.13	1.00	1.00		0.96	
Satd. Flow (perm)	237	1845	2068		1875	
Peak-hour factor, PHF	0.89	0.89	0.98	0.98	0.97	0.97
Adj. Flow (vph)	22	854	730	82	381	67
RTOR Reduction (vph)	0	0	3	0	0	0
Lane Group Flow (vph)	22	854	809	0	448	0
Heavy Vehicles (%)	0%	3%	3%	0%	1%	5%
Turn Type	Perm					
Protected Phases		1	1		2	
Permitted Phases	1					
Actuated Green, G (s)	35.1	35.1	35.1		22.1	
Effective Green, g (s)	35.1	35.1	35.1		22.1	
Actuated g/C Ratio	0.51	0.51	0.51		0.32	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	120	936	1049		599	
v/s Ratio Prot		c0.46	0.39		c0.24	
v/s Ratio Perm	0.09					
v/c Ratio	0.18	0.91	0.77		0.75	
Uniform Delay, d1	9.3	15.6	13.8		21.1	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.7	12.9	3.6		5.1	
Delay (s)	10.0	28.6	17.4		26.1	
Level of Service	B	C	B		C	
Approach Delay (s)		28.1	17.4		26.1	
Approach LOS		C	B		C	

Intersection Summary

HCM Average Control Delay	23.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	69.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

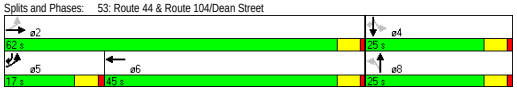
Lanes, Volumes, Timings
53: Route 44 & Route 104/Dean Street

2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	965	0	0	990	15	15	10	5	60	15	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	16	12	12	12	12	12	16
Storage Length (ft)	50		0	0		50	0		0	0		50
Storage Lanes	1		0	0		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		825			1426			127			959	
Travel Time (s)		18.8			32.4			2.9			21.8	
Peak Hour Factor	0.97	0.97	0.97	0.84	0.84	0.84	0.75	0.75	0.75	0.93	0.93	0.93
Heavy Vehicles (%)	2%	2%	0%	0%	2%	6%	0%	0%	0%	0%	0%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1134	0	0	1197	0	0	40	0	0	81	290
Turn Type	pm+pt						Perm			Perm		pm+ov
Protected Phases	5	2			6			8			4	5
Permitted Phases	2						8			4		4
Detector Phase	5	2			6		8	8		4	4	5
Switch Phase												
Minimum Initial (s)	6.0	12.0			12.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	11.0	17.0			17.0		11.0	11.0		11.0	11.0	11.0
Total Split (s)	17.0	62.0	0.0	0.0	45.0	0.0	25.0	25.0	0.0	25.0	25.0	17.0
Total Split (%)	19.5%	71.3%	0.0%	0.0%	51.7%	0.0%	28.7%	28.7%	0.0%	28.7%	28.7%	19.5%
Maximum Green (s)	12.0	57.0			40.0		20.0	20.0		20.0	20.0	12.0
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lead				Lag							Lead
Lead-Lag Optimize?	Yes				Yes							Yes
Vehicle Extension (s)	1.5	1.5			1.5		2.0	2.0		2.0	2.0	1.5
Recall Mode	None	Min			Min		None	None		None	None	None
v/c Ratio		0.67			0.73			0.16			0.35	0.47
Control Delay		6.6			14.9			24.3			30.7	17.4
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay		6.6			14.9			24.3			30.7	17.4
Queue Length 50th (ft)		75			154			9			24	60
Queue Length 95th (ft)		135			243			34			78	166
Internal Link Dist (ft)		745			1346			47			879	
Turn Bay Length (ft)												50
Base Capacity (vph)		2125			2636			615			580	801
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		0.53			0.45			0.07			0.14	0.36

Intersection Summary	
Area Type:	Other
Cycle Length: 87	
Actuated Cycle Length: 55.2	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 53: Route 44 & Route 104/Dean Street



HCM Signalized Intersection Capacity Analysis
53: Route 44 & Route 104/Dean Street

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	965	0	0	990	15	15	10	5	60	15	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	12	12	12	12	16
Total Lost time (s)		5.0			5.0			5.0			5.0	5.0
Lane Util. Factor		0.95			0.95			1.00			1.00	1.00
Frt		1.00			1.00			0.98			1.00	0.85
Flt Protected		0.99			1.00			0.98			0.96	1.00
Satd. Flow (prot)		3518			3529			1810			1827	1794
Flt Permitted		0.60			1.00			0.80			0.74	1.00
Satd. Flow (perm)		2121			3529			1484			1408	1794
Peak-hour factor, PHF	0.97	0.97	0.97	0.84	0.84	0.84	0.75	0.75	0.75	0.93	0.93	0.93
Adj. Flow (vph)	139	995	0	0	1179	18	20	13	7	65	16	290
RTOR Reduction (vph)	0	0	0	0	1	0	0	6	0	0	0	25
Lane Group Flow (vph)	0	1134	0	0	1196	0	0	34	0	0	81	265
Heavy Vehicles (%)	2%	2%	0%	0%	2%	6%	0%	0%	0%	0%	0%	2%
Turn Type	pm+pt						Perm			Perm		pm+ov
Protected Phases	5	2			6			8			4	5
Permitted Phases	2						8			4		4
Actuated Green, G (s)		39.1			26.4			6.7			6.7	14.4
Effective Green, g (s)		39.1			26.4			6.7			6.7	14.4
Actuated g/C Ratio		0.70			0.47			0.12			0.12	0.26
Clearance Time (s)		5.0			5.0			5.0			5.0	5.0
Vehicle Extension (s)		1.5			1.5			2.0			2.0	1.5
Lane Grp Cap (vph)		1679			1670			178			169	624
v/s Ratio Prot		c0.09			0.34							c0.06
v/s Ratio Perm		c0.38						0.02			0.06	0.09
v/c Ratio		0.68			0.72			0.19			0.48	0.42
Uniform Delay, d1		4.7			11.7			22.1			22.9	17.2
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.9			1.2			0.2			0.8	0.2
Delay (s)		5.6			13.0			22.3			23.7	17.4
Level of Service		A			B			C			C	B
Approach Delay (s)		5.6			13.0			22.3			18.8	
Approach LOS		A			B			C			B	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	55.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
57: Spring Street & Summer Street

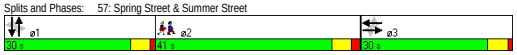
2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	40	205	105	15	235	10	55	355	10	10	335	30	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	16	12	
Right Turn on Red			Yes			No			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		376			382			1581			384		
Travel Time (s)		8.5			8.7			35.9			8.7		
Peak Hour Factor	0.80	0.80	0.80	0.76	0.76	0.76	0.85	0.85	0.85	0.93	0.93	0.93	
Heavy Vehicles (%)	2%	2%	1%	0%	1%	0%	0%	2%	0%	0%	1%	3%	
Parking (#/hr)											0		
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	437	0	0	342	0	0	495	0	0	403	0	
Turn Type	Perm			Perm			Perm			Perm			
Protected Phases		3			3			1			1		2
Permitted Phases	3			3			1			1			
Detector Phase	3	3		3	3		1	1		1	1		
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0		15.0
Minimum Split (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0		21.0
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	41.0
Total Split (%)	29.7%	29.7%	0.0%	29.7%	29.7%	0.0%	29.7%	29.7%	0.0%	29.7%	29.7%	0.0%	41%
Maximum Green (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0		35.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	
Lead/Lag							Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													8.0
Pedestrian Calls (#/hr)													0
v/c Ratio		0.62			0.40			0.70			0.52		
Control Delay		17.8			14.0			20.9			15.8		
Queue Delay		0.0			0.0			0.0			0.1		
Total Delay		17.8			14.0			20.9			16.0		
Queue Length 50th (ft)		113			83			141			102		
Queue Length 95th (ft)		164			113			218			174		
Internal Link Dist (ft)		296			302			1501			304		
Turn Bay Length (ft)													
Base Capacity (vph)		705			854			708			780		
Starvation Cap Reductn		0			0			0			44		
Spillback Cap Reductn		0			0			0			0		
Storage Cap Reductn		0			0			0			0		
Reduced v/c Ratio		0.62			0.40			0.70			0.55		

Intersection Summary

Area Type: Other
Cycle Length: 101
Actuated Cycle Length: 60
Natural Cycle: 90
Control Type: Semi Act-Uncoord

Splits and Phases: 57: Spring Street & Summer Street



HCM Signalized Intersection Capacity Analysis
57: Spring Street & Summer Street

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	205	105	15	235	10	55	355	10	10	335	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	12	12	12	12	12	16	12
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.96			0.99			1.00			0.99	
Flt Protected		0.99			1.00			0.99			1.00	
Satd. Flow (prot)		1782			2117			1850			1893	
Flt Permitted		0.93			0.97			0.91			0.98	
Satd. Flow (perm)		1662			2049			1696			1866	
Peak-hour factor, PHF	0.80	0.80	0.80	0.76	0.76	0.76	0.85	0.85	0.85	0.93	0.93	0.93
Adj. Flow (vph)	50	256	131	20	309	13	65	418	12	11	360	32
RTOR Reduction (vph)	0	12	0	0	0	0	0	1	0	0	2	0
Lane Group Flow (vph)	0	425	0	0	342	0	0	494	0	0	401	0
Heavy Vehicles (%)	2%	2%	1%	0%	1%	0%	0%	2%	0%	0%	1%	3%
Parking (#/hr)											0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Actuated Green, G (s)		25.0			25.0			25.0			25.0	
Effective Green, g (s)		25.0			25.0			25.0			25.0	
Actuated g/C Ratio		0.42			0.42			0.42			0.42	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		693			854			707			778	
v/s Ratio Prot												
v/s Ratio Perm		c0.26			0.17			c0.29			0.21	
v/c Ratio		0.61			0.40			0.70			0.51	
Uniform Delay, d1		13.7			12.3			14.4			13.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		4.0			1.4			5.7			2.4	
Delay (s)		17.7			13.7			20.1			15.4	
Level of Service		B			B			C			B	
Approach Delay (s)		17.7			13.7			20.1			15.4	
Approach LOS		B			B			C			B	

Intersection Summary

HCM Average Control Delay	17.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
58: Route 44/Main Street & Union Street

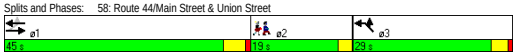
2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2	ø2
Lane Configurations												
Volume (vph)	15	460	375	0	485	20	0	0	375	25	15	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	16	12	16	12	12	12	12	16	15	
Right Turn on Red			Yes			Yes		Yes			Yes	
Link Speed (mph)		30			30		30		30			
Link Distance (ft)		913			784		606		384			
Travel Time (s)		20.8			17.8		13.8		8.7			
Peak Hour Factor	0.93	0.93	0.93	0.86	0.86	0.86	0.92	0.92	0.91	0.91	0.91	
Heavy Vehicles (%)	7%	3%	1%	0%	4%	0%	0%	0%	2%	4%	0%	
Parking (#/hr)			0			0						
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	914	0	0	587	0	0	0	412	43	0	
Turn Type	Perm									Prot		
Protected Phases		1			1				3	3		2
Permitted Phases	1											
Detector Phase	1	1			1				3	3		
Switch Phase												
Minimum Initial (s)	15.0	15.0			15.0				5.0	5.0		1.0
Minimum Split (s)	20.0	20.0			20.0				9.0	9.0		19.0
Total Split (s)	45.0	45.0	0.0	0.0	45.0	0.0	0.0	0.0	29.0	29.0	0.0	19.0
Total Split (%)	48.4%	48.4%	0.0%	0.0%	48.4%	0.0%	0.0%	0.0%	31.2%	31.2%	0.0%	20%
Maximum Green (s)	40.0	40.0			40.0				25.0	25.0		16.0
Yellow Time (s)	4.0	4.0			4.0				3.0	3.0		3.0
All-Red Time (s)	1.0	1.0			1.0				1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lead			Lead							Lag
Lead-Lag Optimize?	Yes	Yes			Yes							Yes
Vehicle Extension (s)	3.0	3.0			3.0				3.0	3.0		3.0
Recall Mode	Max	Max			Max				Max	Max		None
Walk Time (s)												7.0
Flash Dont Walk (s)												9.0
Pedestrian Calls (#/hr)												0
v/c Ratio		0.84			0.53				0.69	0.07		
Control Delay		22.9			13.0				28.3	12.4		
Queue Delay		0.0			0.0				0.1	0.0		
Total Delay		22.9			13.0				28.4	12.4		
Queue Length 50th (ft)		310			159				160	8		
Queue Length 95th (ft)		#566			226				258	28		
Internal Link Dist (ft)		833			704		526		304			
Turn Bay Length (ft)												
Base Capacity (vph)		1083			1117				598	614		
Starvation Cap Reductn		0			0				10	0		
Spillback Cap Reductn		0			0				0	0		
Storage Cap Reductn		0			0				0	0		
Reduced v/c Ratio		0.84			0.53				0.70	0.07		

Intersection Summary

Area Type: Other
Cycle Length: 93
Actuated Cycle Length: 74
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 58: Route 44/Main Street & Union Street



HCM Signalized Intersection Capacity Analysis
58: Route 44/Main Street & Union Street

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2
Lane Configurations											
Volume (vph)	15	460	375	0	485	20	0	0	375	25	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	16	12	16	12	12	12	12	16	15
Total Lost time (s)		5.0			5.0				4.0	4.0	
Lane Util. Factor		1.00			1.00				1.00	1.00	
Frt		0.94			0.99				1.00	0.85	
Flt Protected		1.00			1.00				0.95	1.00	
Satd. Flow (prot)		1980			2063				1770	1785	
Flt Permitted		0.99			1.00				0.95	1.00	
Satd. Flow (perm)		1958			2063				1770	1785	
Peak-hour factor, PHF	0.93	0.93	0.93	0.86	0.86	0.86	0.92	0.92	0.91	0.91	0.91
Adj. Flow (vph)	16	495	403	0	564	23	0	0	412	27	16
RTOR Reduction (vph)	0	25	0	0	1	0	0	0	0	11	0
Lane Group Flow (vph)	0	889	0	0	586	0	0	0	412	32	0
Heavy Vehicles (%)	7%	3%	1%	0%	4%	0%	0%	0%	2%	4%	0%
Parking (#/hr)			0			0					
Turn Type	Perm									Prot	
Protected Phases		1			1				3	3	
Permitted Phases	1										
Actuated Green, G (s)		40.0			40.0				25.0	25.0	
Effective Green, g (s)		40.0			40.0				25.0	25.0	
Actuated g/C Ratio		0.54			0.54				0.34	0.34	
Clearance Time (s)		5.0			5.0				4.0	4.0	
Vehicle Extension (s)		3.0			3.0				3.0	3.0	
Lane Grp Cap (vph)		1058			1115				598	603	
v/s Ratio Prot					0.28				c0.23	0.02	
v/s Ratio Perm		c0.45									
v/c Ratio		0.84			0.53				0.69	0.05	
Uniform Delay, d1		14.3			10.9				21.1	16.5	
Progression Factor		1.00			1.00				1.00	1.00	
Incremental Delay, d2		8.1			1.8				6.4	0.2	
Delay (s)		22.4			12.7				27.5	16.7	
Level of Service		C			B				C	B	
Approach Delay (s)		22.4			12.7		0.0		26.5		
Approach LOS		C			B		A		C		

Intersection Summary

HCM Average Control Delay	20.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	74.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	88.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
61: Taunton Green & Broadway

2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	160	855	320	0	0	1075	0	190	125	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	16	12	12	12	12	10	10	12	12	12	
Right Turn on Red	Yes		Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		304			913			579			302		
Travel Time (s)		6.9			20.8			13.2			6.9		
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.88	0.88	0.88	0.92	0.92	0.92	
Heavy Vehicles (%)	2%	3%	2%	0%	0%	2%	0%	2%	2%	0%	0%	0%	
Parking (#/hr)			0			0			0				
Shared Lane Traffic (%)													
Lane Group Flow (vph)	172	919	344	0	0	1168	0	216	142	0	0	0	
Turn Type	Perm		Perm			Free			Perm				
Protected Phases		1						3					2
Permitted Phases	1		1			Free			3				
Detector Phase	1	1	1					3	3				
Switch Phase													
Minimum Initial (s)	30.0	30.0	30.0					25.0	25.0				1.0
Minimum Split (s)	35.0	35.0	35.0					30.0	30.0				21.0
Total Split (s)	35.0	35.0	35.0	0.0	0.0	0.0	0.0	30.0	30.0	0.0	0.0	0.0	21.0
Total Split (%)	40.7%	40.7%	40.7%	0.0%	0.0%	0.0%	0.0%	34.9%	34.9%	0.0%	0.0%	0.0%	24%
Maximum Green (s)	30.0	30.0	30.0					25.0	25.0				17.0
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0				4.0
All-Red Time (s)	1.0	1.0	1.0					1.0	1.0				0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lead	Lead										Lag
Lead-Lag Optimize?	Yes	Yes	Yes										Yes
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0				2.0
Recall Mode	Max	Max	Max					Max	Max				Ped
Walk Time (s)													10.0
Flash Dont Walk (s)													7.0
Pedestrian Calls (#/hr)													0
v/c Ratio	0.24	0.75	0.44			0.44		0.43	0.29				
Control Delay	5.4	28.8	4.0			0.5		27.9	6.1				
Queue Delay	0.0	0.0	0.0			0.0		0.0	0.0				
Total Delay	5.4	28.8	4.0			0.5		27.9	6.1				
Queue Length 50th (ft)	6	228	0			0		94	0				
Queue Length 95th (ft)	47	298	49			0		154	39				
Internal Link Dist (ft)		224			833			499			222		
Turn Bay Length (ft)													
Base Capacity (vph)	714	1223	787			2647		506	487				
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	0.24	0.75	0.44			0.44		0.43	0.29				

Intersection Summary

Area Type: Other
Cycle Length: 86
Actuated Cycle Length: 86
Natural Cycle: 90
Control Type: Semi Act-Uncoord

Splits and Phases: 61: Taunton Green & Broadway

HCM Signalized Intersection Capacity Analysis
61: Taunton Green & Broadway

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	855	320	0	0	1075	0	190	125	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	16	12	12	12	12	10	10	12	12	12
Total Lost time (s)	5.0	5.0	5.0			4.0		5.0	5.0			
Lane Util. Factor	1.00	0.95	1.00			0.88		1.00	1.00			
Frt	1.00	1.00	0.85			0.85		1.00	0.85			
Flt Protected	0.95	1.00	1.00			1.00		1.00	1.00			
Satd. Flow (prot)	1770	3505	1615			2647		1739	1330			
Flt Permitted	0.95	1.00	1.00			1.00		1.00	1.00			
Satd. Flow (perm)	1770	3505	1615			2647		1739	1330			
Peak-hour factor, PHF	0.93	0.93	0.93	0.92	0.92	0.92	0.88	0.88	0.88	0.92	0.92	0.92
Adj. Flow (vph)	172	919	344	0	0	1168	0	216	142	0	0	0
RTOR Reduction (vph)	96	0	224	0	0	0	0	0	101	0	0	0
Lane Group Flow (vph)	76	919	120	0	0	1168	0	216	41	0	0	0
Heavy Vehicles (%)	2%	3%	2%	0%	0%	2%	0%	2%	2%	0%	0%	0%
Parking (#/hr)			0			0			0			
Turn Type	Perm		Perm			Free			Perm			
Protected Phases		1						3				
Permitted Phases	1		1			Free			3			
Actuated Green, G (s)	30.0	30.0	30.0			86.0		25.0	25.0			
Effective Green, g (s)	30.0	30.0	30.0			86.0		25.0	25.0			
Actuated g/C Ratio	0.35	0.35	0.35			1.00		0.29	0.29			
Clearance Time (s)	5.0	5.0	5.0					5.0	5.0			
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0			
Lane Grp Cap (vph)	617	1223	563			2647		506	387			
v/s Ratio Prot		c0.26						0.12				
v/s Ratio Perm	0.04		0.07			c0.44			0.03			
v/c Ratio	0.12	0.75	0.21			0.44		0.43	0.11			
Uniform Delay, d1	19.0	24.7	19.7			0.0		24.7	22.3			
Progression Factor	0.91	0.98	0.86			1.00		1.00	1.00			
Incremental Delay, d2	0.4	4.3	0.9			0.5		2.6	0.6			
Delay (s)	17.7	28.4	17.9			0.5		27.3	22.9			
Level of Service	B	C	B			A		C	C			
Approach Delay (s)		24.6			0.5			25.6			0.0	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM Average Control Delay	15.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2
Lane Configurations							
Volume (vph)	415	20	540	230	50	650	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	14	10	9	12	12	
Storage Length (ft)	0	50		0	0		
Storage Lanes	1	1		1	1		
Taper Length (ft)	25	25		25	25		
Right Turn on Red		Yes		Yes			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1051		260			584	
Travel Time (s)	23.9		5.9			13.3	
Peak Hour Factor	0.94	0.94	0.92	0.92	0.95	0.95	
Heavy Vehicles (%)	3%	0%	1%	2%	8%	1%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	441	21	587	250	53	684	
Turn Type		Perm		Perm	Perm		
Protected Phases	3		1			1	2
Permitted Phases		3		1	1		
Minimum Split (s)	10.0	10.0	15.0	15.0	15.0	15.0	17.0
Total Split (s)	25.0	25.0	55.0	55.0	55.0	55.0	17.0
Total Split (%)	25.8%	25.8%	56.7%	56.7%	56.7%	56.7%	18%
Maximum Green (s)	20.0	20.0	50.0	50.0	50.0	50.0	15.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag			Lead	Lead	Lead	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes	Yes
Walk Time (s)							7.0
Flash Dont Walk (s)							8.0
Pedestrian Calls (#/hr)							0
v/c Ratio	1.18	0.06	0.65	0.29	0.20	0.71	
Control Delay	142.1	24.5	21.3	2.6	15.4	22.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	142.1	24.5	21.3	2.6	15.4	22.9	
Queue Length 50th (ft)	~329	7	251	0	17	306	
Queue Length 95th (ft)	#516	27	370	36	42	443	
Internal Link Dist (ft)	971		180			504	
Turn Bay Length (ft)		50					
Base Capacity (vph)	373	361	905	856	259	970	
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	1.18	0.06	0.65	0.29	0.20	0.71	

Intersection Summary

Area Type: Other
Cycle Length: 97
Actuated Cycle Length: 97
Offset: 0 (0%), Referenced to phase 2:Ped and 6:, Start of Green
Natural Cycle: 80
Control Type: Pretimed
~ 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.

Splits and Phases: 71: Court Street & Washington Street

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	415	20	540	230	50	650
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	14	10	9	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1811	1723	1756	1425	1671	1881
Flt Permitted	0.95	1.00	1.00	1.00	0.29	1.00
Satd. Flow (perm)	1811	1723	1756	1425	503	1881
Peak-hour factor, PHF	0.94	0.94	0.92	0.92	0.95	0.95
Adj. Flow (vph)	441	21	587	250	53	684
RTOR Reduction (vph)	0	6	0	121	0	0
Lane Group Flow (vph)	441	15	587	129	53	684
Heavy Vehicles (%)	3%	0%	1%	2%	8%	1%
Turn Type		Perm		Perm	Perm	
Protected Phases	3		1			1
Permitted Phases		3		1	1	
Actuated Green, G (s)	20.0	20.0	50.0	50.0	50.0	50.0
Effective Green, g (s)	20.0	20.0	50.0	50.0	50.0	50.0
Actuated g/C Ratio	0.21	0.21	0.52	0.52	0.52	0.52
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	373	355	905	735	259	970
v/s Ratio Prot	c0.24		0.33			c0.36
v/s Ratio Perm		0.01		0.09	0.11	
v/c Ratio	1.18	0.04	0.65	0.18	0.20	0.71
Uniform Delay, d1	38.5	30.8	17.1	12.5	12.7	17.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	106.2	0.2	3.6	0.5	1.8	4.3
Delay (s)	144.7	31.1	20.7	13.0	14.5	22.2
Level of Service	F	C	C	B	B	C
Approach Delay (s)	139.5		18.4			21.6
Approach LOS	F		B			C

Intersection Summary

HCM Average Control Delay	47.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	97.0	Sum of lost time (s)	27.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
77: Tremont Street & Washington Street

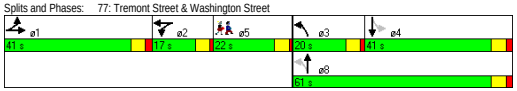
2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5
Lane Configurations													
Volume (vph)	480	165	95	25	125	35	100	300	55	35	340	490	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	14	12	16	12	12	12	13	12	12	12	11	12	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		698			192			1911			574		
Travel Time (s)		15.9			4.4			43.4			13.0		
Peak Hour Factor	0.97	0.97	0.97	0.81	0.81	0.81	0.94	0.94	0.94	0.88	0.88	0.88	
Heavy Vehicles (%)	1%	2%	2%	0%	2%	3%	3%	6%	0%	0%	4%	2%	
Shared Lane Traffic (%)	23%												
Lane Group Flow (vph)	381	382	0	0	228	0	0	484	0	0	983	0	
Turn Type	Split			Split			pm+pt			Perm			
Protected Phases	1	1		2	2		3	8			4		5
Permitted Phases							8			4			
Detector Phase	1	1		2	2		3	8		4	4		
Switch Phase													
Minimum Initial (s)	18.0	18.0		7.0	7.0		6.0	18.0		18.0	18.0		3.0
Minimum Split (s)	24.0	24.0		12.0	12.0		11.0	24.0		24.0	24.0		22.0
Total Split (s)	41.0	41.0	0.0	17.0	17.0	0.0	20.0	61.0	0.0	41.0	41.0	0.0	22.0
Total Split (%)	29.1%	29.1%	0.0%	12.1%	12.1%	0.0%	14.2%	43.3%	0.0%	29.1%	29.1%	0.0%	16%
Maximum Green (s)	35.0	35.0		12.0	12.0		15.0	55.0		35.0	35.0		17.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		1.0	1.0		1.0	2.0		2.0	2.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	5.0	6.0	4.0	6.0	6.0	4.0	
Lead/Lag	Lead	Lead		Lag	Lag		Lead			Lag	Lag		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None		None	None		None	Min		Min	Min		None
Walk Time (s)													7.0
Flash Dont Walk (s)													10.0
Pedestrian Calls (#/hr)													0
v/c Ratio	0.72	0.76			0.94			0.88dl			0.79		
Control Delay	37.4	39.3			86.3			30.3			25.3		
Queue Delay	0.0	0.0			0.0			0.0			0.0		
Total Delay	37.4	39.3			86.3			30.3			25.3		
Queue Length 50th (ft)	204	202			128			117			204		
Queue Length 95th (ft)	324	326			#267			202			313		
Internal Link Dist (ft)		618			112			1831			494		
Turn Bay Length (ft)													
Base Capacity (vph)	693	651			242			1068			1241		
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	0.55	0.59			0.94			0.45			0.79		

Intersection Summary

Area Type: Other
Cycle Length: 141
Actuated Cycle Length: 91.9
Natural Cycle: 125
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.

Splits and Phases: 77: Tremont Street & Washington Street



HCM Signalized Intersection Capacity Analysis
77: Tremont Street & Washington Street

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	480	165	95	25	125	35	100	300	55	35	340	490
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	12	16	12	12	12	13	12	12	12	11	12
Total Lost time (s)	6.0	6.0			5.0			6.0			6.0	
Lane Util. Factor	0.95	0.95			1.00			0.95			0.95	
Frt	1.00	0.96			0.97			0.98			0.92	
Flt Protected	0.95	0.99			0.99			0.99			1.00	
Satd. Flow (prot)	1811	1681			1805			3351			3103	
Flt Permitted	0.95	0.99			0.99			0.52			0.91	
Satd. Flow (perm)	1811	1681			1805			1766			2832	
Peak-hour factor, PHF	0.97	0.97	0.97	0.81	0.81	0.81	0.94	0.94	0.94	0.88	0.88	0.88
Adj. Flow (vph)	495	170	98	31	154	43	106	319	59	40	386	557
RTOR Reduction (vph)	0	8	0	0	5	0	0	8	0	0	136	0
Lane Group Flow (vph)	381	374	0	0	223	0	0	476	0	0	847	0
Heavy Vehicles (%)	1%	2%	2%	0%	2%	3%	3%	6%	0%	0%	4%	2%
Turn Type	Split			Split			pm+pt			Perm		
Protected Phases	1	1		2	2		3	8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	26.9	26.9			12.1			35.9			35.9	
Effective Green, g (s)	26.9	26.9			12.1			35.9			35.9	
Actuated g/C Ratio	0.29	0.29			0.13			0.39			0.39	
Clearance Time (s)	6.0	6.0			5.0			6.0			6.0	
Vehicle Extension (s)	2.0	2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)	530	492			238			690			1106	
v/s Ratio Prot	0.21	c0.22			c0.12							
v/s Ratio Perm								0.27			c0.30	
v/c Ratio	0.72	0.76			0.94			0.88dl			0.77	
Uniform Delay, d1	29.1	29.6			39.5			23.4			24.3	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	3.9	5.9			40.3			2.3			2.9	
Delay (s)	33.0	35.5			79.8			25.7			27.2	
Level of Service	C	D			E			C			C	
Approach Delay (s)		34.2			79.8			25.7			27.2	
Approach LOS		C			E			C			C	

Intersection Summary

HCM Average Control Delay	34.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	91.9	Sum of lost time (s)	17.0
Intersection Capacity Utilization	91.0%	ICU Level of Service	E
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Lanes, Volumes, Timings
93: Washington Street & Broadway

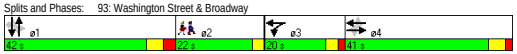
2008 Existing Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	270	140	5	35	140	5	5	480	55	20	480	375	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	12	12	12	12	12	12	12	12	12	12	
Storage Length (ft)	0		0	0		0	0		0	0		50	
Storage Lanes	0		0	0		0	0		1	0		1	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			No			Yes			No	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		1068			1376			92			2042		
Travel Time (s)		24.3			31.3			2.1			46.4		
Peak Hour Factor	0.92	0.92	0.92	0.84	0.84	0.84	0.98	0.98	0.98	0.95	0.95	0.95	
Heavy Vehicles (%)	3%	2%	0%	3%	3%	50%	29%	4%	15%	9%	4%	3%	
Parking (#/hr)									2				
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	450	0	0	215	0	0	551	0	0	526	395	
Turn Type	Perm			pm+pt			Perm			Perm		Perm	
Protected Phases		4		3	3 4			1			1		2
Permitted Phases	4			3 4			1			1		1	
Detector Phase	4	4		3	3 4		1	1		1	1	1	
Switch Phase													
Minimum Initial (s)	8.0	8.0		4.0			18.0	18.0		18.0	18.0	18.0	1.0
Minimum Split (s)	14.0	14.0		9.0			25.0	25.0		25.0	25.0	25.0	22.0
Total Split (s)	41.0	41.0	0.0	20.0	61.0	0.0	42.0	42.0	0.0	42.0	42.0	42.0	22.0
Total Split (%)	32.8%	32.8%	0.0%	16.0%	48.8%	0.0%	33.6%	33.6%	0.0%	33.6%	33.6%	33.6%	18%
Maximum Green (s)	35.0	35.0		15.0			35.0	35.0		35.0	35.0	35.0	19.0
Yellow Time (s)	4.0	4.0		3.0			4.0	4.0		4.0	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0		2.0			3.0	3.0		3.0	3.0	3.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	7.0	7.0	4.0	7.0	7.0	7.0	
Lead/Lag	Lag	Lag		Lead			Lead	Lead		Lead	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0		2.0			3.0	3.0		3.0	3.0	3.0	2.0
Recall Mode	None	None		None			Max	Max		Max	Max	Max	None
Walk Time (s)													7.0
Flash Dont Walk (s)													12.0
Pedestrian Calls (#/hr)													0
v/c Ratio		0.89			0.27			0.48			0.85	0.71	
Control Delay		53.1			13.8			26.5			44.4	36.6	
Queue Delay		0.0			0.0			0.0			0.0	0.0	
Total Delay		53.1			13.8			26.5			44.4	36.6	
Queue Length 50th (ft)		265			70			137			302	212	
Queue Length 95th (ft)		#477			103			198			#514	342	
Internal Link Dist (ft)		988			1296			12			1962		
Turn Bay Length (ft)												50	
Base Capacity (vph)		503			851			1142			622	555	
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		0.89			0.25			0.48			0.85	0.71	

Intersection Summary	
Area Type:	Other
Cycle Length: 125	
Actuated Cycle Length: 98.9	
Natural Cycle: 110	
Control Type: Semi Act-Uncoord	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 93: Washington Street & Broadway



HCM Signalized Intersection Capacity Analysis
93: Washington Street & Broadway

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	140	5	35	140	5	5	480	55	20	480	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		6.0			5.0			7.0			7.0	7.0
Lane Util. Factor		1.00			1.00			0.95			1.00	1.00
Frt		1.00			1.00			0.98			1.00	0.85
Flt Protected		0.97			0.99			1.00			1.00	1.00
Satd. Flow (prot)		2029			1797			3373			1820	1568
Flt Permitted		0.68			0.89			0.95			0.96	1.00
Satd. Flow (perm)		1423			1619			3206			1756	1568
Peak-hour factor, PHF	0.92	0.92	0.92	0.84	0.84	0.84	0.98	0.98	0.98	0.95	0.95	0.95
Adj. Flow (vph)	293	152	5	42	167	6	5	490	56	21	505	395
RTOR Reduction (vph)	0	0	0	0	0	0	0	6	0	0	0	0
Lane Group Flow (vph)	0	450	0	0	215	0	0	545	0	0	526	395
Heavy Vehicles (%)	3%	2%	0%	3%	3%	50%	29%	4%	15%	9%	4%	3%
Parking (#/hr)									2			
Turn Type	Perm			pm+pt			Perm			Perm		Perm
Protected Phases		4		3	3 4			1			1	
Permitted Phases	4			3 4			1			1		1
Actuated Green, G (s)		35.0			45.9			35.0			35.0	35.0
Effective Green, g (s)		35.0			45.9			35.0			35.0	35.0
Actuated g/C Ratio		0.35			0.46			0.35			0.35	0.35
Clearance Time (s)		6.0						7.0			7.0	7.0
Vehicle Extension (s)		4.0						3.0			3.0	3.0
Lane Grp Cap (vph)		504			771			1135			621	555
v/s Ratio Prot					c0.03							
v/s Ratio Perm		c0.32			0.10			0.17			c0.30	0.25
v/c Ratio		0.89			0.28			0.48			0.85	0.71
Uniform Delay, d1		30.2			16.3			24.9			29.5	27.6
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		18.3			0.1			1.5			13.4	7.6
Delay (s)		48.4			16.4			26.3			42.9	35.2
Level of Service		D			B			C			D	D
Approach Delay (s)		48.4			16.4			26.3			39.6	
Approach LOS		D			B			C			D	

Intersection Summary			
HCM Average Control Delay	35.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	98.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Route 140 On/Off Ramps & Stevens St

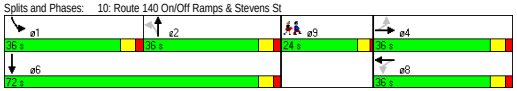
2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	5	5	0	10	5	110	5	205	70	80	55	10	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	14	13	16	12	12	16	12	12	16	12	12	12	
Storage Length (ft)	0		0	0		0	0		0	200		0	
Storage Lanes	0		0	0		0	0		0	1		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		819			376			787			471		
Travel Time (s)		18.6			8.5			17.9			10.7		
Peak Hour Factor	0.45	0.45	0.45	0.84	0.84	0.84	0.85	0.85	0.85	0.84	0.84	0.84	
Heavy Vehicles (%)	0%	0%	0%	33%	0%	3%	0%	7%	13%	11%	4%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	22	0	0	149	0	0	329	0	95	77	0	
Turn Type	Perm			Perm			Perm			Prot			
Protected Phases		4			8			2		1	6		9
Permitted Phases	4			8			2						
Detector Phase	4	4		8	8		2	2		1	6		
Switch Phase													
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0		4.0
Minimum Split (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0		24.0
Total Split (s)	36.0	36.0	0.0	36.0	36.0	0.0	36.0	36.0	0.0	36.0	72.0	0.0	24.0
Total Split (%)	27.3%	27.3%	0.0%	27.3%	27.3%	0.0%	27.3%	27.3%	0.0%	27.3%	54.5%	0.0%	18%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	66.0		20.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		3.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	
Lead/Lag							Lag	Lag		Lead			
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		3.0
Recall Mode	None	None		None	None		None	None		None	None		None
Walk Time (s)													7.0
Flash Dont Walk (s)													13.0
Pedestrian Calls (#/hr)													0
v/c Ratio		0.03			0.22			0.39		0.14	0.08		
Control Delay		14.9			6.2			13.1		15.2	4.2		
Queue Delay		0.0			0.0			0.0		0.0	0.0		
Total Delay		14.9			6.2			13.1		15.2	4.2		
Queue Length 50th (ft)		2			1			28		9	6		
Queue Length 95th (ft)		4			17			53		22	16		
Internal Link Dist (ft)		739			296			707			391		
Turn Bay Length (ft)										200			
Base Capacity (vph)		2652			2271			2476		2561	1796		
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		0.01			0.07			0.13		0.04	0.04		

Intersection Summary

Area Type: Other
Cycle Length: 132
Actuated Cycle Length: 34.4
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 10: Route 140 On/Off Ramps & Stevens St



HCM Signalized Intersection Capacity Analysis
10: Route 140 On/Off Ramps & Stevens St

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	5	0	10	5	110	5	205	70	80	55	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	13	16	12	12	16	12	12	16	12	12	12
Total Lost time (s)		6.0			6.0			6.0		6.0	6.0	
Lane Util. Factor		0.95			0.95			0.95		0.97	1.00	
Frt		1.00			0.87			0.96		1.00	0.98	
Flt Protected		0.98			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		3639			2964			3204		3155	1795	
Flt Permitted		0.88			0.93			0.95		0.95	1.00	
Satd. Flow (perm)		3269			2768			3043		3155	1795	
Peak-hour factor, PHF	0.45	0.45	0.45	0.84	0.84	0.84	0.85	0.85	0.85	0.84	0.84	0.84
Adj. Flow (vph)	11	11	0	12	6	131	6	241	82	95	65	12
RTOR Reduction (vph)	0	0	0	0	115	0	0	24	0	0	5	0
Lane Group Flow (vph)	0	22	0	0	34	0	0	305	0	95	72	0
Heavy Vehicles (%)	0%	0%	0%	33%	0%	3%	0%	7%	13%	11%	4%	0%
Turn Type	Perm			Perm			Perm			Prot		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		4.3			4.3			9.2		4.4	19.6	
Effective Green, g (s)		4.3			4.3			9.2		4.4	19.6	
Actuated g/C Ratio		0.12			0.12			0.26		0.12	0.55	
Clearance Time (s)		6.0			6.0			6.0		6.0	6.0	
Vehicle Extension (s)		2.0			2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		392			332			780		387	980	
v/s Ratio Prot										c0.03	0.04	
v/s Ratio Perm		0.01			c0.01			c0.10				
v/c Ratio		0.06			0.10			0.39		0.25	0.07	
Uniform Delay, d1		14.0			14.1			11.0		14.2	3.9	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.0			0.0			0.1		0.1	0.0	
Delay (s)		14.0			14.1			11.2		14.4	3.9	
Level of Service		B			B			B		B	A	
Approach Delay (s)		14.0			14.1			11.2			9.7	
Approach LOS		B			B			B			A	

Intersection Summary

HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	35.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	35.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

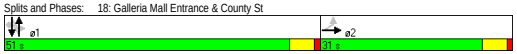
Lanes, Volumes, Timings
18: Galleria Mall Entrance & County St

2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	10	10	0	0	0	5	100	0	50	50	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	14	12	12	12	12	12	16	12	12	16
Storage Length (ft)	0		0	0		0	200		0	0		0
Storage Lanes	0		0	0		0	1		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		396			269			674			311	
Travel Time (s)		9.0			6.1			15.3			7.1	
Peak Hour Factor	0.83	0.83	0.83	0.77	0.77	0.77	0.85	0.85	0.85	0.87	0.87	0.87
Heavy Vehicles (%)	41%	25%	38%	0%	0%	0%	36%	4%	0%	13%	8%	9%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	42	0	0	0	0	0	124	0	0	114	86
Turn Type	Perm						Perm			Perm		Perm
Protected Phases		2						1			1	
Permitted Phases	2						1			1		1
Detector Phase	2	2					1	1		1	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0					8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	13.0	13.0					13.0	13.0		13.0	13.0	13.0
Total Split (s)	31.0	31.0	0.0	0.0	0.0	0.0	51.0	51.0	0.0	51.0	51.0	51.0
Total Split (%)	37.8%	37.8%	0.0%	0.0%	0.0%	0.0%	62.2%	62.2%	0.0%	62.2%	62.2%	62.2%
Maximum Green (s)	26.0	26.0					46.0	46.0		46.0	46.0	46.0
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag					Lead	Lead		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes					Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0					2.0	2.0		2.0	2.0	2.0
Recall Mode	None	None					Min	Min		Min	Min	Min
v/c Ratio		0.06						0.04			0.05	0.06
Control Delay		8.2						2.0			2.0	1.2
Queue Delay		0.0						0.0			0.0	0.0
Total Delay		8.2						2.0			2.0	1.2
Queue Length 50th (ft)		1						0			0	0
Queue Length 95th (ft)		9						12			11	10
Internal Link Dist (ft)		316			189			594			231	
Turn Bay Length (ft)												
Base Capacity (vph)		2420						3239			2721	1679
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		0.02						0.04			0.04	0.05

Intersection Summary	
Area Type:	Other
Cycle Length: 82	
Actuated Cycle Length: 29.9	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 18: Galleria Mall Entrance & County St



HCM Signalized Intersection Capacity Analysis
18: Galleria Mall Entrance & County St

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	10	10	0	0	0	5	100	0	50	50	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	14	12	12	12	12	12	16	12	12	16
Total Lost time (s)		5.0						5.0			5.0	5.0
Lane Util. Factor		0.95						0.95			0.95	1.00
Frt		0.96						1.00			1.00	0.85
Flt Protected		0.98						1.00			0.98	1.00
Satd. Flow (prot)		2745						3412			3187	1679
Flt Permitted		0.98						0.95			0.83	1.00
Satd. Flow (perm)		2745						3238			2722	1679
Peak-hour factor, PHF	0.83	0.83	0.83	0.77	0.77	0.77	0.85	0.85	0.85	0.87	0.87	0.87
Adj. Flow (vph)	18	12	12	0	0	0	6	118	0	57	57	86
RTOR Reduction (vph)	0	12	0	0	0	0	0	0	0	0	0	28
Lane Group Flow (vph)	0	30	0	0	0	0	0	124	0	0	114	58
Heavy Vehicles (%)	41%	25%	38%	0%	0%	0%	36%	4%	0%	13%	8%	9%
Turn Type	Perm						Perm			Perm		Perm
Protected Phases		2						1			1	
Permitted Phases	2						1			1		1
Actuated Green, G (s)		1.3						22.8			22.8	22.8
Effective Green, g (s)		1.3						22.8			22.8	22.8
Actuated g/C Ratio		0.04						0.67			0.67	0.67
Clearance Time (s)		5.0						5.0			5.0	5.0
Vehicle Extension (s)		2.0						2.0			2.0	2.0
Lane Grp Cap (vph)		105						2165			1820	1123
v/s Ratio Prot												
v/s Ratio Perm		0.01						0.04			c0.04	0.03
v/c Ratio		0.29						0.06			0.06	0.05
Uniform Delay, d1		16.0						1.9			2.0	1.9
Progression Factor		1.00						1.00			1.00	1.00
Incremental Delay, d2		0.6						0.0			0.0	0.0
Delay (s)		16.5						2.0			2.0	1.9
Level of Service		B						A			A	A
Approach Delay (s)		16.5			0.0			2.0			2.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	3.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.07		
Actuated Cycle Length (s)	34.1	Sum of lost time (s)	10.0
Intersection Capacity Utilization	24.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

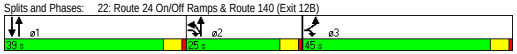
Lanes, Volumes, Timings
22: Route 24 On/Off Ramps & Route 140 (Exit 12B)

2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	200	605	75	740	585	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	12	12	12	12	12
Storage Length (ft)	0	50	50			100
Storage Lanes	1	1	1			1
Taper Length (ft)	25	25	25			25
Right Turn on Red		No				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	741			870	518	
Travel Time (s)	16.8			19.8	11.8	
Peak Hour Factor	0.85	0.85	0.90	0.90	0.84	0.84
Heavy Vehicles (%)	5%	9%	16%	4%	6%	2%
Shared Lane Traffic (%)		35%				
Lane Group Flow (vph)	484	463	83	822	964	0
Turn Type		pt+ov	Prot			
Protected Phases	3	2 3	2	1 2	1	
Permitted Phases						
Detector Phase	3	2 3	2	1 2	1	
Switch Phase						
Minimum Initial (s)	12.0		8.0		10.0	
Minimum Split (s)	17.0		13.0		15.0	
Total Split (s)	45.0	70.0	25.0	64.0	39.0	0.0
Total Split (%)	41.3%	64.2%	22.9%	58.7%	35.8%	0.0%
Maximum Green (s)	40.0		20.0		34.0	
Yellow Time (s)	4.0		4.0		4.0	
All-Red Time (s)	1.0		1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	4.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes			
Vehicle Extension (s)	4.0		3.0		4.0	
Recall Mode	None		None		Min	
v/c Ratio	0.83	0.57	0.28	0.42	0.86	
Control Delay	44.6	17.1	40.4	14.1	40.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	44.6	17.1	40.4	14.1	40.9	
Queue Length 50th (ft)	292	191	49	163	311	
Queue Length 95th (ft)	386	263	97	220	370	
Internal Link Dist (ft)	661			790	438	
Turn Bay Length (ft)		50	50			
Base Capacity (vph)	687	878	304	1961	1130	
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	0.70	0.53	0.27	0.42	0.85	

Intersection Summary	
Area Type:	Other
Cycle Length: 109	
Actuated Cycle Length: 103	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 22: Route 24 On/Off Ramps & Route 140 (Exit 12B)



HCM Signalized Intersection Capacity Analysis
22: Route 24 On/Off Ramps & Route 140 (Exit 12B)

2008 Existing Condition - AM Peak Hour

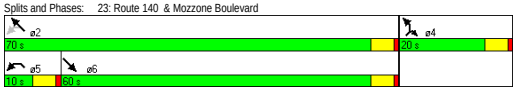
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	200	605	75	740	585	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	15	12	12	12	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	
Frt	0.92	0.85	1.00	1.00	0.96	
Flt Protected	0.98	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1759	1408	1556	3471	3298	
Flt Permitted	0.98	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1759	1408	1556	3471	3298	
Peak-hour factor, PHF	0.85	0.85	0.90	0.90	0.84	0.84
Adj. Flow (vph)	235	712	83	822	696	268
RTOR Reduction (vph)	0	0	0	0	36	0
Lane Group Flow (vph)	484	463	83	822	928	0
Heavy Vehicles (%)	5%	9%	16%	4%	6%	2%
Turn Type		pt+ov	Prot			
Protected Phases	3	2 3	2	1 2	1	
Permitted Phases						
Actuated Green, G (s)	34.2	59.1	19.9	58.7	33.8	
Effective Green, g (s)	34.2	59.1	19.9	58.7	33.8	
Actuated g/C Ratio	0.33	0.57	0.19	0.57	0.33	
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	4.0		3.0		4.0	
Lane Grp Cap (vph)	585	809	301	1980	1083	
v/s Ratio Prot	c0.28	c0.33	0.05	0.24	c0.28	
v/s Ratio Perm						
v/c Ratio	0.83	0.57	0.28	0.42	0.86	
Uniform Delay, d1	31.6	13.9	35.4	12.4	32.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.8	1.0	0.5	0.2	7.1	
Delay (s)	41.4	14.9	35.9	12.6	39.4	
Level of Service	D	B	D	B	D	
Approach Delay (s)	28.4			14.8	39.4	
Approach LOS	C			B	D	

Intersection Summary			
HCM Average Control Delay	27.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	102.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (vph)	795	20	35	905	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		150	0		0	0
Storage Lanes		0	0		1	1
Taper Length (ft)		25	25		25	25
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	1797			332	1312	
Travel Time (s)	40.8			7.5	29.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	886	0	0	1022	5	16
Turn Type			pm+pt			Prot
Protected Phases	6		5	2	4	4
Permitted Phases			2			
Detector Phase	6		5	2	4	4
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	15.0		10.0	10.0	15.0	15.0
Total Split (s)	60.0	0.0	10.0	70.0	20.0	20.0
Total Split (%)	66.7%	0.0%	11.1%	77.8%	22.2%	22.2%
Maximum Green (s)	55.0		5.0	65.0	15.0	15.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	4.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	Min		None	Min	None	None
v/c Ratio	0.27			0.34	0.02	0.06
Control Delay	1.2			1.5	18.0	11.2
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	1.2			1.5	18.0	11.2
Queue Length 50th (ft)	0			0	1	0
Queue Length 95th (ft)	66			85	9	14
Internal Link Dist (ft)	1717			252	1232	
Turn Bay Length (ft)						
Base Capacity (vph)	3525			3207	752	682
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	0.25			0.32	0.01	0.02

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 37.1	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 23: Route 140 & Mozzone Boulevard



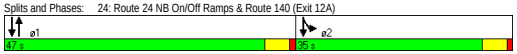
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (vph)	795	20	35	905	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3526			3533	1770	1583
Flt Permitted	1.00			0.91	0.95	1.00
Satd. Flow (perm)	3526			3206	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	864	22	38	984	5	16
RTOR Reduction (vph)	1	0	0	0	0	16
Lane Group Flow (vph)	885	0	0	1022	5	0
Turn Type			pm+pt			Prot
Protected Phases	6		5	2	4	4
Permitted Phases			2			
Actuated Green, G (s)	30.3			30.3	0.9	0.9
Effective Green, g (s)	30.3			30.3	0.9	0.9
Actuated g/C Ratio	0.74			0.74	0.02	0.02
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2593			2358	39	35
v/s Ratio Prot	0.25				c0.00	0.00
v/s Ratio Perm				c0.32		
v/c Ratio	0.34			0.43	0.13	0.01
Uniform Delay, d1	1.9			2.1	19.8	19.7
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.1			0.1	1.5	0.1
Delay (s)	2.0			2.2	21.3	19.8
Level of Service	A			A	C	B
Approach Delay (s)	2.0			2.2	20.2	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	2.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	41.2	Sum of lost time (s)	10.0
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	270	565	1095	270	910
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	12	12
Storage Length (ft)	0	0		300	50	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		30			30
Link Distance (ft)	736		624			870
Travel Time (s)	16.7		14.2			19.8
Peak Hour Factor	0.92	0.92	0.86	0.86	0.92	0.92
Heavy Vehicles (%)	0%	1%	7%	6%	6%	8%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	293	657	1273	293	989
Turn Type		Free		Free	Prot	
Protected Phases			1		2	1 2
Permitted Phases		Free		Free		
Detector Phase			1		2	1 2
Switch Phase						
Minimum Initial (s)			16.0		8.0	
Minimum Split (s)			21.0		13.0	
Total Split (s)	0.0	0.0	47.0	0.0	35.0	82.0
Total Split (%)	0.0%	0.0%	57.3%	0.0%	42.7%	100.0%
Maximum Green (s)			42.0		30.0	
Yellow Time (s)			4.0		4.0	
All-Red Time (s)			1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	5.0	4.0	5.0	5.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?						
Vehicle Extension (s)			2.0		2.0	
Recall Mode			Min		None	
v/c Ratio		0.16	0.44	0.84	0.54	0.30
Control Delay		0.2	10.2	6.6	16.2	0.2
Queue Delay		0.0	0.0	0.0	0.0	0.0
Total Delay		0.2	10.2	6.6	16.2	0.2
Queue Length 50th (ft)		0	50	0	49	0
Queue Length 95th (ft)		0	107	0	130	0
Internal Link Dist (ft)	656		544			790
Turn Bay Length (ft)				300	50	
Base Capacity (vph)		1790	3142	1524	1248	3343
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		0.16	0.21	0.84	0.23	0.30

Intersection Summary	
Area Type:	Other
Cycle Length: 82	
Actuated Cycle Length: 42.4	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 24: Route 24 NB On/Off Ramps & Route 140 (Exit 12A)



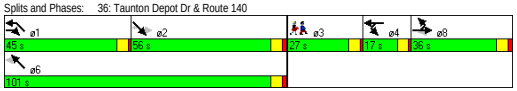
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	270	565	1095	270	910
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	15	12	12	12	12
Total Lost time (s)		4.0	5.0	4.0	5.0	5.0
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95
Frt		0.86	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1790	3374	1524	1703	3343
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1790	3374	1524	1703	3343
Peak-hour factor, PHF	0.92	0.92	0.86	0.86	0.92	0.92
Adj. Flow (vph)	0	293	657	1273	293	989
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	293	657	1273	293	989
Heavy Vehicles (%)	0%	1%	7%	6%	6%	8%
Turn Type		Free		Free	Prot	
Protected Phases			1		2	1 2
Permitted Phases		Free		Free		
Actuated Green, G (s)		42.1	18.6	42.1	13.5	42.1
Effective Green, g (s)		42.1	18.6	42.1	13.5	42.1
Actuated g/C Ratio		1.00	0.44	1.00	0.32	1.00
Clearance Time (s)			5.0		5.0	
Vehicle Extension (s)			2.0		2.0	
Lane Grp Cap (vph)		1790	1491	1524	546	3343
v/s Ratio Prot			0.19		0.17	0.30
v/s Ratio Perm		0.16		c0.84		
v/c Ratio		0.16	0.44	0.84	0.54	0.30
Uniform Delay, d1		0.0	8.1	0.0	11.7	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2	0.1	5.6	0.5	0.0
Delay (s)		0.2	8.2	5.6	12.2	0.0
Level of Service		A	A	A	B	A
Approach Delay (s)	0.2		6.5			2.8
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	4.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	42.1	Sum of lost time (s)	0.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR	ø3
Lane Configurations													
Volume (vph)	55	0	60	0	0	5	5	720	120	80	670	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	12	12	
Storage Length (ft)	0		100	0		0	180		130	320		350	
Storage Lanes	1		1	0		0	1		1	1		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		846			205			2224			1797		
Travel Time (s)		19.2			4.7			50.5			40.8		
Peak Hour Factor	0.85	0.85	0.85	0.50	0.50	0.50	0.90	0.90	0.90	0.93	0.93	0.93	
Heavy Vehicles (%)	9%	0%	4%	0%	0%	0%	0%	4%	5%	0%	6%	0%	
Shared Lane Traffic (%)	50%												
Lane Group Flow (vph)	32	33	71	0	10	0	0	806	133	86	720	0	
Turn Type	Split		pm+ov	Split			Perm		Perm	pm+pt			
Protected Phases	8	8	1	4	4			2		1	6		3
Permitted Phases			8				2		2	6			
Detector Phase	8	8	1	4	4		2	2	2	1	6		
Switch Phase													
Minimum Initial (s)	6.0	6.0	6.0	4.0	4.0		6.0	6.0	6.0	6.0	20.0		7.0
Minimum Split (s)	12.0	12.0	11.0	9.0	9.0		12.0	12.0	12.0	11.0	26.0		27.0
Total Split (s)	36.0	36.0	45.0	17.0	17.0	0.0	56.0	56.0	56.0	45.0	101.0	0.0	27.0
Total Split (%)	19.9%	19.9%	24.9%	9.4%	9.4%	0.0%	30.9%	30.9%	30.9%	24.9%	55.8%	0.0%	15%
Maximum Green (s)	30.0	30.0	40.0	12.0	12.0		50.0	50.0	50.0	40.0	95.0		22.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0		2.0	2.0	2.0	1.0	2.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	5.0	5.0	5.0	4.0	6.0	6.0	6.0	5.0	6.0	4.0	
Lead/Lag			Lead	Lag	Lag		Lag	Lag	Lag	Lead			Lead
Lead-Lag Optimize?				Yes	Yes								Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		4.0	4.0	4.0	2.0	4.0		3.0
Recall Mode	None	None	None	None	None		Min	Min	Min	None	Min		None
Walk Time (s)													7.0
Flash Dont Walk (s)													15.0
Pedestrian Calls (#/hr)													0
v/c Ratio	0.17	0.18	0.14		0.02			0.51	0.17	0.18	0.30		
Control Delay	28.7	28.8	6.2		0.0			12.7	7.5	5.0	5.0		
Queue Delay	0.0	0.0	0.0		0.0			0.0	0.0	0.0	0.0		
Total Delay	28.7	28.8	6.2		0.0			12.7	7.5	5.0	5.0		
Queue Length 50th (ft)	9	9	0		0			90	14	7	40		
Queue Length 95th (ft)	38	40	25		0			193	53	30	110		
Internal Link Dist (ft)		766			125			2144			1717		
Turn Bay Length (ft)			100						130	320			
Base Capacity (vph)	860	860	1397		738			2938	1377	1329	3406		
Starvation Cap Reductn	0	0	0		0			0	0	0	0		
Spillback Cap Reductn	0	0	0		0			0	0	0	0		
Storage Cap Reductn	0	0	0		0			0	0	0	0		
Reduced v/c Ratio	0.04	0.04	0.05		0.01			0.27	0.10	0.06	0.21		

Intersection Summary	
Area Type:	Other
Cycle Length: 181	
Actuated Cycle Length: 56.6	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 36: Taunton Depot Dr & Route 140



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	55	0	60	0	0	5	5	720	120	80	670	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)	6.0	6.0	5.0		5.0			6.0	6.0	5.0	6.0	
Lane Util. Factor	0.95	0.95	1.00		1.00			0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85		0.86			1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00		1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1573	1573	1553		1863			3471	1538	1805	3406	
Flt Permitted	0.95	0.95	1.00		1.00			0.95	1.00	0.24	1.00	
Satd. Flow (perm)	1573	1573	1553		1863			3296	1538	465	3406	
Peak-hour factor, PHF	0.85	0.85	0.85	0.50	0.50	0.50	0.90	0.90	0.90	0.93	0.93	0.93
Adj. Flow (vph)	65	0	71	0	0	10	6	800	133	86	720	0
RTOR Reduction (vph)	0	0	58	0	10	0	0	0	29	0	0	0
Lane Group Flow (vph)	32	33	13	0	0	0	0	806	104	86	720	0
Heavy Vehicles (%)	9%	0%	4%	0%	0%	0%	0%	4%	5%	0%	6%	0%
Turn Type	Split		pm+ov	Split			Perm		Perm	pm+pt		
Protected Phases	8	8	1	4	4			2		1	6	
Permitted Phases			8				2		2	6		
Actuated Green, G (s)	5.3	5.3	11.7		0.7			27.6	27.6	39.0	39.0	
Effective Green, g (s)	5.3	5.3	11.7		0.7			27.6	27.6	39.0	39.0	
Actuated g/C Ratio	0.09	0.09	0.19		0.01			0.45	0.45	0.63	0.63	
Clearance Time (s)	6.0	6.0	5.0		5.0			6.0	6.0	5.0	6.0	
Vehicle Extension (s)	2.0	2.0	2.0		2.0			4.0	4.0	2.0	4.0	
Lane Grp Cap (vph)	134	134	293		21			1467	685	431	2142	
v/s Ratio Prot	0.02	c0.02	0.00		c0.00					0.02	c0.21	
v/s Ratio Perm			0.00					c0.24	0.07	0.10		
v/c Ratio	0.24	0.25	0.05		0.01			0.55	0.15	0.20	0.34	
Uniform Delay, d1	26.5	26.5	20.6		30.3			12.6	10.2	5.3	5.4	
Progression Factor	1.00	1.00	1.00		1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.4	0.0		0.0			0.5	0.1	0.1	0.1	
Delay (s)	26.8	26.8	20.6		30.3			13.2	10.4	5.4	5.5	
Level of Service	C	C	C		C			B	B	A	A	
Approach Delay (s)		23.6			30.3			12.8			5.5	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	62.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

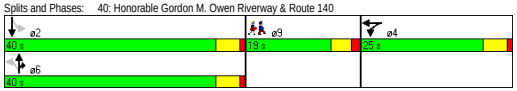
Lanes, Volumes, Timings
40: Honorable Gordon M. Owen Riverway & Route 140

2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	0	0	0	210	0	5	0	620	275	10	380	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	13	12	12	11	12	12	13	12	
Storage Length (ft)	0		0	0		0	0		175	0		0	
Storage Lanes	0		0	0		0	0		1	0		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		220			991			547			1888		
Travel Time (s)		5.0			22.5			12.4			42.9		
Peak Hour Factor	0.92	0.92	0.92	0.84	0.84	0.84	0.93	0.93	0.93	0.89	0.89	0.89	
Heavy Vehicles (%)	0%	0%	0%	8%	0%	0%	0%	6%	4%	8%	5%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	0	0	0	256	0	0	667	296	0	438	0	
Turn Type				Split			Perm		Prot	Perm			
Protected Phases				4	4			6	6		2		9
Permitted Phases							6			2			
Detector Phase				4	4		6	6	6	2	2		
Switch Phase													
Minimum Initial (s)				6.0	6.0		6.0	6.0	6.0	6.0	6.0		1.0
Minimum Split (s)				11.0	11.0		11.0	11.0	11.0	11.0	11.0		19.0
Total Split (s)	0.0	0.0	0.0	25.0	25.0	0.0	40.0	40.0	40.0	40.0	40.0	0.0	19.0
Total Split (%)	0.0%	0.0%	0.0%	29.8%	29.8%	0.0%	47.6%	47.6%	47.6%	47.6%	47.6%	0.0%	23%
Maximum Green (s)				20.0	20.0		35.0	35.0	35.0	35.0	35.0		14.0
Yellow Time (s)				4.0	4.0		4.0	4.0	4.0	4.0	4.0		3.5
All-Red Time (s)				1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0	
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)				4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0
Recall Mode				None	None		None	None	None	None	None		None
Walk Time (s)													7.0
Flash Dont Walk (s)													7.0
Pedestrian Calls (#/hr)													0
v/c Ratio					0.56			0.70	0.30		0.43		
Control Delay					23.9			14.4	2.5		9.4		
Queue Delay					0.0			0.0	0.0		0.0		
Total Delay					23.9			14.4	2.5		9.4		
Queue Length 50th (ft)					81			141	5		75		
Queue Length 95th (ft)					132			302	37		156		
Internal Link Dist (ft)		140			911			467			1808		
Turn Bay Length (ft)									175				
Base Capacity (vph)					643			1126	1101		1194		
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					0.40			0.59	0.27		0.37		

Intersection Summary	
Area Type:	Other
Cycle Length: 84	
Actuated Cycle Length: 55.5	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 40: Honorable Gordon M. Owen Riverway & Route 140



HCM Signalized Intersection Capacity Analysis
40: Honorable Gordon M. Owen Riverway & Route 140

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	210	0	5	0	620	275	10	380	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	13	12	12	11	12	12	13	12
Total Lost time (s)					5.0			5.0	5.0		5.0	
Lane Util. Factor					1.00			1.00	1.00		1.00	
Frt					1.00			1.00	0.85		1.00	
Flt Protected					0.95			1.00	1.00		1.00	
Satd. Flow (prot)					1731			1733	1553		1866	
Flt Permitted					0.95			1.00	1.00		0.98	
Satd. Flow (perm)					1731			1733	1553		1837	
Peak-hour factor, PHF	0.92	0.92	0.92	0.84	0.84	0.84	0.93	0.93	0.93	0.89	0.89	0.89
Adj. Flow (vph)	0	0	0	250	0	6	0	667	296	11	427	0
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	116	0	0	0
Lane Group Flow (vph)	0	0	0	0	255	0	0	667	180	0	438	0
Heavy Vehicles (%)	0%	0%	0%	8%	0%	0%	0%	6%	4%	8%	5%	0%
Turn Type				Split			Perm		Prot	Perm		
Protected Phases				4	4			6	6		2	
Permitted Phases							6			2		
Actuated Green, G (s)					14.6			30.6	30.6		30.6	
Effective Green, g (s)					14.6			30.6	30.6		30.6	
Actuated g/C Ratio					0.26			0.55	0.55		0.55	
Clearance Time (s)					5.0			5.0	5.0		5.0	
Vehicle Extension (s)					4.0			4.0	4.0		4.0	
Lane Grp Cap (vph)					458			961	861		1018	
v/s Ratio Prot					c0.15			c0.38	0.12			
v/s Ratio Perm											0.24	
v/c Ratio					0.56			0.69	0.21		0.43	
Uniform Delay, d1					17.5			8.9	6.2		7.2	
Progression Factor					1.00			1.00	1.00		1.00	
Incremental Delay, d2					1.8			2.4	0.2		0.4	
Delay (s)					19.3			11.3	6.4		7.6	
Level of Service					B			B	A		A	
Approach Delay (s)		0.0			19.3			9.8			7.6	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	55.2	Sum of lost time (s)	10.0
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
43: Route 44/Dean Street & Longmeadow Street

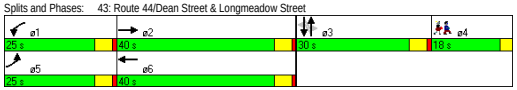
2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø4
Lane Configurations													
Volume (vph)	10	775	270	175	610	90	110	335	260	120	210	15	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	16	10	12	13	12	11	16	12	11	12	
Storage Length (ft)	100		70	100		70	0		50	0		100	
Storage Lanes	1		1	1		1	0		1	0		1	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		1663			1440			2994			1249		
Travel Time (s)		37.8			32.7			68.0			28.4		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.86	0.86	0.86	0.68	0.68	0.68	
Heavy Vehicles (%)	18%	3%	3%	5%	4%	2%	8%	6%	3%	3%	8%	20%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	11	1111	0	186	745	0	0	820	0	0	507	0	
Turn Type	Prot			Prot			Perm			Perm			
Protected Phases	5	2		1	6			3			3		4
Permitted Phases							3			3			
Detector Phase	5	2		1	6		3	3		3	3		
Switch Phase													
Minimum Initial (s)	9.0	12.0		9.0	12.0		8.0	8.0		8.0	8.0		8.0
Minimum Split (s)	14.0	17.0		14.0	17.0		13.0	13.0		13.0	13.0		18.0
Total Split (s)	25.0	40.0	0.0	25.0	40.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	18.0
Total Split (%)	22.1%	35.4%	0.0%	22.1%	35.4%	0.0%	26.5%	26.5%	0.0%	26.5%	26.5%	0.0%	16%
Maximum Green (s)	20.0	35.0		20.0	35.0		25.0	25.0		25.0	25.0		15.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	4.0	5.0		4.0	5.0		4.0	4.0		4.0	4.0		0.2
Recall Mode	None	Min		None	Min		None	None		None	None		None
Walk Time (s)													8.0
Flash Dont Walk (s)													7.0
Pedestrian Calls (#/hr)													0
v/c Ratio	0.08	0.84		0.66	0.37			1.27			2.17dl		
Control Delay	40.4	32.2		46.5	11.1			162.6			77.3		
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0		
Total Delay	40.4	32.2		46.5	11.1			162.6			77.3		
Queue Length 50th (ft)	6	293		101	98			~299			~157		
Queue Length 95th (ft)	23	#436		171	194			#409			#171		
Internal Link Dist (ft)		1583			1360			2914			1169		
Turn Bay Length (ft)	100			100									
Base Capacity (vph)	314	1322		352	2007			644			503		
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	0.04	0.84		0.53	0.37			1.27			1.01		

Intersection Summary

Area Type: Other
Cycle Length: 113
Actuated Cycle Length: 91.2
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
~ 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 43: Route 44/Dean Street & Longmeadow Street



HCM Signalized Intersection Capacity Analysis
43: Route 44/Dean Street & Longmeadow Street

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	775	270	175	610	90	110	335	260	120	210	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	16	10	12	13	12	11	16	12	11	12
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frt	1.00	0.96		1.00	0.98			0.94			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1428	3369		1604	3413			3109			3191	
Flt Permitted	0.95	1.00		0.95	1.00			0.67			0.56	
Satd. Flow (perm)	1428	3369		1604	3413			2093			1822	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.86	0.86	0.86	0.68	0.68	0.68
Adj. Flow (vph)	11	824	287	186	649	96	128	390	302	176	309	22
RTOR Reduction (vph)	0	26	0	0	7	0	0	70	0	0	3	0
Lane Group Flow (vph)	11	1085	0	186	738	0	0	750	0	0	504	0
Heavy Vehicles (%)	18%	3%	3%	5%	4%	2%	8%	6%	3%	3%	8%	20%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			3			3	
Permitted Phases							3			3		
Actuated Green, G (s)	1.7	39.0		16.1	53.4			25.0			25.0	
Effective Green, g (s)	1.7	39.0		16.1	53.4			25.0			25.0	
Actuated g/C Ratio	0.02	0.41		0.17	0.56			0.26			0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	4.0	5.0		4.0	5.0			4.0			4.0	
Lane Grp Cap (vph)	26	1382		272	1916			550			479	
v/s Ratio Prot	0.01	c0.32		c0.12	0.22							
v/s Ratio Perm								c0.36			0.28	
v/c Ratio	0.42	0.79		0.68	0.39			1.36			2.17dl	
Uniform Delay, d1	46.2	24.4		37.1	11.7			35.0			35.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	14.4	3.5		7.5	0.3			175.1			55.6	
Delay (s)	60.6	27.9		44.6	11.9			210.1			90.6	
Level of Service	E	C		D	B			F			F	
Approach Delay (s)		28.2			18.5			210.1			90.6	
Approach LOS		C			B			F			F	

Intersection Summary

HCM Average Control Delay	79.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	95.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	87.0%	ICU Level of Service	E
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

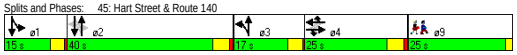
Lanes, Volumes, Timings
45: Hart Street & Route 140

2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2	ø9
Lane Configurations														
Volume (vph)	25	140	230	115	100	220	125	575	55	85	400	10		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	11	11	12	12	12	11	11	11	12	12	12		
Storage Length (ft)	0		50	0		50	50		0	50		0		
Storage Lanes	0		1	0		1	1		0	1		0		
Taper Length (ft)	25		25	25		25	25		25	25		25		
Right Turn on Red			Yes			Yes			Yes			Yes		
Link Speed (mph)		30			30			35			35			
Link Distance (ft)		1373			971			2224			3692			
Travel Time (s)		31.2			22.1			43.3			71.9			
Peak Hour Factor	0.80	0.80	0.80	0.95	0.95	0.95	0.95	0.95	0.95	0.73	0.73	0.73		
Heavy Vehicles (%)	0%	6%	3%	1%	4%	3%	4%	5%	2%	10%	6%	13%		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	206	288	0	226	232	0	795	0	0	678	0		
Turn Type	Perm		Prot	Perm		Prot	pm+pt			pm+pt				
Protected Phases		4	4		4	4	3	2 3		1	1 2		2	9
Permitted Phases	4			4			2 3			1 2				
Detector Phase	4	4	4	4	4	4	3	2 3		1	1 2			
Switch Phase														
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	4.0			4.0			8.0	1.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	8.0			8.0			13.0	25.0
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	17.0	57.0	0.0	15.0	55.0	0.0	40.0	25.0
Total Split (%)	20.5%	20.5%	20.5%	20.5%	20.5%	20.5%	13.9%	46.7%	0.0%	12.3%	45.1%	0.0%	33%	20%
Maximum Green (s)	20.0	20.0	20.0	20.0	20.0	20.0	13.0			11.0			35.0	23.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.5			3.5			4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	0.5			0.5			1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	4.0	4.0	4.0	4.0		
Lead/Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead			Lead			Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes			Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0			3.0	3.0
Recall Mode	Max	Max	Max	Max	Max	Max	None			None			None	None
Walk Time (s)														7.0
Flash Dont Walk (s)														16.0
Pedestrian Calls (#/hr)														0
v/c Ratio		0.60	0.64		0.96	0.54		0.69			0.56			
Control Delay		41.1	23.5		88.2	22.5		20.4			15.1			
Queue Delay		0.0	0.0		0.0	0.0		0.0			0.0			
Total Delay		41.1	23.5		88.2	22.5		20.4			15.1			
Queue Length 50th (ft)		110	73		134	62		147			111			
Queue Length 95th (ft)		165	132		#291	142		195			122			
Internal Link Dist (ft)		1293			891			2144			3612			
Turn Bay Length (ft)			50			50								
Base Capacity (vph)		346	450		235	431		1322			1272			
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		0.60	0.64		0.96	0.54		0.60			0.53			

Intersection Summary	
Area Type:	Other
Cycle Length: 122	
Actuated Cycle Length: 91	
Natural Cycle: 110	
Control Type: Semi Act-Uncoord	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 45: Hart Street & Route 140



HCM Signalized Intersection Capacity Analysis
45: Hart Street & Route 140

2008 Existing Condition - AM Peak Hour

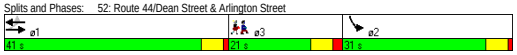
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	140	230	115	100	220	125	575	55	85	400	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12	11	11	11	12	12	12
Total Lost time (s)		5.0	5.0		5.0	5.0		5.0			4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.95			0.95	
Frt		1.00	0.85		1.00	0.85		0.99			1.00	
Flt Protected		0.99	1.00		0.97	1.00		0.99			0.99	
Satd. Flow (prot)		1735	1516		1807	1568		3272			3340	
Flt Permitted		0.90	1.00		0.58	1.00		0.72			0.65	
Satd. Flow (perm)		1569	1516		1067	1568		2360			2179	
Peak-hour factor, PHF	0.80	0.80	0.80	0.95	0.95	0.95	0.95	0.95	0.95	0.73	0.73	0.73
Adj. Flow (vph)	31	175	288	121	105	232	132	605	58	116	548	14
RTOR Reduction (vph)	0	0	115	0	0	85	0	4	0	0	1	0
Lane Group Flow (vph)	0	206	173	0	226	147	0	791	0	0	677	0
Heavy Vehicles (%)	0%	6%	3%	1%	4%	3%	4%	5%	2%	10%	6%	13%
Turn Type	Perm		Prot	Perm		Prot	pm+pt			pm+pt		
Protected Phases		4	4		4	4	3	2 3		1	1 2	
Permitted Phases	4			4			2 3			1 2		
Actuated Green, G (s)		20.1	20.1		20.1	20.1		41.8			43.4	
Effective Green, g (s)		20.1	20.1		20.1	20.1		41.8			43.4	
Actuated g/C Ratio		0.22	0.22		0.22	0.22		0.46			0.48	
Clearance Time (s)		5.0	5.0		5.0	5.0						
Vehicle Extension (s)		3.0	3.0		3.0	3.0						
Lane Grp Cap (vph)		347	335		236	347		1180			1181	
v/s Ratio Prot			0.11			0.09		c0.07			c0.07	
v/s Ratio Perm		0.13			c0.21			c0.24			0.20	
v/c Ratio		0.59	0.52		0.96	0.42		0.67			0.57	
Uniform Delay, d1		31.7	31.1		35.0	30.4		19.2			17.1	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		7.3	5.6		48.6	3.8		1.5			0.7	
Delay (s)		39.0	36.7		83.6	34.2		20.7			17.8	
Level of Service		D	D		F	C		C			B	
Approach Delay (s)		37.7			58.6			20.7			17.8	
Approach LOS		D			E			C			B	

Intersection Summary			
HCM Average Control Delay	30.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.9	Sum of lost time (s)	19.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	ø3
Lane Configurations							
Volume (vph)	30	765	625	110	265	50	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	16	12	14	12	
Storage Length (ft)	150			0	0	0	
Storage Lanes	1			0	1	0	
Taper Length (ft)	25			25	25	25	
Right Turn on Red				Yes		No	
Link Speed (mph)		30	30		30		
Link Distance (ft)		1036	1663		418		
Travel Time (s)		23.5	37.8		9.5		
Peak Hour Factor	0.87	0.87	0.86	0.86	0.81	0.81	
Heavy Vehicles (%)	3%	5%	5%	3%	4%	12%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	34	879	855	0	389	0	
Turn Type	Perm						
Protected Phases		1	1		2		3
Permitted Phases	1						
Detector Phase	1	1	1		2		
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		5.0		5.0
Minimum Split (s)	15.0	15.0	15.0		10.0		21.0
Total Split (s)	41.0	41.0	41.0	0.0	31.0	0.0	21.0
Total Split (%)	44.1%	44.1%	44.1%	0.0%	33.3%	0.0%	23%
Maximum Green (s)	36.0	36.0	36.0		26.0		15.0
Yellow Time (s)	4.0	4.0	4.0		4.0		4.0
All-Red Time (s)	1.0	1.0	1.0		1.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	4.0	5.0	4.0	
Lead/Lag	Lead	Lead	Lead				Lag
Lead-Lag Optimize?	Yes	Yes	Yes				Yes
Vehicle Extension (s)	3.0	3.0	3.0		3.0		1.0
Recall Mode	None	None	None		None		None
Walk Time (s)							5.0
Flash Dont Walk (s)							10.0
Pedestrian Calls (#/hr)							0
v/c Ratio	0.26	0.88	0.77		0.73		
Control Delay	15.8	27.3	18.7		29.3		
Queue Delay	0.0	0.0	0.0		0.0		
Total Delay	15.8	27.3	18.7		29.3		
Queue Length 50th (ft)	6	278	237		138		
Queue Length 95th (ft)	29	#579	#448		193		
Internal Link Dist (ft)		956	1583		338		
Turn Bay Length (ft)	150						
Base Capacity (vph)	133	999	1117		720		
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	0.26	0.88	0.77		0.54		

Intersection Summary	
Area Type:	Other
Cycle Length: 93	
Actuated Cycle Length: 65.5	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 52: Route 44/Dean Street & Arlington Street



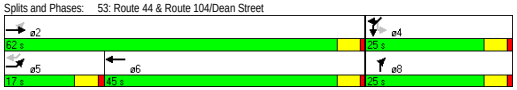
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	30	765	625	110	265	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	16	12	14	12
Total Lost time (s)	5.0	5.0	5.0		5.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.98		0.98	
Flt Protected	0.95	1.00	1.00		0.96	
Satd. Flow (prot)	1636	1810	2015		1808	
Flt Permitted	0.14	1.00	1.00		0.96	
Satd. Flow (perm)	241	1810	2015		1808	
Peak-hour factor, PHF	0.87	0.87	0.86	0.86	0.81	0.81
Adj. Flow (vph)	34	879	727	128	327	62
RTOR Reduction (vph)	0	0	5	0	0	0
Lane Group Flow (vph)	34	879	850	0	389	0
Heavy Vehicles (%)	3%	5%	5%	3%	4%	12%
Turn Type	Perm					
Protected Phases		1	1		2	
Permitted Phases	1					
Actuated Green, G (s)	36.2	36.2	36.2		19.3	
Effective Green, g (s)	36.2	36.2	36.2		19.3	
Actuated g/C Ratio	0.55	0.55	0.55		0.29	
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	133	1000	1114		533	
v/s Ratio Prot		c0.49	0.42		c0.22	
v/s Ratio Perm	0.14					
v/c Ratio	0.26	0.88	0.76		0.73	
Uniform Delay, d1	7.6	12.7	11.3		20.8	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	1.0	8.9	3.2		5.0	
Delay (s)	8.7	21.6	14.5		25.7	
Level of Service	A	C	B		C	
Approach Delay (s)		21.2	14.5		25.7	
Approach LOS		C	B		C	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	65.5	Sum of lost time (s)	10.0
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Volume (vph)	170	955	0	0	695	20	0	0	30	5	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	16	12	12	12	12	16
Storage Length (ft)	50		0	0		50	0	0		0	50
Storage Lanes	1		0	0		0	0	1		1	1
Taper Length (ft)	25		25	25		25	25	25		25	25
Right Turn on Red			Yes			Yes					Yes
Link Speed (mph)		30			30		30			30	
Link Distance (ft)		825			1426		127			959	
Travel Time (s)		18.8			32.4		2.9			21.8	
Peak Hour Factor	0.85	0.85	0.85	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89
Heavy Vehicles (%)	3%	3%	0%	0%	4%	0%	0%	0%	7%	0%	4%
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	1324	0	0	777	0	0	0	0	40	191
Turn Type	pm+pt							custom	Perm		custom
Protected Phases	5	2			6			8		4	4
Permitted Phases	2								4		5
Detector Phase	5	2			6			8	4	4	4
Switch Phase											
Minimum Initial (s)	6.0	12.0			12.0			6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	17.0			17.0			11.0	11.0	11.0	11.0
Total Split (s)	17.0	62.0	0.0	0.0	45.0	0.0	0.0	25.0	25.0	25.0	25.0
Total Split (%)	19.5%	71.3%	0.0%	0.0%	51.7%	0.0%	0.0%	28.7%	28.7%	28.7%	28.7%
Maximum Green (s)	12.0	57.0			40.0			20.0	20.0	20.0	20.0
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	4.0	4.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead				Lag						
Lead-Lag Optimize?	Yes				Yes						
Vehicle Extension (s)	1.5	1.5			1.5			2.0	2.0	2.0	2.0
Recall Mode	None	Min			Min			None	None	None	None
v/c Ratio		0.78			0.32					0.18	0.56
Control Delay		10.4			4.0					28.7	18.1
Queue Delay		0.0			0.0					0.0	0.0
Total Delay		10.4			4.0					28.7	18.1
Queue Length 50th (ft)		121			41					12	20
Queue Length 95th (ft)		230			84					44	87
Internal Link Dist (ft)		745			1346		47			879	
Turn Bay Length (ft)											50
Base Capacity (vph)		2190			2608					576	677
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		0.60			0.30					0.07	0.28

Intersection Summary	
Area Type:	Other
Cycle Length: 87	
Actuated Cycle Length: 61.6	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 53: Route 44 & Route 104/Dean Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Volume (vph)	170	955	0	0	695	20	0	0	30	5	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	12	12	12	16
Total Lost time (s)		5.0			5.0					5.0	5.0
Lane Util. Factor		0.95			0.95					1.00	1.00
Frt		1.00			1.00					1.00	0.85
Flt Protected		0.99			1.00					0.95	1.00
Satd. Flow (prot)		3479			3460					1704	1760
Flt Permitted		0.69			1.00					0.95	1.00
Satd. Flow (perm)		2432			3460					1704	1760
Peak-hour factor, PHF	0.85	0.85	0.85	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89
Adj. Flow (vph)	200	1124	0	0	755	22	0	0	34	6	191
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	108
Lane Group Flow (vph)	0	1324	0	0	776	0	0	0	0	40	83
Heavy Vehicles (%)	3%	3%	0%	0%	4%	0%	0%	0%	7%	0%	4%
Turn Type	pm+pt							custom	Perm		custom
Protected Phases	5	2			6			8		4	4
Permitted Phases	2								4		5
Actuated Green, G (s)		42.9			42.9					8.2	8.2
Effective Green, g (s)		42.9			42.9					8.2	8.2
Actuated g/C Ratio		0.70			0.70					0.13	0.13
Clearance Time (s)		5.0			5.0					5.0	5.0
Vehicle Extension (s)		1.5			1.5					2.0	2.0
Lane Grp Cap (vph)		1708			2429					229	236
v/s Ratio Prot					0.22						c0.05
v/s Ratio Perm		c0.54								0.02	
v/c Ratio		0.78			0.32					0.17	0.35
Uniform Delay, d1		5.9			3.5					23.4	24.0
Progression Factor		1.00			1.00					1.00	1.00
Incremental Delay, d2		2.1			0.0					0.1	0.3
Delay (s)		8.0			3.5					23.6	24.4
Level of Service		A			A					C	C
Approach Delay (s)		8.0			3.5		0.0			24.2	
Approach LOS		A			A		A			C	

Intersection Summary			
HCM Average Control Delay	8.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	61.1	Sum of lost time (s)	10.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
57: Spring Street & Summer Street

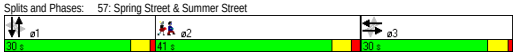
2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	20	205	55	35	135	10	45	425	20	10	250	20	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	16	12	
Right Turn on Red			Yes			No			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		376			382			1581			384		
Travel Time (s)		8.5			8.7			35.9			8.7		
Peak Hour Factor	0.87	0.87	0.87	0.82	0.82	0.82	0.93	0.93	0.93	0.76	0.76	0.76	
Heavy Vehicles (%)	5%	4%	4%	3%	5%	13%	2%	5%	0%	0%	2%	5%	
Parking (#/hr)											0		
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	322	0	0	220	0	0	527	0	0	368	0	
Turn Type	Perm			Perm			Perm			Perm			
Protected Phases		3			3			1			1		2
Permitted Phases	3			3			1			1			
Detector Phase	3	3		3	3		1	1		1	1		
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0		15.0
Minimum Split (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0		21.0
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	41.0
Total Split (%)	29.7%	29.7%	0.0%	29.7%	29.7%	0.0%	29.7%	29.7%	0.0%	29.7%	29.7%	0.0%	41%
Maximum Green (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0		35.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	
Lead/Lag							Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		5.0
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													8.0
Pedestrian Calls (#/hr)													0
v/c Ratio		0.44			0.29			0.75			0.48		
Control Delay		14.4			12.9			23.1			15.2		
Queue Delay		0.0			0.0			0.0			0.1		
Total Delay		14.4			12.9			23.1			15.3		
Queue Length 50th (ft)		76			51			153			91		
Queue Length 95th (ft)		129			83			#300			124		
Internal Link Dist (ft)		296			302			1501			304		
Turn Bay Length (ft)													
Base Capacity (vph)		727			758			707			768		
Starvation Cap Reductn		0			0			0			34		
Spillback Cap Reductn		0			0			0			0		
Storage Cap Reductn		0			0			0			0		
Reduced v/c Ratio		0.44			0.29			0.75			0.50		

Intersection Summary

Area Type: Other
Cycle Length: 101
Actuated Cycle Length: 60
Natural Cycle: 70
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 57: Spring Street & Summer Street



HCM Signalized Intersection Capacity Analysis
57: Spring Street & Summer Street

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	205	55	35	135	10	45	425	20	10	250	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	12	12	12	12	12	16	12
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			0.99			0.99			0.99	
Flt Protected		1.00			0.99			1.00			1.00	
Satd. Flow (prot)		1771			2015			1799			1876	
Flt Permitted		0.97			0.89			0.94			0.98	
Satd. Flow (perm)		1727			1816			1696			1838	
Peak-hour factor, PHF	0.87	0.87	0.87	0.82	0.82	0.82	0.93	0.93	0.93	0.76	0.76	0.76
Adj. Flow (vph)	23	236	63	43	165	12	48	457	22	13	329	26
RTOR Reduction (vph)	0	7	0	0	0	0	0	1	0	0	2	0
Lane Group Flow (vph)	0	315	0	0	220	0	0	526	0	0	366	0
Heavy Vehicles (%)	5%	4%	4%	3%	5%	13%	2%	5%	0%	0%	2%	5%
Parking (#/hr)											0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Actuated Green, G (s)		25.0			25.0			25.0			25.0	
Effective Green, g (s)		25.0			25.0			25.0			25.0	
Actuated g/C Ratio		0.42			0.42			0.42			0.42	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		720			757			707			766	
v/s Ratio Prot												
v/s Ratio Perm		c0.18			0.12			c0.31			0.20	
v/c Ratio		0.44			0.29			0.74			0.48	
Uniform Delay, d1		12.5			11.6			14.8			12.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.9			1.0			7.0			2.1	
Delay (s)		14.4			12.6			21.8			14.9	
Level of Service		B			B			C			B	
Approach Delay (s)		14.4			12.6			21.8			14.9	
Approach LOS		B			B			C			B	

Intersection Summary

HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
58: Route 44/Main Street & Union Street

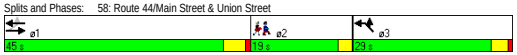
2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2	ø2
Lane Configurations												
Volume (vph)	10	505	290	0	465	10	0	0	430	10	20	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	16	12	16	12	12	12	12	16	15	
Right Turn on Red			Yes			Yes		Yes			Yes	
Link Speed (mph)		30			30		30		30			
Link Distance (ft)		913			784		606		384			
Travel Time (s)		20.8			17.8		13.8		8.7			
Peak Hour Factor	0.90	0.90	0.90	0.89	0.89	0.89	0.92	0.92	0.97	0.97	0.97	
Heavy Vehicles (%)	0%	5%	5%	0%	6%	14%	0%	0%	7%	0%	0%	
Parking (#/hr)			0			0						
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	894	0	0	533	0	0	0	443	31	0	
Turn Type	Perm									Prot		
Protected Phases		1			1				3	3		2
Permitted Phases	1											
Detector Phase	1	1			1				3	3		
Switch Phase												
Minimum Initial (s)	15.0	15.0			15.0				5.0	5.0		1.0
Minimum Split (s)	20.0	20.0			20.0				9.0	9.0		19.0
Total Split (s)	45.0	45.0	0.0	0.0	45.0	0.0	0.0	0.0	29.0	29.0	0.0	19.0
Total Split (%)	48.4%	48.4%	0.0%	0.0%	48.4%	0.0%	0.0%	0.0%	31.2%	31.2%	0.0%	20%
Maximum Green (s)	40.0	40.0			40.0				25.0	25.0		16.0
Yellow Time (s)	4.0	4.0			4.0				3.0	3.0		3.0
All-Red Time (s)	1.0	1.0			1.0				1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lead			Lead							Lag
Lead-Lag Optimize?	Yes	Yes			Yes							Yes
Vehicle Extension (s)	3.0	3.0			3.0				3.0	3.0		3.0
Recall Mode	Max	Max			Max				Max	Max		None
Walk Time (s)												7.0
Flash Dont Walk (s)												9.0
Pedestrian Calls (#/hr)												0
v/c Ratio		0.84			0.49				0.78	0.05		
Control Delay		22.9			12.5				33.5	9.7		
Queue Delay		0.0			0.0				0.0	0.0		
Total Delay		22.9			12.5				33.5	9.7		
Queue Length 50th (ft)		307			141				180	3		
Queue Length 95th (ft)		#557			213				#322	20		
Internal Link Dist (ft)		833			704		526		304			
Turn Bay Length (ft)												
Base Capacity (vph)		1065			1093				570	632		
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		0.84			0.49				0.78	0.05		

Intersection Summary

Area Type: Other
Cycle Length: 93
Actuated Cycle Length: 74
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 58: Route 44/Main Street & Union Street



HCM Signalized Intersection Capacity Analysis
58: Route 44/Main Street & Union Street

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2
Lane Configurations											
Volume (vph)	10	505	290	0	465	10	0	0	430	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	16	12	16	12	12	12	12	16	15
Total Lost time (s)		5.0			5.0				4.0	4.0	
Lane Util. Factor		1.00			1.00				1.00	1.00	
Frt		0.95			1.00				1.00	0.85	
Flt Protected		1.00			1.00				0.95	1.00	
Satd. Flow (prot)		1951			2023				1687	1830	
Flt Permitted		0.99			1.00				0.95	1.00	
Satd. Flow (perm)		1939			2023				1687	1830	
Peak-hour factor, PHF	0.90	0.90	0.90	0.89	0.89	0.89	0.92	0.92	0.97	0.97	0.97
Adj. Flow (vph)	11	561	322	0	522	11	0	0	443	10	21
RTOR Reduction (vph)	0	17	0	0	0	0	0	0	0	14	0
Lane Group Flow (vph)	0	877	0	0	533	0	0	0	443	17	0
Heavy Vehicles (%)	0%	5%	5%	0%	6%	14%	0%	0%	7%	0%	0%
Parking (#/hr)			0			0					
Turn Type	Perm									Prot	
Protected Phases		1			1				3	3	
Permitted Phases	1										
Actuated Green, G (s)		40.0			40.0				25.0	25.0	
Effective Green, g (s)		40.0			40.0				25.0	25.0	
Actuated g/C Ratio		0.54			0.54				0.34	0.34	
Clearance Time (s)		5.0			5.0				4.0	4.0	
Vehicle Extension (s)		3.0			3.0				3.0	3.0	
Lane Grp Cap (vph)		1048			1094				570	618	
v/s Ratio Prot					0.26				c0.26	0.01	
v/s Ratio Perm		c0.45									
v/c Ratio		0.84			0.49				0.78	0.03	
Uniform Delay, d1		14.3			10.6				22.0	16.4	
Progression Factor		1.00			1.00				1.00	1.00	
Incremental Delay, d2		7.9			1.6				10.0	0.1	
Delay (s)		22.2			12.2				32.0	16.5	
Level of Service		C			B				C	B	
Approach Delay (s)		22.2			12.2		0.0		31.0		
Approach LOS		C			B		A		C		

Intersection Summary

HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	74.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
61: Taunton Green & Broadway

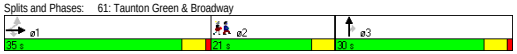
2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	170	730	180	0	0	905	0	280	85	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	16	12	12	12	12	10	10	12	12	12	
Right Turn on Red	Yes		Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		304			913			579			302		
Travel Time (s)		6.9			20.8			13.2			6.9		
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.92	0.92	
Heavy Vehicles (%)	6%	6%	11%	0%	0%	6%	2%	6%	8%	0%	0%	0%	
Parking (#/hr)			0			0			0				
Shared Lane Traffic (%)													
Lane Group Flow (vph)	187	802	198	0	0	984	0	311	94	0	0	0	
Turn Type	Perm		Perm			Free			Perm				
Protected Phases		1						3					2
Permitted Phases	1		1			Free			3				
Detector Phase	1	1	1					3	3				
Switch Phase													
Minimum Initial (s)	30.0	30.0	30.0					25.0	25.0				1.0
Minimum Split (s)	35.0	35.0	35.0					30.0	30.0				21.0
Total Split (s)	35.0	35.0	35.0	0.0	0.0	0.0	0.0	30.0	30.0	0.0	0.0	0.0	21.0
Total Split (%)	40.7%	40.7%	40.7%	0.0%	0.0%	0.0%	0.0%	34.9%	34.9%	0.0%	0.0%	0.0%	24%
Maximum Green (s)	30.0	30.0	30.0					25.0	25.0				17.0
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0				4.0
All-Red Time (s)	1.0	1.0	1.0					1.0	1.0				0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lead	Lead										Lag
Lead-Lag Optimize?	Yes	Yes	Yes										Yes
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0				2.0
Recall Mode	Max	Max	Max					Max	Max				Ped
Walk Time (s)													10.0
Flash Dont Walk (s)													7.0
Pedestrian Calls (#/hr)													0
v/c Ratio	0.27	0.68	0.31			0.39		0.64	0.22				
Control Delay	5.0	26.5	4.0			0.4		33.7	6.7				
Queue Delay	0.0	0.0	0.0			0.0		0.0	0.0				
Total Delay	5.0	26.5	4.0			0.4		33.7	6.7				
Queue Length 50th (ft)	5	193	0			0		146	0				
Queue Length 95th (ft)	m46	253	m38			0		234	34				
Internal Link Dist (ft)		224			833			499			222		
Turn Bay Length (ft)													
Base Capacity (vph)	702	1188	647			2547		486	432				
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	0.27	0.68	0.31			0.39		0.64	0.22				

Intersection Summary

Area Type: Other
Cycle Length: 86
Actuated Cycle Length: 86
Natural Cycle: 90
Control Type: Semi Act-Uncoord
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 61: Taunton Green & Broadway



HCM Signalized Intersection Capacity Analysis
61: Taunton Green & Broadway

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	730	180	0	0	905	0	280	85	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	16	12	12	12	12	10	10	12	12	12
Total Lost time (s)	5.0	5.0	5.0			4.0		5.0	5.0			
Lane Util. Factor	1.00	0.95	1.00			0.88		1.00	1.00			
Frt	1.00	1.00	0.85			0.85		1.00	0.85			
Flt Protected	0.95	1.00	1.00			1.00		1.00	1.00			
Satd. Flow (prot)	1703	3406	1484			2547		1673	1256			
Flt Permitted	0.95	1.00	1.00			1.00		1.00	1.00			
Satd. Flow (perm)	1703	3406	1484			2547		1673	1256			
Peak-hour factor, PHF	0.91	0.91	0.91	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.92	0.92
Adj. Flow (vph)	187	802	198	0	0	984	0	311	94	0	0	0
RTOR Reduction (vph)	107	0	129	0	0	0	0	0	67	0	0	0
Lane Group Flow (vph)	80	802	69	0	0	984	0	311	27	0	0	0
Heavy Vehicles (%)	6%	6%	11%	0%	0%	6%	2%	6%	8%	0%	0%	0%
Parking (#/hr)			0			0			0			
Turn Type	Perm		Perm			Free			Perm			
Protected Phases		1						3				
Permitted Phases	1		1			Free			3			
Actuated Green, G (s)	30.0	30.0	30.0			86.0		25.0	25.0			
Effective Green, g (s)	30.0	30.0	30.0			86.0		25.0	25.0			
Actuated g/C Ratio	0.35	0.35	0.35			1.00		0.29	0.29			
Clearance Time (s)	5.0	5.0	5.0					5.0	5.0			
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0			
Lane Grp Cap (vph)	594	1188	518			2547		486	365			
v/s Ratio Prot		c0.24						c0.19				
v/s Ratio Perm	0.05		0.05			c0.39			0.02			
v/c Ratio	0.13	0.68	0.13			0.39		0.64	0.07			
Uniform Delay, d1	19.1	23.8	19.1			0.0		26.6	22.1			
Progression Factor	0.86	0.97	0.85			1.00		1.00	1.00			
Incremental Delay, d2	0.5	3.1	0.5			0.4		6.3	0.4			
Delay (s)	16.9	26.1	16.8			0.4		32.9	22.5			
Level of Service	B	C	B			A		C	C			
Approach Delay (s)		23.1			0.4			30.5			0.0	
Approach LOS		C			A			C			A	

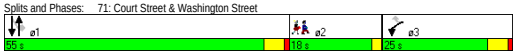
Intersection Summary			
HCM Average Control Delay	15.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2
Lane Configurations							
Volume (vph)	345	20	590	260	35	390	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	14	10	9	12	12	
Storage Length (ft)	0	50		0	0		
Storage Lanes	1	1		1	1		
Taper Length (ft)	25	25		25	25		
Right Turn on Red		Yes		Yes			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1051		260			584	
Travel Time (s)	23.9		5.9			13.3	
Peak Hour Factor	0.88	0.88	0.87	0.87	0.85	0.85	
Heavy Vehicles (%)	9%	0%	3%	4%	0%	3%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	392	23	678	299	41	459	
Turn Type		Perm		Perm	Perm		
Protected Phases	3		1			1	2
Permitted Phases		3		1	1		
Detector Phase	3	3	1	1	1	1	
Switch Phase							
Minimum Initial (s)	5.0	5.0	10.0	10.0	10.0	10.0	3.0
Minimum Split (s)	10.0	10.0	15.0	15.0	15.0	15.0	18.0
Total Split (s)	25.0	25.0	55.0	55.0	55.0	55.0	18.0
Total Split (%)	25.5%	25.5%	56.1%	56.1%	56.1%	56.1%	18%
Maximum Green (s)	20.0	20.0	50.0	50.0	50.0	50.0	16.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag			Lead	Lead	Lead	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	4.0	4.0	4.0	4.0	0.7
Recall Mode	Max	Max	Max	Max	Max	Max	None
Walk Time (s)							7.0
Flash Dont Walk (s)							8.0
Pedestrian Calls (#/hr)							0
v/c Ratio	0.92	0.05	0.63	0.30	0.12	0.40	
Control Delay	58.4	18.1	12.6	1.7	7.1	8.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	58.4	18.1	12.6	1.7	7.1	8.8	
Queue Length 50th (ft)	191	6	186	0	7	102	
Queue Length 95th (ft)	#341	23	273	23	19	145	
Internal Link Dist (ft)	971		180			504	
Turn Bay Length (ft)		50					
Base Capacity (vph)	428	437	1076	986	356	1153	
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	0.92	0.05	0.63	0.30	0.12	0.40	

Intersection Summary	
Area Type:	Other
Cycle Length: 98	
Actuated Cycle Length: 80	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 71: Court Street & Washington Street



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	345	20	590	260	35	390
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	14	10	9	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1723	1722	1398	1805	1845
Flt Permitted	0.95	1.00	1.00	1.00	0.30	1.00
Satd. Flow (perm)	1711	1723	1722	1398	571	1845
Peak-hour factor, PHF	0.88	0.88	0.87	0.87	0.85	0.85
Adj. Flow (vph)	392	23	678	299	41	459
RTOR Reduction (vph)	0	6	0	112	0	0
Lane Group Flow (vph)	392	17	678	187	41	459
Heavy Vehicles (%)	9%	0%	3%	4%	0%	3%
Turn Type		Perm		Perm	Perm	
Protected Phases	3		1			1
Permitted Phases		3		1	1	
Actuated Green, G (s)	20.0	20.0	50.0	50.0	50.0	50.0
Effective Green, g (s)	20.0	20.0	50.0	50.0	50.0	50.0
Actuated g/C Ratio	0.25	0.25	0.62	0.62	0.62	0.62
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	428	431	1076	874	357	1153
v/s Ratio Prot	c0.23		c0.39			0.25
v/s Ratio Perm		0.01		0.13	0.07	
v/c Ratio	0.92	0.04	0.63	0.21	0.11	0.40
Uniform Delay, d1	29.2	22.7	9.3	6.5	6.1	7.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	26.8	0.2	2.8	0.6	0.7	1.0
Delay (s)	56.0	22.9	12.1	7.1	6.7	8.5
Level of Service	E	C	B	A	A	A
Approach Delay (s)	54.2		10.5			8.4
Approach LOS	D		B			A

Intersection Summary			
HCM Average Control Delay	19.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
77: Tremont Street & Washington Street

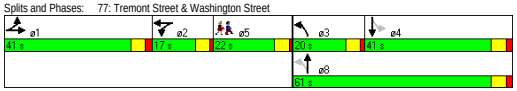
2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5
Lane Configurations													
Volume (vph)	430	150	50	35	120	50	80	365	55	30	230	350	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	14	12	16	12	12	12	13	12	12	12	11	12	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		698			192			1911			574		
Travel Time (s)		15.9			4.4			43.4			13.0		
Peak Hour Factor	0.97	0.97	0.97	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	
Heavy Vehicles (%)	4%	4%	10%	8%	1%	10%	8%	4%	6%	3%	6%	8%	
Shared Lane Traffic (%)	27%												
Lane Group Flow (vph)	323	327	0	0	221	0	0	562	0	0	663	0	
Turn Type	Split			Split			pm+pt			Perm			
Protected Phases	1	1		2	2		3	8			4		5
Permitted Phases							8			4			
Detector Phase	1	1		2	2		3	8		4	4		
Switch Phase													
Minimum Initial (s)	18.0	18.0		7.0	7.0		6.0	18.0		18.0	18.0		3.0
Minimum Split (s)	24.0	24.0		12.0	12.0		11.0	24.0		24.0	24.0		22.0
Total Split (s)	41.0	41.0	0.0	17.0	17.0	0.0	20.0	61.0	0.0	41.0	41.0	0.0	22.0
Total Split (%)	29.1%	29.1%	0.0%	12.1%	12.1%	0.0%	14.2%	43.3%	0.0%	29.1%	29.1%	0.0%	16%
Maximum Green (s)	35.0	35.0		12.0	12.0		15.0	55.0		35.0	35.0		17.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		1.0	1.0		1.0	2.0		2.0	2.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	5.0	6.0	4.0	6.0	6.0	4.0	
Lead/Lag	Lead	Lead		Lag	Lag		Lead			Lag	Lag		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None		None	None		None	Min		Min	Min		None
Walk Time (s)													7.0
Flash Dont Walk (s)													10.0
Pedestrian Calls (#/hr)													0
v/c Ratio	0.65	0.69			0.86			0.67			0.58		
Control Delay	35.2	36.9			68.6			26.7			16.0		
Queue Delay	0.0	0.0			0.0			0.0			0.0		
Total Delay	35.2	36.9			68.6			26.7			16.0		
Queue Length 50th (ft)	160	161			112			123			91		
Queue Length 95th (ft)	302	307			#333			210			170		
Internal Link Dist (ft)		618			112			1831			494		
Turn Bay Length (ft)													
Base Capacity (vph)	737	694			258			1499			1329		
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	0.47			0.86			0.37			0.50		

Intersection Summary

Area Type: Other
Cycle Length: 141
Actuated Cycle Length: 86.4
Natural Cycle: 95
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 77: Tremont Street & Washington Street



HCM Signalized Intersection Capacity Analysis
77: Tremont Street & Washington Street

2008 Existing Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	430	150	50	35	120	50	80	365	55	30	230	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	12	16	12	12	12	13	12	12	12	11	12
Total Lost time (s)	6.0	6.0			5.0			6.0			6.0	
Lane Util. Factor	0.95	0.95			1.00			0.95			0.95	
Frt	1.00	0.98			0.97			0.98			0.91	
Flt Protected	0.95	0.98			0.99			0.99			1.00	
Satd. Flow (prot)	1759	1649			1745			3359			2974	
Flt Permitted	0.95	0.98			0.99			0.67			0.90	
Satd. Flow (perm)	1759	1649			1745			2273			2683	
Peak-hour factor, PHF	0.97	0.97	0.97	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92
Adj. Flow (vph)	443	155	52	38	129	54	90	410	62	33	250	380
RTOR Reduction (vph)	0	4	0	0	8	0	0	7	0	0	145	0
Lane Group Flow (vph)	323	323	0	0	213	0	0	555	0	0	518	0
Heavy Vehicles (%)	4%	4%	10%	8%	1%	10%	8%	4%	6%	3%	6%	8%
Turn Type	Split			Split			pm+pt			Perm		
Protected Phases	1	1		2	2		3	8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	24.5	24.5			12.4			31.8			31.8	
Effective Green, g (s)	24.5	24.5			12.4			31.8			31.8	
Actuated g/C Ratio	0.29	0.29			0.14			0.37			0.37	
Clearance Time (s)	6.0	6.0			5.0			6.0			6.0	
Vehicle Extension (s)	2.0	2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)	503	471			252			843			996	
v/s Ratio Prot	0.18	c0.20			c0.12							
v/s Ratio Perm								c0.24			0.19	
v/c Ratio	0.64	0.69			0.85			0.66			0.52	
Uniform Delay, d1	26.8	27.2			35.7			22.4			21.0	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	2.1	3.3			21.4			1.4			0.2	
Delay (s)	28.9	30.5			57.1			23.9			21.2	
Level of Service	C	C			E			C			C	
Approach Delay (s)		29.7			57.1			23.9			21.2	
Approach LOS		C			E			C			C	

Intersection Summary

HCM Average Control Delay	28.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	85.7	Sum of lost time (s)	17.0
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

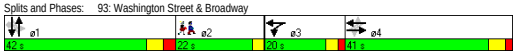
Lanes, Volumes, Timings
93: Washington Street & Broadway

2008 Existing Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	265	85	5	20	90	5	5	495	15	10	355	215	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	12	12	12	12	12	12	12	12	12	12	
Storage Length (ft)	0		0	0		0	0		0	0		50	
Storage Lanes	0		0	0		0	0		1	0		1	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			No			Yes			No	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		1068			1376			92			2042		
Travel Time (s)		24.3			31.3			2.1			46.4		
Peak Hour Factor	0.88	0.88	0.88	0.72	0.72	0.72	0.87	0.87	0.87	0.89	0.89	0.89	
Heavy Vehicles (%)	5%	2%	25%	6%	1%	0%	6%	0%	0%	13%	7%	4%	
Parking (#/hr)									2				
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	404	0	0	160	0	0	592	0	0	410	242	
Turn Type	Perm			pm+pt			Perm			Perm		Perm	
Protected Phases		4		3	3 4			1			1		2
Permitted Phases	4			3 4			1			1		1	
Detector Phase	4	4		3	3 4		1	1		1	1	1	
Switch Phase													
Minimum Initial (s)	8.0	8.0		4.0			18.0	18.0		18.0	18.0	18.0	1.0
Minimum Split (s)	14.0	14.0		9.0			25.0	25.0		25.0	25.0	25.0	22.0
Total Split (s)	41.0	41.0	0.0	20.0	61.0	0.0	42.0	42.0	0.0	42.0	42.0	42.0	22.0
Total Split (%)	32.8%	32.8%	0.0%	16.0%	48.8%	0.0%	33.6%	33.6%	0.0%	33.6%	33.6%	33.6%	18%
Maximum Green (s)	35.0	35.0		15.0			35.0	35.0		35.0	35.0	35.0	19.0
Yellow Time (s)	4.0	4.0		3.0			4.0	4.0		4.0	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0		2.0			3.0	3.0		3.0	3.0	3.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	7.0	7.0	4.0	7.0	7.0	7.0	
Lead/Lag	Lag	Lag		Lead			Lead	Lead		Lead	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0		2.0			3.0	3.0		3.0	3.0	3.0	2.0
Recall Mode	None	None		None			Min	Min		Min	Min	Min	None
Walk Time (s)													7.0
Flash Dont Walk (s)													12.0
Pedestrian Calls (#/hr)													0
v/c Ratio		0.75			0.19			0.54			0.74	0.49	
Control Delay		36.2			12.1			27.3			36.6	28.6	
Queue Delay		0.0			0.0			0.0			0.0	0.0	
Total Delay		36.2			12.1			27.3			36.6	28.6	
Queue Length 50th (ft)		203			45			145			208	111	
Queue Length 95th (ft)		#380			66			196			323	186	
Internal Link Dist (ft)		988			1296			12			1962		
Turn Bay Length (ft)												50	
Base Capacity (vph)		542			947			1322			670	601	
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		0.75			0.17			0.45			0.61	0.40	

Intersection Summary	
Area Type:	Other
Cycle Length: 125	
Actuated Cycle Length: 91.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 93: Washington Street & Broadway



HCM Signalized Intersection Capacity Analysis
93: Washington Street & Broadway

2008 Existing Condition - AM Peak Hour

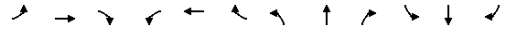
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	265	85	5	20	90	5	5	495	15	10	355	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		6.0			5.0			7.0			7.0	7.0
Lane Util. Factor		1.00			1.00			0.95			1.00	1.00
Frt		1.00			0.99			1.00			1.00	0.85
Flt Protected		0.96			0.99			1.00			1.00	1.00
Satd. Flow (prot)		1981			1839			3590			1771	1553
Flt Permitted		0.68			0.92			0.95			0.98	1.00
Satd. Flow (perm)		1399			1701			3412			1732	1553
Peak-hour factor, PHF	0.88	0.88	0.88	0.72	0.72	0.72	0.87	0.87	0.87	0.89	0.89	0.89
Adj. Flow (vph)	301	97	6	28	125	7	6	569	17	11	399	242
RTOR Reduction (vph)	0	1	0	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	403	0	0	160	0	0	591	0	0	410	242
Heavy Vehicles (%)	5%	2%	25%	6%	1%	0%	6%	0%	0%	13%	7%	4%
Parking (#/hr)									2			
Turn Type	Perm			pm+pt			Perm			Perm		Perm
Protected Phases		4		3	3 4			1			1	
Permitted Phases	4			3 4			1			1		1
Actuated Green, G (s)		35.3			43.9			29.2			29.2	29.2
Effective Green, g (s)		35.3			43.9			29.2			29.2	29.2
Actuated g/C Ratio		0.39			0.48			0.32			0.32	0.32
Clearance Time (s)		6.0						7.0			7.0	7.0
Vehicle Extension (s)		4.0						3.0			3.0	3.0
Lane Grp Cap (vph)		542			833			1094			555	498
v/s Ratio Prot					c0.02							
v/s Ratio Perm		c0.29			0.07			0.17			c0.24	0.16
v/c Ratio		0.74			0.19			0.54			0.74	0.49
Uniform Delay, d1		24.0			13.5			25.4			27.6	24.9
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		5.8			0.0			0.5			5.1	0.7
Delay (s)		29.9			13.5			25.9			32.7	25.7
Level of Service		C			B			C			C	C
Approach Delay (s)		29.9			13.5			25.9			30.1	
Approach LOS		C			B			C			C	

Intersection Summary					
HCM Average Control Delay	27.2	HCM Level of Service	C		
HCM Volume to Capacity ratio	0.68				
Actuated Cycle Length (s)	91.1	Sum of lost time (s)	18.0		
Intersection Capacity Utilization	63.7%	ICU Level of Service	B		
Analysis Period (min)	15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
66: Cohannet Street & Taunton Green

2008 Existing Condition - PM Peak Hour



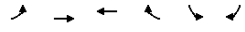
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	245	30	0	0	0	0	0	405	740	430	95
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.99	0.99	0.99	0.94	0.94	0.94
Hourly flow rate (vph)	0	263	32	0	0	0	0	0	409	787	457	101
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			Raised	
Median storage veh)											1	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2287	2492	508	2196	2133	0	559			409		
vC1, stage 1 conf vol	2082	2082		0	0							
vC2, stage 2 conf vol	205	409		2196	2133							
vCu, unblocked vol	2287	2492	508	2196	2133	0	559			409		
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 %	100	0	94	0	100	100	100			32		
cM capacity (veh/h)	13	9	563	0	26	1085	1022			1150		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2	SB 3
Volume Total	263	32	409	394	394	559
Volume Left	0	0	0	394	394	0
Volume Right	0	32	409	0	0	101
cSH	9	563	1700	1150	1150	1700
Volume to Capacity	29.10	0.06	0.24	0.68	0.68	0.33
Queue Length 95th (ft)	Err	5	0	144	144	0
Control Delay (s)	Err	11.8	0.0	14.6	14.6	0.0
Lane LOS	F	B		B	B	
Approach Delay (s)	8909.5		0.0	8.6		
Approach LOS	F					

Intersection Summary				
Average Delay	1290.4			
Intersection Capacity Utilization	69.1%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
67: Post Office Square & Broadway

2008 Existing Condition - PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	0	885	530	0	520
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.95	0.95	0.89	0.89
Hourly flow rate (vph)	0	0	932	558	0	584
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			302			
pX, platoon unblocked						
vC, conflicting volume	932				932	466
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	932				932	466
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	0
cM capacity (veh/h)	730				269	543

Direction, Lane #	WB 1	WB 2	WB 3	SB 1
Volume Total	466	466	558	584
Volume Left	0	0	0	0
Volume Right	0	0	558	584
cSH	1700	1700	1700	543
Volume to Capacity	0.27	0.27	0.33	1.08
Queue Length 95th (ft)	0	0	0	439
Control Delay (s)	0.0	0.0	0.0	87.6
Lane LOS				F
Approach Delay (s)	0.0			87.6
Approach LOS				F

Intersection Summary			
Average Delay	24.7		
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
70: Post Office Square & Court Street

2008 Existing Condition - PM Peak Hour

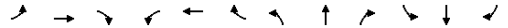
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	25	900	120	350	0	0	0	0	325	20
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.92	0.92	0.92	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	29	968	129	376	0	0	0	0	361	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					565							
pX, platoon unblocked												
vC, conflicting volume	129			29			2267	2065	0	2079	2094	129
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	129			29			2267	2065	0	2079	2094	129
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			39			0	100	100	100	0	98
cM capacity (veh/h)	1469			1584			0	21	1091	20	20	926

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1
Volume Total	29	645	452	376	383
Volume Left	0	645	323	0	0
Volume Right	29	0	0	376	22
cSH	1700	1584	1584	1700	22
Volume to Capacity	0.02	0.61	0.61	0.22	17.78
Queue Length 95th (ft)	0	111	111	0	Err
Control Delay (s)	0.0	10.8	9.7	0.0	Err
Lane LOS		B	A		F
Approach Delay (s)	0.0	7.7			Err
Approach LOS					F

Intersection Summary				
Average Delay	2038.8			
Intersection Capacity Utilization	59.7%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
75: Frederick Martin Parkway & Washington Street

2008 Existing Condition - PM Peak Hour



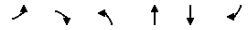
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	5	90	0	165	5	615	300	230	805	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Hourly flow rate (vph)	0	0	10	99	0	181	5	661	323	245	856	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								574			260	
pX, platoon unblocked	0.74	0.74	0.74	0.74	0.74		0.74					
vC, conflicting volume	1868	2340	856	2189	2179	492	856			984		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2000	2640	627	2435	2421	492	627			984		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	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 %	100	100	97	0	100	66	99			65		
cM capacity (veh/h)	13	11	318	9	16	528	711			704		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	10	99	181	336	653	245	856
Volume Left	0	99	0	5	0	245	0
Volume Right	10	0	181	0	323	0	0
cSH	318	9	528	711	1700	704	1700
Volume to Capacity	0.03	11.49	0.34	0.01	0.38	0.35	0.50
Queue Length 95th (ft)	2	Err	38	1	0	39	0
Control Delay (s)	16.7	Err	15.3	0.3	0.0	12.8	0.0
Lane LOS	C	F	C	A		B	
Approach Delay (s)	16.7	3539.0		0.1		2.8	
Approach LOS	C	F					

Intersection Summary				
Average Delay	418.0			
Intersection Capacity Utilization	90.8%	ICU Level of Service	E	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
78: Kilmer Street & Oak Street

2008 Existing Condition - PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	80	20	25	200	340	80
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.72	0.72	0.72	0.72	0.91	0.91
Hourly flow rate (vph)	111	28	35	278	374	88
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	765	418	462			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	765	418	462			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	69	96	97			
cM capacity (veh/h)	357	640	1110			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	139	312	462
Volume Left	111	35	0
Volume Right	28	0	88
cSH	392	1110	1700
Volume to Capacity	0.35	0.03	0.27
Queue Length 95th (ft)	39	2	0
Control Delay (s)	19.2	1.2	0.0
Lane LOS	C	A	
Approach Delay (s)	19.2	1.2	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		3.3		
Intersection Capacity Utilization		43.8%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
87: Purchase Street & School Street

2008 Existing Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	310	20	5	85	5	30	85	40	20	130	60
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.72	0.72	0.72	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	64	330	21	7	118	7	37	104	49	24	159	73
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	125			351			756	607	340	704	614	122
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	125			351			756	607	340	704	614	122
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 %	96			99			81	73	93	90	59	92
cM capacity (veh/h)	1462			1219			196	391	707	253	387	930

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	415	132	189	256
Volume Left	64	7	37	24
Volume Right	21	7	49	73
cSH	1462	1219	363	438
Volume to Capacity	0.04	0.01	0.52	0.58
Queue Length 95th (ft)	3	0	72	91
Control Delay (s)	1.5	0.5	25.3	24.2
Lane LOS	A	A	D	C
Approach Delay (s)	1.5	0.5	25.3	24.2
Approach LOS			D	C

Intersection Summary				
Average Delay		11.7		
Intersection Capacity Utilization		49.0%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
88: Purchase Street & Washington Street

2008 Existing Condition - PM Peak Hour

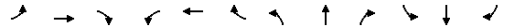
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	65	50	230	100	5	40	85	35	5	85	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.81	0.81	0.81	0.88	0.88	0.88	0.77	0.77	0.77
Hourly flow rate (vph)	11	69	53	284	123	6	45	97	40	6	110	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	130			122			873	815	96	900	838	127
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	130			122			873	815	96	900	838	127
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			81			70	61	96	96	55	99
cM capacity (veh/h)	1468			1459			150	250	958	150	244	929

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	133	414	182	123
Volume Left	11	284	45	6
Volume Right	53	6	40	6
cSH	1468	1459	249	245
Volume to Capacity	0.01	0.19	0.73	0.50
Queue Length 95th (ft)	1	18	127	65
Control Delay (s)	0.7	6.1	50.7	33.7
Lane LOS	A	A	F	D
Approach Delay (s)	0.7	6.1	50.7	33.7
Approach LOS			F	D

Intersection Summary				
Average Delay	18.7			
Intersection Capacity Utilization	47.1%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
89: Winter Street & School Street

2008 Existing Condition - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	240	15	170	380	25	25	45	80	25	60	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.72	0.72	0.72	0.85	0.85	0.85	0.78	0.78	0.78	0.88	0.88	0.88
Hourly flow rate (vph)	7	333	21	200	447	29	32	58	103	28	68	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	476			354			1271	1234	344	1351	1230	462
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	476			354			1271	1234	344	1351	1230	462
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			83			59	61	85	57	54	97
cM capacity (veh/h)	1096			1210			78	148	694	66	147	604

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	361	676	192	114
Volume Left	7	200	32	28
Volume Right	21	29	103	17
cSH	1096	1210	203	123
Volume to Capacity	0.01	0.17	0.95	0.92
Queue Length 95th (ft)	0	15	197	149
Control Delay (s)	0.2	3.9	98.9	128.6
Lane LOS	A	A	F	F
Approach Delay (s)	0.2	3.9	98.9	128.6
Approach LOS			F	F

Intersection Summary				
Average Delay	27.1			
Intersection Capacity Utilization	65.1%	ICU Level of Service	C	
Analysis Period (min)	15			

Appendix A – Capacity Analysis Results

- No-Build Condition
- Build Condition
- Build with Mitigation Condition

Capacity Analysis Results
No-Build Condition

Fall River

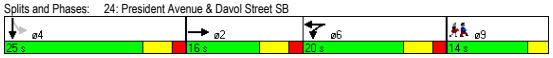
Lanes, Volumes, Timings
24: President Avenue & Davol Street SB

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	0	10	5	400	15	0	0	0	0	435	480	5	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	10	12	12	12	12	12	12	12	8	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		238			272			1959			1114		
Travel Time (s)		5.4			6.2			44.5			25.3		
Peak Hour Factor	0.57	0.57	0.57	0.88	0.88	0.88	0.92	0.92	0.92	0.88	0.88	0.88	
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	0%	0%	2%	1%	0%	
Shared Lane Traffic (%)				48%									
Lane Group Flow (vph)	0	27	0	237	235	0	0	0	0	0	1045	0	
Turn Type				Split						Perm			
Protected Phases		2		6	6						4		9
Permitted Phases										4			
Detector Phase		2		6	6					4	4		
Switch Phase													
Minimum Initial (s)		4.0		12.0	12.0					12.0	12.0		7.0
Minimum Split (s)		10.0		18.0	18.0					18.0	18.0		14.0
Total Split (s)	0.0	16.0	0.0	20.0	20.0	0.0	0.0	0.0	0.0	25.0	25.0	0.0	14.0
Total Split (%)	0.0%	21.3%	0.0%	26.7%	26.7%	0.0%	0.0%	0.0%	0.0%	33.3%	33.3%	0.0%	19%
Maximum Green (s)		10.0		14.0	14.0					19.0	19.0		11.0
Yellow Time (s)		4.0		4.0	4.0					4.0	4.0		3.0
All-Red Time (s)		2.0		2.0	2.0					2.0	2.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.0	
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0		3.0
Recall Mode		None		Min	Min					C-Max	C-Max		None
Walk Time (s)													5.0
Flash Dont Walk (s)													6.0
Pedestrian Calls (#/hr)													5
v/c Ratio		0.17		0.73	0.67						0.57		
Control Delay		26.3		53.6	49.3						18.7		
Queue Delay		0.0		1.2	2.1						0.0		
Total Delay		26.3		54.7	51.4						18.7		
Queue Length 50th (ft)		8		125	121						128		
Queue Length 95th (ft)		17		#214	197						#422		
Internal Link Dist (ft)		158			192			1879			1034		
Turn Bay Length (ft)													
Base Capacity (vph)		250		333	359						1820		
Starvation Cap Reductn		0		19	45						0		
Spillback Cap Reductn		0		0	0						0		
Storage Cap Reductn		0		0	0						0		
Reduced v/c Ratio		0.11		0.75	0.75						0.57		

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 5 (7%), Referenced to phase 4:SBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 24: President Avenue & Davol Street SB



HCM Signalized Intersection Capacity Analysis
24: President Avenue & Davol Street SB

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	10	5	400	15	0	0	0	0	435	480	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	12	12	12	12	12	12	12	8
Total Lost time (s)		6.0		6.0	6.0						6.0	
Lane Util. Factor		1.00		0.95	0.95						0.95	
Frt		0.96		1.00	1.00						1.00	
Flt Protected		1.00		0.95	0.96						0.98	
Satd. Flow (prot)		1814		1569	1694						3473	
Flt Permitted		1.00		0.95	0.96						0.98	
Satd. Flow (perm)		1814		1569	1694						3473	
Peak-hour factor, PHF	0.57	0.57	0.57	0.88	0.88	0.88	0.92	0.92	0.92	0.88	0.88	0.88
Adj. Flow (vph)	0	18	9	455	17	0	0	0	0	494	545	6
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	18	0	237	235	0	0	0	0	0	1044	0
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	0%	0%	2%	1%	0%
Turn Type				Split						Perm		
Protected Phases		2		6	6						4	
Permitted Phases										4		
Actuated Green, G (s)		3.0		15.5	15.5						33.3	
Effective Green, g (s)		3.0		15.5	15.5						33.3	
Actuated g/C Ratio		0.04		0.21	0.21						0.44	
Clearance Time (s)		6.0		6.0	6.0						6.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		73		324	350						1542	
v/s Ratio Prot		c0.01		c0.15	0.14							
v/s Ratio Perm											0.30	
v/c Ratio		0.25		0.73	0.67						0.68	
Uniform Delay, d1		34.9		27.8	27.4						16.6	
Progression Factor		1.00		1.43	1.44						1.00	
Incremental Delay, d2		1.8		8.0	4.9						2.4	
Delay (s)		36.7		47.9	44.3						19.0	
Level of Service		D		D	D						B	
Approach Delay (s)		36.7			46.1			0.0			19.0	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	27.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	23.2
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

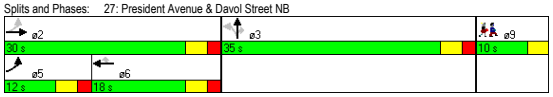
Lanes, Volumes, Timings
27: President Avenue & Davol Street NB

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	30	410	0	0	330	205	85	470	290	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	11	12	12	11	12	12	11	12	12	12	12	
Storage Length (ft)	0		0	0		165	0		125	0		0	
Storage Lanes	0		0	0		1	0		1	0		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			No			No			No			No	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		272			959			475			333		
Travel Time (s)		6.2			21.8			10.8			7.6		
Peak Hour Factor	0.82	0.82	0.82	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	13%	2%	0%	0%	3%	3%	1%	3%	2%	0%	0%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	537	0	0	375	233	0	603	315	0	0	0	
Turn Type	pm+pt					Perm	Perm		Perm				
Protected Phases	5	2			6			3					9
Permitted Phases	2					6	3		3				
Detector Phase	5	2			6	6	3	3	3				
Switch Phase													
Minimum Initial (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0				7.0
Minimum Split (s)	11.0	11.0			11.0	11.0	11.0	11.0	11.0				10.0
Total Split (s)	12.0	30.0	0.0	0.0	18.0	18.0	35.0	35.0	35.0	0.0	0.0	0.0	10.0
Total Split (%)	16.0%	40.0%	0.0%	0.0%	24.0%	24.0%	46.7%	46.7%	46.7%	0.0%	0.0%	0.0%	13%
Maximum Green (s)	7.0	25.0			13.0	13.0	30.0	30.0	30.0				7.0
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0				3.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0				0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	
Lead/Lag	Lead				Lag	Lag							
Lead-Lag Optimize?	Yes				Yes	Yes							
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0				3.0
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None				Ped
Walk Time (s)													4.0
Flash Dont Walk (s)													3.0
Pedestrian Calls (#/hr)													1
v/c Ratio		0.39			0.25	0.34		0.61	0.68				
Control Delay		20.1			15.1	17.4		25.0	30.5				
Queue Delay		0.3			0.0	0.0		0.1	0.0				
Total Delay		20.4			15.1	17.4		25.1	30.5				
Queue Length 50th (ft)		38			55	68		126	129				
Queue Length 95th (ft)		162			99	141		149	179				
Internal Link Dist (ft)		192			879			395			253		
Turn Bay Length (ft)						165			125				
Base Capacity (vph)		1362			1498	693		1348	633				
Starvation Cap Reductn		315			0	0		0	0				
Spillback Cap Reductn		0			0	0		156	0				
Storage Cap Reductn		0			0	0		0	0				
Reduced v/c Ratio		0.51			0.25	0.34		0.51	0.50				

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green, Master Intersection	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Splits and Phases: 27: President Avenue & Davol Street NB



HCM Signalized Intersection Capacity Analysis
27: President Avenue & Davol Street NB

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	410	0	0	330	205	85	470	290	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	11	12	12	12	12
Total Lost time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		1.00			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3384			3388	1568		3372	1583			
Flt Permitted		0.91			1.00	1.00		0.99	1.00			
Satd. Flow (perm)		3080			3388	1568		3372	1583			
Peak-hour factor, PHF	0.82	0.82	0.82	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	500	0	0	375	233	92	511	315	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	537	0	0	375	233	0	603	315	0	0	0
Heavy Vehicles (%)	13%	2%	0%	0%	3%	3%	1%	3%	2%	0%	0%	0%
Turn Type	pm+pt					Perm	Perm		Perm			
Protected Phases	5	2			6			3				
Permitted Phases	2					6	3		3			
Actuated Green, G (s)		33.2			33.2	33.2		21.8	21.8			
Effective Green, g (s)		33.2			33.2	33.2		21.8	21.8			
Actuated g/C Ratio		0.44			0.44	0.44		0.29	0.29			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)		1363			1500	694		980	460			
v/s Ratio Prot					0.11							
v/s Ratio Perm		c0.17				0.15		0.18	c0.20			
v/c Ratio		0.39			0.25	0.34		0.62	0.68			
Uniform Delay, d1		14.1			13.1	13.7		23.0	23.6			
Progression Factor		1.22			1.00	1.00		1.00	1.00			
Incremental Delay, d2		0.2			0.4	1.3		1.2	4.2			
Delay (s)		17.4			13.5	15.0		24.1	27.8			
Level of Service		B			B	B		C	C			
Approach Delay (s)		17.4			14.1			25.4			0.0	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM Average Control Delay	20.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

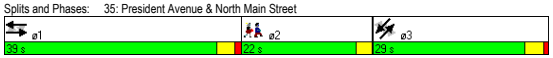
Lanes, Volumes, Timings
35: President Avenue & North Main Street

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR	ø2
Lane Configurations													
Volume (vph)	140	495	70	55	345	70	100	195	75	105	165	80	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	12	12	16	12	12	16	12	12	16	12	
Storage Length (ft)	0		0	125		0	0		0	0		0	
Storage Lanes	1		0	1		0	0		0	0		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			No			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		959			1952			265			1409		
Travel Time (s)		21.8			44.4			6.0			32.0		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.75	0.75	0.75	
Heavy Vehicles (%)	2%	2%	3%	0%	2%	0%	9%	6%	9%	6%	3%	6%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	0	
Parking (#/hr)			5										
Shared Lane Traffic (%)													
Lane Group Flow (vph)	161	649	0	63	477	0	0	425	0	0	467	0	
Turn Type	Perm			Perm			Perm			Perm			
Protected Phases		1			1			3			3		2
Permitted Phases	1			1			3			3			
Detector Phase	1	1		1	1		3	3		3	3		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0		10.0
Minimum Split (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0		22.0
Total Split (s)	39.0	39.0	0.0	39.0	39.0	0.0	29.0	29.0	0.0	29.0	29.0	0.0	22.0
Total Split (%)	43.3%	43.3%	0.0%	43.3%	43.3%	0.0%	32.2%	32.2%	0.0%	32.2%	32.2%	0.0%	24%
Maximum Green (s)	35.0	35.0		35.0	35.0		25.0	25.0		25.0	25.0		19.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lead		Lead	Lead								Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes								Yes
Vehicle Extension (s)	5.0	5.0		5.0	5.0		6.0	6.0		6.0	6.0		3.0
Recall Mode	Min	Min		Min	Min		None	None		None	None		None
Walk Time (s)													10.0
Flash Dont Walk (s)													9.0
Pedestrian Calls (#/hr)													14
v/c Ratio	0.56	0.68		0.40	0.50			0.79			0.88		
Control Delay	25.4	20.5		24.4	15.9			34.8			43.4		
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0		
Total Delay	25.4	20.5		24.4	15.9			34.8			43.4		
Queue Length 50th (ft)	41	177		15	113			149			173		
Queue Length 95th (ft)	#161	439		69	289			#418			#376		
Internal Link Dist (ft)		879			1872			185			1329		
Turn Bay Length (ft)				125									
Base Capacity (vph)	321	1073		176	1076			539			531		
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	0.50	0.60		0.36	0.44			0.79			0.88		

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 69.3	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 35: President Avenue & North Main Street



HCM Signalized Intersection Capacity Analysis
35: President Avenue & North Main Street

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	140	495	70	55	345	70	100	195	75	105	165	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	16	12	12	16	12	12	16	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.97			0.97			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	2070		1805	2065			1924			1966	
Flt Permitted	0.33	1.00		0.18	1.00			0.73			0.70	
Satd. Flow (perm)	621	2070		341	2065			1433			1406	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.75	0.75	0.75
Adj. Flow (vph)	161	569	80	63	397	80	115	224	86	140	220	107
RTOR Reduction (vph)	0	0	0	0	7	0	0	9	0	0	10	0
Lane Group Flow (vph)	161	649	0	63	470	0	0	416	0	0	457	0
Heavy Vehicles (%)	2%	2%	3%	0%	2%	0%	9%	6%	9%	6%	3%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	0
Parking (#/hr)			5									
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Actuated Green, G (s)	32.0	32.0		32.0	32.0			25.6			25.6	
Effective Green, g (s)	32.0	32.0		32.0	32.0			25.6			25.6	
Actuated g/C Ratio	0.45	0.45		0.45	0.45			0.36			0.36	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			6.0			6.0	
Lane Grp Cap (vph)	278	926		153	924			513			503	
v/s Ratio Prot		c0.31			0.23							
v/s Ratio Perm	0.26			0.18				0.29			c0.32	
v/c Ratio	0.58	0.70		0.41	0.51			0.81			0.91	
Uniform Delay, d1	14.7	15.9		13.4	14.1			20.8			21.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	4.6	3.0		3.7	0.9			11.1			21.8	
Delay (s)	19.3	18.9		17.1	15.0			31.8			43.6	
Level of Service	B	B		B	B			C			D	
Approach Delay (s)		19.0			15.3			31.8			43.6	
Approach LOS		B			B			C			D	

Intersection Summary					
HCM Average Control Delay	25.7	HCM Level of Service		C	
HCM Volume to Capacity ratio	0.79				
Actuated Cycle Length (s)	71.5	Sum of lost time (s)		13.9	
Intersection Capacity Utilization	73.7%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis
4: Ferry Street & Ponta Delgada

2030 No-Build Conditions - AM Peak Hour

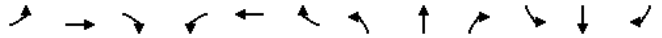
Movement	EBL	EBR	NBL	NBR	SWL	SWR
Lane Configurations						
Volume (veh/h)	260	50	10	65	25	170
Sign Control	Stop		Free		Free	
Grade	1%		1%		1%	
Peak Hour Factor	0.90	0.90	0.62	0.62	0.78	0.78
Hourly flow rate (vph)	289	56	16	105	32	218
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	278	141	250			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	278	141	250			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	59	94	99			
cM capacity (veh/h)	705	912	1327			

Direction, Lane #	EB 1	NB 1	SW 1
Volume Total	344	121	250
Volume Left	289	16	0
Volume Right	56	0	218
cSH	732	1327	1700
Volume to Capacity	0.47	0.01	0.15
Queue Length 95th (ft)	63	1	0
Control Delay (s)	14.2	1.1	0.0
Lane LOS	B	A	
Approach Delay (s)	14.2	1.1	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		7.0		
Intersection Capacity Utilization		43.9%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
7: Anawan Street & Ponta Delgada

2030 No-Build Conditions - AM Peak Hour



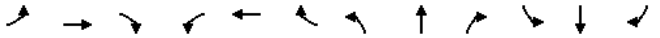
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	20	0	35	10	5	5	10	310	20	160	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.64	0.64	0.64	0.72	0.72	0.72	0.91	0.91	0.91	0.87	0.87	0.87
Hourly flow rate (vph)	0	31	0	49	14	7	5	11	341	23	184	23
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	448	604	195	449	445	181	207			352		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	448	604	195	449	445	181	207			352		
tC, single (s)	7.1	6.6	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.1	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	92	100	90	97	99	100			98		
cM capacity (veh/h)	500	386	851	482	499	866	1376			1191		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	31	69	357	230
Volume Left	0	49	5	23
Volume Right	0	7	341	23
cSH	386	508	1376	1191
Volume to Capacity	0.08	0.14	0.00	0.02
Queue Length 95th (ft)	7	12	0	1
Control Delay (s)	15.1	13.2	0.2	1.0
Lane LOS	C	B	A	A
Approach Delay (s)	15.1	13.2	0.2	1.0
Approach LOS	C	B		

Intersection Summary				
Average Delay		2.4		
Intersection Capacity Utilization		37.7%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
9: Central Street & Davol Street

2030 No-Build Conditions - AM Peak Hour



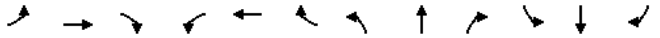
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	75	105	140	0	320	0	0	470	85
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.76	0.76	0.76	0.86	0.86	0.86	0.80	0.80	0.80
Hourly flow rate (vph)	0	0	0	99	138	184	0	372	0	0	588	106
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1266	1013	641	1013	1066	372	694			372		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1266	1013	641	1013	1066	372	694			372		
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 %	100	100	100	54	37	72	100			100		
cM capacity (veh/h)	53	241	479	216	220	669	911			1198		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	168	253	372	694
Volume Left	99	0	0	0
Volume Right	0	184	0	106
cSH	218	430	911	1700
Volume to Capacity	0.77	0.59	0.00	0.41
Queue Length 95th (ft)	135	92	0	0
Control Delay (s)	61.6	24.6	0.0	0.0
Lane LOS	F	C		
Approach Delay (s)	39.4		0.0	0.0
Approach LOS	E			

Intersection Summary				
Average Delay	11.2			
Intersection Capacity Utilization	46.1%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
10: Anawan Street & Davol Street

2030 No-Build Conditions - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	35	140	180	25	30	20	10	150	75	235	295	30
Peak Hour Factor	0.94	0.94	0.94	0.76	0.76	0.76	0.84	0.84	0.84	0.81	0.81	0.81
Hourly flow rate (vph)	37	149	191	33	39	26	12	179	89	290	364	37

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	378	99	280	691
Volume Left (vph)	37	33	12	290
Volume Right (vph)	191	26	89	37
Hadj (s)	0.04	-0.02	-0.17	0.07
Departure Headway (s)	6.8	7.7	6.7	6.4
Degree Utilization, x	0.72	0.21	0.52	1.22
Capacity (veh/h)	509	407	507	557
Control Delay (s)	25.3	12.8	16.7	137.8
Approach Delay (s)	25.3	12.8	16.7	137.8
Approach LOS	D	B	C	F

Intersection Summary				
Delay	76.6			
HCM Level of Service	F			
Intersection Capacity Utilization	74.8%	ICU Level of Service	D	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
29: Turner Street & Davol Street NB

2030 No-Build Conditions - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	45	720	165	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.68	0.68	0.91	0.91	0.92	0.92
Hourly flow rate (vph)	0	66	791	181	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	882	486			973	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	882	486			973	
tC, single (s)	6.8	7.1			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	100	87			100	
cM capacity (veh/h)	290	509			717	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	66	527	445
Volume Left	0	0	0
Volume Right	66	0	181
cSH	509	1700	1700
Volume to Capacity	0.13	0.31	0.26
Queue Length 95th (ft)	11	0	0
Control Delay (s)	13.1	0.0	0.0
Lane LOS	B		
Approach Delay (s)	13.1	0.0	
Approach LOS	B		

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization		35.2%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
30: Pearce Street & North Davol Street

2030 No-Build Conditions - AM Peak Hour

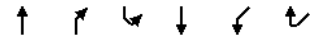
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	80	765	0	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.91	0.91	0.92	0.92
Hourly flow rate (vph)	0	87	841	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						475
pX, platoon unblocked						
vC, conflicting volume	841	420			841	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	841	420			841	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	85			100	
cM capacity (veh/h)	308	585			803	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	87	420	420
Volume Left	0	0	0
Volume Right	87	0	0
cSH	585	1700	1700
Volume to Capacity	0.15	0.25	0.25
Queue Length 95th (ft)	13	0	0
Control Delay (s)	12.2	0.0	0.0
Lane LOS	B		
Approach Delay (s)	12.2	0.0	
Approach LOS	B		

Intersection Summary			
Average Delay		1.1	
Intersection Capacity Utilization		32.8%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Davol St. SB & U-Turn to SB U-turn to SB Davol St

2030 No-Build Conditions - AM Peak Hour



Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	0	0	0	770	20	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.86	0.86	0.75	0.75
Hourly flow rate (vph)	0	0	0	895	27	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			0		448	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		448	0
tC, single (s)			4.1		7.1	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			100		95	100
cM capacity (veh/h)			1636		510	1091

Direction, Lane #	SB 1	SB 2	SW 1
Volume Total	448	448	27
Volume Left	0	0	27
Volume Right	0	0	0
cSH	1700	1700	510
Volume to Capacity	0.26	0.26	0.05
Queue Length 95th (ft)	0	0	4
Control Delay (s)	0.0	0.0	12.5
Lane LOS			B
Approach Delay (s)	0.0		12.5
Approach LOS			B

Intersection Summary			
Average Delay			0.4
Intersection Capacity Utilization			49.5%
Analysis Period (min)			15
ICU Level of Service			A

HCM Unsignalized Intersection Capacity Analysis
88: Davol St. NB & U-turn to NB Davol St

2030 No-Build Conditions - AM Peak Hour

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	760	0	0	120	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.92	0.92	0.72	0.72
Hourly flow rate (vph)	0	844	0	0	167	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0				422	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				422	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				70	100
cM capacity (veh/h)	1636				562	1091

Direction, Lane #	NB 1	NB 2	NE 1
Volume Total	422	422	167
Volume Left	0	0	167
Volume Right	0	0	0
cSH	1700	1700	562
Volume to Capacity	0.25	0.25	0.30
Queue Length 95th (ft)	0	0	31
Control Delay (s)	0.0	0.0	14.1
Lane LOS			B
Approach Delay (s)	0.0		14.1
Approach LOS			B

Intersection Summary			
Average Delay			2.3
Intersection Capacity Utilization			52.7%
Analysis Period (min)			15
ICU Level of Service			A

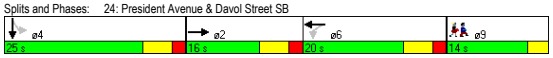
Lanes, Volumes, Timings
24: President Avenue & Davol Street SB

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	0	0	0	355	5	0	0	0	0	545	535	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	10	12	12	12	12	12	12	12	12	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		238			272			1959			1114		
Travel Time (s)		5.4			6.2			44.5			25.3		
Peak Hour Factor	0.38	0.38	0.38	0.85	0.85	0.85	0.92	0.92	0.92	0.90	0.90	0.90	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%	0%	
Shared Lane Traffic (%)				49%									
Lane Group Flow (vph)	0	0	0	213	211	0	0	0	0	0	1200	0	
Turn Type				Perm						Perm			
Protected Phases		2			6						4		9
Permitted Phases				6						4			
Detector Phase		2		6	6					4	4		
Switch Phase													
Minimum Initial (s)		4.0		12.0	12.0					12.0	12.0		7.0
Minimum Split (s)		10.0		18.0	18.0					18.0	18.0		14.0
Total Split (s)	0.0	16.0	0.0	20.0	20.0	0.0	0.0	0.0	0.0	25.0	25.0	0.0	14.0
Total Split (%)	0.0%	21.3%	0.0%	26.7%	26.7%	0.0%	0.0%	0.0%	0.0%	33.3%	33.3%	0.0%	19%
Maximum Green (s)		10.0		14.0	14.0					19.0	19.0		11.0
Yellow Time (s)		4.0		4.0	4.0					4.0	4.0		3.0
All-Red Time (s)		2.0		2.0	2.0					2.0	2.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.0	
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0		3.0
Recall Mode		None		Min	Min					C-Max	C-Max		None
Walk Time (s)													5.0
Flash Dont Walk (s)													6.0
Pedestrian Calls (#/hr)													5
v/c Ratio				0.52	0.48						0.64		
Control Delay				35.1	33.8						17.2		
Queue Delay				2.3	2.5						0.0		
Total Delay				37.4	36.3						17.2		
Queue Length 50th (ft)				104	103						174		
Queue Length 95th (ft)				162	158						#446		
Internal Link Dist (ft)		158			192			1879			1034		
Turn Bay Length (ft)													
Base Capacity (vph)				414	444						1884		
Starvation Cap Reductn				102	133						0		
Spillback Cap Reductn				0	0						0		
Storage Cap Reductn				0	0						0		
Reduced v/c Ratio				0.68	0.68						0.64		

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 5 (7%), Referenced to phase 4:SBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 24: President Avenue & Davol Street SB



HCM Signalized Intersection Capacity Analysis
24: President Avenue & Davol Street SB

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	355	5	0	0	0	0	545	535	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	12	12	12	12	12	12	12	12
Total Lost time (s)				6.0	6.0						6.0	
Lane Util. Factor				0.95	0.95						0.95	
Frt				1.00	1.00						1.00	
Flt Protected				0.95	0.95						0.98	
Satd. Flow (prot)				1600	1721						3452	
Flt Permitted				0.95	0.95						0.98	
Satd. Flow (perm)				1600	1715						3452	
Peak-hour factor, PHF	0.38	0.38	0.38	0.85	0.85	0.85	0.92	0.92	0.92	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	418	6	0	0	0	0	606	594	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	213	211	0	0	0	0	0	1200	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%	0%
Turn Type				Perm						Perm		
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)				19.3	19.3						38.5	
Effective Green, g (s)				19.3	19.3						38.5	
Actuated g/C Ratio				0.26	0.26						0.51	
Clearance Time (s)				6.0	6.0						6.0	
Vehicle Extension (s)				3.0	3.0						3.0	
Lane Grp Cap (vph)				412	441						1772	
v/s Ratio Prot												
v/s Ratio Perm				c0.13	0.12						0.35	
v/c Ratio				0.52	0.48						0.68	
Uniform Delay, d1				23.9	23.6						13.6	
Progression Factor				1.32	1.32						1.00	
Incremental Delay, d2				1.1	0.8						2.1	
Delay (s)				32.5	31.9						15.7	
Level of Service				C	C						B	
Approach Delay (s)		0.0			32.2			0.0			15.7	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM Average Control Delay	20.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	17.2
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

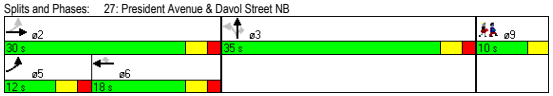
Lanes, Volumes, Timings
27: President Avenue & Davol Street NB

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	35	510	0	0	290	365	70	620	300	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	11	12	12	11	12	12	11	12	12	12	12	
Storage Length (ft)	0		0	0		165	0		125	0		0	
Storage Lanes	0		0	0		1	0		1	0		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			No			No			No			No	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		272			959			475			333		
Travel Time (s)		6.2			21.8			10.8			7.6		
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.87	0.87	0.87	0.92	0.92	0.92	
Heavy Vehicles (%)	3%	1%	0%	0%	1%	1%	0%	1%	0%	0%	0%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	592	0	0	326	410	0	793	345	0	0	0	
Turn Type	pm+pt					Perm	Perm		Perm				
Protected Phases	5	2			6			3					9
Permitted Phases	2					6	3		3				
Detector Phase	5	2			6	6	3	3	3				
Switch Phase													
Minimum Initial (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0				7.0
Minimum Split (s)	11.0	11.0			11.0	11.0	11.0	11.0	11.0				10.0
Total Split (s)	12.0	30.0	0.0	0.0	18.0	18.0	35.0	35.0	35.0	0.0	0.0	0.0	10.0
Total Split (%)	16.0%	40.0%	0.0%	0.0%	24.0%	24.0%	46.7%	46.7%	46.7%	0.0%	0.0%	0.0%	13%
Maximum Green (s)	7.0	25.0			13.0	13.0	30.0	30.0	30.0				7.0
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0				3.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0				0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	
Lead/Lag	Lead				Lag	Lag							
Lead-Lag Optimize?	Yes				Yes	Yes							
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0				3.0
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None				Ped
Walk Time (s)													4.0
Flash Dont Walk (s)													3.0
Pedestrian Calls (#/hr)													5
v/c Ratio		0.46			0.23	0.63		0.71	0.65				
Control Delay		16.1			16.3	25.2		25.3	27.3				
Queue Delay		0.3			0.0	0.0		0.0	0.0				
Total Delay		16.4			16.3	25.2		25.3	27.3				
Queue Length 50th (ft)		37			51	149		166	135				
Queue Length 95th (ft)		147			88	#300		192	188				
Internal Link Dist (ft)		192			879			395			253		
Turn Bay Length (ft)						165			125				
Base Capacity (vph)		1281			1405	650		1376	646				
Starvation Cap Reductn		243			0	0		0	0				
Spillback Cap Reductn		0			0	0		0	0				
Storage Cap Reductn		0			0	0		0	0				
Reduced v/c Ratio		0.57			0.23	0.63		0.58	0.53				

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green, Master Intersection	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 27: President Avenue & Davol Street NB



HCM Signalized Intersection Capacity Analysis
27: President Avenue & Davol Street NB

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	510	0	0	290	365	70	620	300	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	11	12	12	12	12
Total Lost time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		1.00			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3440			3455	1599		3441	1615			
Flt Permitted		0.91			1.00	1.00		0.99	1.00			
Satd. Flow (perm)		3150			3455	1599		3441	1615			
Peak-hour factor, PHF	0.92	0.92	0.92	0.89	0.89	0.89	0.87	0.87	0.87	0.92	0.92	0.92
Adj. Flow (vph)	38	554	0	0	326	410	80	713	345	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	592	0	0	326	410	0	793	345	0	0	0
Heavy Vehicles (%)	3%	1%	0%	0%	1%	1%	0%	1%	0%	0%	0%	0%
Turn Type	pm+pt					Perm	Perm		Perm			
Protected Phases	5	2			6			3				
Permitted Phases	2					6	3		3			
Actuated Green, G (s)		30.5			30.5	30.5		24.5	24.5			
Effective Green, g (s)		30.5			30.5	30.5		24.5	24.5			
Actuated g/C Ratio		0.41			0.41	0.41		0.33	0.33			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)		1281			1405	650		1124	528			
v/s Ratio Prot					0.09							
v/s Ratio Perm		0.19				c0.26		0.23	0.21			
v/c Ratio		0.46			0.23	0.63		0.71	0.65			
Uniform Delay, d1		16.3			14.6	17.8		22.1	21.6			
Progression Factor		0.86			1.00	1.00		1.00	1.00			
Incremental Delay, d2		0.2			0.4	4.6		2.0	2.9			
Delay (s)		14.2			15.0	22.4		24.1	24.5			
Level of Service		B			B	C		C	C			
Approach Delay (s)		14.2			19.1			24.3			0.0	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM Average Control Delay	20.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

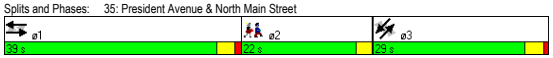
Lanes, Volumes, Timings
35: President Avenue & North Main Street

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR	ø2
Lane Configurations													
Volume (vph)	120	570	120	60	435	60	120	255	75	155	195	90	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	12	12	16	12	12	16	12	12	16	12	
Storage Length (ft)	0		0	125		0	0		0	0		0	
Storage Lanes	1		0	1		0	0		0	0		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			No			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		959			1952			265			1409		
Travel Time (s)		21.8			44.4			6.0			32.0		
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.92	0.92	0.92	0.96	0.96	0.96	
Heavy Vehicles (%)	3%	1%	3%	5%	1%	2%	1%	1%	0%	1%	2%	1%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	0	
Parking (#/hr)			5										
Shared Lane Traffic (%)													
Lane Group Flow (vph)	133	766	0	71	583	0	0	489	0	0	458	0	
Turn Type	Perm			Perm			Perm			Perm			
Protected Phases		1			1			3			3		2
Permitted Phases	1			1			3			3			
Detector Phase	1	1		1	1		3	3		3	3		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0		10.0
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0		22.0
Total Split (s)	39.0	39.0	0.0	39.0	39.0	0.0	29.0	29.0	0.0	29.0	29.0	0.0	22.0
Total Split (%)	43.3%	43.3%	0.0%	43.3%	43.3%	0.0%	32.2%	32.2%	0.0%	32.2%	32.2%	0.0%	24%
Maximum Green (s)	35.0	35.0		35.0	35.0		25.0	25.0		25.0	25.0		19.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lead		Lead	Lead								Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes								Yes
Vehicle Extension (s)	5.0	5.0		5.0	5.0		6.0	6.0		6.0	6.0		3.0
Recall Mode	Min	Min		Min	Min		None	None		None	None		None
Walk Time (s)													10.0
Flash Dont Walk (s)													9.0
Pedestrian Calls (#/hr)													8
v/c Ratio	0.57	0.76		0.71	0.57			0.90			1.02		
Control Delay	28.9	23.2		59.7	17.2			45.4			75.9		
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0		
Total Delay	28.9	23.2		59.7	17.2			45.4			75.9		
Queue Length 50th (ft)	35	228		20	149			180			179		
Queue Length 95th (ft)	#162	#653		#114	360			#514			#519		
Internal Link Dist (ft)		879			1872			185			1329		
Turn Bay Length (ft)				125									
Base Capacity (vph)	233	1013		100	1029			545			447		
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	0.57	0.76		0.71	0.57			0.90			1.02		

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 72.4	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 35: President Avenue & North Main Street



HCM Signalized Intersection Capacity Analysis
35: President Avenue & North Main Street

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	120	570	120	60	435	60	120	255	75	155	195	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	16	12	12	16	12	12	16	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.97		1.00	0.98			0.98			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1752	2069		1719	2091			2060			2028	
Flt Permitted	0.26	1.00		0.11	1.00			0.74			0.61	
Satd. Flow (perm)	476	2069		204	2091			1535			1253	
Peak-hour factor, PHF	0.90	0.90	0.90	0.85	0.85	0.85	0.92	0.92	0.92	0.96	0.96	0.96
Adj. Flow (vph)	133	633	133	71	512	71	130	277	82	161	203	94
RTOR Reduction (vph)	0	0	0	0	5	0	0	7	0	0	9	0
Lane Group Flow (vph)	133	766	0	71	578	0	0	482	0	0	449	0
Heavy Vehicles (%)	3%	1%	3%	5%	1%	2%	1%	1%	0%	1%	2%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	0
Parking (#/hr)			5									
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Actuated Green, G (s)	35.4	35.4		35.4	35.4			25.3			25.3	
Effective Green, g (s)	35.4	35.4		35.4	35.4			25.3			25.3	
Actuated g/C Ratio	0.47	0.47		0.47	0.47			0.34			0.34	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			6.0			6.0	
Lane Grp Cap (vph)	225	979		97	990			519			424	
v/s Ratio Prot		c0.37			0.28							
v/s Ratio Perm	0.28			0.35				0.31			c0.36	
v/c Ratio	0.59	0.78		0.73	0.58			0.93			1.06	
Uniform Delay, d1	14.4	16.5		15.9	14.3			23.9			24.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	6.2	4.8		29.0	1.4			24.3			60.0	
Delay (s)	20.6	21.3		44.9	15.7			48.2			84.7	
Level of Service	C	C		D	B			D			F	
Approach Delay (s)		21.2			18.9			48.2			84.7	
Approach LOS		C			B			D			F	

Intersection Summary					
HCM Average Control Delay	37.5	HCM Level of Service	D		
HCM Volume to Capacity ratio	0.90				
Actuated Cycle Length (s)	74.8	Sum of lost time (s)	14.1		
Intersection Capacity Utilization	90.2%	ICU Level of Service	E		
Analysis Period (min)	15				
c Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis
4: Ferry Street & Ponta Delgada

2030 No-Build Conditions - PM Peak Hour

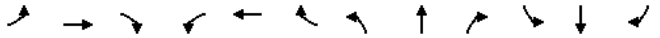
Movement	EBL	EBR	NBL	NBR	SWL	SWR
Lane Configurations						
Volume (veh/h)	155	30	15	15	25	275
Sign Control	Stop		Free		Free	
Grade	1%		1%		1%	
Peak Hour Factor	0.89	0.89	0.91	0.91	0.74	0.74
Hourly flow rate (vph)	174	34	16	16	34	372
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	269	220	405			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	269	220	405			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	76	96	99			
cM capacity (veh/h)	712	825	1164			

Direction, Lane #	EB 1	NB 1	SW 1
Volume Total	208	33	405
Volume Left	174	16	0
Volume Right	34	0	372
cSH	728	1164	1700
Volume to Capacity	0.29	0.01	0.24
Queue Length 95th (ft)	29	1	0
Control Delay (s)	11.9	4.1	0.0
Lane LOS	B	A	
Approach Delay (s)	11.9	4.1	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		4.0		
Intersection Capacity Utilization		42.1%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
7: Anawan Street & Ponta Delgada

2030 No-Build Conditions - PM Peak Hour



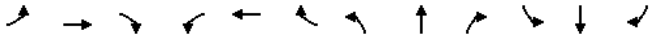
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	25	5	70	0	5	0	10	165	35	230	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.70	0.70	0.67	0.67	0.67	0.91	0.91	0.91	0.78	0.78	0.78
Hourly flow rate (vph)	0	36	7	104	0	7	0	11	181	45	295	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	500	583	301	518	499	102	308			192		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	500	583	301	518	499	102	308			192		
tC, single (s)	7.1	6.6	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.1	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	91	99	75	100	99	100			97		
cM capacity (veh/h)	469	402	743	425	461	959	1264			1375		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	43	112	192	353
Volume Left	0	104	0	45
Volume Right	7	7	181	13
cSH	436	441	1264	1375
Volume to Capacity	0.10	0.25	0.00	0.03
Queue Length 95th (ft)	8	25	0	3
Control Delay (s)	14.2	15.9	0.0	1.2
Lane LOS	B	C		A
Approach Delay (s)	14.2	15.9	0.0	1.2
Approach LOS	B	C		

Intersection Summary				
Average Delay		4.0		
Intersection Capacity Utilization		46.2%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
9: Central Street & Davol Street

2030 No-Build Conditions - PM Peak Hour



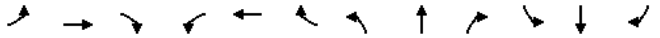
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	130	120	275	5	330	0	0	470	125
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.86	0.86	0.86	0.78	0.78	0.78	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	151	140	320	6	423	0	0	522	139
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1417	1028	592	1028	1097	423	661			423		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1417	1028	592	1028	1097	423	661			423		
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 %	100	100	100	28	34	50	99			100		
cM capacity (veh/h)	27	234	510	211	210	635	937			1147		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	221	390	429	661
Volume Left	151	0	6	0
Volume Right	0	320	0	139
cSH	211	466	937	1700
Volume to Capacity	1.05	0.84	0.01	0.39
Queue Length 95th (ft)	244	205	1	0
Control Delay (s)	123.1	41.2	0.2	0.0
Lane LOS	F	E	A	
Approach Delay (s)	70.8		0.2	0.0
Approach LOS	F			

Intersection Summary				
Average Delay	25.5			
Intersection Capacity Utilization	54.9%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
10: Anawan Street & Davol Street

2030 No-Build Conditions - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	120	90	55	100	45	60	5	160	90	180	380	35
Peak Hour Factor	0.87	0.87	0.87	0.76	0.76	0.76	0.94	0.94	0.94	0.85	0.85	0.85
Hourly flow rate (vph)	138	103	63	132	59	79	5	170	96	212	447	41

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	305	270	271	700
Volume Left (vph)	138	132	5	212
Volume Right (vph)	63	79	96	41
Hadj (s)	0.01	-0.07	-0.19	0.04
Departure Headway (s)	7.6	7.6	7.4	7.0
Degree Utilization, x	0.64	0.57	0.56	1.36
Capacity (veh/h)	452	438	455	505
Control Delay (s)	23.1	20.4	19.3	195.2
Approach Delay (s)	23.1	20.4	19.3	195.2
Approach LOS	C	C	C	F

Intersection Summary				
Delay	99.9			
HCM Level of Service	F			
Intersection Capacity Utilization	74.3%	ICU Level of Service	D	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
29: Turner Street & Davol Street NB

2030 No-Build Conditions - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	60	840	125	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.56	0.56	0.90	0.90	0.92	0.92
Hourly flow rate (vph)	0	107	933	139	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1003	536			1072	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1003	536			1072	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	78			100	
cM capacity (veh/h)	242	489			658	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	107	622	450
Volume Left	0	0	0
Volume Right	107	0	139
cSH	489	1700	1700
Volume to Capacity	0.22	0.37	0.26
Queue Length 95th (ft)	21	0	0
Control Delay (s)	14.4	0.0	0.0
Lane LOS	B		
Approach Delay (s)	14.4	0.0	
Approach LOS	B		

Intersection Summary				
Average Delay		1.3		
Intersection Capacity Utilization		37.6%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
30: Pearce Street & North Davol Street

2030 No-Build Conditions - PM Peak Hour

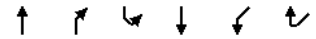
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	75	915	0	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.67	0.67	0.86	0.86	0.92	0.92
Hourly flow rate (vph)	0	112	1064	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						475
pX, platoon unblocked						
vC, conflicting volume	1064	532			1064	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1064	532			1064	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	77			100	
cM capacity (veh/h)	221	495			663	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	112	532	532
Volume Left	0	0	0
Volume Right	112	0	0
cSH	495	1700	1700
Volume to Capacity	0.23	0.31	0.31
Queue Length 95th (ft)	22	0	0
Control Delay (s)	14.4	0.0	0.0
Lane LOS	B		
Approach Delay (s)	14.4	0.0	
Approach LOS	B		

Intersection Summary				
Average Delay		1.4		
Intersection Capacity Utilization		36.6%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
85: Davol St. SB & U-Turn to SB U-turn to SB Davol St

2030 No-Build Conditions - PM Peak Hour



Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	0	0	0	785	20	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	0	0	0	853	40	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			0		427	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		427	0
tC, single (s)			4.1		7.0	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			100		93	100
cM capacity (veh/h)			1636		536	1091

Direction, Lane #	SB 1	SB 2	SW 1
Volume Total	427	427	40
Volume Left	0	0	40
Volume Right	0	0	0
cSH	1700	1700	536
Volume to Capacity	0.25	0.25	0.07
Queue Length 95th (ft)	0	0	6
Control Delay (s)	0.0	0.0	12.3
Lane LOS			B
Approach Delay (s)	0.0		12.3
Approach LOS			B

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		53.4%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
88: Davol St. NB & U-turn to NB Davol St

2030 No-Build Conditions - PM Peak Hour

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	885	0	0	80	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.92	0.92	0.89	0.89
Hourly flow rate (vph)	0	994	0	0	90	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0				497	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				497	0
tC, single (s)	4.1				6.9	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				82	100
cM capacity (veh/h)	1636				500	1091

Direction, Lane #	NB 1	NB 2	NE 1
Volume Total	497	497	90
Volume Left	0	0	90
Volume Right	0	0	0
cSH	1700	1700	500
Volume to Capacity	0.29	0.29	0.18
Queue Length 95th (ft)	0	0	16
Control Delay (s)	0.0	0.0	13.8
Lane LOS			B
Approach Delay (s)	0.0		13.8
Approach LOS			B

Intersection Summary			
Average Delay		1.1	
Intersection Capacity Utilization		56.1%	ICU Level of Service B
Analysis Period (min)		15	

Freetown

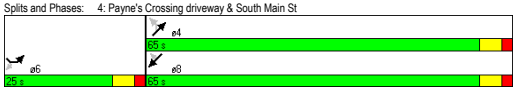
Lanes, Volumes, Timings
4: Payne's Crossing driveway & South Main St

2030 No Build Conditions - AM Peak Hour

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Volume (vph)	5	5	5	327	435	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	200			0
Storage Lanes	2	1	1			1
Taper Length (ft)	25	25	25			25
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	381			1115	461	
Travel Time (s)	8.7			25.3	10.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	5	5	355	473	0
Turn Type		Perm	Perm			Perm
Protected Phases	6			4	8	
Permitted Phases		6	4			8
Detector Phase	6	6	4	4	8	8
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	25.0	25.0	65.0	65.0	65.0	65.0
Total Split (%)	27.8%	27.8%	72.2%	72.2%	72.2%	72.2%
Maximum Green (s)	19.0	19.0	59.0	59.0	59.0	59.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.02	0.05	0.01	0.24	0.32	
Control Delay	39.4	25.4	1.8	2.6	0.6	
Queue Delay	0.0	0.0	0.0	0.0	0.1	
Total Delay	39.4	25.4	1.8	2.6	0.7	
Queue Length 50th (ft)	1	0	1	35	1	
Queue Length 95th (ft)	7	11	2	58	1	
Internal Link Dist (ft)	301			1035	381	
Turn Bay Length (ft)			200			
Base Capacity (vph)	725	338	732	1496	1496	
Starvation Cap Reductn	0	0	0	0	298	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.01	0.01	0.01	0.24	0.39	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 33 (37%), Referenced to phase 4:NETL and 8:SWT, Start of Green	
Natural Cycle: 45	
Control Type: Actuated-Coordinated	

Splits and Phases: 4: Payne's Crossing driveway & South Main St



HCM Signalized Intersection Capacity Analysis
4: Payne's Crossing driveway & South Main St

2030 No Build Conditions - AM Peak Hour

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Volume (vph)	5	5	5	327	435	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	1583	1770	1863	1863	
Flt Permitted	0.95	1.00	0.49	1.00	1.00	
Satd. Flow (perm)	3433	1583	913	1863	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	5	5	355	473	0
RTOR Reduction (vph)	0	5	0	0	0	0
Lane Group Flow (vph)	5	0	5	355	473	0
Turn Type		Perm	Perm			Perm
Protected Phases	6			4	8	
Permitted Phases		6	4			8
Actuated Green, G (s)	5.8	5.8	72.2	72.2	72.2	
Effective Green, g (s)	5.8	5.8	72.2	72.2	72.2	
Actuated g/C Ratio	0.06	0.06	0.80	0.80	0.80	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	221	102	732	1495	1495	
v/s Ratio Prot	c0.00			0.19	c0.25	
v/s Ratio Perm		0.00	0.01			
v/c Ratio	0.02	0.00	0.01	0.24	0.32	
Uniform Delay, d1	39.4	39.4	1.8	2.2	2.4	
Progression Factor	1.00	1.00	1.00	1.00	0.01	
Incremental Delay, d2	0.0	0.0	0.0	0.4	0.5	
Delay (s)	39.5	39.4	1.8	2.5	0.6	
Level of Service	D	D	A	A	A	
Approach Delay (s)	39.4			2.5	0.6	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	1.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	36.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

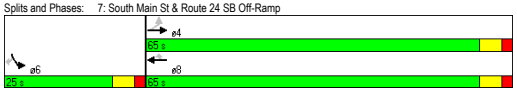
Lanes, Volumes, Timings
7: South Main St & Route 24 SB Off-Ramp

2030 No Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	45	275	430	875	120	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	16	12
Storage Length (ft)	0			240	0	0
Storage Lanes	1			2	1	1
Taper Length (ft)	25			25	25	25
Right Turn on Red				Yes		Yes
Link Speed (mph)		30	30		30	
Link Distance (ft)		461	773		388	
Travel Time (s)		10.5	17.6		8.8	
Peak Hour Factor	0.85	0.85	0.87	0.87	0.91	0.91
Heavy Vehicles (%)	9%	11%	12%	2%	15%	24%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	53	324	494	1006	132	5
Turn Type	Perm			Perm		Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	65.0	65.0	65.0	65.0	25.0	25.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%
Maximum Green (s)	59.0	59.0	59.0	59.0	19.0	19.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	Min	Min
v/c Ratio	0.09	0.26	0.21	0.67	0.56	0.03
Control Delay	4.3	4.6	0.5	1.2	45.0	19.6
Queue Delay	0.0	0.0	0.0	1.2	0.0	0.0
Total Delay	4.3	4.6	0.5	2.4	45.0	19.6
Queue Length 50th (ft)	7	49	3	0	71	0
Queue Length 95th (ft)	18	71	m4	m0	122	10
Internal Link Dist (ft)		381	693		308	
Turn Bay Length (ft)				240		
Base Capacity (vph)	602	1256	2365	1507	376	279
Starvation Cap Reductn	0	0	0	279	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.26	0.21	0.82	0.35	0.02

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 20 (22%), Referenced to phase 4:EBTL and 8:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 7: South Main St & Route 24 SB Off-Ramp



HCM Signalized Intersection Capacity Analysis
7: South Main St & Route 24 SB Off-Ramp

2030 No Build Conditions - AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	45	275	430	875	120	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	14	16	12
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1656	1712	3223	1689	1779	1302
Flt Permitted	0.47	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	822	1712	3223	1689	1779	1302
Peak-hour factor, PHF	0.85	0.85	0.87	0.87	0.91	0.91
Adj. Flow (vph)	53	324	494	1006	132	5
RTOR Reduction (vph)	0	0	0	268	0	4
Lane Group Flow (vph)	53	324	494	738	132	1
Heavy Vehicles (%)	9%	11%	12%	2%	15%	24%
Turn Type	Perm			Perm		Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	66.0	66.0	66.0	66.0	12.0	12.0
Effective Green, g (s)	66.0	66.0	66.0	66.0	12.0	12.0
Actuated g/C Ratio	0.73	0.73	0.73	0.73	0.13	0.13
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	603	1255	2364	1239	237	174
v/s Ratio Prot		0.19	0.15		c0.07	
v/s Ratio Perm	0.06			c0.44		0.00
v/c Ratio	0.09	0.26	0.21	0.60	0.56	0.00
Uniform Delay, d1	3.4	3.9	3.8	5.7	36.5	33.8
Progression Factor	0.94	0.90	0.11	1.21	1.00	1.00
Incremental Delay, d2	0.3	0.5	0.1	0.6	2.8	0.0
Delay (s)	3.5	4.1	0.5	7.4	39.3	33.8
Level of Service	A	A	A	A	D	C
Approach Delay (s)		4.0	5.1		39.1	
Approach LOS		A	A		D	

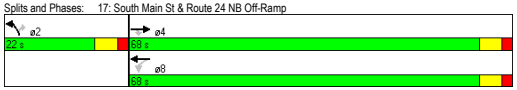
Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	325	60	120	1290	15	515
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	15	16	16
Storage Length (ft)		200	100		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)		25	25		25	25
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	773			446	481	
Travel Time (s)	17.6			10.1	10.9	
Peak Hour Factor	0.82	0.82	0.88	0.88	0.80	0.80
Heavy Vehicles (%)	7%	26%	10%	3%	33%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	396	73	136	1466	19	644
Turn Type		Perm	Perm			Perm
Protected Phases	4			8	2	
Permitted Phases		4	8			2
Detector Phase	4	4	8	8	2	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	68.0	68.0	68.0	68.0	22.0	22.0
Total Split (%)	75.6%	75.6%	75.6%	75.6%	24.4%	24.4%
Maximum Green (s)	62.0	62.0	62.0	62.0	16.0	16.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	Min	Min
v/c Ratio	0.31	0.07	0.21	1.00	0.08	0.92
Control Delay	4.0	0.5	5.7	39.9	32.1	27.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.0	0.5	5.7	39.9	32.1	27.3
Queue Length 50th (ft)	51	0	25	~917	9	62
Queue Length 95th (ft)	67	3	46	#1125	25	128
Internal Link Dist (ft)	693			366	401	
Turn Bay Length (ft)		200	100			
Base Capacity (vph)	1278	1066	645	1461	273	741
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	0.07	0.21	1.00	0.07	0.87

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green, Master Intersection
Natural Cycle: 90
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.

Splits and Phases: 17: South Main St & Route 24 NB Off-Ramp



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	325	60	120	1290	15	515
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	15	16	16
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1776	1453	1641	2029	1538	1760
Flt Permitted	1.00	1.00	0.52	1.00	0.95	1.00
Satd. Flow (perm)	1776	1453	897	2029	1538	1760
Peak-hour factor, PHF	0.82	0.82	0.88	0.88	0.80	0.80
Adj. Flow (vph)	396	73	136	1466	19	644
RTOR Reduction (vph)	0	20	0	0	0	445
Lane Group Flow (vph)	396	53	136	1466	19	199
Heavy Vehicles (%)	7%	26%	10%	3%	33%	4%
Turn Type		Perm	Perm			Perm
Protected Phases	4			8	2	
Permitted Phases		4	8			2
Actuated Green, G (s)	64.8	64.8	64.8	64.8	13.2	13.2
Effective Green, g (s)	64.8	64.8	64.8	64.8	13.2	13.2
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.15	0.15
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1279	1046	646	1461	226	258
v/s Ratio Prot	0.22			c0.72	0.01	
v/s Ratio Perm		0.04	0.15			c0.11
v/c Ratio	0.31	0.05	0.21	1.00	0.08	0.77
Uniform Delay, d1	4.5	3.7	4.2	12.6	33.2	37.0
Progression Factor	0.65	0.28	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.1	0.7	24.4	0.2	13.4
Delay (s)	3.6	1.1	4.9	37.0	33.3	50.4
Level of Service	A	A	A	D	C	D
Approach Delay (s)	3.2			34.2	49.9	
Approach LOS	A			C	D	

Intersection Summary

HCM Average Control Delay	32.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

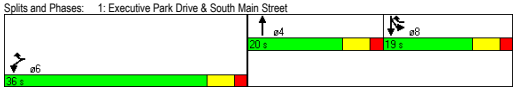
Lanes, Volumes, Timings
1: Executive Park Drive & South Main Street

2030 No-Build Condition - AM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	10	1385	220	40	190	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-3%		-3%			4%
Storage Length (ft)	0	0		0	200	
Storage Lanes	1	2		1	1	
Taper Length (ft)	100	100		100	100	
Right Turn on Red		No		No		
Link Speed (mph)	35		35			35
Link Distance (ft)	285		553			804
Travel Time (s)	5.6		10.8			15.7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	10%	2%	2%	10%	2%
Shared Lane Traffic (%)					10%	
Lane Group Flow (vph)	11	1458	274	0	180	194
Turn Type		pt+ov			Split	
Protected Phases	6	6 8	4		8	8
Permitted Phases						
Detector Phase	6	6 8	4		8	8
Switch Phase						
Minimum Initial (s)	6.0		6.0		6.0	6.0
Minimum Split (s)	12.0		12.0		12.0	12.0
Total Split (s)	36.0	55.0	20.0	0.0	19.0	19.0
Total Split (%)	48.0%	73.3%	26.7%	0.0%	25.3%	25.3%
Maximum Green (s)	30.0		14.0		13.0	13.0
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	C-Max		None		None	None
v/c Ratio	0.01	0.82	0.77		0.68	0.65
Control Delay	5.8	14.2	45.0		43.9	40.8
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	5.8	14.2	45.0		43.9	40.8
Queue Length 50th (ft)	1	113	121		83	89
Queue Length 95th (ft)	m4	186	#229		#173	#175
Internal Link Dist (ft)	205		473			724
Turn Bay Length (ft)					200	
Base Capacity (vph)	757	1771	370		265	297
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	0.01	0.82	0.74		0.68	0.65

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 6:WBL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 1: Executive Park Drive & South Main Street



HCM Signalized Intersection Capacity Analysis
1: Executive Park Drive & South Main Street

2030 No-Build Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	10	1385	220	40	190	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-3%		-3%			4%
Total Lost time (s)	5.0	5.0	5.0		6.0	6.0
Lane Util. Factor	1.00	0.88	1.00		0.95	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	0.99
Satd. Flow (prot)	1796	2623	1852		1528	1711
Flt Permitted	0.95	1.00	1.00		0.95	0.99
Satd. Flow (perm)	1796	2623	1852		1528	1711
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	1458	232	42	200	174
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	11	1458	274	0	180	194
Heavy Vehicles (%)	2%	10%	2%	2%	10%	2%
Turn Type		pt+ov			Split	
Protected Phases	6	6 8	4		8	8
Permitted Phases						
Actuated Green, G (s)	30.6	49.6	13.4		13.0	13.0
Effective Green, g (s)	31.6	50.6	14.4		13.0	13.0
Actuated g/C Ratio	0.42	0.67	0.19		0.17	0.17
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	757	1770	356		265	297
v/s Ratio Prot	0.01	c0.56	c0.15		0.12	0.11
v/s Ratio Perm						
v/c Ratio	0.01	0.82	0.77		0.68	0.65
Uniform Delay, d1	12.6	8.9	28.7		29.0	28.9
Progression Factor	0.44	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	3.0	9.6		6.8	5.1
Delay (s)	5.6	12.0	38.4		35.8	34.0
Level of Service	A	B	D		D	C
Approach Delay (s)	11.9		38.4			34.9
Approach LOS	B		D			C

Intersection Summary			
HCM Average Control Delay	19.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

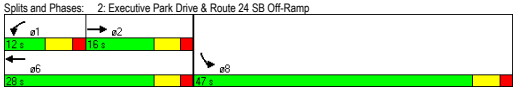
Lanes, Volumes, Timings
2: Executive Park Drive & Route 24 SB Off-Ramp

2030 No-Build Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	85	0	165	770	0	0	0	0	1575	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-1%			0%			5%	
Storage Length (ft)	0		0	0		0	0		0	0		300
Storage Lanes	0		1	2		0	0		0	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			No			Yes			Yes			No
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		307			406			405			737	
Travel Time (s)		6.0			7.9			7.9			14.4	
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
Heavy Vehicles (%)	2%	8%	8%	2%	8%	2%	2%	2%	2%	2%	2%	8%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	89	0	174	811	0	0	0	0	1658	0	0
Turn Type			Free	Prot						Prot		Free
Protected Phases		2		1	6					8		
Permitted Phases			Free									Free
Detector Phase		2		1	6					8		
Switch Phase												
Minimum Initial (s)		10.0		6.0	10.0					10.0		
Minimum Split (s)		16.0		12.0	16.0					16.0		
Total Split (s)	0.0	16.0	0.0	12.0	28.0	0.0	0.0	0.0	0.0	47.0	0.0	0.0
Total Split (%)	0.0%	21.3%	0.0%	16.0%	37.3%	0.0%	0.0%	0.0%	0.0%	62.7%	0.0%	0.0%
Maximum Green (s)		10.0		6.0	22.0					41.0		
Yellow Time (s)		4.0		4.0	4.0					4.0		
All-Red Time (s)		2.0		2.0	2.0					2.0		
Lost Time Adjust (s)	0.0	0.0	0.0	-1.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	5.0	5.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0					3.0		
Recall Mode		C-Max		None	C-Max					None		
v/c Ratio		0.19		0.54	0.77					0.92		
Control Delay		8.4		48.0	43.2					25.5		
Queue Delay		0.0		0.0	0.0					0.0		
Total Delay		8.4		48.0	43.2					25.5		
Queue Length 50th (ft)		4		45	187					329		
Queue Length 95th (ft)		m11		m58	m232					#506		
Internal Link Dist (ft)		227			326			325			657	
Turn Bay Length (ft)												
Base Capacity (vph)		458		322	1052					1830		
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		0.19		0.54	0.77					0.91		

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green, Master Intersection	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 2: Executive Park Drive & Route 24 SB Off-Ramp



HCM Signalized Intersection Capacity Analysis
2: Executive Park Drive & Route 24 SB Off-Ramp

2030 No-Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	85	0	165	770	0	0	0	0	1575	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-1%			0%			5%	
Total Lost time (s)		6.0		5.0	5.0					6.0		
Lane Util. Factor		0.95		0.97	0.95					0.97		
Frt		1.00		1.00	1.00					1.00		
Flt Protected		1.00		0.95	1.00					0.95		
Satd. Flow (prot)		3276		3450	3359					3347		
Flt Permitted		1.00		0.95	1.00					0.95		
Satd. Flow (perm)		3276		3450	3359					3347		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	89	0	174	811	0	0	0	0	1658	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	89	0	174	811	0	0	0	0	1658	0	0
Heavy Vehicles (%)	2%	8%	8%	2%	8%	2%	2%	2%	2%	2%	2%	8%
Turn Type			Free	Prot						Prot		Free
Protected Phases		2		1	6					8		
Permitted Phases			Free									Free
Actuated Green, G (s)		10.5		6.0	22.5					40.5		
Effective Green, g (s)		10.5		7.0	23.5					40.5		
Actuated g/C Ratio		0.14		0.09	0.31					0.54		
Clearance Time (s)		6.0		6.0	6.0					6.0		
Vehicle Extension (s)		3.0		3.0	3.0					3.0		
Lane Grp Cap (vph)		459		322	1052					1807		
v/s Ratio Prot		0.03		0.05	c0.24					c0.50		
v/s Ratio Perm												
v/c Ratio		0.19		0.54	0.77					0.92		
Uniform Delay, d1		28.5		32.5	23.3					15.7		
Progression Factor		0.26		1.33	1.65					1.00		
Incremental Delay, d2		0.7		1.3	3.8					7.8		
Delay (s)		8.2		44.4	42.2					23.6		
Level of Service		A		D	D					C		
Approach Delay (s)		8.2			42.6			0.0			23.6	
Approach LOS		A			D			A			C	

Intersection Summary			
HCM Average Control Delay	29.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

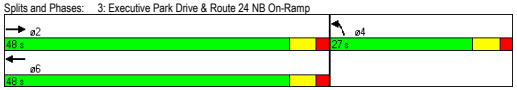
Lanes, Volumes, Timings
3: Executive Park Drive & Route 24 NB On-Ramp

2030 No-Build Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1575	0	0	165	0	770	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			-1%			-1%			0%	
Storage Length (ft)	0		0	0		0	400		615	0		0
Storage Lanes	0		0	0		1	1		1	0		0
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			No			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		352			205			1194			650	
Travel Time (s)		6.9			4.0			23.3			12.7	
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
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	8%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1658	0	0	174	0	811	0	0	0	0	0
Turn Type						Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases						Free			Free			
Detector Phase		2			6		4					
Switch Phase												
Minimum Initial (s)		10.0			10.0		6.0					
Minimum Split (s)		16.0			16.0		12.0					
Total Split (s)	0.0	48.0	0.0	0.0	48.0	0.0	27.0	0.0	0.0	0.0	0.0	0.0
Total Split (%)	0.0%	64.0%	0.0%	0.0%	64.0%	0.0%	36.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)		42.0			42.0		21.0					
Yellow Time (s)		4.0			4.0		4.0					
All-Red Time (s)		2.0			2.0		2.0					
Lost Time Adjust (s)	0.0	-1.0	0.0	0.0	-1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	4.0	4.0	5.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0		3.0					
Recall Mode		C-Max			C-Max		None					
v/c Ratio		0.81			0.08		0.87					
Control Delay		6.8			7.3		37.0					
Queue Delay		0.0			0.0		0.0					
Total Delay		6.8			7.3		37.0					
Queue Length 50th (ft)		73			17		181					
Queue Length 95th (ft)		m126			30		#276					
Internal Link Dist (ft)		272			125			1114			570	
Turn Bay Length (ft)							400					
Base Capacity (vph)		2043			2063		956					
Starvation Cap Reductn		0			0		0					
Spillback Cap Reductn		0			0		0					
Storage Cap Reductn		0			0		0					
Reduced v/c Ratio		0.81			0.08		0.85					

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 20 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 3: Executive Park Drive & Route 24 NB On-Ramp



HCM Signalized Intersection Capacity Analysis
3: Executive Park Drive & Route 24 NB On-Ramp

2030 No-Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1575	0	0	165	0	770	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			-1%			-1%			0%	
Total Lost time (s)		5.0			5.0		5.0					
Lane Util. Factor		0.95			0.95		0.97					
Frt		1.00			1.00		1.00					
Flt Protected		1.00			1.00		0.95					
Satd. Flow (prot)		3522			3557		3259					
Flt Permitted		1.00			1.00		0.95					
Satd. Flow (perm)		3522			3557		3259					
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1658	0	0	174	0	811	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1658	0	0	174	0	811	0	0	0	0	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	8%	2%	2%	2%	2%	2%
Turn Type						Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases						Free			Free			
Actuated Green, G (s)		42.5			42.5		20.5					
Effective Green, g (s)		43.5			43.5		21.5					
Actuated g/C Ratio		0.58			0.58		0.29					
Clearance Time (s)		6.0			6.0		6.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		2043			2063		934					
v/s Ratio Prot		c0.47			0.05		c0.25					
v/s Ratio Perm												
v/c Ratio		0.81			0.08		0.87					
Uniform Delay, d1		12.5			7.0		25.4					
Progression Factor		0.39			1.00		1.00					
Incremental Delay, d2		1.7			0.1		8.6					
Delay (s)		6.6			7.0		34.0					
Level of Service		A			A		C					
Approach Delay (s)		6.6			7.0			34.0			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	88.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
2: Narrows Rd & South Main St

2030 No Build Conditions - AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	145	45	15	170	325	100
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.75	0.75	0.79	0.79
Hourly flow rate (vph)	177	55	20	227	411	127
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					1115	
pX, platoon unblocked						
vC, conflicting volume	741	475	538			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	741	475	538			
tC, single (s)	6.5	6.4	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.5	2.3			
p0 queue free %	51	90	98			
cM capacity (veh/h)	363	555	991			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	232	247	538
Volume Left	177	20	0
Volume Right	55	0	127
cSH	396	991	1700
Volume to Capacity	0.59	0.02	0.32
Queue Length 95th (ft)	90	2	0
Control Delay (s)	26.2	0.9	0.0
Lane LOS	D	A	
Approach Delay (s)	26.2	0.9	0.0
Approach LOS	D		

Intersection Summary			
Average Delay		6.2	
Intersection Capacity Utilization		40.6%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
11: Copicut Rd & South Main St

2030 No Build Conditions - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	40	5	180	5	5	375
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	43	5	225	6	6	469
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	709	228			231	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	709	228			231	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	99			100	
cM capacity (veh/h)	399	811			1337	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	49	231	475
Volume Left	43	0	6
Volume Right	5	6	0
cSH	422	1700	1337
Volume to Capacity	0.12	0.14	0.00
Queue Length 95th (ft)	10	0	0
Control Delay (s)	14.6	0.0	0.2
Lane LOS	B		A
Approach Delay (s)	14.6	0.0	0.2
Approach LOS	B		

Intersection Summary			
Average Delay		1.0	
Intersection Capacity Utilization		33.7%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
21: Ridge Hill Rd & South Main St

2030 No Build Conditions - AM Peak Hour

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	20	5	155	70	0	20	35	540	265	75	1185	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.76	0.76	0.76	0.59	0.59	0.59	0.84	0.84	0.84	0.95	0.95	0.95
Hourly flow rate (vph)	26	7	204	119	0	34	42	643	315	79	1247	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								446				
pX, platoon unblocked	0.94	0.94		0.94	0.94	0.94				0.94		
vC, conflicting volume	2326	2450	1250	2499	2294	801	1253			958		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2382	2514	1250	2567	2349	753	1253			921		
tC, single (s)	7.1	7.0	6.2	7.3	6.5	6.4	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.4	3.3	3.7	4.0	3.5	2.3			2.3		
p0 queue free %	0	56	3	0	100	90	92			88		
cM capacity (veh/h)	17	15	210	0	28	351	519			671		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	237	153	1000	1332
Volume Left	26	119	42	79
Volume Right	204	34	315	5
cSH	81	0	519	671
Volume to Capacity	2.92	531.28	0.08	0.12
Queue Length 95th (ft)	582	Err	7	10
Control Delay (s)	976.5	Err	2.7	5.3
Lane LOS	F	F	A	A
Approach Delay (s)	976.5	Err	2.7	5.3
Approach LOS	F	F		

Intersection Summary				
Average Delay			649.2	
Intersection Capacity Utilization			117.0%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
30: South Main St & High St

2030 No Build Conditions - AM Peak Hour

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	5	540	5	5	1220	5	0	0	0	60	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.97	0.97	0.97	0.25	0.25	0.25	0.64	0.64	0.64
Hourly flow rate (vph)	5	581	5	5	1258	5	0	0	0	94	0	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1263			586			1880	1867	1260	1865	1867	583
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1263			586			1880	1867	1260	1865	1867	583
tC, single (s)	4.1			5.1			7.1	6.5	6.2	7.3	6.5	6.4
tC, 2 stage (s)												
tF (s)	2.2			3.1			3.5	4.0	3.3	3.7	4.0	3.5
p0 queue free %	99			99			100	100	100	0	100	97
cM capacity (veh/h)	557			645			52	72	210	50	72	485

Direction, Lane #	NB 1	SB 1	SE 1	NW 1
Volume Total	591	1268	0	109
Volume Left	5	5	0	94
Volume Right	5	5	0	16
cSH	557	645	1700	58
Volume to Capacity	0.01	0.01	0.00	1.90
Queue Length 95th (ft)	1	1	0	260
Control Delay (s)	0.3	0.4	0.0	578.1
Lane LOS	A	A	A	F
Approach Delay (s)	0.3	0.4	0.0	578.1
Approach LOS			A	F

Intersection Summary				
Average Delay			32.4	
Intersection Capacity Utilization			78.2%	ICU Level of Service
Analysis Period (min)			15	

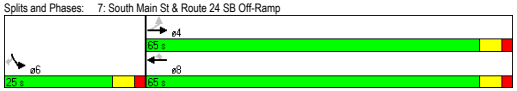
Lanes, Volumes, Timings
7: South Main St & Route 24 SB Off-Ramp

2030 No Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	210	670	600	495	155	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	12	12
Storage Length (ft)	0			240	0	0
Storage Lanes	1			2	1	1
Taper Length (ft)	25			25	25	25
Right Turn on Red				Yes		Yes
Link Speed (mph)		30	30		30	
Link Distance (ft)		496	772		360	
Travel Time (s)		11.3	17.5		8.2	
Peak Hour Factor	0.88	0.88	0.94	0.94	0.79	0.79
Heavy Vehicles (%)	8%	6%	6%	3%	6%	13%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	239	761	638	527	196	89
Turn Type	Perm			Perm		Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	65.0	65.0	65.0	65.0	25.0	25.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%
Maximum Green (s)	59.0	59.0	59.0	59.0	19.0	19.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	Min	Min
v/c Ratio	0.48	0.61	0.27	0.40	0.69	0.28
Control Delay	8.8	8.8	4.4	1.1	47.5	9.4
Queue Delay	0.0	0.5	0.0	0.0	0.0	0.0
Total Delay	8.8	9.3	4.4	1.1	47.5	9.4
Queue Length 50th (ft)	30	268	43	5	105	0
Queue Length 95th (ft)	73	328	m63	m3	145	28
Internal Link Dist (ft)		416	692		280	
Turn Bay Length (ft)				240		
Base Capacity (vph)	502	1253	2382	1328	360	372
Starvation Cap Reductn	0	175	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	0.48	0.71	0.27	0.40	0.54	0.24

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 88 (98%), Referenced to phase 4:EBTL and 8:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 7: South Main St & Route 24 SB Off-Ramp



HCM Signalized Intersection Capacity Analysis
7: South Main St & Route 24 SB Off-Ramp

2030 No Build Conditions - PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	210	670	600	495	155	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	14	12	12
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1671	1792	3406	1672	1703	1429
Flt Permitted	0.41	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	718	1792	3406	1672	1703	1429
Peak-hour factor, PHF	0.88	0.88	0.94	0.94	0.79	0.79
Adj. Flow (vph)	239	761	638	527	196	89
RTOR Reduction (vph)	0	0	0	159	0	74
Lane Group Flow (vph)	239	761	638	368	196	15
Heavy Vehicles (%)	8%	6%	6%	3%	6%	13%
Turn Type	Perm			Perm		Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	62.9	62.9	62.9	62.9	15.1	15.1
Effective Green, g (s)	62.9	62.9	62.9	62.9	15.1	15.1
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.17	0.17
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	502	1252	2380	1169	286	240
v/s Ratio Prot		c0.42	0.19		c0.12	
v/s Ratio Perm	0.33			0.22		0.01
v/c Ratio	0.48	0.61	0.27	0.32	0.69	0.06
Uniform Delay, d1	6.1	7.1	5.0	5.2	35.2	31.5
Progression Factor	0.76	0.82	0.78	0.93	1.00	1.00
Incremental Delay, d2	3.0	2.0	0.2	0.4	6.7	0.1
Delay (s)	7.6	7.9	4.1	5.2	41.9	31.6
Level of Service	A	A	A	A	D	C
Approach Delay (s)		7.8	4.6		38.7	
Approach LOS		A	A		D	

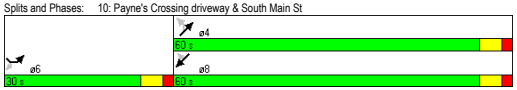
Intersection Summary			
HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
10: Payne's Crossing driveway & South Main St — 2030 No Build Conditions - PM Peak Hour

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Volume (vph)	385	125	120	500	305	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	75	200			0
Storage Lanes	2	1	1			1
Taper Length (ft)	25	25	25			25
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	230			1086	496	
Travel Time (s)	5.2			24.7	11.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	418	136	130	543	332	397
Turn Type		Perm	Perm			Perm
Protected Phases	6			4	8	
Permitted Phases		6	4			8
Detector Phase	6	6	4	4	8	8
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	30.0	30.0	60.0	60.0	60.0	60.0
Total Split (%)	33.3%	33.3%	66.7%	66.7%	66.7%	66.7%
Maximum Green (s)	24.0	24.0	54.0	54.0	54.0	54.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.66	0.34	0.18	0.43	0.26	0.33
Control Delay	39.1	7.9	6.7	8.2	2.4	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	7.9	6.7	8.2	2.4	0.9
Queue Length 50th (ft)	115	0	23	119	11	0
Queue Length 95th (ft)	153	44	54	216	29	0
Internal Link Dist (ft)	150			1006	416	
Turn Bay Length (ft)		75	200			
Base Capacity (vph)	915	522	708	1272	1272	1207
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	12	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.26	0.18	0.43	0.26	0.33

Intersection Summary
Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 13 (14%), Referenced to phase 4:NETL and 8:SWT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 10: Payne's Crossing driveway & South Main St



HCM Signalized Intersection Capacity Analysis
10: Payne's Crossing driveway & South Main St — 2030 No Build Conditions - PM Peak Hour

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Volume (vph)	385	125	120	500	305	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	1770	1863	1863	1583
Flt Permitted	0.95	1.00	0.56	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	1036	1863	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	418	136	130	543	332	397
RTOR Reduction (vph)	0	111	0	0	0	126
Lane Group Flow (vph)	418	25	130	543	332	271
Turn Type		Perm	Perm			Perm
Protected Phases	6			4	8	
Permitted Phases		6	4			8
Actuated Green, G (s)	16.5	16.5	61.5	61.5	61.5	61.5
Effective Green, g (s)	16.5	16.5	61.5	61.5	61.5	61.5
Actuated g/C Ratio	0.18	0.18	0.68	0.68	0.68	0.68
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	629	290	708	1273	1273	1082
v/s Ratio Prot	c0.12			c0.29	0.18	
v/s Ratio Perm		0.02	0.13			0.17
v/c Ratio	0.66	0.09	0.18	0.43	0.26	0.25
Uniform Delay, d1	34.2	30.5	5.2	6.4	5.5	5.4
Progression Factor	1.00	1.00	1.00	1.00	0.30	0.28
Incremental Delay, d2	2.7	0.1	0.6	1.0	0.5	0.5
Delay (s)	36.8	30.6	5.7	7.4	2.1	2.1
Level of Service	D	C	A	A	A	A
Approach Delay (s)	35.3			7.1	2.1	
Approach LOS	D			A	A	

Intersection Summary

HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
17: South Main St & Route 24 NB Off-Ramp

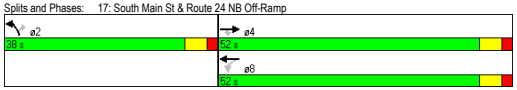
2030 No Build Conditions - PM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	630	130	140	890	205	835
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	15	16	16
Storage Length (ft)		200	100		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)		25	25		25	25
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	772			440	420	
Travel Time (s)	17.5			10.0	9.5	
Peak Hour Factor	0.85	0.85	0.94	0.94	0.95	0.95
Heavy Vehicles (%)	4%	13%	4%	4%	16%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	741	153	149	947	216	879
Turn Type		Perm	Perm			Perm
Protected Phases	4			8	2	
Permitted Phases		4	8			2
Detector Phase	4	4	8	8	2	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	52.0	52.0	52.0	52.0	38.0	38.0
Total Split (%)	57.8%	57.8%	57.8%	57.8%	42.2%	42.2%
Maximum Green (s)	46.0	46.0	46.0	46.0	32.0	32.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	Min	Min
v/c Ratio	0.79	0.17	0.90	0.92	0.34	1.18
Control Delay	17.1	2.1	73.9	36.4	23.3	120.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.1	2.1	73.9	36.4	23.3	120.2
Queue Length 50th (ft)	163	3	73	473	89	~545
Queue Length 95th (ft)	287	13	#198	#749	148	#776
Internal Link Dist (ft)	692			360	340	
Turn Bay Length (ft)		200	100			
Base Capacity (vph)	934	902	165	1027	627	743
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	0.79	0.17	0.90	0.92	0.34	1.18

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green, Master Intersection
Natural Cycle: 130
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.

Splits and Phases: 17: South Main St & Route 24 NB Off-Ramp



HCM Signalized Intersection Capacity Analysis
17: South Main St & Route 24 NB Off-Ramp

2030 No Build Conditions - PM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	630	130	140	890	205	835
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	15	16	16
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1827	1620	1736	2010	1764	1794
Flt Permitted	1.00	1.00	0.18	1.00	0.95	1.00
Satd. Flow (perm)	1827	1620	323	2010	1764	1794
Peak-hour factor, PHF	0.85	0.85	0.94	0.94	0.95	0.95
Adj. Flow (vph)	741	153	149	947	216	879
RTOR Reduction (vph)	0	74	0	0	0	105
Lane Group Flow (vph)	741	79	149	947	216	774
Heavy Vehicles (%)	4%	13%	4%	4%	16%	2%
Turn Type		Perm	Perm			Perm
Protected Phases	4			8	2	
Permitted Phases		4	8			2
Actuated Green, G (s)	46.0	46.0	46.0	46.0	32.0	32.0
Effective Green, g (s)	46.0	46.0	46.0	46.0	32.0	32.0
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.36	0.36
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	934	828	165	1027	627	638
v/s Ratio Prot	0.41			c0.47	0.12	
v/s Ratio Perm		0.05	0.46			c0.43
v/c Ratio	0.79	0.10	0.90	0.92	0.34	1.21
Uniform Delay, d1	18.1	11.3	20.0	20.3	21.3	29.0
Progression Factor	0.59	0.84	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.6	0.2	48.2	14.6	0.3	109.9
Delay (s)	16.4	9.7	68.2	35.0	21.6	138.9
Level of Service	B	A	E	C	C	F
Approach Delay (s)	15.2			39.5	115.8	
Approach LOS	B			D	F	

Intersection Summary

HCM Average Control Delay	59.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

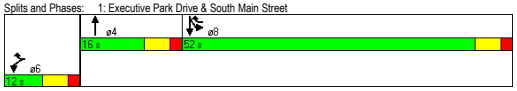
Lanes, Volumes, Timings
1: Executive Park Drive & South Main Street

2030 No-Build Condition - PM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	25	245	195	20	1425	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-3%		-3%			4%
Storage Length (ft)	0	0		0	200	
Storage Lanes	1	2		0	1	
Taper Length (ft)	25	25		25	25	
Right Turn on Red		No		No		
Link Speed (mph)	35		35			35
Link Distance (ft)	282		553			804
Travel Time (s)	5.5		10.8			15.7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	10%	2%	2%	10%	2%
Shared Lane Traffic (%)					41%	
Lane Group Flow (vph)	26	258	226	0	885	883
Turn Type		pt+ov			Split	
Protected Phases	6	6 8	4		8	8
Permitted Phases						
Detector Phase	6	6 8	4		8	8
Switch Phase						
Minimum Initial (s)	6.0		6.0		6.0	6.0
Minimum Split (s)	12.0		12.0		12.0	12.0
Total Split (s)	12.0	64.0	16.0	0.0	52.0	52.0
Total Split (%)	15.0%	80.0%	20.0%	0.0%	65.0%	65.0%
Maximum Green (s)	6.0		10.0		46.0	46.0
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		None		C-Max	C-Max
v/c Ratio	0.17	0.13	0.88		1.01	0.97
Control Delay	33.1	3.2	68.6		51.5	41.4
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	33.1	3.2	68.6		51.5	41.4
Queue Length 50th (ft)	12	16	113		~438	407
Queue Length 95th (ft)	34	26	#237		#725	#704
Internal Link Dist (ft)	202		473			724
Turn Bay Length (ft)					200	
Base Capacity (vph)	157	1934	257		879	913
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	0.17	0.13	0.88		1.01	0.97

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 33 (41%), Referenced to phase 8:SBTL, Start of Green	
Natural Cycle: 90	
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.	

Splits and Phases: 1: Executive Park Drive & South Main Street



HCM Signalized Intersection Capacity Analysis
1: Executive Park Drive & South Main Street

2030 No-Build Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	25	245	195	20	1425	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-3%		-3%			4%
Total Lost time (s)	5.0	5.0	5.0		6.0	6.0
Lane Util. Factor	1.00	0.88	1.00		0.95	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	0.97
Satd. Flow (prot)	1796	2623	1867		1528	1589
Flt Permitted	0.95	1.00	1.00		0.95	0.97
Satd. Flow (perm)	1796	2623	1867		1528	1589
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	258	205	21	1500	268
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	26	258	226	0	885	883
Heavy Vehicles (%)	2%	10%	2%	2%	10%	2%
Turn Type		pt+ov			Split	
Protected Phases	6	6 8	4		8	8
Permitted Phases						
Actuated Green, G (s)	6.0	58.0	10.0		46.0	46.0
Effective Green, g (s)	7.0	59.0	11.0		46.0	46.0
Actuated g/C Ratio	0.09	0.74	0.14		0.57	0.57
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	157	1934	257		879	914
v/s Ratio Prot	0.01	c0.10	c0.12		c0.58	0.56
v/s Ratio Perm						
v/c Ratio	0.17	0.13	0.88		1.01	0.97
Uniform Delay, d1	33.8	3.1	33.8		17.0	16.3
Progression Factor	0.90	0.97	1.00		1.00	1.00
Incremental Delay, d2	0.5	0.0	27.0		32.0	22.6
Delay (s)	30.9	3.0	60.9		49.0	38.9
Level of Service	C	A	E		D	D
Approach Delay (s)	5.6		60.9			44.0
Approach LOS	A		E			D

Intersection Summary			
HCM Average Control Delay	40.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

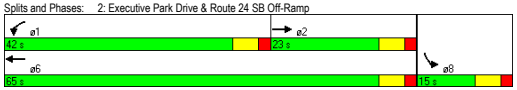
Lanes, Volumes, Timings
2: Executive Park Drive & Route 24 SB Off-Ramp

2030 No-Build Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	645	0	1395	135	0	0	0	0	235	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-1%			0%			5%	
Storage Length (ft)	0		0	0		0	0		0	0		300
Storage Lanes	0		1	2		0	0		0	2		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			Yes			Yes			No
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		307			406			405			737	
Travel Time (s)		6.0			7.9			7.9			14.4	
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
Heavy Vehicles (%)	2%	8%	8%	2%	8%	2%	2%	2%	2%	2%	2%	8%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	679	0	1468	142	0	0	0	0	247	0	0
Turn Type			Free	Prot						Prot		Free
Protected Phases		2		1	6					8		
Permitted Phases			Free									Free
Detector Phase		2		1	6					8		
Switch Phase												
Minimum Initial (s)		10.0		6.0	10.0					6.0		
Minimum Split (s)		16.0		12.0	16.0					12.0		
Total Split (s)	0.0	23.0	0.0	42.0	65.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Total Split (%)	0.0%	28.8%	0.0%	52.5%	81.3%	0.0%	0.0%	0.0%	0.0%	18.8%	0.0%	0.0%
Maximum Green (s)		17.0		36.0	59.0					9.0		
Yellow Time (s)		4.0		4.0	4.0					4.0		
All-Red Time (s)		2.0		2.0	2.0					2.0		
Lost Time Adjust (s)	0.0	0.0	0.0	-1.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	5.0	5.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0					3.0		
Recall Mode		C-Max		None	C-Max					None		
v/c Ratio		0.95		0.93	0.06					0.67		
Control Delay		28.0		26.8	2.1					43.8		
Queue Delay		0.0		0.0	0.0					0.0		
Total Delay		28.0		26.8	2.1					43.8		
Queue Length 50th (ft)		158		198	5					61		
Queue Length 95th (ft)		m158		#494	8					#99		
Internal Link Dist (ft)		227			326			325			657	
Turn Bay Length (ft)												
Base Capacity (vph)		712		1596	2527					377		
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		0.95		0.92	0.06					0.66		

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green, Master Intersection	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 2: Executive Park Drive & Route 24 SB Off-Ramp



HCM Signalized Intersection Capacity Analysis
2: Executive Park Drive & Route 24 SB Off-Ramp

2030 No-Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	645	0	1395	135	0	0	0	0	235	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-1%			0%			5%	
Total Lost time (s)		6.0		5.0	5.0					6.0		
Lane Util. Factor		0.95		0.97	0.95					0.97		
Frt		1.00		1.00	1.00					1.00		
Flt Protected		1.00		0.95	1.00					0.95		
Satd. Flow (prot)		3276		3450	3359					3347		
Flt Permitted		1.00		0.95	1.00					0.95		
Satd. Flow (perm)		3276		3450	3359					3347		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	679	0	1468	142	0	0	0	0	247	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	679	0	1468	142	0	0	0	0	247	0	0
Heavy Vehicles (%)	2%	8%	8%	2%	8%	2%	2%	2%	2%	2%	2%	8%
Turn Type			Free	Prot						Prot		Free
Protected Phases		2		1	6					8		
Permitted Phases			Free									Free
Actuated Green, G (s)		17.4		35.8	59.2					8.8		
Effective Green, g (s)		17.4		36.8	60.2					8.8		
Actuated g/C Ratio		0.22		0.46	0.75					0.11		
Clearance Time (s)		6.0		6.0	6.0					6.0		
Vehicle Extension (s)		3.0		3.0	3.0					3.0		
Lane Grp Cap (vph)		713		1587	2528					368		
v/s Ratio Prot		c0.21		c0.43	0.04					c0.07		
v/s Ratio Perm												
v/c Ratio		0.95		0.93	0.06					0.67		
Uniform Delay, d1		30.9		20.3	2.6					34.2		
Progression Factor		0.50		0.80	0.78					1.00		
Incremental Delay, d2		8.8		8.4	0.0					4.8		
Delay (s)		24.3		24.7	2.0					39.0		
Level of Service		C		C	A					D		
Approach Delay (s)		24.3			22.7			0.0			39.0	
Approach LOS		C			C			A			D	

Intersection Summary			
HCM Average Control Delay	24.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

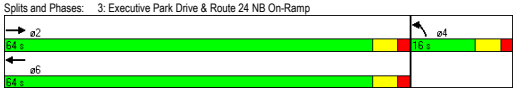
Lanes, Volumes, Timings
3: Executive Park Drive & Route 24 NB On-Ramp

2030 No-Build Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	235	0	0	1395	0	135	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			-1%			-1%			0%	
Storage Length (ft)	0		0	0		0	400		615	0		0
Storage Lanes	0		0	0		1	1		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			No			No			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		352			205			740			316	
Travel Time (s)		6.9			4.0			14.4			6.2	
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
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	8%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	247	0	0	1468	0	142	0	0	0	0	0
Turn Type						Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases						Free			Free			
Detector Phase		2			6		4					
Switch Phase												
Minimum Initial (s)		10.0			10.0		6.0					
Minimum Split (s)		16.0			16.0		12.0					
Total Split (s)	0.0	64.0	0.0	0.0	64.0	0.0	16.0	0.0	0.0	0.0	0.0	0.0
Total Split (%)	0.0%	80.0%	0.0%	0.0%	80.0%	0.0%	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)		58.0			58.0		10.0					
Yellow Time (s)		4.0			4.0		4.0					
All-Red Time (s)		2.0			2.0		2.0					
Lost Time Adjust (s)	0.0	-1.0	0.0	0.0	-1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	4.0	4.0	5.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0		3.0					
Recall Mode		C-Max			C-Max		None					
v/c Ratio		0.09			0.55		0.37					
Control Delay		10.1			5.1		34.8					
Queue Delay		0.0			0.0		0.0					
Total Delay		10.1			5.1		34.8					
Queue Length 50th (ft)		53			126		34					
Queue Length 95th (ft)		m62			179		59					
Internal Link Dist (ft)		272			125			660			236	
Turn Bay Length (ft)							400					
Base Capacity (vph)		2661			2687		448					
Starvation Cap Reductn		0			0		0					
Spillback Cap Reductn		0			0		0					
Storage Cap Reductn		0			0		0					
Reduced v/c Ratio		0.09			0.55		0.32					

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 35 (44%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 3: Executive Park Drive & Route 24 NB On-Ramp



HCM Signalized Intersection Capacity Analysis
3: Executive Park Drive & Route 24 NB On-Ramp

2030 No-Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	235	0	0	1395	0	135	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			-1%			-1%			0%	
Total Lost time (s)		5.0			5.0		5.0					
Lane Util. Factor		0.95			0.95		0.97					
Frt		1.00			1.00		1.00					
Flt Protected		1.00			1.00		0.95					
Satd. Flow (prot)		3522			3557		3259					
Flt Permitted		1.00			1.00		0.95					
Satd. Flow (perm)		3522			3557		3259					
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	247	0	0	1468	0	142	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	247	0	0	1468	0	142	0	0	0	0	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	8%	2%	2%	2%	2%	2%
Turn Type						Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases						Free			Free			
Actuated Green, G (s)		59.4			59.4		8.6					
Effective Green, g (s)		60.4			60.4		9.6					
Actuated g/C Ratio		0.76			0.76		0.12					
Clearance Time (s)		6.0			6.0		6.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		2659			2686		391					
v/s Ratio Prot		0.07			c0.41		c0.04					
v/s Ratio Perm												
v/c Ratio		0.09			0.55		0.36					
Uniform Delay, d1		2.6			4.1		32.4					
Progression Factor		3.66			1.00		1.00					
Incremental Delay, d2		0.0			0.8		0.6					
Delay (s)		9.5			4.9		33.0					
Level of Service		A			A		C					
Approach Delay (s)		9.5			4.9			33.0			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
2: Narrows Rd & South Main St

2030 No Build Conditions - PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	130	25	50	500	315	120
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.89	0.89	0.95	0.95
Hourly flow rate (vph)	159	30	56	562	332	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)					1086	
pX, platoon unblocked						
vC, conflicting volume	1069	395	458			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1069	395	458			
tC, single (s)	6.5	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.2			
p0 queue free %	31	95	95			
cM capacity (veh/h)	229	633	1114			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	189	618	458
Volume Left	159	56	0
Volume Right	30	0	126
cSH	255	1114	1700
Volume to Capacity	0.74	0.05	0.27
Queue Length 95th (ft)	131	4	0
Control Delay (s)	50.9	1.3	0.0
Lane LOS	F	A	
Approach Delay (s)	50.9	1.3	0.0
Approach LOS	F		

Intersection Summary			
Average Delay		8.3	
Intersection Capacity Utilization		71.7%	ICU Level of Service C
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
11: Copicut Rd & South Main St

2030 No Build Conditions - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	10	30	505	40	30	310
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	33	549	43	33	337
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	973	571			592	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	973	571			592	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	94			97	
cM capacity (veh/h)	270	521			983	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	43	592	370
Volume Left	11	0	33
Volume Right	33	43	0
cSH	423	1700	983
Volume to Capacity	0.10	0.35	0.03
Queue Length 95th (ft)	9	0	3
Control Delay (s)	14.5	0.0	1.1
Lane LOS	B		A
Approach Delay (s)	14.5	0.0	1.1
Approach LOS	B		

Intersection Summary			
Average Delay		1.0	
Intersection Capacity Utilization		51.2%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
21: Ridge Hill Rd & South Main St

2030 No Build Conditions - PM Peak Hour

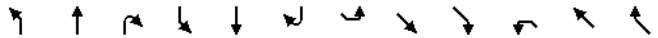
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	10	0	95	260	0	70	40	1355	105	20	675	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.92	0.92	0.92	0.87	0.87	0.87
Hourly flow rate (vph)	11	0	103	302	0	81	43	1473	114	23	776	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								440				
pX, platoon unblocked	0.64	0.64		0.64	0.64	0.64				0.64		
vC, conflicting volume	2520	2496	776	2542	2439	1530	776			1587		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3099	3061	776	3134	2972	1547	776			1636		
tC, single (s)	7.2	6.5	6.2	7.2	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	74	0	100	10	95			91		
cM capacity (veh/h)	0	7	399	3	8	91	849			256		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	114	384	1630	799
Volume Left	11	302	43	23
Volume Right	103	81	114	0
cSH	4	3	849	256
Volume to Capacity	29.15	119.98	0.05	0.09
Queue Length 95th (ft)	Err	Err	4	7
Control Delay (s)	Err	Err	7.3	3.9
Lane LOS	F	F	A	A
Approach Delay (s)	Err	Err	7.3	3.9
Approach LOS	F	F		

Intersection Summary				
Average Delay	1705.8			
Intersection Capacity Utilization	127.4%	ICU Level of Service	H	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
30: South Main St & High St

2030 No Build Conditions - PM Peak Hour



Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	0	1360	60	20	690	5	0	0	0	10	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.93	0.93	0.93	0.25	0.25	0.25	0.83	0.83	0.83
Hourly flow rate (vph)	0	1495	66	22	742	5	0	0	0	12	0	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	747			1560			2327	2348	745	2315	2318	1527
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	747			1560			2327	2348	745	2315	2318	1527
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			100	100	100	53	100	92
cM capacity (veh/h)	870			410			23	35	418	26	36	146

Direction, Lane #	NB 1	SB 1	SE 1	NW 1
Volume Total	1560	769	0	24
Volume Left	0	22	0	12
Volume Right	66	5	0	12
cSH	870	410	1700	44
Volume to Capacity	0.00	0.05	0.00	0.55
Queue Length 95th (ft)	0	4	0	50
Control Delay (s)	0.0	1.7	0.0	160.3
Lane LOS		A	A	F
Approach Delay (s)	0.0	1.7	0.0	160.3
Approach LOS			A	F

Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	85.2%	ICU Level of Service	E	
Analysis Period (min)	15			

New Bedford

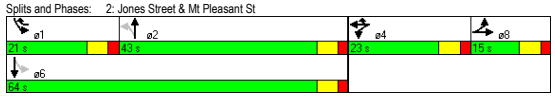
Lanes, Volumes, Timings
2: Jones Street & Mt Pleasant St

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	5	0	180	10	550	0	75	230	180	195	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	12	12	12	12	16	12	11	11	12
Storage Length (ft)	0		0	0		0	0		300	300		0
Storage Lanes	0		0	0		1	0		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1031			525			388			877	
Travel Time (s)		23.4			11.9			8.8			19.9	
Peak Hour Factor	0.88	0.88	0.88	0.82	0.82	0.82	0.94	0.94	0.94	0.83	0.83	0.83
Heavy Vehicles (%)	0%	20%	0%	7%	25%	5%	0%	9%	8%	5%	11%	60%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	0	232	671	0	325	0	217	241	0
Turn Type	Split			Split		pt+ov	Perm			pm+pt		
Protected Phases	8	8		4	4	4 1		2		1	6	
Permitted Phases							2			6		
Detector Phase	8	8		4	4	4 1	2	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	13.0	13.0		13.0	13.0		27.0	27.0		19.0	22.0	
Total Split (s)	15.0	15.0	0.0	23.0	23.0	44.0	43.0	43.0	0.0	21.0	64.0	0.0
Total Split (%)	14.7%	14.7%	0.0%	22.5%	22.5%	43.1%	42.2%	42.2%	0.0%	20.6%	62.7%	0.0%
Maximum Green (s)	9.0	9.0		17.0	17.0		37.0	37.0		15.0	58.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		Min	Min		None	Min	
Walk Time (s)							5.0	5.0				
Flash Dont Walk (s)							16.0	16.0				
Pedestrian Calls (#/hr)							0	0				
v/c Ratio		0.02			0.56	0.59		0.67		0.50	0.30	
Control Delay		29.0			27.2	3.2		18.9		13.8	10.6	
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	
Total Delay		29.0			27.2	3.2		18.9		13.8	10.6	
Queue Length 50th (ft)		2			59	0		42		35	39	
Queue Length 95th (ft)		14			166	21		152		97	107	
Internal Link Dist (ft)		951			445			308			797	
Turn Bay Length (ft)										300		
Base Capacity (vph)		311			551	1195		1323		564	1535	
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		0.02			0.42	0.56		0.25		0.38	0.16	

Intersection Summary	
Area Type:	Other
Cycle Length: 102	
Actuated Cycle Length: 55.1	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 2: Jones Street & Mt Pleasant St



HCM Signalized Intersection Capacity Analysis
2: Jones Street & Mt Pleasant St

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	5	0	180	10	550	0	75	230	180	195	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	16	12	11	11	12
Total Lost time (s)		6.0			6.0	6.0		6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Frt		1.00			1.00	0.85		0.90		1.00	1.00	
Flt Protected		1.00			0.95	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		1794			1681	1538		1787		1662	1631	
Flt Permitted		1.00			0.95	1.00		1.00		0.23	1.00	
Satd. Flow (perm)		1794			1681	1538		1787		409	1631	
Peak-hour factor, PHF	0.88	0.88	0.88	0.82	0.82	0.82	0.94	0.94	0.94	0.83	0.83	0.83
Adj. Flow (vph)	0	6	0	220	12	671	0	80	245	217	235	6
RTOR Reduction (vph)	0	0	0	0	0	406	0	138	0	0	1	0
Lane Group Flow (vph)	0	6	0	0	232	265	0	187	0	217	240	0
Heavy Vehicles (%)	0%	20%	0%	7%	25%	5%	0%	9%	8%	5%	11%	60%
Turn Type	Split			Split		pt+ov	Perm			pm+pt		
Protected Phases	8	8		4	4	4 1		2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		0.9			13.5	23.5		11.1		27.1	27.1	
Effective Green, g (s)		0.9			13.5	23.5		11.1		27.1	27.1	
Actuated g/C Ratio		0.02			0.23	0.39		0.19		0.46	0.46	
Clearance Time (s)		6.0			6.0			6.0		6.0	6.0	
Vehicle Extension (s)		2.0			2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		27			381	607		333		397	743	
v/s Ratio Prot		c0.00			c0.14	0.17		0.10		c0.09	0.15	
v/s Ratio Perm										c0.16		
v/c Ratio		0.22			0.61	0.44		0.56		0.55	0.32	
Uniform Delay, d1		29.0			20.6	13.2		22.0		11.3	10.3	
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2		1.5			1.9	0.2		1.3		0.8	0.1	
Delay (s)		30.5			22.5	13.3		23.3		12.2	10.4	
Level of Service		C			C	B		C		B	B	
Approach Delay (s)		30.5			15.7			23.3			11.3	
Approach LOS		C			B			C			B	

Intersection Summary					
HCM Average Control Delay	16.0	HCM Level of Service		B	
HCM Volume to Capacity ratio	0.52				
Actuated Cycle Length (s)	59.5	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	73.0%	ICU Level of Service		C	
Analysis Period (min)	15				
c Critical Lane Group					

Lanes, Volumes, Timings
14: Tarkiln Hill Road & Church Street

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	305	0	30	470	60	225	200	40	45	170	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	12	11	11	12	11	11	11	11	11	12
Storage Length (ft)	50		0	0		0	0		0	0		145
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		305			1116			176			552	
Travel Time (s)		6.9			25.4			4.0			12.5	
Peak Hour Factor	0.81	0.81	0.81	0.87	0.87	0.87	0.84	0.84	0.84	0.90	0.90	0.90
Heavy Vehicles (%)	5%	2%	0%	8%	2%	2%	1%	2%	0%	11%	4%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	377	0	34	609	0	268	286	0	0	239	100
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Minimum Split (s)	35.0	35.0		35.0	35.0		12.0	12.0		12.0	12.0	12.0
Total Split (s)	35.0	35.0	0.0	35.0	35.0	0.0	24.0	24.0	0.0	24.0	24.0	24.0
Total Split (%)	59.3%	59.3%	0.0%	59.3%	59.3%	0.0%	40.7%	40.7%	0.0%	40.7%	40.7%	40.7%
Maximum Green (s)	30.0	30.0		30.0	30.0		19.0	19.0		19.0	19.0	19.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
v/c Ratio	0.29	0.41		0.08	0.68		0.80	0.50			0.48	0.19
Control Delay	12.4	10.7		8.1	15.6		39.3	20.0			20.1	15.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	12.4	10.7		8.1	15.6		39.3	20.0			20.1	15.7
Queue Length 50th (ft)	14	76		6	149		85	81			67	25
Queue Length 95th (ft)	34	113		17	237		#179	131			125	55
Internal Link Dist (ft)		225			1036			96			472	
Turn Bay Length (ft)	50											145
Base Capacity (vph)	251	916		424	900		336	567			493	520
Starvation Cap Reductn	0	0		0	0		0	0			0	0
Spillback Cap Reductn	0	0		0	0		0	0			0	0
Storage Cap Reductn	0	0		0	0		0	0			0	0
Reduced v/c Ratio	0.29	0.41		0.08	0.68		0.80	0.50			0.48	0.19

Intersection Summary

Area Type: Other
Cycle Length: 59
Actuated Cycle Length: 59
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green
Natural Cycle: 60
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 14: Tarkiln Hill Road & Church Street

HCM Signalized Intersection Capacity Analysis
14: Tarkiln Hill Road & Church Street

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	305	0	30	470	60	225	200	40	45	170	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	12	11	11	12	11	11	11	11	11	12
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)	1604	1801		1616	1770		1728	1761			1723	1615
Flt Permitted	0.29	1.00		0.49	1.00		0.57	1.00			0.88	1.00
Satd. Flow (perm)	493	1801		833	1770		1044	1761			1531	1615
Peak-hour factor, PHF	0.81	0.81	0.81	0.87	0.87	0.87	0.84	0.84	0.84	0.90	0.90	0.90
Adj. Flow (vph)	74	377	0	34	540	69	268	238	48	50	189	100
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	74	377	0	34	609	0	268	286	0	0	239	100
Heavy Vehicles (%)	5%	2%	0%	8%	2%	2%	1%	2%	0%	11%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Actuated Green, G (s)	30.0	30.0		30.0	30.0		19.0	19.0			19.0	19.0
Effective Green, g (s)	30.0	30.0		30.0	30.0		19.0	19.0			19.0	19.0
Actuated g/C Ratio	0.51	0.51		0.51	0.51		0.32	0.32			0.32	0.32
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lane Grp Cap (vph)	251	916		424	900		336	567			493	520
v/s Ratio Prot		0.21			c0.34			0.16				
v/s Ratio Perm	0.15			0.04			c0.26				0.16	0.06
v/c Ratio	0.29	0.41		0.08	0.68		0.80	0.50			0.48	0.19
Uniform Delay, d1	8.4	9.0		7.4	10.9		18.2	16.2			16.1	14.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	3.0	1.4		0.4	4.1		17.7	3.2			3.4	0.8
Delay (s)	11.4	10.4		7.8	14.9		35.9	19.4			19.5	15.3
Level of Service	B	B		A	B		D	B			B	B
Approach Delay (s)		10.5			14.6			27.4			18.2	
Approach LOS		B			B			C			B	

Intersection Summary

HCM Average Control Delay	17.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
19: Wood Street & Route 18

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	25	80	10	55	120	40	10	290	60	60	370	15	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	14	16	16	14	16	11	11	16	11	11	16	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		197			310			393			488		
Travel Time (s)		4.5			7.0			8.9			11.1		
Peak Hour Factor	0.77	0.77	0.77	0.69	0.69	0.69	0.88	0.88	0.88	0.91	0.91	0.91	
Heavy Vehicles (%)	0%	8%	11%	4%	4%	3%	0%	4%	5%	0%	4%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	149	0	0	312	0	11	398	0	66	423	0	
Turn Type	Perm			Perm			Perm			Perm			
Protected Phases		3			3			1			1		2
Permitted Phases	3			3			1			1			
Detector Phase	3	3		3	3		1	1		1	1		
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0		15.0
Minimum Split (s)	17.0	17.0		17.0	17.0		21.0	21.0		21.0	21.0		21.0
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	21.0
Total Split (%)	37.0%	37.0%	0.0%	37.0%	37.0%	0.0%	37.0%	37.0%	0.0%	37.0%	37.0%	0.0%	26%
Maximum Green (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0		15.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	
Lead/Lag							Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		5.0
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													4.0
Pedestrian Calls (#/hr)													8
v/c Ratio		0.22			0.46		0.04	0.58		0.24	0.61		
Control Delay		15.4			18.2		16.2	20.9		18.8	22.1		
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0		
Total Delay		15.4			18.2		16.2	20.9		18.8	22.1		
Queue Length 50th (ft)		31			73		2	100		15	111		
Queue Length 95th (ft)		84			146		15	#272		61	#333		
Internal Link Dist (ft)		117			230			313			408		
Turn Bay Length (ft)													
Base Capacity (vph)		666			672		249	686		270	696		
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		0.22			0.46		0.04	0.58		0.24	0.61		

Intersection Summary	
Area Type:	Other
Cycle Length: 81	
Actuated Cycle Length: 64.2	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 19: Wood Street & Route 18

HCM Signalized Intersection Capacity Analysis
19: Wood Street & Route 18

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	80	10	55	120	40	10	290	60	60	370	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	14	16	16	14	16	11	11	16	11	11	16
Total Lost time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.97		1.00	0.97		1.00	0.99	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1860			1879		1745	1718		1745	1759	
Flt Permitted		0.89			0.88		0.34	1.00		0.37	1.00	
Satd. Flow (perm)		1676			1678		632	1718		685	1759	
Peak-hour factor, PHF	0.77	0.77	0.77	0.69	0.69	0.69	0.88	0.88	0.88	0.91	0.91	0.91
Adj. Flow (vph)	32	104	13	80	174	58	11	330	68	66	407	16
RTOR Reduction (vph)	0	4	0	0	9	0	0	8	0	0	2	0
Lane Group Flow (vph)	0	145	0	0	303	0	11	390	0	66	421	0
Heavy Vehicles (%)	0%	8%	11%	4%	4%	3%	0%	4%	5%	0%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Actuated Green, G (s)		25.4			25.4		25.4	25.4		25.4	25.4	
Effective Green, g (s)		25.4			25.4		25.4	25.4		25.4	25.4	
Actuated g/C Ratio		0.37			0.37		0.37	0.37		0.37	0.37	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		615			616		232	631		251	646	
v/s Ratio Prot								0.23			c0.24	
v/s Ratio Perm		0.09			c0.18		0.02			0.10		
v/c Ratio		0.24			0.49		0.05	0.62		0.26	0.65	
Uniform Delay, d1		15.2			16.9		14.1	17.9		15.3	18.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.9			2.8		0.4	4.5		2.5	5.1	
Delay (s)		16.1			19.7		14.5	22.4		17.9	23.3	
Level of Service		B			B		B	C		B	C	
Approach Delay (s)		16.1			19.7			22.2			22.5	
Approach LOS		B			B			C			C	

Intersection Summary					
HCM Average Control Delay	21.1	HCM Level of Service	C		
HCM Volume to Capacity ratio	0.57				
Actuated Cycle Length (s)	69.2	Sum of lost time (s)	18.4		
Intersection Capacity Utilization	58.0%	ICU Level of Service	B		
Analysis Period (min)	15				
c Critical Lane Group					

Lanes, Volumes, Timings
24: Nash Road & Church Street

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	95	240	25	40	255	40	60	100	25	35	160	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	14	16	16	16	16
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1761			1229			1754			2421	
Travel Time (s)		40.0			27.9			39.9			55.0	
Peak Hour Factor	0.89	0.89	0.89	0.96	0.96	0.96	0.83	0.83	0.83	0.91	0.91	0.91
Heavy Vehicles (%)	15%	6%	12%	7%	2%	0%	2%	2%	8%	8%	10%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	405	0	0	350	0	0	222	0	0	373	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Minimum Split (s)	36.0	36.0		36.0	36.0		29.0	29.0		29.0	29.0	
Total Split (s)	36.0	36.0	0.0	36.0	36.0	0.0	29.0	29.0	0.0	29.0	29.0	0.0
Total Split (%)	55.4%	55.4%	0.0%	55.4%	55.4%	0.0%	44.6%	44.6%	0.0%	44.6%	44.6%	0.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
v/c Ratio		0.54			0.40			0.46			0.62	
Control Delay		16.0			13.3			20.6			23.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		16.0			13.3			20.6			23.4	
Queue Length 50th (ft)		109			87			67			121	
Queue Length 95th (ft)		182			145			113			204	
Internal Link Dist (ft)		1681			1149			1674			2341	
Turn Bay Length (ft)												
Base Capacity (vph)		744			876			484			601	
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		0.54			0.40			0.46			0.62	

Intersection Summary	
Area Type:	Other
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 18 (28%), Referenced to phase 2: and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Pretimed	

Splits and Phases: 24: Nash Road & Church Street

HCM Signalized Intersection Capacity Analysis
24: Nash Road & Church Street

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	95	240	25	40	255	40	60	100	25	35	160	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	16	14	16	16	16	16
Total Lost time (s)		6.0			6.0			7.0			7.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.98			0.98			0.94	
Flt Protected		0.99			0.99			0.98			0.99	
Satd. Flow (prot)		1935			2057			1904			1875	
Flt Permitted		0.82			0.92			0.74			0.94	
Satd. Flow (perm)		1613			1898			1430			1778	
Peak-hour factor, PHF	0.89	0.89	0.89	0.96	0.96	0.96	0.83	0.83	0.83	0.91	0.91	0.91
Adj. Flow (vph)	107	270	28	42	266	42	72	120	30	38	176	159
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	405	0	0	350	0	0	222	0	0	373	0
Heavy Vehicles (%)	15%	6%	12%	7%	2%	0%	2%	2%	8%	8%	10%	5%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Actuated Green, G (s)		30.0			30.0			22.0			22.0	
Effective Green, g (s)		30.0			30.0			22.0			22.0	
Actuated g/C Ratio		0.46			0.46			0.34			0.34	
Clearance Time (s)		6.0			6.0			7.0			7.0	
Lane Grp Cap (vph)		744			876			484			602	
v/s Ratio Prot												
v/s Ratio Perm		c0.25			0.18			0.16			c0.21	
v/c Ratio		0.54			0.40			0.46			0.62	
Uniform Delay, d1		12.6			11.6			16.8			18.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.9			1.4			3.1			4.7	
Delay (s)		15.4			12.9			19.9			22.7	
Level of Service		B			B			B			C	
Approach Delay (s)		15.4			12.9			19.9			22.7	
Approach LOS		B			B			B			C	

Intersection Summary					
HCM Average Control Delay	17.5	HCM Level of Service	B		
HCM Volume to Capacity ratio	0.58				
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	13.0		
Intersection Capacity Utilization	70.0%	ICU Level of Service	C		
Analysis Period (min)	15				

c Critical Lane Group

Lanes, Volumes, Timings
28: Coggeshall Street & Route 18 SB

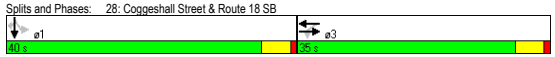
2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	200	95	195	205	0	0	0	0	120	690	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	15	12	12	12	12	12	10	10
Storage Length (ft)	0		0	0		0	0		0	0		130
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			No			No			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		686			474			1008			501	
Travel Time (s)		15.6			10.8			22.9			11.4	
Peak Hour Factor	0.78	0.78	0.78	0.86	0.86	0.86	0.92	0.92	0.92	0.88	0.88	0.88
Heavy Vehicles (%)	0%	5%	2%	2%	8%	0%	0%	0%	0%	7%	3%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	378	0	0	465	0	0	0	0	0	920	45
Turn Type				Perm						Perm		Perm
Protected Phases		3			3						1	
Permitted Phases				3						1		1
Minimum Split (s)		35.0		35.0	35.0					40.0	40.0	40.0
Total Split (s)	0.0	35.0	0.0	35.0	35.0	0.0	0.0	0.0	0.0	40.0	40.0	40.0
Total Split (%)	0.0%	46.7%	0.0%	46.7%	46.7%	0.0%	0.0%	0.0%	0.0%	53.3%	53.3%	53.3%
Maximum Green (s)		30.0		30.0	30.0					35.0	35.0	35.0
Yellow Time (s)		4.0		4.0	4.0					4.0	4.0	4.0
All-Red Time (s)		1.0		1.0	1.0					1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	4.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
v/c Ratio		0.52			1.15						0.61	0.06
Control Delay		18.4			116.0						17.1	4.0
Queue Delay		0.0			0.0						0.0	0.0
Total Delay		18.4			116.0						17.1	4.0
Queue Length 50th (ft)		116			~259						160	0
Queue Length 95th (ft)		157			#403						211	15
Internal Link Dist (ft)		606			394			928			421	
Turn Bay Length (ft)												130
Base Capacity (vph)		721			406						1507	694
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		0.52			1.15						0.61	0.06

Intersection Summary

Area Type: Other
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 0 (0%), Referenced to phase 2: and 6:, Start of Green
Natural Cycle: 80
Control Type: Pretimed
~ 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.

Splits and Phases: 28: Coggeshall Street & Route 18 SB



HCM Signalized Intersection Capacity Analysis
28: Coggeshall Street & Route 18 SB

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	200	95	195	205	0	0	0	0	120	690	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	15	12	12	12	12	12	10	10
Total Lost time (s)		5.0			5.0						5.0	5.0
Lane Util. Factor		1.00			1.00						0.95	1.00
Frt		0.96			1.00						1.00	0.85
Flt Protected		1.00			0.98						0.99	1.00
Satd. Flow (prot)		1747			1942						3229	1436
Flt Permitted		1.00			0.51						0.99	1.00
Satd. Flow (perm)		1747			1014						3229	1436
Peak-hour factor, PHF	0.78	0.78	0.78	0.86	0.86	0.86	0.92	0.92	0.92	0.88	0.88	0.88
Adj. Flow (vph)	0	256	122	227	238	0	0	0	0	136	784	45
RTOR Reduction (vph)	0	23	0	0	0	0	0	0	0	0	0	24
Lane Group Flow (vph)	0	355	0	0	465	0	0	0	0	0	920	21
Heavy Vehicles (%)	0%	5%	2%	2%	8%	0%	0%	0%	0%	7%	3%	5%
Turn Type				Perm						Perm		Perm
Protected Phases		3			3						1	
Permitted Phases				3						1		1
Actuated Green, G (s)		30.0			30.0						35.0	35.0
Effective Green, g (s)		30.0			30.0						35.0	35.0
Actuated g/C Ratio		0.40			0.40						0.47	0.47
Clearance Time (s)		5.0			5.0						5.0	5.0
Lane Grp Cap (vph)		699			406						1507	670
v/s Ratio Prot		0.20										
v/s Ratio Perm					c0.46						0.28	0.01
v/c Ratio		0.51			1.15						0.61	0.03
Uniform Delay, d1		16.9			22.5						14.9	10.8
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		2.6			90.6						1.9	0.1
Delay (s)		19.6			113.1						16.8	10.9
Level of Service		B			F						B	B
Approach Delay (s)		19.6			113.1			0.0			16.5	
Approach LOS		B			F			A			B	

Intersection Summary

HCM Average Control Delay	42.0	HCM Level of Service		D	
HCM Volume to Capacity ratio	0.86				
Actuated Cycle Length (s)	75.0	Sum of lost time (s)		10.0	
Intersection Capacity Utilization	91.7%	ICU Level of Service		F	
Analysis Period (min)	15				

c Critical Lane Group

Lanes, Volumes, Timings
31: Coggeshall Street & Acushnet Ave (Rte 18 NB)

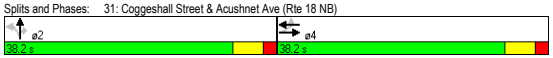
2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	270	0	0	310	50	85	295	230	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	15	12	12	11	11	12	12	12
Storage Length (ft)	0		0	0		0	0		160	0		0
Storage Lanes	0		0	0		0	1		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		474			546			1002			363	
Travel Time (s)		10.8			12.4			22.8			8.3	
Peak Hour Factor	0.95	0.95	0.95	0.86	0.86	0.86	0.84	0.84	0.84	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	0%	0%	4%	4%	12%	10%	4%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	331	0	0	418	0	101	351	274	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			4			2				
Permitted Phases	4						2		2			
Minimum Split (s)	38.2	38.2			38.2		38.2	38.2	38.2			
Total Split (s)	38.2	38.2	0.0	0.0	38.2	0.0	38.2	38.2	38.2	0.0	0.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	0.0%	50.0%	0.0%	50.0%	50.0%	50.0%	0.0%	0.0%	0.0%
Maximum Green (s)	32.0	32.0			32.0		32.0	32.0	32.0			
Yellow Time (s)	4.2	4.2			4.2		4.2	4.2	4.2			
All-Red Time (s)	2.0	2.0			2.0		2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	4.0	4.0	6.2	4.0	6.2	6.2	6.2	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
v/c Ratio		0.45			0.50		0.15	0.50	0.35			
Control Delay		18.4			18.4		14.6	19.5	3.4			
Queue Delay		0.0			0.0		0.0	0.0	0.0			
Total Delay		18.4			18.4		14.6	19.5	3.4			
Queue Length 50th (ft)		109			136		29	119	0			
Queue Length 95th (ft)		178			202		54	176	33			
Internal Link Dist (ft)		394			466			922			283	
Turn Bay Length (ft)									160			
Base Capacity (vph)		731			833		675	699	788			
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		0.45			0.50		0.15	0.50	0.35			

Intersection Summary

Area Type: Other
Cycle Length: 76.4
Actuated Cycle Length: 76.4
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:, Start of Green
Natural Cycle: 80
Control Type: Pretimed

Splits and Phases: 31: Coggeshall Street & Acushnet Ave (Rte 18 NB)



HCM Signalized Intersection Capacity Analysis
31: Coggeshall Street & Acushnet Ave (Rte 18 NB)

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	270	0	0	310	50	85	295	230	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	12	12	15	12	12	11	11	12	12	12
Total Lost time (s)		6.2			6.2		6.2	6.2	6.2			
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00			
Frt		1.00			0.98		1.00	1.00	0.85			
Flt Protected		0.99			1.00		0.95	1.00	1.00			
Satd. Flow (prot)		1940			1972		1612	1670	1501			
Flt Permitted		0.89			1.00		0.95	1.00	1.00			
Satd. Flow (perm)		1747			1972		1612	1670	1501			
Peak-hour factor, PHF	0.95	0.95	0.95	0.86	0.86	0.86	0.84	0.84	0.84	0.92	0.92	0.92
Adj. Flow (vph)	47	284	0	0	360	58	101	351	274	0	0	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	0	159	0	0	0
Lane Group Flow (vph)	0	331	0	0	410	0	101	351	115	0	0	0
Heavy Vehicles (%)	7%	7%	0%	0%	4%	4%	12%	10%	4%	0%	0%	0%
Turn Type	Perm						Perm		Perm			
Protected Phases		4			4			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		32.0			32.0		32.0	32.0	32.0			
Effective Green, g (s)		32.0			32.0		32.0	32.0	32.0			
Actuated g/C Ratio		0.42			0.42		0.42	0.42	0.42			
Clearance Time (s)		6.2			6.2		6.2	6.2	6.2			
Lane Grp Cap (vph)		732			826		675	699	629			
v/s Ratio Prot					c0.21			c0.21				
v/s Ratio Perm		0.19					0.06		0.08			
v/c Ratio		0.45			0.50		0.15	0.50	0.18			
Uniform Delay, d1		15.9			16.3		13.8	16.3	14.0			
Progression Factor		1.00			1.00		1.00	1.00	1.00			
Incremental Delay, d2		2.0			2.1		0.5	2.6	0.6			
Delay (s)		17.9			18.4		14.2	18.9	14.6			
Level of Service		B			B		B	B	B			
Approach Delay (s)		17.9			18.4			16.6			0.0	
Approach LOS		B			B			B			A	

Intersection Summary

HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	76.4	Sum of lost time (s)	12.4
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		

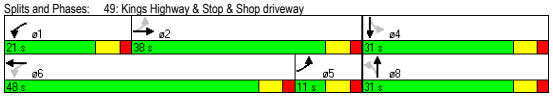
c Critical Lane Group

Lanes, Volumes, Timings
49: Kings Highway & Stop & Shop driveway — 2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	465	40	105	600	35	25	5	60	45	10	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		515			228			360			359	
Travel Time (s)		11.7			5.2			8.2			8.2	
Peak Hour Factor	0.81	0.81	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.72	0.72	0.72
Heavy Vehicles (%)	6%	6%	3%	1%	4%	0%	12%	29%	2%	0%	13%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	722	0	0	823	0	0	101	0	0	159	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.0	13.0		11.0	13.0		13.0	13.0		19.0	19.0	
Total Split (s)	11.0	38.0	0.0	21.0	48.0	0.0	31.0	31.0	0.0	31.0	31.0	0.0
Total Split (%)	12.2%	42.2%	0.0%	23.3%	53.3%	0.0%	34.4%	34.4%	0.0%	34.4%	34.4%	0.0%
Maximum Green (s)	5.0	32.0		15.0	42.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)										5.0	5.0	
Flash Dont Walk (s)										8.0	8.0	
Pedestrian Calls (#/hr)										0	0	
v/c Ratio		0.51			0.56			0.21			0.31	
Control Delay		7.3			7.9			10.2			11.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		7.3			7.9			10.2			11.6	
Queue Length 50th (ft)		46			56			3			7	
Queue Length 95th (ft)		71			99			22			23	
Internal Link Dist (ft)		435			148			280			279	
Turn Bay Length (ft)												
Base Capacity (vph)		1870			2395			1474			1565	
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		0.39			0.34			0.07			0.10	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 44.8	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 49: Kings Highway & Stop & Shop driveway



HCM Signalized Intersection Capacity Analysis
49: Kings Highway & Stop & Shop driveway — 2030 No-Build Conditions - AM Peak Hour

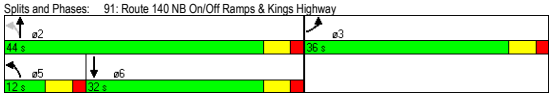
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	465	40	105	600	35	25	5	60	45	10	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frt		0.99			0.99			0.90			0.92	
Flt Protected		0.99			0.99			0.99			0.98	
Satd. Flow (prot)		3354			3443			3014			3227	
Flt Permitted		0.75			0.75			0.83			0.82	
Satd. Flow (perm)		2533			2610			2540			2685	
Peak-hour factor, PHF	0.81	0.81	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.72	0.72	0.72
Adj. Flow (vph)	99	574	49	117	667	39	28	6	67	62	14	83
RTOR Reduction (vph)	0	4	0	0	3	0	0	56	0	0	69	0
Lane Group Flow (vph)	0	718	0	0	820	0	0	45	0	0	90	0
Heavy Vehicles (%)	6%	6%	3%	1%	4%	0%	12%	29%	2%	0%	13%	0%
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		25.1			25.1			7.5			7.5	
Effective Green, g (s)		25.1			25.1			7.5			7.5	
Actuated g/C Ratio		0.56			0.56			0.17			0.17	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		1426			1469			427			452	
v/s Ratio Prot												
v/s Ratio Perm		0.28			c0.31			0.02			c0.03	
v/c Ratio		0.50			0.56			0.11			0.20	
Uniform Delay, d1		5.9			6.2			15.7			16.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.3			0.0			0.1	
Delay (s)		6.1			6.5			15.8			16.0	
Level of Service		A			A			B			B	
Approach Delay (s)		6.1			6.5			15.8			16.0	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	44.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	320	100	90	265	640	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	12	12	16
Storage Length (ft)	0	100	0			100
Storage Lanes	1	0	0			0
Taper Length (ft)	25	25	25			25
Right Turn on Red		No				No
Link Speed (mph)	30			30	30	
Link Distance (ft)	268			574	515	
Travel Time (s)	6.1			13.0	11.7	
Peak Hour Factor	0.83	0.83	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	3%	4%	7%	5%	5%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	506	0	0	418	806	0
Turn Type			pm+pt			
Protected Phases	3		5	2	6	
Permitted Phases			2			
Detector Phase	3		5	2	6	
Switch Phase						
Minimum Initial (s)	7.0		5.0	7.0	7.0	
Minimum Split (s)	13.0		11.0	13.0	13.0	
Total Split (s)	36.0	0.0	12.0	44.0	32.0	0.0
Total Split (%)	45.0%	0.0%	15.0%	55.0%	40.0%	0.0%
Maximum Green (s)	30.0		6.0	38.0	26.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	4.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		None	Min	Min	
v/c Ratio	0.68			0.55	0.64	
Control Delay	19.0			16.6	16.5	
Queue Delay	0.0			0.0	0.0	
Total Delay	19.0			16.6	16.5	
Queue Length 50th (ft)	115			47	96	
Queue Length 95th (ft)	214			100	175	
Internal Link Dist (ft)	188			494	435	
Turn Bay Length (ft)						
Base Capacity (vph)	1219			1598	1855	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.42			0.26	0.43	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 50.4	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 91: Route 140 NB On/Off Ramps & Kings Highway



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	320	100	90	265	640	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	12	12	16
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			0.95	0.95	
Frt	0.97			1.00	0.99	
Flt Protected	0.96			0.99	1.00	
Satd. Flow (prot)	1945			3379	3415	
Flt Permitted	0.96			0.60	1.00	
Satd. Flow (perm)	1945			2058	3415	
Peak-hour factor, PHF	0.83	0.83	0.85	0.85	0.85	0.85
Adj. Flow (vph)	386	120	106	312	753	53
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	506	0	0	418	806	0
Heavy Vehicles (%)	3%	4%	7%	5%	5%	0%
Turn Type			pm+pt			
Protected Phases	3		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	19.2			18.6	18.6	
Effective Green, g (s)	19.2			18.6	18.6	
Actuated g/C Ratio	0.39			0.37	0.37	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	750			769	1275	
v/s Ratio Prot	c0.26				c0.24	
v/s Ratio Perm				0.20		
v/c Ratio	0.67			0.54	0.63	
Uniform Delay, d1	12.7			12.3	12.8	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	2.4			0.8	1.0	
Delay (s)	15.1			13.1	13.8	
Level of Service	B			B	B	
Approach Delay (s)	15.1			13.1	13.8	
Approach LOS	B			B	B	

Intersection Summary			
HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	49.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
96: Kings Highway & Shaw's driveway

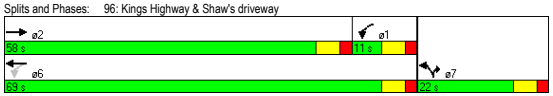
2030 No-Build Conditions - AM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	310	105	90	650	90	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	525			574	347	
Travel Time (s)	11.9			13.0	7.9	
Peak Hour Factor	0.93	0.93	0.92	0.92	0.85	0.85
Heavy Vehicles (%)	6%	2%	5%	4%	7%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	446	0	0	805	106	53
Turn Type			pm+pt			Prot
Protected Phases	2		1	6	7	7
Permitted Phases			6			
Detector Phase	2		1	6	7	7
Switch Phase						
Minimum Initial (s)	7.0		5.0	7.0	7.0	7.0
Minimum Split (s)	13.0		11.0	13.0	13.0	13.0
Total Split (s)	58.0	0.0	11.0	69.0	22.0	22.0
Total Split (%)	63.7%	0.0%	12.1%	75.8%	24.2%	24.2%
Maximum Green (s)	52.0		5.0	63.0	16.0	16.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	2.0		2.0	2.0	2.0	2.0
Recall Mode	Min		None	Min	None	None
v/c Ratio	0.22			0.46	0.31	0.15
Control Delay	4.7			7.4	16.3	6.4
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	4.7			7.4	16.3	6.4
Queue Length 50th (ft)	18			52	18	0
Queue Length 95th (ft)	40			98	50	18
Internal Link Dist (ft)	445			494	267	
Turn Bay Length (ft)						
Base Capacity (vph)	3308			2905	745	709
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	0.13			0.28	0.14	0.07

Intersection Summary

Area Type: Other
Cycle Length: 91
Actuated Cycle Length: 37.1
Natural Cycle: 40
Control Type: Actuated-Uncoordinated

Splits and Phases: 96: Kings Highway & Shaw's driveway



HCM Signalized Intersection Capacity Analysis
96: Kings Highway & Shaw's driveway

2030 No-Build Conditions - AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	310	105	90	650	90	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12
Total Lost time (s)	6.0			6.0	6.0	6.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	0.96			1.00	1.00	0.85
Flt Protected	1.00			0.99	0.95	1.00
Satd. Flow (prot)	3308			3446	1687	1538
Flt Permitted	1.00			0.84	0.95	1.00
Satd. Flow (perm)	3308			2904	1687	1538
Peak-hour factor, PHF	0.93	0.93	0.92	0.92	0.85	0.85
Adj. Flow (vph)	333	113	98	707	106	53
RTOR Reduction (vph)	39	0	0	0	0	45
Lane Group Flow (vph)	407	0	0	805	106	8
Heavy Vehicles (%)	6%	2%	5%	4%	7%	5%
Turn Type			pm+pt			Prot
Protected Phases	2		1	6	7	7
Permitted Phases			6			
Actuated Green, G (s)	20.7			20.7	5.7	5.7
Effective Green, g (s)	20.7			20.7	5.7	5.7
Actuated g/C Ratio	0.54			0.54	0.15	0.15
Clearance Time (s)	6.0			6.0	6.0	6.0
Vehicle Extension (s)	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	1783			1565	250	228
v/s Ratio Prot	0.12				c0.06	0.01
v/s Ratio Perm				c0.28		
v/c Ratio	0.23			0.51	0.42	0.03
Uniform Delay, d1	4.7			5.6	14.9	14.0
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.0			0.1	0.4	0.0
Delay (s)	4.7			5.8	15.3	14.0
Level of Service	A			A	B	B
Approach Delay (s)	4.7			5.8	14.9	
Approach LOS	A			A	B	

Intersection Summary

HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	38.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

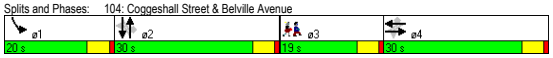
Lanes, Volumes, Timings
104: Coggeshall Street & Belville Avenue

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations													
Volume (vph)	90	260	90	70	220	135	35	130	165	225	215	185	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	11	16	16	10	10	16	12	14	16	11	16	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		443			1111			850			178		
Travel Time (s)		10.1			25.3			19.3			4.0		
Peak Hour Factor	0.90	0.90	0.90	0.91	0.91	0.91	0.82	0.82	0.82	0.84	0.84	0.84	
Heavy Vehicles (%)	1%	6%	5%	1%	6%	6%	3%	6%	11%	4%	4%	2%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	489	0	0	319	148	0	202	201	0	744	0	
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt			
Protected Phases		4			4			2		1	2		3
Permitted Phases	4			4		4	2		2	2			
Detector Phase	4	4		4	4	4	2	2	2	1	2		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0		6.0
Minimum Split (s)	13.0	13.0		13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0		19.0
Total Split (s)	30.0	30.0	0.0	30.0	30.0	30.0	30.0	30.0	30.0	20.0	30.0	0.0	19.0
Total Split (%)	30.3%	30.3%	0.0%	30.3%	30.3%	30.3%	30.3%	30.3%	30.3%	20.2%	30.3%	0.0%	19%
Maximum Green (s)	25.0	25.0		25.0	25.0	25.0	25.0	25.0	25.0	15.0	25.0		14.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	
Lead/Lag	Lag	Lag		Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lag		Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		3.0
Recall Mode	Max	Max		Max	Max	Max	None	None	None	None	None		None
Walk Time (s)													6.0
Flash Dont Walk (s)													8.0
Pedestrian Calls (#/hr)													6
v/c Ratio		0.47			0.58	0.22		0.39	0.28		0.76		
Control Delay		16.2			22.6	4.4		18.3	4.2		22.5		
Queue Delay		0.0			0.0	0.0		0.0	0.0		0.0		
Total Delay		16.2			22.6	4.4		18.3	4.2		22.5		
Queue Length 50th (ft)		59			84	0		48	0		98		
Queue Length 95th (ft)		150			#264	39		126	33		#238		
Internal Link Dist (ft)		363			1031			770			98		
Turn Bay Length (ft)													
Base Capacity (vph)		1040			548	669		560	753		1055		
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		0.47			0.58	0.22		0.36	0.27		0.71		

Intersection Summary	
Area Type:	Other
Cycle Length: 99	
Actuated Cycle Length: 62.2	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 104: Coggeshall Street & Belville Avenue



HCM Signalized Intersection Capacity Analysis
104: Coggeshall Street & Belville Avenue

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	260	90	70	220	135	35	130	165	225	215	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	11	16	16	10	10	16	12	14	16	11	16
Total Lost time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Lane Util. Factor		0.95			1.00	1.00		1.00	1.00		0.95	
Frt		0.97			1.00	0.85		1.00	0.85		0.96	
Flt Protected		0.99			0.99	1.00		0.99	1.00		0.98	
Satd. Flow (prot)		3196			1672	1422		1784	1552		3168	
Flt Permitted		0.77			0.79	1.00		0.76	1.00		0.77	
Satd. Flow (perm)		2499			1340	1422		1371	1552		2467	
Peak-hour factor, PHF	0.90	0.90	0.90	0.91	0.91	0.91	0.82	0.82	0.82	0.84	0.84	0.84
Adj. Flow (vph)	100	289	100	77	242	148	43	159	201	268	256	220
RTOR Reduction (vph)	0	19	0	0	0	91	0	0	129	0	50	0
Lane Group Flow (vph)	0	470	0	0	319	57	0	202	72	0	694	0
Heavy Vehicles (%)	1%	6%	5%	1%	6%	6%	3%	6%	11%	4%	4%	2%
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt		
Protected Phases		4			4			2		1	2	
Permitted Phases	4			4		4	2		2	2		
Actuated Green, G (s)		25.4			25.4	25.4		23.6	23.6		23.6	
Effective Green, g (s)		25.4			25.4	25.4		23.6	23.6		23.6	
Actuated g/C Ratio		0.38			0.38	0.38		0.36	0.36		0.36	
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Vehicle Extension (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Grp Cap (vph)		959			514	546		489	553		879	
v/s Ratio Prot												
v/s Ratio Perm		0.19			c0.24	0.04		0.15	0.05		c0.28	
v/c Ratio		0.49			0.62	0.10		0.41	0.13		0.79	
Uniform Delay, d1		15.5			16.5	13.1		16.1	14.4		19.1	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		1.8			5.5	0.4		0.8	0.1		5.0	
Delay (s)		17.3			22.1	13.5		16.8	14.5		24.1	
Level of Service		B			C	B		B	B		C	
Approach Delay (s)		17.3			19.3			15.7			24.1	
Approach LOS		B			B			B			C	

Intersection Summary					
HCM Average Control Delay	19.8	HCM Level of Service		B	
HCM Volume to Capacity ratio	0.70				
Actuated Cycle Length (s)	66.2	Sum of lost time (s)		17.2	
Intersection Capacity Utilization	72.0%	ICU Level of Service		C	
Analysis Period (min)	15				
c Critical Lane Group					

Lanes, Volumes, Timings
137: Hillman St & Pleasant Street

2030 No-Build Conditions - AM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	50	40	180	415	130	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	14	16	16	14
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		30			30
Link Distance (ft)	693		149			313
Travel Time (s)	15.8		3.4			7.1
Peak Hour Factor	0.84	0.84	0.86	0.86	0.90	0.90
Heavy Vehicles (%)	8%	18%	7%	5%	8%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	108	0	692	0	0	572
Turn Type					Perm	
Protected Phases	2		1			1
Permitted Phases					1	
Minimum Split (s)	27.0		37.0		37.0	37.0
Total Split (s)	27.0	0.0	37.0	0.0	37.0	37.0
Total Split (%)	42.2%	0.0%	57.8%	0.0%	57.8%	57.8%
Maximum Green (s)	20.0		30.0		30.0	30.0
Yellow Time (s)	5.0		5.0		5.0	5.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	4.0	7.0	4.0	7.0	7.0
Lead/Lag	Lag		Lead		Lead	Lead
Lead-Lag Optimize?	Yes		Yes		Yes	Yes
v/c Ratio	0.19		0.39			0.52
Control Delay	10.9		3.9			14.0
Queue Delay	0.0		0.0			0.0
Total Delay	10.9		3.9			14.0
Queue Length 50th (ft)	16		23			77
Queue Length 95th (ft)	43		45			119
Internal Link Dist (ft)	613		69			233
Turn Bay Length (ft)						
Base Capacity (vph)	581		1786			1103
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.19		0.39			0.52

Intersection Summary	
Area Type:	Other
Cycle Length: 64	
Actuated Cycle Length: 64	
Offset: 35 (55%), Referenced to phase 2:WBL and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Pretimed	

Splits and Phases: 137: Hillman St & Pleasant Street

HCM Signalized Intersection Capacity Analysis
137: Hillman St & Pleasant Street

2030 No-Build Conditions - AM Peak Hour

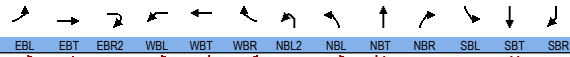
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	50	40	180	415	130	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	14	16	16	14
Total Lost time (s)	7.0		7.0			7.0
Lane Util. Factor	1.00		0.95			0.95
Frt	0.94		0.90			1.00
Flt Protected	0.97		1.00			0.99
Satd. Flow (prot)	1751		3265			3596
Flt Permitted	0.97		1.00			0.65
Satd. Flow (perm)	1751		3265			2352
Peak-hour factor, PHF	0.84	0.84	0.86	0.86	0.90	0.90
Adj. Flow (vph)	60	48	209	483	144	428
RTOR Reduction (vph)	33	0	257	0	0	0
Lane Group Flow (vph)	75	0	435	0	0	572
Heavy Vehicles (%)	8%	18%	7%	5%	8%	5%
Turn Type					Perm	
Protected Phases	2		1			1
Permitted Phases					1	
Actuated Green, G (s)	20.0		30.0			30.0
Effective Green, g (s)	20.0		30.0			30.0
Actuated g/C Ratio	0.31		0.47			0.47
Clearance Time (s)	7.0		7.0			7.0
Lane Grp Cap (vph)	547		1530			1103
v/s Ratio Prot	c0.04		0.13			
v/s Ratio Perm						c0.24
v/c Ratio	0.14		0.28			0.52
Uniform Delay, d1	15.8		10.4			11.9
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.5		0.5			1.7
Delay (s)	16.3		10.9			13.7
Level of Service	B		B			B
Approach Delay (s)	16.3		10.9			13.7
Approach LOS	B		B			B

Intersection Summary			
HCM Average Control Delay	12.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	64.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
140: Mill Street & Pleasant St

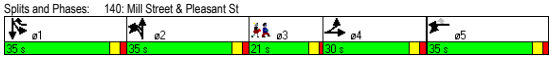
2030 No-Build Conditions - AM Peak Hour



Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations														
Volume (vph)	225	140	5	410	180	145	20	55	215	30	50	280	45	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	16	16	11	12	10	16	10	12	14	16	14	16	
Storage Length (ft)	0			0		0		100		0	0		0	
Storage Lanes	1			1		1		1		0	0		0	
Taper Length (ft)	25			25		25		25		25	25		25	
Right Turn on Red			Yes			No				Yes				
Link Speed (mph)		30			30				30			30		
Link Distance (ft)		168			308				709			499		
Travel Time (s)		3.8			7.0				16.1			11.3		
Peak Hour Factor	0.88	0.88	0.88	0.82	0.82	0.82	0.88	0.88	0.88	0.88	0.84	0.84	0.84	
Heavy Vehicles (%)	5%	1%	0%	3%	3%	4%	0%	9%	5%	3%	4%	0%	4%	
Shared Lane Traffic (%)														
Lane Group Flow (vph)	256	165	0	500	220	177	0	85	278	0	0	447	0	
Turn Type	Split			Split		pm+ov	Split	Split			Split			
Protected Phases	4	4		5	5	1	2	2	2		1	1		3
Permitted Phases						5								
Detector Phase	4	4		5	5	1	2	2	2		1	1		
Switch Phase														
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0		4.0
Minimum Split (s)	21.0	21.0		21.0	21.0	21.0	21.0	21.0	21.0		21.0	21.0		21.0
Total Split (s)	30.0	30.0	0.0	35.0	35.0	35.0	35.0	35.0	35.0	0.0	35.0	35.0	0.0	21.0
Total Split (%)	19.2%	19.2%	0.0%	22.4%	22.4%	22.4%	22.4%	22.4%	22.4%	0.0%	22.4%	22.4%	0.0%	13%
Maximum Green (s)	25.0	25.0		30.0	30.0	30.0	30.0	30.0	30.0		30.0	30.0		17.0
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0	
Lead/Lag	Lag	Lag				Lead	Lag	Lag	Lag		Lead	Lead		Lead
Lead-Lag Optimize?	Yes	Yes				Yes	Yes	Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		3.0
Recall Mode	Max	Max		Max	Max	Max	Max	Max	Max		Max	Max		None
Walk Time (s)														10.0
Flash Dont Walk (s)														7.0
Pedestrian Calls (#/hr)														9
v/c Ratio	0.80	0.43		1.37	0.55	0.26		0.25	0.38			0.56		
Control Delay	74.0	55.7		222.3	55.8	24.9		49.2	47.7			52.5		
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0			0.0		
Total Delay	74.0	55.7		222.3	55.8	24.9		49.2	47.7			52.5		
Queue Length 50th (ft)	216	128		~568	172	90		62	105			183		
Queue Length 95th (ft)	#409	228		#828	271	162		127	172			262		
Internal Link Dist (ft)		88			228				629			419		
Turn Bay Length (ft)								100						
Base Capacity (vph)	320	383		366	399	679		342	739			804		
Starvation Cap Reductn	0	0		0	0	0		0	0			0		
Spillback Cap Reductn	0	0		0	0	0		0	0			0		
Storage Cap Reductn	0	0		0	0	0		0	0			0		
Reduced v/c Ratio	0.80	0.43		1.37	0.55	0.26		0.25	0.38			0.56		

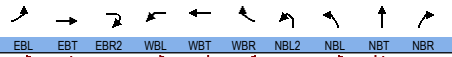
Intersection Summary	
Area Type:	Other
Cycle Length: 156	
Actuated Cycle Length: 139.2	
Natural Cycle: 125	
Control Type: Semi Act-Uncoord	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 140: Mill Street & Pleasant St



HCM Signalized Intersection Capacity Analysis
140: Mill Street & Pleasant St

2030 No-Build Conditions - AM Peak Hour



Movement	EBL	EBT	EBR2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Volume (vph)	225	140	5	410	180	145	20	55	215	30	50	280	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	16	16	11	12	10	16	10	12	14	16	14	16
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0			5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	0.95			0.95	
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.98			0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1776	2121		1694	1845	1449		1581	3383			3718	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.95	1.00			0.99	
Satd. Flow (perm)	1776	2121		1694	1845	1449		1581	3383			3718	
Peak-hour factor, PHF	0.88	0.88	0.88	0.82	0.82	0.82	0.88	0.88	0.88	0.88	0.84	0.84	0.84
Adj. Flow (vph)	256	159	6	500	220	177	23	62	244	34	60	333	54
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	7	0	0	0	0
Lane Group Flow (vph)	256	164	0	500	220	177	0	85	271	0	0	447	0
Heavy Vehicles (%)	5%	1%	0%	3%	3%	4%	0%	9%	5%	3%	4%	0%	4%
Turn Type	Split			Split		pm+ov	Split	Split			Split		
Protected Phases	4	4		5	5	1	2	2	2		1	1	
Permitted Phases						5							
Actuated Green, G (s)	25.1	25.1		30.1	30.1	60.2		30.1	30.1			30.1	
Effective Green, g (s)	25.1	25.1		30.1	30.1	60.2		30.1	30.1			30.1	
Actuated g/C Ratio	0.18	0.18		0.21	0.21	0.42		0.21	0.21			0.21	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0			5.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0			5.0	
Lane Grp Cap (vph)	313	374		358	390	663		334	715			786	
v/s Ratio Prot	c0.14	0.08		c0.30	0.12	0.06		0.05	c0.08			c0.12	
v/s Ratio Perm						0.07							
v/c Ratio	0.82	0.44		1.40	0.56	0.27		0.25	0.38			0.57	
Uniform Delay, d1	56.5	52.4		56.2	50.3	26.7		46.8	48.1			50.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	20.6	3.7		194.7	5.8	1.0		1.8	1.5			3.0	
Delay (s)	77.1	56.1		250.9	56.1	27.7		48.6	49.7			53.3	
Level of Service	E	E		F	E	C		D	D			D	
Approach Delay (s)		68.8			159.1				49.4			53.3	
Approach LOS		E			F				D			D	

Intersection Summary			
HCM Average Control Delay	100.3	HCM Level of Service	F
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	142.4	Sum of lost time (s)	27.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

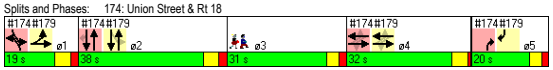
Lanes, Volumes, Timings
174: Union Street & Rt 18

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations													
Volume (vph)	250	50	40	35	15	10	40	890	25	90	855	240	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	11	11	16	16	16	16	11	11	11	10	11	11	
Storage Length (ft)	0		0	0		0	150		225	150		225	
Storage Lanes	1		0	0		0	1		1	1		1	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			No			No			No			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		440			82			328			2491		
Travel Time (s)		10.0			1.9			7.5			56.6		
Peak Hour Factor	0.89	0.89	0.89	0.82	0.82	0.82	0.88	0.88	0.88	0.92	0.92	0.92	
Heavy Vehicles (%)	8%	6%	3%	6%	6%	10%	7%	7%	4%	7%	5%	3%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	281	101	0	0	73	0	45	1011	28	98	929	261	
Turn Type	Perm			Perm			Prot		custom	Prot		Perm	
Protected Phases		4			4		1	2	5	1	2		3
Permitted Phases	4			4								2	
Detector Phase	4	4		4	4		1	2	5	1	2	2	
Switch Phase													
Minimum Initial (s)	7.0	7.0		7.0	7.0		4.0	7.0	4.0	4.0	7.0	7.0	17.0
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0	13.0	9.0	10.0	13.0	13.0	31.0
Total Split (s)	32.0	32.0	0.0	32.0	32.0	0.0	19.0	38.0	20.0	19.0	38.0	38.0	31.0
Total Split (%)	22.9%	22.9%	0.0%	22.9%	22.9%	0.0%	13.6%	27.1%	14.3%	13.6%	27.1%	27.1%	22%
Maximum Green (s)	27.0	27.0		27.0	27.0		13.0	32.0	15.0	13.0	32.0	32.0	26.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	3.0	4.0	4.0	4.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	6.0	6.0	5.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lag		Lead	Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes
Vehicle Extension (s)	5.0	5.0		5.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0	3.0
Recall Mode	None	None		None	None		None	None	None	None	None	None	None
Walk Time (s)													17.0
Flash Dont Walk (s)													9.0
Pedestrian Calls (#/hr)													7
v/c Ratio	0.87	0.24			0.18		0.25	1.01	0.19	0.56	0.91	0.44	
Control Delay	68.0	38.5			67.8		52.6	70.2	52.2	62.4	51.6	14.9	
Queue Delay	0.0	0.0			0.0		0.0	128.2	0.8	0.1	0.0	0.0	
Total Delay	68.0	38.5			67.8		52.6	198.3	53.1	62.5	51.6	14.9	
Queue Length 50th (ft)	180	53			43		27	~362	17	62	313	41	
Queue Length 95th (ft)	#482	136			95		79	#746	54	#170	#681	155	
Internal Link Dist (ft)		360			2			248			2411		
Turn Bay Length (ft)							150		225	150		225	
Base Capacity (vph)	322	423			410		203	999	215	196	1018	588	
Starvation Cap Reductn	0	0			0		0	233	0	0	0	0	
Spillback Cap Reductn	0	0			0		0	0	89	2	0	0	
Storage Cap Reductn	0	0			0		0	0	0	0	0	0	
Reduced v/c Ratio	0.87	0.24			0.18		0.22	1.32	0.22	0.51	0.91	0.44	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 107.3	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
~ 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.	

Splits and Phases: 174: Union Street & Rt 18



HCM Signalized Intersection Capacity Analysis
174: Union Street & Rt 18

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	50	40	35	15	10	40	890	25	90	855	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	16	16	16	16	11	11	11	10	11	11
Total Lost time (s)	5.0	5.0			5.0		6.0	6.0	5.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93			0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1616	1638			1918		1631	3261	1501	1574	3323	1516
Flt Permitted	0.73	1.00			0.80		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1246	1638			1586		1631	3261	1501	1574	3323	1516
Peak-hour factor, PHF	0.89	0.89	0.89	0.82	0.82	0.82	0.88	0.88	0.88	0.92	0.92	0.92
Adj. Flow (vph)	281	56	45	43	18	12	45	1011	28	98	929	261
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	126
Lane Group Flow (vph)	281	101	0	0	73	0	45	1011	28	98	929	135
Heavy Vehicles (%)	8%	6%	3%	6%	6%	10%	7%	7%	4%	7%	5%	3%
Turn Type	Perm			Perm			Prot		custom	Prot		Perm
Protected Phases		4			4		1	2	5	1	2	
Permitted Phases	4			4								2
Actuated Green, G (s)	27.7	27.7			27.7		11.8	32.8	8.8	11.8	32.8	32.8
Effective Green, g (s)	27.7	27.7			27.7		11.8	32.8	8.8	11.8	32.8	32.8
Actuated g/C Ratio	0.25	0.25			0.25		0.11	0.29	0.08	0.11	0.29	0.29
Clearance Time (s)	5.0	5.0			5.0		6.0	6.0	5.0	6.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0			5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	308	405			392		172	954	118	166	972	444
v/s Ratio Prot		0.06					0.03	c0.31	c0.02	c0.06	0.28	
v/s Ratio Perm	c0.23				0.05							0.09
v/c Ratio	0.91	0.25			0.19		0.26	1.06	0.24	0.59	0.96	0.30
Uniform Delay, d1	41.0	33.9			33.3		46.1	39.6	48.5	47.8	38.9	30.8
Progression Factor	1.00	1.00			1.79		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	31.0	0.7			0.5		1.1	46.3	1.4	6.4	19.0	0.5
Delay (s)	72.0	34.5			60.1		47.3	86.0	49.9	54.3	58.0	31.3
Level of Service	E	C			E		D	F	D	D	E	C
Approach Delay (s)		62.1			60.1			83.4			52.3	
Approach LOS		E			E			F			D	

Intersection Summary			
HCM Average Control Delay	65.8	HCM Level of Service	E
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	112.1	Sum of lost time (s)	31.0
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

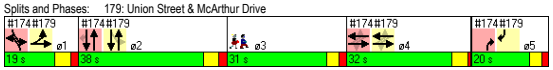
Lanes, Volumes, Timings
179: Union Street & McArthur Drive

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations													
Volume (vph)	50	20	95	5	10	5	0	160	20	15	175	50	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	16	16	16	15	16	16	16	16	16	12	12	
Storage Length (ft)	0		0	0		0	0		0	0		50	
Storage Lanes	0		0	0		0	0		0	0		1	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			No			Yes			Yes			No	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		82			609			920			687		
Travel Time (s)		1.9			13.8			20.9			15.6		
Peak Hour Factor	0.78	0.78	0.78	0.57	0.57	0.57	0.89	0.89	0.89	0.81	0.81	0.81	
Heavy Vehicles (%)	12%	14%	5%	0%	17%	33%	0%	22%	0%	14%	13%	4%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	212	0	0	36	0	0	202	0	0	235	62	
Turn Type	pm+pt			Perm						Perm		custom	
Protected Phases	1	1 4			4			2			2	5	3
Permitted Phases	1 4			4						2			
Detector Phase	1	1 4		4	4			2		2	2	5	
Switch Phase													
Minimum Initial (s)	4.0			7.0	7.0			7.0		7.0	7.0	4.0	17.0
Minimum Split (s)	10.0			12.0	12.0			13.0		13.0	13.0	9.0	31.0
Total Split (s)	19.0	51.0	0.0	32.0	32.0	0.0	0.0	38.0	0.0	38.0	38.0	20.0	31.0
Total Split (%)	13.6%	36.4%	0.0%	22.9%	22.9%	0.0%	0.0%	27.1%	0.0%	27.1%	27.1%	14.3%	22%
Maximum Green (s)	13.0			27.0	27.0			32.0		32.0	32.0	15.0	26.0
Yellow Time (s)	4.0			4.0	4.0			4.0		4.0	4.0	3.0	3.0
All-Red Time (s)	2.0			1.0	1.0			2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	4.0	6.0	4.0	6.0	6.0	5.0	
Lead/Lag	Lead			Lag	Lag			Lag		Lag	Lag		Lead
Lead-Lag Optimize?	Yes			Yes	Yes			Yes		Yes	Yes		Yes
Vehicle Extension (s)	4.0			5.0	5.0			4.0		4.0	4.0	4.0	3.0
Recall Mode	None			None	None			None		None	None	None	None
Walk Time (s)													17.0
Flash Dont Walk (s)													9.0
Pedestrian Calls (#/hr)													7
v/c Ratio		0.35			0.09			0.37			0.47	0.41	
Control Delay		8.4			30.7			35.1			38.3	57.9	
Queue Delay		0.0			0.0			0.0			0.0	119.9	
Total Delay		8.4			30.7			35.1			38.3	177.7	
Queue Length 50th (ft)		25			14			103			127	40	
Queue Length 95th (ft)		41			30			238			254	92	
Internal Link Dist (ft)		2			529			840			607		
Turn Bay Length (ft)												50	
Base Capacity (vph)		637			420			546			497	223	
Starvation Cap Reductn		0			0			0			0	0	
Spillback Cap Reductn		0			11			0			0	170	
Storage Cap Reductn		0			0			0			0	0	
Reduced v/c Ratio		0.33			0.09			0.37			0.47	1.17	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 107.3	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 179: Union Street & McArthur Drive



HCM Signalized Intersection Capacity Analysis
179: Union Street & McArthur Drive

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	20	95	5	10	5	0	160	20	15	175	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	15	16	16	16	16	16	12	12
Total Lost time (s)		6.0			5.0			6.0			6.0	5.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frt		0.92			0.97			0.99			1.00	0.85
Flt Protected		0.99			0.99			1.00			1.00	1.00
Satd. Flow (prot)		1808			1708			1774			1673	1553
Flt Permitted		0.90			0.92			1.00			0.97	1.00
Satd. Flow (perm)		1659			1598			1774			1622	1553
Peak-hour factor, PHF	0.78	0.78	0.78	0.57	0.57	0.57	0.89	0.89	0.89	0.81	0.81	0.81
Adj. Flow (vph)	64	26	122	9	18	9	0	180	22	19	216	62
RTOR Reduction (vph)	0	0	0	0	7	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	212	0	0	29	0	0	199	0	0	235	62
Heavy Vehicles (%)	12%	14%	5%	0%	17%	33%	0%	22%	0%	14%	13%	4%
Turn Type	pm+pt			Perm						Perm		custom
Protected Phases	1	1 4			4			2			2	5
Permitted Phases	1 4			4						2		
Actuated Green, G (s)		39.5			27.7			32.8			32.8	8.8
Effective Green, g (s)		39.5			27.7			32.8			32.8	8.8
Actuated g/C Ratio		0.35			0.25			0.29			0.29	0.08
Clearance Time (s)					5.0			6.0			6.0	5.0
Vehicle Extension (s)					5.0			4.0			4.0	4.0
Lane Grp Cap (vph)		600			395			519			475	122
v/s Ratio Prot		c0.04						0.11				c0.04
v/s Ratio Perm		c0.09			0.02						c0.14	
v/c Ratio		0.35			0.07			0.38			0.49	0.51
Uniform Delay, d1		26.9			32.4			31.6			32.8	49.6
Progression Factor		0.39			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.5			0.2			0.6			1.1	4.5
Delay (s)		11.0			32.5			32.2			33.9	54.1
Level of Service		B			C			C			C	D
Approach Delay (s)		11.0			32.5			32.2			38.1	
Approach LOS		B			C			C			D	

Intersection Summary					
HCM Average Control Delay	28.6	HCM Level of Service	C		
HCM Volume to Capacity ratio	0.43				
Actuated Cycle Length (s)	112.1	Sum of lost time (s)	32.0		
Intersection Capacity Utilization	45.5%	ICU Level of Service	A		
Analysis Period (min)	15				
c Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis
9: Tarkiln Hill Rd & Kings Highway

2030 No-Build Conditions - AM Peak Hour

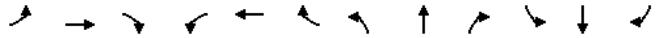
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	10	20	10	560	720	60
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.83	0.83	0.90	0.90
Hourly flow rate (vph)	12	24	12	675	800	67
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				394	611	
pX, platoon unblocked	0.82					
vC, conflicting volume	1532	833	867			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1539	833	867			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	93	98			
cM capacity (veh/h)	102	364	786			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	37	687	867
Volume Left	12	12	0
Volume Right	24	0	67
cSH	197	786	1700
Volume to Capacity	0.19	0.02	0.51
Queue Length 95th (ft)	17	1	0
Control Delay (s)	27.5	0.4	0.0
Lane LOS	D	A	
Approach Delay (s)	27.5	0.4	0.0
Approach LOS	D		

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization		51.5%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
16: Park Avenue & Church Street

2030 No-Build Conditions - AM Peak Hour



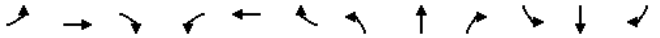
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	70	135	20	0	45	0	420	20	10	190	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.84	0.84	0.84	0.85	0.85	0.85	0.76	0.76	0.76
Hourly flow rate (vph)	0	90	173	24	0	54	0	494	24	13	250	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											176	
pX, platoon unblocked	0.92	0.92	0.92	0.92	0.92		0.92					
vC, conflicting volume	836	794	250	1000	782	506	250			518		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	780	735	145	958	722	506	145			518		
tC, single (s)	7.1	6.5	6.3	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	72	79	82	100	91	100			99		
cM capacity (veh/h)	261	316	813	134	324	570	1337			1059		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	263	77	518	263
Volume Left	0	24	0	13
Volume Right	173	54	24	0
cSH	529	285	1700	1059
Volume to Capacity	0.50	0.27	0.30	0.01
Queue Length 95th (ft)	68	27	0	1
Control Delay (s)	18.3	22.3	0.0	0.5
Lane LOS	C	C		A
Approach Delay (s)	18.3	22.3	0.0	0.5
Approach LOS	C	C		

Intersection Summary			
Average Delay		6.0	
Intersection Capacity Utilization		49.2%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
17: Irvington Street & Church Street

2030 No-Build Conditions - AM Peak Hour



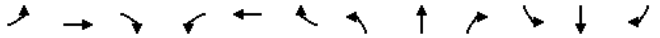
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	0	5	25	0	20	5	270	0	0	340	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.79	0.79	0.79	0.85	0.85	0.85	0.77	0.77	0.77
Hourly flow rate (vph)	7	0	7	32	0	25	6	318	0	0	442	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	803	777	448	784	784	318	455			318		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	803	777	448	784	784	318	455			318		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	99	89	100	97	99			100		
cM capacity (veh/h)	292	328	615	299	326	728	1117			1254		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	13	57	324	455
Volume Left	7	32	6	0
Volume Right	7	25	0	13
cSH	396	405	1117	1700
Volume to Capacity	0.03	0.14	0.01	0.27
Queue Length 95th (ft)	3	12	0	0
Control Delay (s)	14.4	15.3	0.2	0.0
Lane LOS	B	C	A	
Approach Delay (s)	14.4	15.3	0.2	0.0
Approach LOS	B	C		

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	28.6%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
32: Coggeshall Street & North Front St

2030 No-Build Conditions - AM Peak Hour



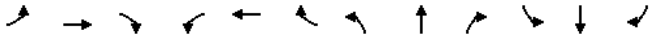
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	50	390	45	90	320	50	25	60	45	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.84	0.84	0.84	0.86	0.86	0.86	0.92	0.92	0.92
Hourly flow rate (vph)	56	438	51	107	381	60	29	70	52	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		546			443							
pX, platoon unblocked	0.94			0.91			0.95	0.95	0.91	0.95	0.95	0.94
vC, conflicting volume	440			489			1201	1231	463	1288	1226	411
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	372			394			1038	1070	367	1130	1065	340
tC, single (s)	4.1			4.1			7.2	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.5	4.0	3.3
p0 queue free %	95			90			83	61	91	100	100	100
cM capacity (veh/h)	1104			1065			171	178	607	98	181	664

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	545	548	151
Volume Left	56	107	29
Volume Right	51	60	52
cSH	1104	1065	233
Volume to Capacity	0.05	0.10	0.65
Queue Length 95th (ft)	4	8	100
Control Delay (s)	1.4	2.7	45.2
Lane LOS	A	A	E
Approach Delay (s)	1.4	2.7	45.2
Approach LOS			E

Intersection Summary				
Average Delay	7.3			
Intersection Capacity Utilization	55.9%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
54: Rt 18 SB Exit Ramp & Purchase St

2030 No-Build Conditions - AM Peak Hour



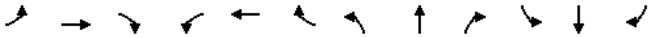
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	10	245	5	35	0	225	0	0	260	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	11	266	5	38	0	245	0	0	283	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								822				
pX, platoon unblocked												
vC, conflicting volume	568	527	283	538	527	245	283			245		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	568	527	283	538	527	245	283			245		
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 %	100	100	99	40	99	95	100			100		
cM capacity (veh/h)	409	456	756	447	456	794	1280			1322		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	11	310	245	283
Volume Left	0	266	0	0
Volume Right	11	38	0	0
cSH	756	473	1280	1700
Volume to Capacity	0.01	0.65	0.00	0.17
Queue Length 95th (ft)	1	116	0	0
Control Delay (s)	9.8	25.9	0.0	0.0
Lane LOS	A	D		
Approach Delay (s)	9.8	25.9	0.0	0.0
Approach LOS	A	D		

Intersection Summary				
Average Delay	9.6			
Intersection Capacity Utilization	43.0%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
58: Coggeshall St & Purchase Street

2030 No-Build Conditions - AM Peak Hour



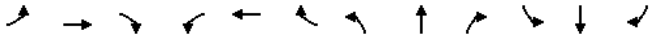
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	15	155	35	35	105	90	10	195	60	95	170	15
Peak Hour Factor	0.80	0.80	0.80	0.83	0.83	0.83	0.89	0.89	0.89	0.88	0.88	0.88
Hourly flow rate (vph)	19	194	44	42	127	108	11	219	67	108	193	17

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	256	277	298	318
Volume Left (vph)	19	42	11	108
Volume Right (vph)	44	108	67	17
Hadj (s)	-0.04	-0.09	-0.04	0.20
Departure Headway (s)	6.6	6.5	6.4	6.6
Degree Utilization, x	0.47	0.50	0.53	0.58
Capacity (veh/h)	484	494	510	499
Control Delay (s)	15.3	15.8	16.4	18.3
Approach Delay (s)	15.3	15.8	16.4	18.3
Approach LOS	C	C	C	C

Intersection Summary				
Delay	16.6			
HCM Level of Service	C			
Intersection Capacity Utilization	61.4%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
72: Weld St & Purchase St

2030 No-Build Conditions - AM Peak Hour



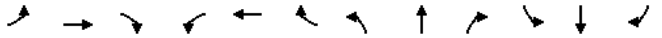
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	0	5	120	55	25	55	220	0	0	235	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.89	0.89	0.89	0.89	0.89	0.89	0.83	0.83	0.83
Hourly flow rate (vph)	6	0	6	135	62	28	62	247	0	0	283	30
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	728	669	298	675	684	247	313			247		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	728	669	298	675	684	247	313			247		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.3			2.2		
p0 queue free %	98	100	99	61	82	96	95			100		
cM capacity (veh/h)	274	362	734	348	352	775	1203			1330		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	12	166	59	309	313
Volume Left	6	135	0	62	0
Volume Right	6	0	28	0	30
cSH	399	349	476	1203	1700
Volume to Capacity	0.03	0.48	0.12	0.05	0.18
Queue Length 95th (ft)	2	61	11	4	0
Control Delay (s)	14.3	24.3	13.6	2.0	0.0
Lane LOS	B	C	B	A	
Approach Delay (s)	14.3	21.5		2.0	0.0
Approach LOS	B	C			

Intersection Summary				
Average Delay	6.6			
Intersection Capacity Utilization	50.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
74: Logan St & Purchase St

2030 No-Build Conditions - AM Peak Hour



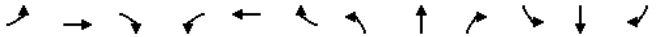
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	35	0	40	0	235	120	95	265	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.84	0.84	0.84	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	42	0	48	0	261	133	106	294	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	881	900	294	833	833	328	294			394		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	881	900	294	833	833	328	294			394		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.3	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.4	2.2			2.3		
p0 queue free %	100	100	100	84	100	93	100			91		
cM capacity (veh/h)	233	254	750	263	278	702	1279			1137		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	89	394	400
Volume Left	0	42	0	106
Volume Right	0	48	133	0
cSH	1700	395	1279	1137
Volume to Capacity	0.00	0.23	0.00	0.09
Queue Length 95th (ft)	0	21	0	8
Control Delay (s)	0.0	16.8	0.0	2.9
Lane LOS	A	C		A
Approach Delay (s)	0.0	16.8	0.0	2.9
Approach LOS	A	C		

Intersection Summary				
Average Delay	3.0			
Intersection Capacity Utilization	53.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
75: Logan St & North Front Street

2030 No-Build Conditions - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	140	15	15	5	5	15	5	135	5	55	200	65
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.69	0.69	0.69	0.78	0.78	0.78	0.93	0.93	0.93
Hourly flow rate (vph)	165	18	18	7	7	22	6	173	6	59	215	70
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											720	
pX, platoon unblocked												
vC, conflicting volume	583	561	250	584	592	176	285			179		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	583	561	250	584	592	176	285			179		
tC, single (s)	7.2	6.5	6.4	7.1	6.5	6.4	4.3			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.5	3.5	4.0	3.5	2.4			2.2		
p0 queue free %	57	96	98	98	98	97	99			96		
cM capacity (veh/h)	380	419	751	388	402	820	1196			1396		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	200	36	186	344
Volume Left	165	7	6	59
Volume Right	18	22	6	70
cSH	401	573	1196	1396
Volume to Capacity	0.50	0.06	0.01	0.04
Queue Length 95th (ft)	67	5	0	3
Control Delay (s)	22.6	11.7	0.3	1.6
Lane LOS	C	B	A	A
Approach Delay (s)	22.6	11.7	0.3	1.6
Approach LOS	C	B		

Intersection Summary				
Average Delay	7.3			
Intersection Capacity Utilization	51.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
77: Route 140 On/Off Ramps & Mt. Pleasant Street

2030 No-Build Conditions - AM Peak Hour

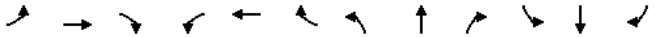
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	160	0	225	400	55	220
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.69	0.69	0.85	0.85	0.75	0.75
Hourly flow rate (vph)	232	0	265	471	73	293
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			877			
pX, platoon unblocked						
vC, conflicting volume	940	500			265	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	940	500			265	
tC, single (s)	6.5	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	12	100			94	
cM capacity (veh/h)	263	567			1299	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	232	735	367
Volume Left	232	0	73
Volume Right	0	471	0
cSH	263	1700	1299
Volume to Capacity	0.88	0.43	0.06
Queue Length 95th (ft)	190	0	4
Control Delay (s)	70.6	0.0	2.0
Lane LOS	F		A
Approach Delay (s)	70.6	0.0	2.0
Approach LOS	F		

Intersection Summary			
Average Delay	12.8		
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
126: Logan St & Acushnet Ave.

2030 No-Build Conditions - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	145	50	20	55	0	20	5	35	0	5	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.90	0.90	0.90	0.88	0.88	0.88	0.67	0.67	0.67
Hourly flow rate (vph)	19	181	62	22	61	0	23	6	40	0	7	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	109	98	7	232	78	26	7			45		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	109	98	7	232	78	26	7			45		
tC, single (s)	7.2	6.5	6.3	7.2	6.6	6.2	4.3			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.6	4.1	3.3	2.3			2.2		
p0 queue free %	98	77	94	96	92	100	99			100		
cM capacity (veh/h)	788	776	1063	538	792	1056	1526			1575		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	262	83	68	7
Volume Left	19	22	23	0
Volume Right	62	0	40	0
cSH	830	704	1526	1575
Volume to Capacity	0.32	0.12	0.01	0.00
Queue Length 95th (ft)	34	10	1	0
Control Delay (s)	11.3	10.8	2.5	0.0
Lane LOS	B	B	A	
Approach Delay (s)	11.3	10.8	2.5	0.0
Approach LOS	B	B		

Intersection Summary				
Average Delay	9.6			
Intersection Capacity Utilization	29.0%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
130: Herman Melville Boulevard & McArthur Drive

2030 No-Build Conditions - AM Peak Hour

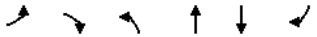
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	120	35	130	100	60	135
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.99	0.99	0.81	0.81
Hourly flow rate (vph)	128	37	131	101	74	167
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	497	182			232	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	497	182			232	
tC, single (s)	6.6	6.4			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.5			2.3	
p0 queue free %	73	95			94	
cM capacity (veh/h)	481	821			1290	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	165	232	241
Volume Left	128	0	74
Volume Right	37	101	0
cSH	531	1700	1290
Volume to Capacity	0.31	0.14	0.06
Queue Length 95th (ft)	33	0	5
Control Delay (s)	14.8	0.0	2.8
Lane LOS	B		A
Approach Delay (s)	14.8	0.0	2.8
Approach LOS	B		

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
136: Hillman St & Acushnet Ave.

2030 No-Build Conditions - AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	45	165	120	45	30	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.91	0.91	0.82	0.82
Hourly flow rate (vph)	53	194	132	49	37	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	365	52	67			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	365	52	67			
tC, single (s)	6.4	6.3	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.4			
p0 queue free %	91	81	91			
cM capacity (veh/h)	576	1005	1433			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	247	181	67
Volume Left	53	132	0
Volume Right	194	0	30
cSH	867	1433	1700
Volume to Capacity	0.29	0.09	0.04
Queue Length 95th (ft)	29	8	0
Control Delay (s)	10.8	5.8	0.0
Lane LOS	B	A	
Approach Delay (s)	10.8	5.8	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		7.5		
Intersection Capacity Utilization		35.0%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
147: Wamsutta St & Acushnet Ave.

2030 No-Build Conditions - AM Peak Hour

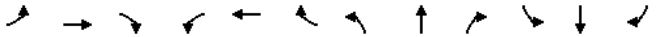
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	20	10	50	15	10	70
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.65	0.65	0.86	0.86	0.76	0.76
Hourly flow rate (vph)	31	15	58	17	13	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	185	67			58	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	185	67			58	
tC, single (s)	6.4	6.4			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.3	
p0 queue free %	96	98			99	
cM capacity (veh/h)	801	936			1502	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	46	76	105
Volume Left	31	0	13
Volume Right	15	17	0
cSH	842	1700	1502
Volume to Capacity	0.05	0.04	0.01
Queue Length 95th (ft)	4	0	1
Control Delay (s)	9.5	0.0	1.0
Lane LOS	A		A
Approach Delay (s)	9.5	0.0	1.0
Approach LOS	A		

Intersection Summary				
Average Delay		2.4		
Intersection Capacity Utilization		20.9%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
148: Wamsutta St & North Front St

2030 No-Build Conditions - AM Peak Hour



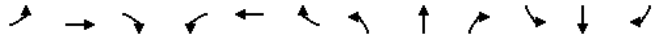
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	0	10	5	0	10	5	115	15	10	160	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.64	0.64	0.64	0.58	0.58	0.58	0.93	0.93	0.93	0.89	0.89	0.89
Hourly flow rate (vph)	23	0	16	9	0	17	5	124	16	11	180	28
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	376	367	194	374	373	132	208			140		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	376	367	194	374	373	132	208			140		
tC, single (s)	7.1	6.5	6.2	7.3	6.5	6.3	4.1			4.5		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.7	4.0	3.4	2.2			2.5		
p0 queue free %	96	100	98	98	100	98	100			99		
cM capacity (veh/h)	568	558	853	536	554	894	1375			1259		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	39	26	145	219
Volume Left	23	9	5	11
Volume Right	16	17	16	28
cSH	656	731	1375	1259
Volume to Capacity	0.06	0.04	0.00	0.01
Queue Length 95th (ft)	5	3	0	1
Control Delay (s)	10.8	10.1	0.3	0.5
Lane LOS	B	B	A	A
Approach Delay (s)	10.8	10.1	0.3	0.5
Approach LOS	B	B		

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	24.0%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
182: McArthur Blvd & McArthur Dr-Leonard's Wharf

2030 No-Build Conditions - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	185	50	5	5	25	20	35	30	5	25	10	205
Peak Hour Factor	0.88	0.88	0.88	0.72	0.72	0.72	0.64	0.64	0.64	0.90	0.90	0.90
Hourly flow rate (vph)	210	57	6	7	35	28	55	47	8	28	11	228

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	273	69	109	267
Volume Left (vph)	210	7	55	28
Volume Right (vph)	6	28	8	228
Hadj (s)	0.31	0.18	0.38	-0.19
Departure Headway (s)	5.3	5.5	5.6	4.9
Degree Utilization, x	0.40	0.11	0.17	0.36
Capacity (veh/h)	641	589	589	697
Control Delay (s)	11.8	9.2	9.8	10.6
Approach Delay (s)	11.8	9.2	9.8	10.6
Approach LOS	B	A	A	B

Intersection Summary				
Delay	10.8			
HCM Level of Service	B			
Intersection Capacity Utilization	41.2%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
184: McArthur Blvd & McArthur Dr

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	230	35	0	15	0	245	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.79	0.79	0.79	0.88	0.88	0.88	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	291	44	0	17	0	278	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	195	312	0	173	173	139	0			278		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	195	312	0	173	173	139	0			278		
tC, single (s)	7.1	6.5	6.2	7.2	7.1	6.2	4.4			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.5	3.3	2.5			2.2		
p0 queue free %	100	100	100	61	93	100	99			100		
cM capacity (veh/h)	720	599	1091	755	621	914	1463			1296		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	335	295	0
Volume Left	291	17	0
Volume Right	0	278	0
cSH	734	1463	1700
Volume to Capacity	0.46	0.01	0.00
Queue Length 95th (ft)	60	1	0
Control Delay (s)	14.0	0.5	0.0
Lane LOS	B	A	
Approach Delay (s)	14.0	0.5	0.0
Approach LOS	B		

Intersection Summary				
Average Delay	7.7			
Intersection Capacity Utilization	37.2%	ICU Level of Service	A	
Analysis Period (min)	15			

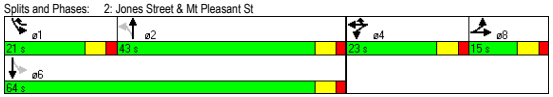
Lanes, Volumes, Timings
2: Jones Street & Mt Pleasant St

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	0	5	280	5	490	5	160	400	420	330	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	12	12	12	12	16	12	11	11	12
Storage Length (ft)	0		0	0		0	0		0	300		0
Storage Lanes	0		0	0		1	0		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1031			525			388			877	
Travel Time (s)		23.4			11.9			8.8			19.9	
Peak Hour Factor	0.54	0.54	0.54	0.97	0.97	0.97	0.94	0.94	0.94	0.80	0.80	0.80
Heavy Vehicles (%)	0%	0%	0%	2%	0%	3%	0%	2%	2%	1%	5%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	18	0	0	294	505	0	601	0	525	412	0
Turn Type	Split			Split		pt+ov	Perm			pm+pt		
Protected Phases	8	8		4	4	4 1		2		1	6	
Permitted Phases							2			6		
Detector Phase	8	8		4	4	4 1	2	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	13.0	13.0		13.0	13.0		27.0	27.0		19.0	22.0	
Total Split (s)	15.0	15.0	0.0	23.0	23.0	44.0	43.0	43.0	0.0	21.0	64.0	0.0
Total Split (%)	14.7%	14.7%	0.0%	22.5%	22.5%	43.1%	42.2%	42.2%	0.0%	20.6%	62.7%	0.0%
Maximum Green (s)	9.0	9.0		17.0	17.0		37.0	37.0		15.0	58.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		Min	Min		None	Min	
Walk Time (s)							5.0	5.0				
Flash Dont Walk (s)							16.0	16.0				
Pedestrian Calls (#/hr)							0	0				
v/c Ratio		0.10			0.76	0.51		0.88		1.21	0.41	
Control Delay		31.1			48.3	3.4		36.3		136.7	11.5	
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	
Total Delay		31.1			48.3	3.4		36.3		136.7	11.5	
Queue Length 50th (ft)		4			124	0		200		~232	86	
Queue Length 95th (ft)		14			#355	49		402		#479	170	
Internal Link Dist (ft)		951			445			308			797	
Turn Bay Length (ft)										300		
Base Capacity (vph)		233			385	995		969		434	1295	
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		0.08			0.76	0.51		0.62		1.21	0.32	

Intersection Summary	
Area Type:	Other
Cycle Length: 102	
Actuated Cycle Length: 80.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
~ 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.	

Splits and Phases: 2: Jones Street & Mt Pleasant St



HCM Signalized Intersection Capacity Analysis
2: Jones Street & Mt Pleasant St

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	0	5	280	5	490	5	160	400	420	330	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	16	12	11	11	12
Total Lost time (s)		6.0			6.0	6.0		6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Frt		0.93			1.00	0.85		0.90		1.00	1.00	
Flt Protected		0.98			0.95	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		1959			1776	1568		1909		1728	1749	
Flt Permitted		0.98			0.95	1.00		1.00		0.15	1.00	
Satd. Flow (perm)		1959			1776	1568		1902		267	1749	
Peak-hour factor, PHF	0.54	0.54	0.54	0.97	0.97	0.97	0.94	0.94	0.94	0.80	0.80	0.80
Adj. Flow (vph)	9	0	9	289	5	505	5	170	426	525	412	0
RTOR Reduction (vph)	0	9	0	0	0	308	0	95	0	0	0	0
Lane Group Flow (vph)	0	9	0	0	294	197	0	506	0	525	412	0
Heavy Vehicles (%)	0%	0%	0%	2%	0%	3%	0%	2%	2%	1%	5%	0%
Turn Type	Split			Split		pt+ov	Perm			pm+pt		
Protected Phases	8	8		4	4	4 1		2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		2.3			17.5	33.0		25.2		46.7	46.7	
Effective Green, g (s)		2.3			17.5	33.0		25.2		46.7	46.7	
Actuated g/C Ratio		0.03			0.21	0.39		0.30		0.55	0.55	
Clearance Time (s)		6.0			6.0			6.0		6.0	6.0	
Vehicle Extension (s)		2.0			2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		53			368	612		567		416	967	
v/s Ratio Prot		c0.00			c0.17	0.13				c0.23	0.24	
v/s Ratio Perm								0.27		c0.47		
v/c Ratio		0.17			0.80	0.32		0.89		1.26	0.43	
Uniform Delay, d1		40.2			31.8	18.0		28.4		23.0	11.1	
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2		0.6			10.8	0.1		15.9		136.0	0.1	
Delay (s)		40.7			42.6	18.1		44.3		159.0	11.2	
Level of Service		D			D	B		D		F	B	
Approach Delay (s)		40.7			27.1			44.3			94.0	
Approach LOS		D			C			D			F	

Intersection Summary					
HCM Average Control Delay	58.2	HCM Level of Service		E	
HCM Volume to Capacity ratio	1.05				
Actuated Cycle Length (s)	84.5	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	94.0%	ICU Level of Service		F	
Analysis Period (min)	15				
c Critical Lane Group					

Lanes, Volumes, Timings
14: Kings Highway & Church Street

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	525	5	35	455	70	230	210	80	70	275	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	12	11	11	12	11	11	11	11	11	12
Storage Length (ft)	50		0	0		0	0		0	0		145
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		305			1116			176			552	
Travel Time (s)		6.9			25.4			4.0			12.5	
Peak Hour Factor	0.92	0.92	0.92	0.91	0.91	0.91	0.86	0.86	0.86	0.89	0.89	0.89
Heavy Vehicles (%)	3%	1%	0%	7%	2%	0%	1%	2%	4%	1%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	125	576	0	38	577	0	267	337	0	0	388	135
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Minimum Split (s)	35.0	35.0		35.0	35.0		21.0	21.0		21.0	21.0	21.0
Total Split (s)	35.0	35.0	0.0	35.0	35.0	0.0	24.0	24.0	0.0	24.0	24.0	24.0
Total Split (%)	59.3%	59.3%	0.0%	59.3%	59.3%	0.0%	40.7%	40.7%	0.0%	40.7%	40.7%	40.7%
Maximum Green (s)	30.0	30.0		30.0	30.0		19.0	19.0		19.0	19.0	19.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
v/c Ratio	0.45	0.62		0.14	0.64		1.25	0.61			0.89	0.26
Control Delay	15.8	14.2		9.3	14.7		171.6	22.5			45.2	16.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	15.8	14.2		9.3	14.7		171.6	22.5			45.2	16.5
Queue Length 50th (ft)	26	135		7	137		~123	99			128	35
Queue Length 95th (ft)	69	227		21	232		#232	163			#269	71
Internal Link Dist (ft)		225			1036			96			472	
Turn Bay Length (ft)	50											145
Base Capacity (vph)	278	924		279	899		213	553			437	515
Starvation Cap Reductn	0	0		0	0		0	0			0	0
Spillback Cap Reductn	0	0		0	0		0	0			0	0
Storage Cap Reductn	0	0		0	0		0	0			0	0
Reduced v/c Ratio	0.45	0.62		0.14	0.64		1.25	0.61			0.89	0.26

Intersection Summary

Area Type: Other
Cycle Length: 59
Actuated Cycle Length: 59
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green
Natural Cycle: 65
Control Type: Pretimed
~ 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.

Splits and Phases: 14: Kings Highway & Church Street

HCM Signalized Intersection Capacity Analysis
14: Kings Highway & Church Street

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	525	5	35	455	70	230	210	80	70	275	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	12	11	11	12	11	11	11	11	11	12
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)	1636	1816		1631	1769		1728	1717			1786	1599
Flt Permitted	0.32	1.00		0.32	1.00		0.36	1.00			0.75	1.00
Satd. Flow (perm)	547	1816		547	1769		663	1717			1357	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.91	0.91	0.91	0.86	0.86	0.86	0.89	0.89	0.89
Adj. Flow (vph)	125	571	5	38	500	77	267	244	93	79	309	135
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	125	576	0	38	577	0	267	337	0	0	388	135
Heavy Vehicles (%)	3%	1%	0%	7%	2%	0%	1%	2%	4%	1%	2%	1%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Actuated Green, G (s)	30.0	30.0		30.0	30.0		19.0	19.0			19.0	19.0
Effective Green, g (s)	30.0	30.0		30.0	30.0		19.0	19.0			19.0	19.0
Actuated g/C Ratio	0.51	0.51		0.51	0.51		0.32	0.32			0.32	0.32
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lane Grp Cap (vph)	278	923		278	899		214	553			437	515
v/s Ratio Prot		0.32			c0.33			0.20				
v/s Ratio Perm	0.23			0.07			c0.40				0.29	0.08
v/c Ratio	0.45	0.62		0.14	0.64		1.25	0.61			0.89	0.26
Uniform Delay, d1	9.2	10.4		7.7	10.6		20.0	16.9			19.0	14.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	5.2	3.2		1.0	3.5		144.2	4.9			22.5	1.2
Delay (s)	14.4	13.6		8.7	14.1		164.2	21.8			41.5	16.0
Level of Service	B	B		A	B		F	C			D	B
Approach Delay (s)		13.8			13.8			84.8			35.0	
Approach LOS		B			B			F			C	

Intersection Summary

HCM Average Control Delay	35.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	104.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
19: Wood Street & Route 18

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	15	155	10	45	105	35	15	385	50	115	530	15	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	14	16	16	14	16	11	11	16	11	11	16	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		197			310			393			488		
Travel Time (s)		4.5			7.0			8.9			11.1		
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.83	0.83	0.83	0.86	0.86	0.86	
Heavy Vehicles (%)	0%	1%	0%	0%	3%	0%	0%	3%	2%	1%	2%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	195	0	0	210	0	18	524	0	134	633	0	
Turn Type	Perm			Perm			Perm			Perm			
Protected Phases		3			3			1			1		2
Permitted Phases	3			3			1			1			
Detector Phase	3	3		3	3		1	1		1	1		
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0		15.0
Minimum Split (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0		21.0
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	21.0
Total Split (%)	37.0%	37.0%	0.0%	37.0%	37.0%	0.0%	37.0%	37.0%	0.0%	37.0%	37.0%	0.0%	26%
Maximum Green (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0		15.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	
Lead/Lag							Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		5.0
Recall Mode	None	None		None	None		None	None		None	None		None
Walk Time (s)													7.0
Flash Dont Walk (s)													4.0
Pedestrian Calls (#/hr)													8
v/c Ratio		0.41			0.48		0.08	0.60		0.45	0.71		
Control Delay		20.1			20.8		13.7	17.2		20.9	20.3		
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0		
Total Delay		20.1			20.8		13.7	17.2		20.9	20.3		
Queue Length 50th (ft)		43			44		2	78		18	104		
Queue Length 95th (ft)		130			134		20	#364		#131	#506		
Internal Link Dist (ft)		117			230			313			408		
Turn Bay Length (ft)													
Base Capacity (vph)		960			860		212	878		300	895		
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		0.20			0.24		0.08	0.60		0.45	0.71		

Intersection Summary	
Area Type:	Other
Cycle Length: 81	
Actuated Cycle Length: 52.4	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 19: Wood Street & Route 18

HCM Signalized Intersection Capacity Analysis
19: Wood Street & Route 18

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	155	10	45	105	35	15	385	50	115	530	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	14	16	16	14	16	11	11	16	11	11	16
Total Lost time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.97		1.00	0.98		1.00	1.00	
Flt Protected		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1986			1918		1745	1754		1728	1794	
Flt Permitted		0.97			0.88		0.23	1.00		0.33	1.00	
Satd. Flow (perm)		1925			1713		427	1754		601	1794	
Peak-hour factor, PHF	0.92	0.92	0.92	0.88	0.88	0.88	0.83	0.83	0.83	0.86	0.86	0.86
Adj. Flow (vph)	16	168	11	51	119	40	18	464	60	134	616	17
RTOR Reduction (vph)	0	3	0	0	12	0	0	4	0	0	1	0
Lane Group Flow (vph)	0	192	0	0	198	0	18	520	0	134	632	0
Heavy Vehicles (%)	0%	1%	0%	0%	3%	0%	0%	3%	2%	1%	2%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Actuated Green, G (s)		13.0			13.0		26.1	26.1		26.1	26.1	
Effective Green, g (s)		13.0			13.0		26.1	26.1		26.1	26.1	
Actuated g/C Ratio		0.23			0.23		0.46	0.46		0.46	0.46	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		438			390		195	802		275	820	
v/s Ratio Prot								0.30			c0.35	
v/s Ratio Perm		0.10			c0.12		0.04			0.22		
v/c Ratio		0.44			0.51		0.09	0.65		0.49	0.77	
Uniform Delay, d1		18.9			19.3		8.8	12.0		10.8	13.0	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.0			1.4		0.3	2.0		1.9	4.8	
Delay (s)		19.9			20.7		9.1	14.0		12.7	17.8	
Level of Service		B			C		A	B		B	B	
Approach Delay (s)		19.9			20.7			13.8			16.9	
Approach LOS		B			C			B			B	

Intersection Summary					
HCM Average Control Delay	16.7	HCM Level of Service		B	
HCM Volume to Capacity ratio	0.68				
Actuated Cycle Length (s)	57.1	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	70.7%	ICU Level of Service		C	
Analysis Period (min)	15				
c Critical Lane Group					

Lanes, Volumes, Timings
24: Nash Road & Church Street

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	415	80	40	275	55	60	165	30	75	245	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	14	16	16	16	16
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1761			1229			1754			2421	
Travel Time (s)		40.0			27.9			39.9			55.0	
Peak Hour Factor	0.84	0.84	0.84	0.91	0.91	0.91	0.89	0.89	0.89	0.86	0.86	0.86
Heavy Vehicles (%)	1%	3%	1%	3%	3%	0%	0%	3%	3%	0%	4%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	726	0	0	406	0	0	286	0	0	546	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Minimum Split (s)	36.0	36.0		36.0	36.0		29.0	29.0		29.0	29.0	
Total Split (s)	36.0	36.0	0.0	36.0	36.0	0.0	29.0	29.0	0.0	29.0	29.0	0.0
Total Split (%)	55.4%	55.4%	0.0%	55.4%	55.4%	0.0%	44.6%	44.6%	0.0%	44.6%	44.6%	0.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
v/c Ratio		0.92			0.48			0.61			0.92	
Control Delay		36.8			14.5			24.7			44.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		36.8			14.5			24.7			44.6	
Queue Length 50th (ft)		254			105			93			203	
Queue Length 95th (ft)		#418			175			166			#354	
Internal Link Dist (ft)		1681			1149			1674			2341	
Turn Bay Length (ft)												
Base Capacity (vph)		788			845			467			596	
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		0.92			0.48			0.61			0.92	

Intersection Summary	
Area Type:	Other
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 18 (28%), Referenced to phase 2: and 6:, Start of Green	
Natural Cycle: 80	
Control Type: Pretimed	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 24: Nash Road & Church Street

HCM Signalized Intersection Capacity Analysis
24: Nash Road & Church Street

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	415	80	40	275	55	60	165	30	75	245	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	16	14	16	16	16	16
Total Lost time (s)		6.0			6.0			7.0			7.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			0.98			0.98			0.96	
Flt Protected		0.99			0.99			0.99			0.99	
Satd. Flow (prot)		2047			2047			1927			1984	
Flt Permitted		0.83			0.89			0.71			0.88	
Satd. Flow (perm)		1708			1831			1380			1763	
Peak-hour factor, PHF	0.84	0.84	0.84	0.91	0.91	0.91	0.89	0.89	0.89	0.86	0.86	0.86
Adj. Flow (vph)	137	494	95	44	302	60	67	185	34	87	285	174
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	726	0	0	406	0	0	286	0	0	546	0
Heavy Vehicles (%)	1%	3%	1%	3%	3%	0%	0%	3%	3%	0%	4%	3%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Actuated Green, G (s)		30.0			30.0			22.0			22.0	
Effective Green, g (s)		30.0			30.0			22.0			22.0	
Actuated g/C Ratio		0.46			0.46			0.34			0.34	
Clearance Time (s)		6.0			6.0			7.0			7.0	
Lane Grp Cap (vph)		788			845			467			597	
v/s Ratio Prot												
v/s Ratio Perm		c0.43			0.22			0.21			c0.31	
v/c Ratio		0.92			0.48			0.61			0.91	
Uniform Delay, d1		16.4			12.1			17.9			20.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		17.8			2.0			5.9			20.9	
Delay (s)		34.2			14.1			23.8			41.5	
Level of Service		C			B			C			D	
Approach Delay (s)		34.2			14.1			23.8			41.5	
Approach LOS		C			B			C			D	

Intersection Summary					
HCM Average Control Delay	30.6	HCM Level of Service	C		
HCM Volume to Capacity ratio	0.92				
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	13.0		
Intersection Capacity Utilization	96.1%	ICU Level of Service	F		
Analysis Period (min)	15				
c Critical Lane Group					

Lanes, Volumes, Timings
28: Coggeshall Street & Route 18 SB

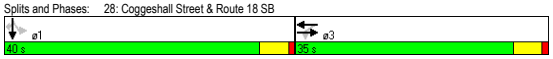
2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	215	95	170	230	0	0	0	0	105	630	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	15	12	12	12	12	12	10	10
Storage Length (ft)	0		0	0		0	0		0	0		130
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			No			No			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		686			474			1008			501	
Travel Time (s)		15.6			10.8			22.9			11.4	
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.92	0.92	0.92	0.96	0.96	0.96
Heavy Vehicles (%)	0%	3%	4%	1%	1%	0%	0%	0%	0%	6%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	337	0	0	465	0	0	0	0	0	765	47
Turn Type				Perm						Perm		Perm
Protected Phases		3			3						1	
Permitted Phases				3						1		1
Minimum Split (s)		35.0		35.0	35.0					40.0	40.0	40.0
Total Split (s)	0.0	35.0	0.0	35.0	35.0	0.0	0.0	0.0	0.0	40.0	40.0	40.0
Total Split (%)	0.0%	46.7%	0.0%	46.7%	46.7%	0.0%	0.0%	0.0%	0.0%	53.3%	53.3%	53.3%
Maximum Green (s)		30.0		30.0	30.0					35.0	35.0	35.0
Yellow Time (s)		4.0		4.0	4.0					4.0	4.0	4.0
All-Red Time (s)		1.0		1.0	1.0					1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	4.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
v/c Ratio		0.46			0.96						0.50	0.06
Control Delay		17.3			57.8						15.4	4.0
Queue Delay		0.0			0.0						0.0	0.0
Total Delay		17.3			57.8						15.4	4.0
Queue Length 50th (ft)		99			205						124	0
Queue Length 95th (ft)		169			#365						172	16
Internal Link Dist (ft)		606			394			928			421	
Turn Bay Length (ft)												130
Base Capacity (vph)		727			483						1522	728
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		0.46			0.96						0.50	0.06

Intersection Summary

Area Type: Other
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 0 (0%), Referenced to phase 2: and 6:, Start of Green
Natural Cycle: 75
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 28: Coggeshall Street & Route 18 SB



HCM Signalized Intersection Capacity Analysis
28: Coggeshall Street & Route 18 SB

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	215	95	170	230	0	0	0	0	105	630	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	15	12	12	12	12	12	10	10
Total Lost time (s)		5.0			5.0						5.0	5.0
Lane Util. Factor		1.00			1.00						0.95	1.00
Frt		0.96			1.00						1.00	0.85
Flt Protected		1.00			0.98						0.99	1.00
Satd. Flow (prot)		1763			2026						3262	1507
Flt Permitted		1.00			0.58						0.99	1.00
Satd. Flow (perm)		1763			1209						3262	1507
Peak-hour factor, PHF	0.92	0.92	0.92	0.86	0.86	0.86	0.92	0.92	0.92	0.96	0.96	0.96
Adj. Flow (vph)	0	234	103	198	267	0	0	0	0	109	656	47
RTOR Reduction (vph)	0	21	0	0	0	0	0	0	0	0	0	25
Lane Group Flow (vph)	0	316	0	0	465	0	0	0	0	0	765	22
Heavy Vehicles (%)	0%	3%	4%	1%	1%	0%	0%	0%	0%	6%	2%	0%
Turn Type				Perm						Perm		Perm
Protected Phases		3			3						1	
Permitted Phases				3						1		1
Actuated Green, G (s)		30.0			30.0						35.0	35.0
Effective Green, g (s)		30.0			30.0						35.0	35.0
Actuated g/C Ratio		0.40			0.40						0.47	0.47
Clearance Time (s)		5.0			5.0						5.0	5.0
Lane Grp Cap (vph)		705			484						1522	703
v/s Ratio Prot		0.18										
v/s Ratio Perm					c0.38						0.23	0.01
v/c Ratio		0.45			0.96						0.50	0.03
Uniform Delay, d1		16.4			21.9						13.9	10.8
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		2.1			32.2						1.2	0.1
Delay (s)		18.5			54.2						15.1	10.9
Level of Service		B			D						B	B
Approach Delay (s)		18.5			54.2			0.0			14.9	
Approach LOS		B			D			A			B	

Intersection Summary

HCM Average Control Delay	27.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

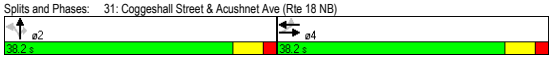
Lanes, Volumes, Timings
31: Coggeshall Street & Acushnet Ave (Rte 18 NB)

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	270	0	0	280	85	120	465	290	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	15	12	12	11	11	12	12	12
Storage Length (ft)	0		0	0		0	0		160	0		0
Storage Lanes	0		0	0		0	1		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		474			546			1002			363	
Travel Time (s)		10.8			12.4			22.8			8.3	
Peak Hour Factor	0.93	0.93	0.93	0.94	0.94	0.94	0.93	0.93	0.93	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	0%	0%	1%	1%	0%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	338	0	0	388	0	129	500	312	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			4			2				
Permitted Phases	4						2		2			
Minimum Split (s)	38.2	38.2			38.2		38.2	38.2	38.2			
Total Split (s)	38.2	38.2	0.0	0.0	38.2	0.0	38.2	38.2	38.2	0.0	0.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	0.0%	50.0%	0.0%	50.0%	50.0%	50.0%	0.0%	0.0%	0.0%
Maximum Green (s)	32.0	32.0			32.0		32.0	32.0	32.0			
Yellow Time (s)	4.2	4.2			4.2		4.2	4.2	4.2			
All-Red Time (s)	2.0	2.0			2.0		2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	4.0	4.0	6.2	4.0	6.2	6.2	6.2	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
v/c Ratio		0.44			0.45		0.17	0.66	0.38			
Control Delay		18.2			17.0		14.7	23.1	3.4			
Queue Delay		0.0			0.0		0.0	0.0	0.0			
Total Delay		18.2			17.0		14.7	23.1	3.4			
Queue Length 50th (ft)		111			119		37	185	0			
Queue Length 95th (ft)		179			192		71	289	44			
Internal Link Dist (ft)		394			466			922			283	
Turn Bay Length (ft)									160			
Base Capacity (vph)		763			854		756	754	823			
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			0.45		0.17	0.66	0.38			

Intersection Summary	
Area Type:	Other
Cycle Length: 76.4	
Actuated Cycle Length: 76.4	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:, Start of Green	
Natural Cycle: 80	
Control Type: Pretimed	

Splits and Phases: 31: Coggeshall Street & Acushnet Ave (Rte 18 NB)



HCM Signalized Intersection Capacity Analysis
31: Coggeshall Street & Acushnet Ave (Rte 18 NB)

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	270	0	0	280	85	120	465	290	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	12	12	15	12	12	11	11	12	12	12
Total Lost time (s)		6.2			6.2		6.2	6.2	6.2			
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00			
Frt		1.00			0.97		1.00	1.00	0.85			
Flt Protected		0.99			1.00		0.95	1.00	1.00			
Satd. Flow (prot)		2012			2005		1805	1801	1531			
Flt Permitted		0.90			1.00		0.95	1.00	1.00			
Satd. Flow (perm)		1821			2005		1805	1801	1531			
Peak-hour factor, PHF	0.93	0.93	0.93	0.94	0.94	0.94	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	48	290	0	0	298	90	129	500	312	0	0	0
RTOR Reduction (vph)	0	0	0	0	14	0	0	0	181	0	0	0
Lane Group Flow (vph)	0	338	0	0	374	0	129	500	131	0	0	0
Heavy Vehicles (%)	4%	3%	0%	0%	1%	1%	0%	2%	2%	0%	0%	0%
Turn Type	Perm						Perm		Perm			
Protected Phases		4			4			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		32.0			32.0		32.0	32.0	32.0			
Effective Green, g (s)		32.0			32.0		32.0	32.0	32.0			
Actuated g/C Ratio		0.42			0.42		0.42	0.42	0.42			
Clearance Time (s)		6.2			6.2		6.2	6.2	6.2			
Lane Grp Cap (vph)		763			840		756	754	641			
v/s Ratio Prot					c0.19			c0.28				
v/s Ratio Perm		0.19					0.07		0.09			
v/c Ratio		0.44			0.45		0.17	0.66	0.20			
Uniform Delay, d1		15.8			15.9		13.9	17.9	14.1			
Progression Factor		1.00			1.00		1.00	1.00	1.00			
Incremental Delay, d2		1.9			1.7		0.5	4.6	0.7			
Delay (s)		17.7			17.6		14.4	22.4	14.8			
Level of Service		B			B		B	C	B			
Approach Delay (s)		17.7			17.6			18.8			0.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	76.4	Sum of lost time (s)	12.4
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

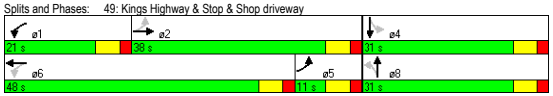
Lanes, Volumes, Timings
49: Kings Highway & Stop & Shop driveway

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	730	115	165	440	50	90	45	230	160	25	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		515			218			360			359	
Travel Time (s)		11.7			5.0			8.2			8.2	
Peak Hour Factor	0.93	0.93	0.93	0.95	0.95	0.95	0.85	0.85	0.85	0.89	0.89	0.89
Heavy Vehicles (%)	1%	1%	0%	1%	1%	0%	2%	0%	0%	1%	0%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1092	0	0	690	0	0	430	0	0	399	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.0	13.0		11.0	13.0		13.0	13.0		19.0	19.0	
Total Split (s)	11.0	38.0	0.0	21.0	48.0	0.0	31.0	31.0	0.0	31.0	31.0	0.0
Total Split (%)	12.2%	42.2%	0.0%	23.3%	53.3%	0.0%	34.4%	34.4%	0.0%	34.4%	34.4%	0.0%
Maximum Green (s)	5.0	32.0		15.0	42.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)										5.0	5.0	
Flash Dont Walk (s)										8.0	8.0	
Pedestrian Calls (#/hr)										0	0	
v/c Ratio		0.74			0.60			0.60			0.67	
Control Delay		13.6			10.9			11.4			16.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		13.6			10.9			11.4			16.3	
Queue Length 50th (ft)		113			61			23			31	
Queue Length 95th (ft)		#258			148			52			70	
Internal Link Dist (ft)		435			138			280			279	
Turn Bay Length (ft)												
Base Capacity (vph)		1467			1482			1274			1114	
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		0.74			0.47			0.34			0.36	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 55.8	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 49: Kings Highway & Stop & Shop driveway



HCM Signalized Intersection Capacity Analysis
49: Kings Highway & Stop & Shop driveway

2030 No-Build Conditions - PM Peak Hour

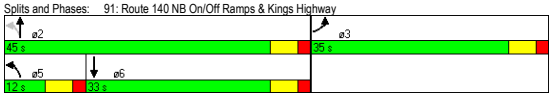
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	730	115	165	440	50	90	45	230	160	25	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frt		0.98			0.99			0.91			0.93	
Flt Protected		0.99			0.99			0.99			0.98	
Satd. Flow (prot)		3488			3492			3213			3247	
Flt Permitted		0.71			0.55			0.77			0.67	
Satd. Flow (perm)		2494			1953			2495			2238	
Peak-hour factor, PHF	0.93	0.93	0.93	0.95	0.95	0.95	0.85	0.85	0.85	0.89	0.89	0.89
Adj. Flow (vph)	183	785	124	174	463	53	106	53	271	180	28	191
RTOR Reduction (vph)	0	7	0	0	5	0	0	217	0	0	153	0
Lane Group Flow (vph)	0	1085	0	0	685	0	0	213	0	0	246	0
Heavy Vehicles (%)	1%	1%	0%	1%	1%	0%	2%	0%	0%	1%	0%	1%
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		32.7			32.7			11.1			11.1	
Effective Green, g (s)		32.7			32.7			11.1			11.1	
Actuated g/C Ratio		0.59			0.59			0.20			0.20	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		1462			1145			496			445	
v/s Ratio Prot												
v/s Ratio Perm		c0.44			0.35			0.09			c0.11	
v/c Ratio		0.74			0.60			0.43			0.55	
Uniform Delay, d1		8.5			7.4			19.6			20.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.8			0.6			0.2			0.8	
Delay (s)		10.3			7.9			19.8			21.0	
Level of Service		B			A			B			C	
Approach Delay (s)		10.3			7.9			19.8			21.0	
Approach LOS		B			A			B			C	

Intersection Summary					
HCM Average Control Delay		12.9	HCM Level of Service		B
HCM Volume to Capacity ratio		0.69			
Actuated Cycle Length (s)		55.8	Sum of lost time (s)		12.0
Intersection Capacity Utilization		89.4%	ICU Level of Service		E
Analysis Period (min)		15			
c Critical Lane Group					

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	485	160	150	530	605	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	12	12	16
Storage Length (ft)	0	100	0			100
Storage Lanes	1	0	0			0
Taper Length (ft)	25	25	25			25
Right Turn on Red		No				No
Link Speed (mph)	30			30	30	
Link Distance (ft)	268			574	515	
Travel Time (s)	6.1			13.0	11.7	
Peak Hour Factor	0.92	0.92	0.83	0.83	0.79	0.79
Heavy Vehicles (%)	2%	0%	3%	1%	2%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	701	0	0	820	886	0
Turn Type			pm+pt			
Protected Phases	3		5	2	6	
Permitted Phases			2			
Detector Phase	3		5	2	6	
Switch Phase						
Minimum Initial (s)	7.0		5.0	7.0	7.0	
Minimum Split (s)	13.0		11.0	13.0	13.0	
Total Split (s)	35.0	0.0	12.0	45.0	33.0	0.0
Total Split (%)	43.8%	0.0%	15.0%	56.3%	41.3%	0.0%
Maximum Green (s)	29.0		6.0	39.0	27.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	4.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	2.0		2.0	2.0	2.0	
Recall Mode	None		None	Min	Min	
v/c Ratio	0.94			0.86	0.55	
Control Delay	47.2			29.4	16.1	
Queue Delay	0.0			0.0	0.0	
Total Delay	47.2			29.4	16.1	
Queue Length 50th (ft)	340			175	152	
Queue Length 95th (ft)	#566			223	170	
Internal Link Dist (ft)	188			494	435	
Turn Bay Length (ft)						
Base Capacity (vph)	765			1068	1622	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.92			0.77	0.55	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 75.5	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 91: Route 140 NB On/Off Ramps & Kings Highway



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	485	160	150	530	605	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	12	12	16
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			0.95	0.95	
Frt	0.97			1.00	0.98	
Flt Protected	0.96			0.99	1.00	
Satd. Flow (prot)	1976			3520	3454	
Flt Permitted	0.96			0.58	1.00	
Satd. Flow (perm)	1976			2049	3454	
Peak-hour factor, PHF	0.92	0.92	0.83	0.83	0.79	0.79
Adj. Flow (vph)	527	174	181	639	766	120
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	701	0	0	820	886	0
Heavy Vehicles (%)	2%	0%	3%	1%	2%	5%
Turn Type			pm+pt			
Protected Phases	3		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	28.5			34.9	34.9	
Effective Green, g (s)	28.5			34.9	34.9	
Actuated g/C Ratio	0.38			0.46	0.46	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	2.0			2.0	2.0	
Lane Grp Cap (vph)	747			948	1599	
v/s Ratio Prot	c0.35				0.26	
v/s Ratio Perm				c0.40		
v/c Ratio	0.94			0.86	0.55	
Uniform Delay, d1	22.6			18.1	14.6	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	19.0			8.0	0.2	
Delay (s)	41.6			26.2	14.9	
Level of Service	D			C	B	
Approach Delay (s)	41.6			26.2	14.9	
Approach LOS	D			C	B	

Intersection Summary			
HCM Average Control Delay	26.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	75.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

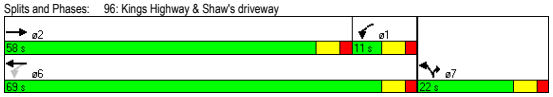
Lanes, Volumes, Timings
96: Kings Highway & Shaw's driveway

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	585	235	145	620	155	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	525			574	347	
Travel Time (s)	11.9			13.0	7.9	
Peak Hour Factor	0.91	0.91	0.96	0.96	0.89	0.89
Heavy Vehicles (%)	2%	0%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	901	0	0	797	174	107
Turn Type			pm+pt			Prot
Protected Phases	2		1	6	7	7
Permitted Phases			6			
Detector Phase	2		1	6	7	7
Switch Phase						
Minimum Initial (s)	7.0		5.0	7.0	7.0	7.0
Minimum Split (s)	13.0		11.0	13.0	13.0	13.0
Total Split (s)	58.0	0.0	11.0	69.0	22.0	22.0
Total Split (%)	63.7%	0.0%	12.1%	75.8%	24.2%	24.2%
Maximum Green (s)	52.0		5.0	63.0	16.0	16.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	2.0		2.0	2.0	2.0	2.0
Recall Mode	Min		None	Min	None	None
v/c Ratio	0.48			0.66	0.49	0.27
Control Delay	6.9			11.0	22.2	6.7
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	6.9			11.0	22.2	6.7
Queue Length 50th (ft)	53			64	36	0
Queue Length 95th (ft)	106			134	101	31
Internal Link Dist (ft)	445			494	267	
Turn Bay Length (ft)						
Base Capacity (vph)	3337			2277	648	648
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	0.27			0.35	0.27	0.17

Intersection Summary	
Area Type:	Other
Cycle Length: 91	
Actuated Cycle Length: 45.3	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 96: Kings Highway & Shaw's driveway



HCM Signalized Intersection Capacity Analysis
96: Kings Highway & Shaw's driveway

2030 No-Build Conditions - PM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	585	235	145	620	155	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12
Total Lost time (s)	6.0			6.0	6.0	6.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	0.96			1.00	1.00	0.85
Flt Protected	1.00			0.99	0.95	1.00
Satd. Flow (prot)	3406			3541	1787	1599
Flt Permitted	1.00			0.64	0.95	1.00
Satd. Flow (perm)	3406			2276	1787	1599
Peak-hour factor, PHF	0.91	0.91	0.96	0.96	0.89	0.89
Adj. Flow (vph)	643	258	151	646	174	107
RTOR Reduction (vph)	51	0	0	0	0	86
Lane Group Flow (vph)	850	0	0	797	174	21
Heavy Vehicles (%)	2%	0%	1%	1%	1%	1%
Turn Type			pm+pt			Prot
Protected Phases	2		1	6	7	7
Permitted Phases			6			
Actuated Green, G (s)	24.1			24.1	8.9	8.9
Effective Green, g (s)	24.1			24.1	8.9	8.9
Actuated g/C Ratio	0.54			0.54	0.20	0.20
Clearance Time (s)	6.0			6.0	6.0	6.0
Vehicle Extension (s)	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	1824			1219	353	316
v/s Ratio Prot	0.25				c0.10	0.01
v/s Ratio Perm				c0.35		
v/c Ratio	0.47			0.65	0.49	0.07
Uniform Delay, d1	6.5			7.5	16.0	14.7
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.1			1.0	0.4	0.0
Delay (s)	6.5			8.4	16.4	14.7
Level of Service	A			A	B	B
Approach Delay (s)	6.5			8.4	15.8	
Approach LOS	A			A	B	

Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

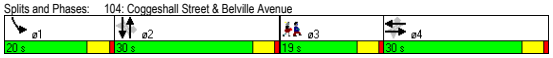
Lanes, Volumes, Timings
104: Coggeshall Street & Belville Avenue

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations													
Volume (vph)	115	275	75	75	235	265	30	235	330	290	180	145	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	11	16	16	10	10	16	12	14	16	11	16	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		443			1111			850			178		
Travel Time (s)		10.1			25.3			19.3			4.0		
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.90	0.90	0.90	0.92	0.92	0.92	
Heavy Vehicles (%)	1%	3%	6%	1%	1%	4%	3%	4%	1%	3%	3%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	506	0	0	330	282	0	294	367	0	669	0	
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt			
Protected Phases		4			4			2		1	2		3
Permitted Phases	4			4		4	2		2	2			
Detector Phase	4	4		4	4	4	2	2	2	1	2		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0		6.0
Minimum Split (s)	13.0	13.0		13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0		19.0
Total Split (s)	30.0	30.0	0.0	30.0	30.0	30.0	30.0	30.0	30.0	20.0	30.0	0.0	19.0
Total Split (%)	30.3%	30.3%	0.0%	30.3%	30.3%	30.3%	30.3%	30.3%	30.3%	20.2%	30.3%	0.0%	19%
Maximum Green (s)	25.0	25.0		25.0	25.0	25.0	25.0	25.0	25.0	15.0	25.0		14.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	
Lead/Lag	Lag	Lag		Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lag		Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		0.2
Recall Mode	Max	Max		Max	Max	Max	None	None	None	None	None		None
Walk Time (s)													6.0
Flash Dont Walk (s)													8.0
Pedestrian Calls (#/hr)													7
v/c Ratio		0.52			0.59	0.37		0.47	0.42		0.76		
Control Delay		17.6			22.9	4.2		19.0	3.8		24.4		
Queue Delay		0.0			0.0	0.0		0.0	0.0		0.0		
Total Delay		17.6			22.9	4.2		19.0	3.8		24.4		
Queue Length 50th (ft)		64			87	0		72	0		93		
Queue Length 95th (ft)		161			#272	51		199	57		#264		
Internal Link Dist (ft)		363			1031			770			98		
Turn Bay Length (ft)													
Base Capacity (vph)		966			557	753		655	908		914		
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		0.52			0.59	0.37		0.45	0.40		0.73		

Intersection Summary	
Area Type:	Other
Cycle Length: 99	
Actuated Cycle Length: 62.8	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 104: Coggeshall Street & Belville Avenue



HCM Signalized Intersection Capacity Analysis
104: Coggeshall Street & Belville Avenue

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	275	75	75	235	265	30	235	330	290	180	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	11	16	16	10	10	16	12	14	16	11	16
Total Lost time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Lane Util. Factor		0.95			1.00	1.00		1.00	1.00		0.95	
Frt		0.98			1.00	0.85		1.00	0.85		0.96	
Flt Protected		0.99			0.99	1.00		0.99	1.00		0.98	
Satd. Flow (prot)		3266			1735	1449		1819	1706		3215	
Flt Permitted		0.71			0.78	1.00		0.89	1.00		0.67	
Satd. Flow (perm)		2356			1376	1449		1621	1706		2189	
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.90	0.90	0.90	0.92	0.92	0.92
Adj. Flow (vph)	125	299	82	80	250	282	33	261	367	315	196	158
RTOR Reduction (vph)	0	14	0	0	0	175	0	0	234	0	32	0
Lane Group Flow (vph)	0	492	0	0	330	107	0	294	133	0	637	0
Heavy Vehicles (%)	1%	3%	6%	1%	1%	4%	3%	4%	1%	3%	3%	0%
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt		
Protected Phases		4			4			2		1	2	
Permitted Phases	4			4		4	2		2	2		
Actuated Green, G (s)		25.4			25.4	25.4		24.2	24.2		24.2	
Effective Green, g (s)		25.4			25.4	25.4		24.2	24.2		24.2	
Actuated g/C Ratio		0.38			0.38	0.38		0.36	0.36		0.36	
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Vehicle Extension (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Grp Cap (vph)		896			523	551		587	618		793	
v/s Ratio Prot												
v/s Ratio Perm		0.21			c0.24	0.07		0.18	0.08		c0.29	
v/c Ratio		0.55			0.63	0.19		0.50	0.22		0.80	
Uniform Delay, d1		16.2			16.9	13.9		16.6	14.7		19.2	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		2.4			5.7	0.8		0.9	0.2		6.2	
Delay (s)		18.6			22.6	14.6		17.5	15.0		25.4	
Level of Service		B			C	B		B	B		C	
Approach Delay (s)		18.6			18.9			16.1			25.4	
Approach LOS		B			B			B			C	

Intersection Summary					
HCM Average Control Delay	19.9	HCM Level of Service		B	
HCM Volume to Capacity ratio	0.71				
Actuated Cycle Length (s)	66.8	Sum of lost time (s)		17.2	
Intersection Capacity Utilization	78.6%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					

Lanes, Volumes, Timings
137: Hillman St & Pleasant Street

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	100	85	270	575	110	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	14	16	16	14
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		30			30
Link Distance (ft)	693		149			313
Travel Time (s)	15.8		3.4			7.1
Peak Hour Factor	0.77	0.77	0.94	0.94	0.73	0.73
Heavy Vehicles (%)	3%	6%	3%	3%	3%	3%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	240	0	899	0	0	630
Turn Type					Perm	
Protected Phases	2		1			1
Permitted Phases					1	
Minimum Split (s)	27.0		37.0		37.0	37.0
Total Split (s)	27.0	0.0	37.0	0.0	37.0	37.0
Total Split (%)	42.2%	0.0%	57.8%	0.0%	57.8%	57.8%
Maximum Green (s)	20.0		30.0		30.0	30.0
Yellow Time (s)	5.0		5.0		5.0	5.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	4.0	7.0	4.0	7.0	7.0
Lead/Lag	Lag		Lead		Lead	Lead
Lead-Lag Optimize?	Yes		Yes		Yes	Yes
v/c Ratio	0.38		0.47			0.62
Control Delay	14.1		4.3			16.0
Queue Delay	0.0		0.0			0.0
Total Delay	14.1		4.3			16.0
Queue Length 50th (ft)	50		32			91
Queue Length 95th (ft)	81		64			102
Internal Link Dist (ft)	613		69			233
Turn Bay Length (ft)						
Base Capacity (vph)	637		1899			1022
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.38		0.47			0.62

Intersection Summary	
Area Type:	Other
Cycle Length: 64	
Actuated Cycle Length: 64	
Offset: 35 (55%), Referenced to phase 2:WBL and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Pretimed	

Splits and Phases: 137: Hillman St & Pleasant Street

HCM Signalized Intersection Capacity Analysis
137: Hillman St & Pleasant Street

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	100	85	270	575	110	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	14	16	16	14
Total Lost time (s)	7.0		7.0			7.0
Lane Util. Factor	1.00		0.95			0.95
Frt	0.94		0.90			1.00
Flt Protected	0.97		1.00			0.99
Satd. Flow (prot)	1884		3357			3694
Flt Permitted	0.97		1.00			0.58
Satd. Flow (perm)	1884		3357			2180
Peak-hour factor, PHF	0.77	0.77	0.94	0.94	0.73	0.73
Adj. Flow (vph)	130	110	287	612	151	479
RTOR Reduction (vph)	47	0	325	0	0	0
Lane Group Flow (vph)	193	0	574	0	0	630
Heavy Vehicles (%)	3%	6%	3%	3%	3%	3%
Turn Type					Perm	
Protected Phases	2		1			1
Permitted Phases					1	
Actuated Green, G (s)	20.0		30.0			30.0
Effective Green, g (s)	20.0		30.0			30.0
Actuated g/C Ratio	0.31		0.47			0.47
Clearance Time (s)	7.0		7.0			7.0
Lane Grp Cap (vph)	589		1574			1022
v/s Ratio Prot	c0.10		0.17			
v/s Ratio Perm						c0.29
v/c Ratio	0.33		0.36			0.62
Uniform Delay, d1	16.8		10.9			12.7
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	1.5		0.7			2.8
Delay (s)	18.3		11.5			15.5
Level of Service	B		B			B
Approach Delay (s)	18.3		11.5			15.5
Approach LOS	B		B			B

Intersection Summary			
HCM Average Control Delay	13.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	64.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

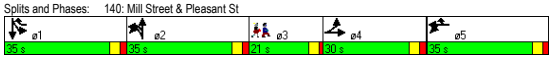
Lanes, Volumes, Timings
140: Mill Street & Pleasant St

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations													
Volume (vph)	260	195	360	205	240	25	135	450	105	85	325	50	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	16	11	12	10	16	10	12	14	16	14	16	
Storage Length (ft)	0		0		0		100		0	0		0	
Storage Lanes	1		1		1		1		0	0		0	
Taper Length (ft)	25		25		25		25		25	25		25	
Right Turn on Red					No				Yes				
Link Speed (mph)		30		30				30			30		
Link Distance (ft)		168		308				709			499		
Travel Time (s)		3.8		7.0				16.1			11.3		
Peak Hour Factor	0.96	0.96	0.93	0.93	0.93	0.87	0.87	0.87	0.87	0.83	0.83	0.83	
Heavy Vehicles (%)	1%	1%	4%	1%	3%	0%	5%	3%	3%	0%	0%	3%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	271	203	387	220	258	0	184	638	0	0	554	0	
Turn Type	Split		Split		pt+ov	Split	Split			Split			
Protected Phases	4	4	5	5	1 5	2	2	2		1	1		3
Permitted Phases													
Detector Phase	4	4	5	5	1 5	2	2	2		1	1		
Switch Phase													
Minimum Initial (s)	7.0	7.0	7.0	7.0		7.0	7.0	7.0		7.0	7.0		10.0
Minimum Split (s)	12.0	12.0	12.0	12.0		12.0	12.0	12.0		12.0	12.0		21.0
Total Split (s)	30.0	30.0	35.0	35.0	70.0	35.0	35.0	35.0	0.0	35.0	35.0	0.0	21.0
Total Split (%)	19.2%	19.2%	22.4%	22.4%	44.9%	22.4%	22.4%	22.4%	0.0%	22.4%	22.4%	0.0%	13%
Maximum Green (s)	25.0	25.0	30.0	30.0		30.0	30.0	30.0		30.0	30.0		17.0
Yellow Time (s)	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0	
Lead/Lag	Lag	Lag				Lag	Lag	Lag		Lead	Lead		Lead
Lead-Lag Optimize?	Yes	Yes				Yes	Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0		5.0	5.0		0.2
Recall Mode	Max	Max	Max	Max		Max	Max	Max		Max	Max		None
Walk Time (s)													10.0
Flash Dont Walk (s)													7.0
Pedestrian Calls (#/hr)													16
v/c Ratio	0.84	0.54	1.10	0.56	0.39		0.54	0.88			0.70		
Control Delay	80.1	61.7	127.8	58.5	29.7		59.1	67.8			59.2		
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0		
Total Delay	80.1	61.7	127.8	58.5	29.7		59.1	67.8			59.2		
Queue Length 50th (ft)	230	162	~365	171	139		143	276			235		
Queue Length 95th (ft)	#450	285	#690	301	269		250	#432			322		
Internal Link Dist (ft)		88		228				629			419		
Turn Bay Length (ft)							100						
Base Capacity (vph)	324	374	353	396	666		340	729			787		
Starvation Cap Reductn	0	0	0	0	0		0	0			0		
Spillback Cap Reductn	0	0	0	0	0		0	0			0		
Storage Cap Reductn	0	0	0	0	0		0	0			0		
Reduced v/c Ratio	0.84	0.54	1.10	0.56	0.39		0.54	0.88			0.70		

Intersection Summary	
Area Type:	Other
Cycle Length: 156	
Actuated Cycle Length: 143.4	
Natural Cycle: 130	
Control Type: Semi Act-Uncoord	
~ 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.	

Splits and Phases: 140: Mill Street & Pleasant St



HCM Signalized Intersection Capacity Analysis
140: Mill Street & Pleasant St

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	260	195	360	205	240	25	135	450	105	85	325	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	16	11	12	10	16	10	12	14	16	14	16
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0			5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95			0.95	
Frt	1.00	1.00	1.00	1.00	0.85		1.00	0.97			0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1847	2132	1678	1881	1463		1617	3405			3741	
Flt Permitted	0.95	1.00	0.95	1.00	1.00		0.95	1.00			0.99	
Satd. Flow (perm)	1847	2132	1678	1881	1463		1617	3405			3741	
Peak-hour factor, PHF	0.96	0.96	0.93	0.93	0.93	0.87	0.87	0.87	0.87	0.83	0.83	0.83
Adj. Flow (vph)	271	203	387	220	258	29	155	517	121	102	392	60
RTOR Reduction (vph)	0	0	0	0	0	0	0	13	0	0	0	0
Lane Group Flow (vph)	271	203	387	220	258	0	184	625	0	0	554	0
Heavy Vehicles (%)	1%	1%	4%	1%	3%	0%	5%	3%	3%	0%	0%	3%
Turn Type	Split		Split		pt+ov	Split	Split			Split		
Protected Phases	4	4	5	5	1 5	2	2	2		1	1	
Permitted Phases												
Actuated Green, G (s)	25.1	25.1	30.2	30.2	65.4		30.2	30.2			30.2	
Effective Green, g (s)	25.1	25.1	30.2	30.2	65.4		30.2	30.2			30.2	
Actuated g/C Ratio	0.17	0.17	0.21	0.21	0.45		0.21	0.21			0.21	
Clearance Time (s)	5.0	5.0	5.0	5.0			5.0	5.0			5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0			5.0	5.0			5.0	
Lane Grp Cap (vph)	318	367	347	389	655		334	704			774	
v/s Ratio Prot	c0.15	0.10	c0.23	0.12	0.18		0.11	c0.18			c0.15	
v/s Ratio Perm												
v/c Ratio	0.85	0.55	1.12	0.57	0.39		0.55	0.89			0.72	
Uniform Delay, d1	58.7	55.3	57.9	52.0	27.0		51.8	56.3			53.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	24.0	5.9	83.2	5.8	1.8		6.4	15.5			5.6	
Delay (s)	82.6	61.2	141.1	57.9	28.8		58.2	71.8			59.5	
Level of Service	F	E	F	E	C		E	E			E	
Approach Delay (s)		73.5		86.4				68.8			59.5	
Approach LOS		E		F				E			E	

Intersection Summary					
HCM Average Control Delay	73.3	HCM Level of Service		E	
HCM Volume to Capacity ratio	0.89				
Actuated Cycle Length (s)	146.0	Sum of lost time (s)		30.3	
Intersection Capacity Utilization	75.7%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					

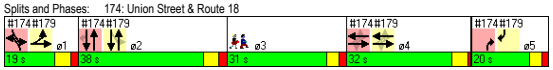
Lanes, Volumes, Timings
174: Union Street & Route 18

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations													
Volume (vph)	340	30	60	70	35	15	90	980	20	35	1150	145	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	16	16	16	16	16	11	11	11	10	11	11	
Storage Length (ft)	0		0	0		0	150		225	150		225	
Storage Lanes	0		0	0		0	1		1	1		1	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			No			No			No			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		432			82			365			2491		
Travel Time (s)		9.8			1.9			8.3			56.6		
Peak Hour Factor	0.93	0.93	0.93	0.85	0.85	0.85	0.91	0.91	0.91	0.99	0.99	0.99	
Heavy Vehicles (%)	1%	3%	0%	2%	0%	0%	1%	4%	0%	17%	4%	1%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	463	0	0	141	0	99	1077	22	35	1162	146	
Turn Type	Perm			Perm			Prot		custom	Prot		Perm	
Protected Phases		4			4		1	2	5	1	2		3
Permitted Phases	4			4								2	
Detector Phase	4	4		4	4		1	2	5	1	2	2	
Switch Phase													
Minimum Initial (s)	7.0	7.0		7.0	7.0		4.0	7.0	4.0	4.0	7.0	7.0	17.0
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0	13.0	9.0	10.0	13.0	13.0	31.0
Total Split (s)	32.0	32.0	0.0	32.0	32.0	0.0	19.0	38.0	20.0	19.0	38.0	38.0	31.0
Total Split (%)	22.9%	22.9%	0.0%	22.9%	22.9%	0.0%	13.6%	27.1%	14.3%	13.6%	27.1%	27.1%	22%
Maximum Green (s)	27.0	27.0		27.0	27.0		13.0	32.0	15.0	13.0	32.0	32.0	26.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	3.0	4.0	4.0	4.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	6.0	6.0	5.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lag		Lead	Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes
Vehicle Extension (s)	5.0	5.0		5.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0	0.2
Recall Mode	None	None		None	None		None	None	None	None	None	None	None
Walk Time (s)													17.0
Flash Dont Walk (s)													9.0
Pedestrian Calls (#/hr)													14
v/c Ratio		1.41			0.34		0.59	1.17	0.12	0.25	1.26	0.30	
Control Delay		237.8			82.9		69.6	125.1	54.5	59.4	161.2	20.9	
Queue Delay		0.0			0.0		0.0	107.5	0.2	0.0	0.0	0.0	
Total Delay		237.8			82.9		69.6	232.6	54.8	59.4	161.2	20.9	
Queue Length 50th (ft)		~418			95		66	~445	14	22	~510	34	
Queue Length 95th (ft)		#835			195		#158	#827	47	67	#912	114	
Internal Link Dist (ft)		352			2			285			2411		
Turn Bay Length (ft)							150		225	150		225	
Base Capacity (vph)		328			412		193	924	202	161	924	484	
Starvation Cap Reductn		0			0		0	159	0	0	0	0	
Spillback Cap Reductn		0			0		0	0	46	0	0	0	
Storage Cap Reductn		0			0		0	0	0	0	0	0	
Reduced v/c Ratio		1.41			0.34		0.51	1.41	0.14	0.22	1.26	0.30	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 118.7	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
~ 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.	

Splits and Phases: 174: Union Street & Route 18



HCM Signalized Intersection Capacity Analysis
174: Union Street & Route 18

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	340	30	60	70	35	15	90	980	20	35	1150	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	11	11	11	10	11	11
Total Lost time (s)		5.0			5.0		6.0	6.0	5.0	6.0	6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.98			0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		2012			2033		1728	3355	1561	1440	3355	1546
Flt Permitted		0.67			0.85		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1411			1773		1728	3355	1561	1440	3355	1546
Peak-hour factor, PHF	0.93	0.93	0.93	0.85	0.85	0.85	0.91	0.91	0.91	0.99	0.99	0.99
Adj. Flow (vph)	366	32	65	82	41	18	99	1077	22	35	1162	146
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	58
Lane Group Flow (vph)	0	463	0	0	141	0	99	1077	22	35	1162	88
Heavy Vehicles (%)	1%	3%	0%	2%	0%	0%	1%	4%	0%	17%	4%	1%
Turn Type	Perm			Perm			Prot		custom	Prot		Perm
Protected Phases		4			4		1	2	5	1	2	
Permitted Phases	4			4								2
Actuated Green, G (s)		27.6			27.6		11.6	32.7	13.8	11.6	32.7	32.7
Effective Green, g (s)		27.6			27.6		11.6	32.7	13.8	11.6	32.7	32.7
Actuated g/C Ratio		0.23			0.23		0.10	0.27	0.11	0.10	0.27	0.27
Clearance Time (s)		5.0			5.0		6.0	6.0	5.0	6.0	6.0	6.0
Vehicle Extension (s)		5.0			5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)		321			403		165	903	177	137	903	416
v/s Ratio Prot							c0.06	0.32	c0.01	0.02	c0.35	
v/s Ratio Perm		c0.33			0.08							0.06
v/c Ratio		1.44			0.35		0.60	1.19	0.12	0.26	1.29	0.21
Uniform Delay, d1		46.9			39.4		52.7	44.4	48.4	50.9	44.4	34.4
Progression Factor		1.00			1.89		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		215.9			0.9		6.9	97.7	0.4	1.3	137.5	0.3
Delay (s)		262.9			75.6		59.7	142.1	48.8	52.3	181.9	34.7
Level of Service		F			E		E	F	D	D	F	C
Approach Delay (s)		262.9			75.6			133.5			162.5	
Approach LOS		F			E			F			F	

Intersection Summary			
HCM Average Control Delay	162.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	121.5	Sum of lost time (s)	35.8
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

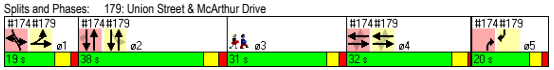
Lanes, Volumes, Timings
179: Union Street & McArthur Drive

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations													
Volume (vph)	45	5	35	0	15	5	0	200	5	5	245	105	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	16	16	16	15	16	16	16	16	16	12	12	
Storage Length (ft)	0		0	0		0	0		0	0		50	
Storage Lanes	0		0	0		0	0		0	0		1	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			No			Yes			Yes			No	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		82			609			920			687		
Travel Time (s)		1.9			13.8			20.9			15.6		
Peak Hour Factor	0.90	0.90	0.90	0.75	0.75	0.75	0.69	0.69	0.69	0.83	0.83	0.83	
Heavy Vehicles (%)	0%	25%	16%	0%	0%	25%	0%	6%	20%	0%	6%	1%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	95	0	0	27	0	0	297	0	0	301	127	
Turn Type	pm+pt			Perm						Perm		custom	
Protected Phases	1	1 4			4			2			2	5	3
Permitted Phases	1 4			4						2			
Detector Phase	1	1 4		4	4			2		2	2	5	
Switch Phase													
Minimum Initial (s)	4.0			7.0	7.0			7.0		7.0	7.0	4.0	17.0
Minimum Split (s)	10.0			12.0	12.0			13.0		13.0	13.0	9.0	31.0
Total Split (s)	19.0	51.0	0.0	32.0	32.0	0.0	0.0	38.0	0.0	38.0	38.0	20.0	31.0
Total Split (%)	13.6%	36.4%	0.0%	22.9%	22.9%	0.0%	0.0%	27.1%	0.0%	27.1%	27.1%	14.3%	22%
Maximum Green (s)	13.0			27.0	27.0			32.0		32.0	32.0	15.0	26.0
Yellow Time (s)	4.0			4.0	4.0			4.0		4.0	4.0	3.0	3.0
All-Red Time (s)	2.0			1.0	1.0			2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	4.0	6.0	4.0	6.0	6.0	5.0	
Lead/Lag	Lead			Lag	Lag			Lag		Lag	Lag		Lead
Lead-Lag Optimize?	Yes			Yes	Yes			Yes		Yes	Yes		Yes
Vehicle Extension (s)	4.0			5.0	5.0			4.0		4.0	4.0	4.0	0.2
Recall Mode	None			None	None			None		None	None	None	None
Walk Time (s)													17.0
Flash Dont Walk (s)													9.0
Pedestrian Calls (#/hr)													14
v/c Ratio		0.18			0.06			0.53			0.61	0.68	
Control Delay		7.2			34.9			44.1			47.4	72.4	
Queue Delay		0.0			0.0			0.0			0.0	670.9	
Total Delay		7.2			34.9			44.1			47.4	743.3	
Queue Length 50th (ft)		20			11			170			177	84	
Queue Length 95th (ft)		m34			35			253			331	#184	
Internal Link Dist (ft)		2			529			840			607		
Turn Bay Length (ft)												50	
Base Capacity (vph)		567			446			557			490	206	
Starvation Cap Reductn		0			0			0			0	0	
Spillback Cap Reductn		0			7			0			0	174	
Storage Cap Reductn		0			0			0			0	0	
Reduced v/c Ratio		0.17			0.06			0.53			0.61	3.97	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 118.7	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 179: Union Street & McArthur Drive



HCM Signalized Intersection Capacity Analysis
179: Union Street & McArthur Drive

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	5	35	0	15	5	0	200	5	5	245	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	15	16	16	16	16	16	12	12
Total Lost time (s)		6.0			5.0			6.0			6.0	5.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frt		0.94			0.96			1.00			1.00	0.85
Flt Protected		0.97			1.00			1.00			1.00	1.00
Satd. Flow (prot)		1833			1894			2019			1793	1599
Flt Permitted		0.86			1.00			1.00			0.99	1.00
Satd. Flow (perm)		1615			1894			2019			1781	1599
Peak-hour factor, PHF	0.90	0.90	0.90	0.75	0.75	0.75	0.69	0.69	0.69	0.83	0.83	0.83
Adj. Flow (vph)	50	6	39	0	20	7	0	290	7	6	295	127
RTOR Reduction (vph)	0	0	0	0	5	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	95	0	0	22	0	0	296	0	0	301	127
Heavy Vehicles (%)	0%	25%	16%	0%	0%	25%	0%	6%	20%	0%	6%	1%
Turn Type	pm+pt			Perm						Perm		custom
Protected Phases	1	1 4			4			2			2	5
Permitted Phases	1 4			4						2		
Actuated Green, G (s)		39.2			27.6			32.7			32.7	13.8
Effective Green, g (s)		39.2			27.6			32.7			32.7	13.8
Actuated g/C Ratio		0.32			0.23			0.27			0.27	0.11
Clearance Time (s)					5.0			6.0			6.0	5.0
Vehicle Extension (s)					5.0			4.0			4.0	4.0
Lane Grp Cap (vph)		542			430			543			479	182
v/s Ratio Prot		c0.02			0.01			0.15				c0.08
v/s Ratio Perm		c0.04									c0.17	
v/c Ratio		0.18			0.05			0.55			0.63	0.70
Uniform Delay, d1		29.5			36.7			38.0			39.1	51.8
Progression Factor		0.33			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.2			0.1			1.4			2.9	11.9
Delay (s)		9.9			36.8			39.4			42.0	63.7
Level of Service		A			D			D			D	E
Approach Delay (s)		9.9			36.8			39.4			48.4	
Approach LOS		A			D			D			D	

Intersection Summary					
HCM Average Control Delay	40.6	HCM Level of Service		D	
HCM Volume to Capacity ratio	0.44				
Actuated Cycle Length (s)	121.5	Sum of lost time (s)		36.8	
Intersection Capacity Utilization	38.5%	ICU Level of Service		A	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis
9: Tarkiln Hill Rd & Kings Highway

2030 No-Build Conditions - PM Peak Hour

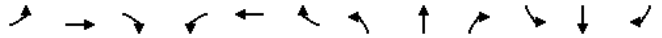
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	50	15	30	1090	640	160
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.91	0.91	0.90	0.90
Hourly flow rate (vph)	62	19	33	1198	711	178
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				393	611	
pX, platoon unblocked	0.72					
vC, conflicting volume	2064	800	889			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2288	800	889			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	95	96			
cM capacity (veh/h)	30	387	762			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	81	1231	889
Volume Left	62	33	0
Volume Right	19	0	178
cSH	38	762	1700
Volume to Capacity	2.16	0.04	0.52
Queue Length 95th (ft)	222	3	0
Control Delay (s)	762.8	1.7	0.0
Lane LOS	F	A	
Approach Delay (s)	762.8	1.7	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	29.1		
Intersection Capacity Utilization	91.9%	ICU Level of Service	F
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: Park Avenue & Church Street

2030 No-Build Conditions - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	165	325	15	0	35	0	485	20	5	310	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.80	0.80	0.80	0.85	0.85	0.85	0.79	0.79	0.79
Hourly flow rate (vph)	5	176	346	19	0	44	0	571	24	6	392	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											176	
pX, platoon unblocked	0.84	0.84	0.84	0.84	0.84		0.84					
vC, conflicting volume	1031	999	392	1421	987	582	392			594		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	939	900	174	1405	886	582	174			594		
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 %	97	25	52	4	100	91	100			99		
cM capacity (veh/h)	187	233	726	20	237	511	1182			992		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	527	62	594	399
Volume Left	5	19	0	6
Volume Right	346	44	24	0
cSH	418	60	1700	992
Volume to Capacity	1.26	1.04	0.35	0.01
Queue Length 95th (ft)	559	125	0	0
Control Delay (s)	163.0	242.7	0.0	0.2
Lane LOS	F	F		A
Approach Delay (s)	163.0	242.7	0.0	0.2
Approach LOS	F	F		

Intersection Summary			
Average Delay	63.9		
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
17: Irvington Street & Church Street

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	0	0	25	5	15	10	380	0	0	475	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.66	0.66	0.66	0.92	0.92	0.92	0.91	0.91	0.91
Hourly flow rate (vph)	7	0	0	38	8	23	11	413	0	0	522	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	986	960	525	960	962	413	527			413		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	986	960	525	960	962	413	527			413		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.3			2.2		
p0 queue free %	97	100	100	84	97	96	99			100		
cM capacity (veh/h)	214	256	557	232	255	628	995			1157		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	7	68	424	527
Volume Left	7	38	11	0
Volume Right	0	23	0	5
cSH	214	298	995	1700
Volume to Capacity	0.03	0.23	0.01	0.31
Queue Length 95th (ft)	3	22	1	0
Control Delay (s)	22.4	20.6	0.3	0.0
Lane LOS	C	C	A	
Approach Delay (s)	22.4	20.6	0.3	0.0
Approach LOS	C	C		

Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	38.0%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
32: Coggeshall Street & North Front St

2030 No-Build Conditions - PM Peak Hour

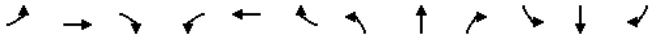
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	100	405	40	50	330	45	25	135	55	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.79	0.79	0.79	0.92	0.92	0.92
Hourly flow rate (vph)	108	435	43	54	355	48	32	171	70	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		546			443							
pX, platoon unblocked	0.93			0.91			0.95	0.95	0.91	0.95	0.95	0.93
vC, conflicting volume	403			478			1159	1183	457	1314	1180	379
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	317			379			967	993	356	1131	990	291
tC, single (s)	4.1			4.1			7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	91			95			84	15	89	100	100	100
cM capacity (veh/h)	1152			1065			199	200	615	39	203	698

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	586	457	272
Volume Left	108	54	32
Volume Right	43	48	70
cSH	1152	1065	242
Volume to Capacity	0.09	0.05	1.13
Queue Length 95th (ft)	8	4	304
Control Delay (s)	2.4	1.5	139.3
Lane LOS	A	A	F
Approach Delay (s)	2.4	1.5	139.3
Approach LOS			F

Intersection Summary				
Average Delay	30.4			
Intersection Capacity Utilization	64.2%	ICU Level of Service		C
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
54: Rt 18 SB Exit Ramp & Purchase St

2030 No-Build Conditions - PM Peak Hour



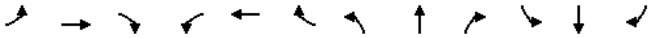
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	195	5	50	5	450	0	0	265	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	212	5	54	5	489	0	0	288	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								823				
pX, platoon unblocked												
vC, conflicting volume	845	788	288	788	788	489	288			489		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	845	788	288	788	788	489	288			489		
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 %	100	100	100	31	98	91	100			100		
cM capacity (veh/h)	252	322	751	308	322	579	1274			1074		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	272	495	288
Volume Left	0	212	5	0
Volume Right	0	54	0	0
cSH	1700	340	1274	1700
Volume to Capacity	0.00	0.80	0.00	0.17
Queue Length 95th (ft)	0	167	0	0
Control Delay (s)	0.0	46.9	0.1	0.0
Lane LOS	A	E	A	
Approach Delay (s)	0.0	46.9	0.1	0.0
Approach LOS	A	E		

Intersection Summary				
Average Delay	12.2			
Intersection Capacity Utilization	48.5%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
58: Coggeshall St & Purchase Street

2030 No-Build Conditions - PM Peak Hour



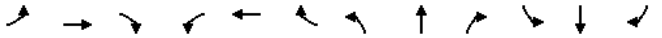
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	135	10	20	145	105	20	325	75	110	230	10
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.83	0.83	0.83	0.94	0.94	0.94
Hourly flow rate (vph)	6	153	11	23	165	119	24	392	90	117	245	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	170	307	506	372
Volume Left (vph)	6	23	24	117
Volume Right (vph)	11	119	90	11
Hadj (s)	0.01	-0.20	-0.03	0.12
Departure Headway (s)	8.1	7.3	6.8	7.2
Degree Utilization, x	0.38	0.63	0.95	0.75
Capacity (veh/h)	399	468	526	482
Control Delay (s)	16.1	21.9	53.4	28.5
Approach Delay (s)	16.1	21.9	53.4	28.5
Approach LOS	C	C	F	D

Intersection Summary				
Delay	34.7			
HCM Level of Service	D			
Intersection Capacity Utilization	74.6%	ICU Level of Service	D	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
72: Weld St & Purchase St

2030 No-Build Conditions - PM Peak Hour



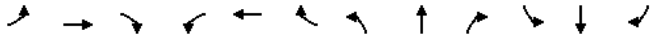
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	0	45	90	120	30	95	355	0	0	240	30
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.86	0.86	0.86	0.94	0.94	0.94	0.90	0.90	0.90
Hourly flow rate (vph)	28	0	51	105	140	35	101	378	0	0	267	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	968	863	283	914	880	378	300			378		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	968	863	283	914	880	378	300			378		
tC, single (s)	7.1	6.5	6.3	7.1	6.5	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.0	3.4	2.2			2.2		
p0 queue free %	76	100	93	53	47	95	92			100		
cM capacity (veh/h)	121	271	744	222	264	650	1267			1192		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	80	174	105	479	300
Volume Left	28	105	0	101	0
Volume Right	51	0	35	0	33
cSH	261	237	329	1267	1700
Volume to Capacity	0.30	0.74	0.32	0.08	0.18
Queue Length 95th (ft)	31	127	33	6	0
Control Delay (s)	24.7	53.3	21.0	2.4	0.0
Lane LOS	C	F	C	A	
Approach Delay (s)	24.7	41.2		2.4	0.0
Approach LOS	C	E			

Intersection Summary				
Average Delay	12.8			
Intersection Capacity Utilization	62.8%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
74: Logan St & Purchase St

2030 No-Build Conditions - PM Peak Hour



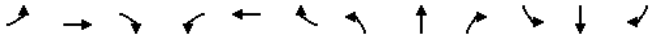
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	60	0	70	0	380	115	60	310	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.85	0.85	0.85	0.96	0.96	0.96	0.94	0.94	0.94
Hourly flow rate (vph)	0	0	0	71	0	82	0	396	120	64	330	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	996	973	330	913	913	456	330			516		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	996	973	330	913	913	456	330			516		
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 %	100	100	100	71	100	86	100			94		
cM capacity (veh/h)	185	238	716	242	258	605	1241			1025		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	153	516	394
Volume Left	0	71	0	64
Volume Right	0	82	120	0
cSH	1700	357	1241	1025
Volume to Capacity	0.00	0.43	0.00	0.06
Queue Length 95th (ft)	0	52	0	5
Control Delay (s)	0.0	22.4	0.0	2.0
Lane LOS	A	C		A
Approach Delay (s)	0.0	22.4	0.0	2.0
Approach LOS	A	C		

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	64.2%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
75: Logan St & North Front Street

2030 No-Build Conditions - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	140	15	10	10	20	45	5	205	5	10	135	45
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.61	0.61	0.61	0.92	0.92	0.92	0.88	0.88	0.88
Hourly flow rate (vph)	161	17	11	16	33	74	5	223	5	11	153	51
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											720	
pX, platoon unblocked												
vC, conflicting volume	528	441	179	458	464	226	205			228		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	528	441	179	458	464	226	205			228		
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 %	59	97	99	97	93	91	100			99		
cM capacity (veh/h)	393	507	869	492	492	819	1379			1352		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	190	123	234	216
Volume Left	161	16	5	11
Volume Right	11	74	5	51
cSH	415	647	1379	1352
Volume to Capacity	0.46	0.19	0.00	0.01
Queue Length 95th (ft)	58	17	0	1
Control Delay (s)	20.8	11.9	0.2	0.5
Lane LOS	C	B	A	A
Approach Delay (s)	20.8	11.9	0.2	0.5
Approach LOS	C	B		

Intersection Summary				
Average Delay	7.3			
Intersection Capacity Utilization	37.4%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
77: Route 140 On/Off Ramps & Mt. Pleasant Street

2030 No-Build Conditions - PM Peak Hour

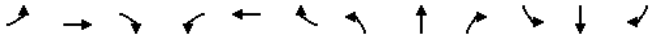
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	255	0	250	405	70	495
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.95	0.95	0.68	0.68
Hourly flow rate (vph)	290	0	263	426	103	728
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			877			
pX, platoon unblocked						
vC, conflicting volume	1410	476			263	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1410	476			263	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	0	100			92	
cM capacity (veh/h)	140	587			1278	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	290	689	831
Volume Left	290	0	103
Volume Right	0	426	0
cSH	140	1700	1278
Volume to Capacity	2.08	0.41	0.08
Queue Length 95th (ft)	586	0	7
Control Delay (s)	561.0	0.0	2.0
Lane LOS	F		A
Approach Delay (s)	561.0	0.0	2.0
Approach LOS	F		

Intersection Summary				
Average Delay	90.7			
Intersection Capacity Utilization	92.0%	ICU Level of Service		F
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
126: Logan St & Acushnet Ave.

2030 No-Build Conditions - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	135	25	25	85	0	40	15	25	0	5	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.61	0.61	0.61	0.93	0.93	0.93	0.75	0.75	0.75
Hourly flow rate (vph)	16	145	27	41	139	0	43	16	27	0	7	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	195	139	10	225	129	30	13			43		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	195	139	10	225	129	30	13			43		
tC, single (s)	7.1	6.5	6.3	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	80	97	93	81	100	97			100		
cM capacity (veh/h)	644	732	1054	588	739	1051	1599			1579		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	188	180	86	13
Volume Left	16	41	43	0
Volume Right	27	0	27	7
cSH	756	698	1599	1579
Volume to Capacity	0.25	0.26	0.03	0.00
Queue Length 95th (ft)	25	26	2	0
Control Delay (s)	11.3	11.9	3.8	0.0
Lane LOS	B	B	A	
Approach Delay (s)	11.3	11.9	3.8	0.0
Approach LOS	B	B		

Intersection Summary				
Average Delay	9.9			
Intersection Capacity Utilization	29.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
130: Herman Melville Boulevard & McArthur Drive

2030 No-Build Conditions - PM Peak Hour

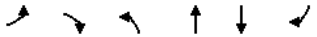
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	140	70	155	95	30	175
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.76	0.76	0.95	0.95	0.73	0.73
Hourly flow rate (vph)	184	92	163	100	41	240
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	535	213			263	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	535	213			263	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	62	89			97	
cM capacity (veh/h)	486	807			1256	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	276	263	281
Volume Left	184	0	41
Volume Right	92	100	0
cSH	560	1700	1256
Volume to Capacity	0.49	0.15	0.03
Queue Length 95th (ft)	68	0	3
Control Delay (s)	17.5	0.0	1.4
Lane LOS	C		A
Approach Delay (s)	17.5	0.0	1.4
Approach LOS	C		

Intersection Summary			
Average Delay	6.4		
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
136: Hillman St & Acushnet Ave.

2030 No-Build Conditions - PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	45	150	190	30	55	60
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.87	0.87	0.77	0.77
Hourly flow rate (vph)	54	181	218	34	71	78
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	582	110	149			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	582	110	149			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	87	81	85			
cM capacity (veh/h)	405	932	1414			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	235	253	149
Volume Left	54	218	0
Volume Right	181	0	78
cSH	717	1414	1700
Volume to Capacity	0.33	0.15	0.09
Queue Length 95th (ft)	36	14	0
Control Delay (s)	12.5	7.1	0.0
Lane LOS	B	A	
Approach Delay (s)	12.5	7.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		7.4	
Intersection Capacity Utilization		37.2%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
147: Wamsutta St & Acushnet Ave.

2030 No-Build Conditions - PM Peak Hour

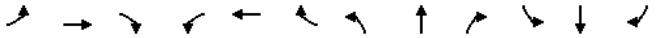
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	15	15	70	15	5	50
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.81	0.81	0.72	0.72	0.63	0.63
Hourly flow rate (vph)	19	19	97	21	8	79
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	203	108			97	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	203	108			97	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	98			99	
cM capacity (veh/h)	786	952			1509	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	37	118	87
Volume Left	19	0	8
Volume Right	19	21	0
cSH	861	1700	1509
Volume to Capacity	0.04	0.07	0.01
Queue Length 95th (ft)	3	0	0
Control Delay (s)	9.4	0.0	0.7
Lane LOS	A		A
Approach Delay (s)	9.4	0.0	0.7
Approach LOS	A		

Intersection Summary			
Average Delay		1.7	
Intersection Capacity Utilization		16.8%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
148: Wamsutta St & North Front St

2030 No-Build Conditions - PM Peak Hour



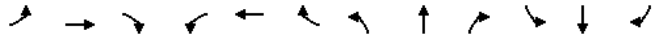
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	0	5	10	0	20	10	175	10	5	155	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.68	0.68	0.63	0.63	0.63	0.90	0.90	0.90	0.82	0.82	0.82
Hourly flow rate (vph)	22	0	7	16	0	32	11	194	11	6	189	24
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	467	441	201	443	448	200	213			206		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	467	441	201	443	448	200	213			206		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.4	4.1			4.1		
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 %	95	100	99	97	100	96	99			100		
cM capacity (veh/h)	484	507	845	519	503	807	1369			1378		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	29	48	217	220
Volume Left	22	16	11	6
Volume Right	7	32	11	24
cSH	542	681	1369	1378
Volume to Capacity	0.05	0.07	0.01	0.00
Queue Length 95th (ft)	4	6	1	0
Control Delay (s)	12.0	10.7	0.5	0.2
Lane LOS	B	B	A	A
Approach Delay (s)	12.0	10.7	0.5	0.2
Approach LOS	B	B		

Intersection Summary				
Average Delay	2.0			
Intersection Capacity Utilization	24.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
182: McArthur Blvd & McArthur Dr-Leonard's Wharf

2030 No-Build Conditions - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	155	10	0	0	20	10	15	20	0	15	10	265
Peak Hour Factor	0.81	0.81	0.81	0.83	0.83	0.83	0.51	0.51	0.51	0.85	0.85	0.85
Hourly flow rate (vph)	191	12	0	0	24	12	29	39	0	18	12	312

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	204	36	69	341
Volume Left (vph)	191	0	29	18
Volume Right (vph)	0	12	0	312
Hadj (s)	0.30	-0.13	0.69	-0.41
Departure Headway (s)	5.2	5.0	5.6	4.2
Degree Utilization, x	0.29	0.05	0.11	0.40
Capacity (veh/h)	646	637	595	806
Control Delay (s)	10.4	8.3	9.3	10.1
Approach Delay (s)	10.4	8.3	9.3	10.1
Approach LOS	B	A	A	B

Intersection Summary				
Delay	10.0			
HCM Level of Service	A			
Intersection Capacity Utilization	40.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
184: McArthur Blvd & McArthur Dr

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	270	30	0	40	0	165	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.83	0.83	0.83	0.82	0.82	0.82	0.25	0.25	0.25
Hourly flow rate (vph)	0	0	0	325	36	0	49	0	201	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	216	299	0	198	198	101	0			201		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	216	299	0	198	198	101	0			201		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	100	100	100	56	95	100	97			100		
cM capacity (veh/h)	698	598	1091	736	680	960	1591			1383		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	361	250	0
Volume Left	325	49	0
Volume Right	0	201	0
cSH	730	1591	1700
Volume to Capacity	0.49	0.03	0.00
Queue Length 95th (ft)	69	2	0
Control Delay (s)	14.7	1.6	0.0
Lane LOS	B	A	
Approach Delay (s)	14.7	1.6	0.0
Approach LOS	B		

Intersection Summary				
Average Delay	9.3			
Intersection Capacity Utilization	35.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Taunton

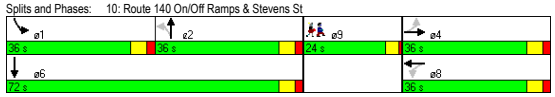
Lanes, Volumes, Timings
10: Route 140 On/Off Ramps & Stevens St

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	5	5	0	10	5	140	5	565	75	160	65	10	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	14	13	16	12	12	16	12	12	16	12	12	12	
Storage Length (ft)	0		0	0		0	0		0	200		0	
Storage Lanes	0		0	0		0	0		0	1		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		819			376			787			471		
Travel Time (s)		18.6			8.5			17.9			10.7		
Peak Hour Factor	0.45	0.45	0.45	0.84	0.84	0.84	0.85	0.85	0.85	0.84	0.84	0.84	
Heavy Vehicles (%)	0%	0%	0%	33%	0%	3%	0%	7%	13%	11%	4%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	22	0	0	185	0	0	759	0	190	89	0	
Turn Type	Perm			Perm			Perm			Prot			
Protected Phases		4			8			2		1	6		9
Permitted Phases	4			8			2						
Detector Phase	4	4		8	8		2	2		1	6		
Switch Phase													
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0		4.0
Minimum Split (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0		24.0
Total Split (s)	36.0	36.0	0.0	36.0	36.0	0.0	36.0	36.0	0.0	36.0	72.0	0.0	24.0
Total Split (%)	27.3%	27.3%	0.0%	27.3%	27.3%	0.0%	27.3%	27.3%	0.0%	27.3%	54.5%	0.0%	18%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	66.0		20.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		3.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	
Lead/Lag							Lag	Lag		Lead			
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		3.0
Recall Mode	None	None		None	None		None	None		None	None		None
Walk Time (s)													7.0
Flash Dont Walk (s)													13.0
Pedestrian Calls (#/hr)													0
v/c Ratio		0.07			0.41			0.56		0.42	0.07		
Control Delay		23.4			9.0			14.4		24.8	3.1		
Queue Delay		0.0			0.0			0.0		0.0	0.0		
Total Delay		23.4			9.0			14.4		24.8	3.1		
Queue Length 50th (ft)		3			2			93		29	7		
Queue Length 95th (ft)		6			24			144		53	17		
Internal Link Dist (ft)		739			296			707			391		
Turn Bay Length (ft)										200			
Base Capacity (vph)		1502			1544			1661		1663	1800		
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		0.01			0.12			0.46		0.11	0.05		

Intersection Summary	
Area Type:	Other
Cycle Length: 132	
Actuated Cycle Length: 57	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 10: Route 140 On/Off Ramps & Stevens St



HCM Signalized Intersection Capacity Analysis
10: Route 140 On/Off Ramps & Stevens St

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	5	0	10	5	140	5	565	75	160	65	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	13	16	12	12	16	12	12	16	12	12	12
Total Lost time (s)		6.0			6.0			6.0		6.0	6.0	
Lane Util. Factor		0.95			0.95			0.95		0.97	1.00	
Frt		1.00			0.86			0.98		1.00	0.98	
Flt Protected		0.98			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		3639			2967			3294		3155	1799	
Flt Permitted		0.76			0.93			0.95		0.95	1.00	
Satd. Flow (perm)		2851			2778			3142		3155	1799	
Peak-hour factor, PHF	0.45	0.45	0.45	0.84	0.84	0.84	0.85	0.85	0.85	0.84	0.84	0.84
Adj. Flow (vph)	11	11	0	12	6	167	6	665	88	190	77	12
RTOR Reduction (vph)	0	0	0	0	149	0	0	6	0	0	3	0
Lane Group Flow (vph)	0	22	0	0	36	0	0	753	0	190	86	0
Heavy Vehicles (%)	0%	0%	0%	33%	0%	3%	0%	7%	13%	11%	4%	0%
Turn Type	Perm			Perm			Perm			Prot		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		6.3			6.3			24.5		8.2	38.7	
Effective Green, g (s)		6.3			6.3			24.5		8.2	38.7	
Actuated g/C Ratio		0.11			0.11			0.43		0.14	0.68	
Clearance Time (s)		6.0			6.0			6.0		6.0	6.0	
Vehicle Extension (s)		2.0			2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		315			307			1351		454	1221	
v/s Ratio Prot										c0.06	0.05	
v/s Ratio Perm		0.01			c0.01			c0.24				
v/c Ratio		0.07			0.12			0.56		0.42	0.07	
Uniform Delay, d1		22.7			22.8			12.2		22.2	3.1	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.0			0.1			0.3		0.2	0.0	
Delay (s)		22.8			22.9			12.5		22.5	3.1	
Level of Service		C			C			B		C	A	
Approach Delay (s)		22.8			22.9			12.5			16.3	
Approach LOS		C			C			B			B	

Intersection Summary					
HCM Average Control Delay	15.1	HCM Level of Service	B		
HCM Volume to Capacity ratio	0.46				
Actuated Cycle Length (s)	57.0	Sum of lost time (s)	18.0		
Intersection Capacity Utilization	46.5%	ICU Level of Service	A		
Analysis Period (min)	15				
c Critical Lane Group					

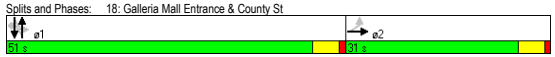
Lanes, Volumes, Timings
18: Galleria Mall Entrance & County St

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	10	10	0	0	0	5	110	0	60	55	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	14	12	12	12	12	12	16	12	12	16
Storage Length (ft)	0		0	0		0	200		0	0		0
Storage Lanes	0		0	0		0	1		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		396			269			674			311	
Travel Time (s)		9.0			6.1			15.3			7.1	
Peak Hour Factor	0.83	0.83	0.83	0.77	0.77	0.77	0.85	0.85	0.85	0.87	0.87	0.87
Heavy Vehicles (%)	41%	25%	38%	0%	0%	0%	36%	4%	0%	13%	8%	9%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	42	0	0	0	0	0	135	0	0	132	92
Turn Type	Perm						Perm			Perm		Perm
Protected Phases		2						1			1	
Permitted Phases	2						1			1		1
Detector Phase	2	2					1	1		1	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0					8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	13.0	13.0					13.0	13.0		13.0	13.0	13.0
Total Split (s)	31.0	31.0	0.0	0.0	0.0	0.0	51.0	51.0	0.0	51.0	51.0	51.0
Total Split (%)	37.8%	37.8%	0.0%	0.0%	0.0%	0.0%	62.2%	62.2%	0.0%	62.2%	62.2%	62.2%
Maximum Green (s)	26.0	26.0					46.0	46.0		46.0	46.0	46.0
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag					Lead	Lead		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes					Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0					2.0	2.0		2.0	2.0	2.0
Recall Mode	None	None					Min	Min		Min	Min	Min
v/c Ratio		0.06						0.05			0.05	0.06
Control Delay		8.2						1.9			2.0	1.2
Queue Delay		0.0						0.0			0.0	0.0
Total Delay		8.2						1.9			2.0	1.2
Queue Length 50th (ft)		1						0			0	0
Queue Length 95th (ft)		9						13			13	11
Internal Link Dist (ft)		316			189			594			231	
Turn Bay Length (ft)												
Base Capacity (vph)		2420						3243			2666	1679
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		0.02						0.04			0.05	0.05

Intersection Summary	
Area Type:	Other
Cycle Length: 82	
Actuated Cycle Length: 29.9	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 18: Galleria Mall Entrance & County St



HCM Signalized Intersection Capacity Analysis
18: Galleria Mall Entrance & County St

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	10	10	0	0	0	5	110	0	60	55	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	14	12	12	12	12	12	16	12	12	16
Total Lost time (s)		5.0						5.0			5.0	5.0
Lane Util. Factor		0.95						0.95			0.95	1.00
Frt		0.96						1.00			1.00	0.85
Flt Protected		0.98						1.00			0.97	1.00
Satd. Flow (prot)		2745						3417			3180	1679
Flt Permitted		0.98						0.95			0.82	1.00
Satd. Flow (perm)		2745						3243			2668	1679
Peak-hour factor, PHF	0.83	0.83	0.83	0.77	0.77	0.77	0.85	0.85	0.85	0.87	0.87	0.87
Adj. Flow (vph)	18	12	12	0	0	0	6	129	0	69	63	92
RTOR Reduction (vph)	0	12	0	0	0	0	0	0	0	0	0	30
Lane Group Flow (vph)	0	30	0	0	0	0	0	135	0	0	132	62
Heavy Vehicles (%)	41%	25%	38%	0%	0%	0%	36%	4%	0%	13%	8%	9%
Turn Type	Perm						Perm			Perm		Perm
Protected Phases		2						1			1	
Permitted Phases	2						1			1		1
Actuated Green, G (s)		1.3						22.8			22.8	22.8
Effective Green, g (s)		1.3						22.8			22.8	22.8
Actuated g/C Ratio		0.04						0.67			0.67	0.67
Clearance Time (s)		5.0						5.0			5.0	5.0
Vehicle Extension (s)		2.0						2.0			2.0	2.0
Lane Grp Cap (vph)		105						2168			1784	1123
v/s Ratio Prot												
v/s Ratio Perm		0.01						0.04			c0.05	0.04
v/c Ratio		0.29						0.06			0.07	0.05
Uniform Delay, d1		16.0						2.0			2.0	1.9
Progression Factor		1.00						1.00			1.00	1.00
Incremental Delay, d2		0.6						0.0			0.0	0.0
Delay (s)		16.5						2.0			2.0	2.0
Level of Service		B						A			A	A
Approach Delay (s)		16.5			0.0			2.0			2.0	
Approach LOS		B			A			A			A	

Intersection Summary					
HCM Average Control Delay	3.5	HCM Level of Service		A	
HCM Volume to Capacity ratio	0.09				
Actuated Cycle Length (s)	34.1	Sum of lost time (s)		10.0	
Intersection Capacity Utilization	25.0%	ICU Level of Service		A	
Analysis Period (min)	15				
c Critical Lane Group					

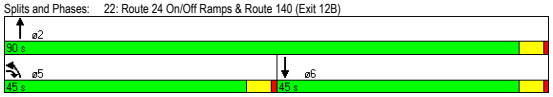
Lanes, Volumes, Timings
22: Route 24 On/Off Ramps & Route 140 (Exit 12B)

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	765	95	805	750	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	12	12	12	12	12
Storage Length (ft)	0	0	250			0
Storage Lanes	0	2	1			0
Taper Length (ft)	25	25	25			25
Right Turn on Red		No				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	741			870	631	
Travel Time (s)	16.8			19.8	14.3	
Peak Hour Factor	0.85	0.85	0.90	0.90	0.84	0.84
Heavy Vehicles (%)	5%	9%	16%	4%	6%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	900	106	894	1173	0
Turn Type		Over	Prot			
Protected Phases		5	5	2	6	
Permitted Phases						
Detector Phase		5	5	2	6	
Switch Phase						
Minimum Initial (s)		4.0	4.0	4.0	4.0	
Minimum Split (s)		10.0	10.0	22.0	22.0	
Total Split (s)	0.0	45.0	45.0	90.0	45.0	0.0
Total Split (%)	0.0%	50.0%	50.0%	100.0%	50.0%	0.0%
Maximum Green (s)		40.0	40.0	85.0	40.0	
Yellow Time (s)		4.0	4.0	4.0	4.0	
All-Red Time (s)		1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	4.0
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	
Recall Mode		None	None	C-Min	C-Min	
Walk Time (s)				5.0	5.0	
Flash Dont Walk (s)				11.0	11.0	
Pedestrian Calls (#/hr)				0	0	
v/c Ratio		0.85	0.17	0.26	0.72	
Control Delay		33.0	11.2	0.2	20.1	
Queue Delay		0.0	0.0	0.0	0.0	
Total Delay		33.0	11.2	0.2	20.1	
Queue Length 50th (ft)		251	33	0	260	
Queue Length 95th (ft)		295	61	0	321	
Internal Link Dist (ft)	661			790	551	
Turn Bay Length (ft)			250			
Base Capacity (vph)		1159	692	3471	1636	
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		0.78	0.15	0.26	0.72	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	

Splits and Phases: 22: Route 24 On/Off Ramps & Route 140 (Exit 12B)



HCM Signalized Intersection Capacity Analysis
22: Route 24 On/Off Ramps & Route 140 (Exit 12B)

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	765	95	805	750	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	15	12	12	12	12	12
Total Lost time (s)		5.0	5.0	5.0	5.0	
Lane Util. Factor		0.88	1.00	0.95	0.95	
Frt		0.85	1.00	1.00	0.96	
Flt Protected		1.00	0.95	1.00	1.00	
Satd. Flow (prot)		2608	1556	3471	3314	
Flt Permitted		1.00	0.95	1.00	1.00	
Satd. Flow (perm)		2608	1556	3471	3314	
Peak-hour factor, PHF	0.85	0.85	0.90	0.90	0.84	0.84
Adj. Flow (vph)	0	900	106	894	893	280
RTOR Reduction (vph)	0	0	0	0	31	0
Lane Group Flow (vph)	0	900	106	894	1142	0
Heavy Vehicles (%)	5%	9%	16%	4%	6%	2%
Turn Type		Over	Prot			
Protected Phases		5	5	2	6	
Permitted Phases						
Actuated Green, G (s)		36.4	36.4	90.0	43.6	
Effective Green, g (s)		36.4	36.4	90.0	43.6	
Actuated g/C Ratio		0.40	0.40	1.00	0.48	
Clearance Time (s)		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1055	629	3471	1605	
v/s Ratio Prot		c0.35	0.07	0.26	c0.34	
v/s Ratio Perm						
v/c Ratio		0.85	0.17	0.26	0.71	
Uniform Delay, d1		24.4	17.1	0.0	18.3	
Progression Factor		1.00	0.66	1.00	0.95	
Incremental Delay, d2		6.8	0.1	0.2	2.6	
Delay (s)		31.2	11.4	0.2	19.9	
Level of Service		C	B	A	B	
Approach Delay (s)	31.2			1.4	19.9	
Approach LOS	C			A	B	

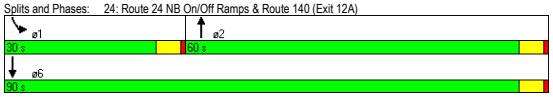
Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
24: Route 24 NB On/Off Ramps & Route 140 (Exit 12A) 2030 No-Build Conditions - AM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	285	640	1175	285	1225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	12	12
Storage Length (ft)	0	0		300	250	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		30			30
Link Distance (ft)	736		624			870
Travel Time (s)	16.7		14.2			19.8
Peak Hour Factor	0.92	0.92	0.86	0.86	0.92	0.92
Heavy Vehicles (%)	0%	1%	7%	6%	6%	8%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	310	744	1366	310	1332
Turn Type		Free		Free	Prot	
Protected Phases			2		1	6
Permitted Phases		Free		Free		
Detector Phase			2		1	6
Switch Phase						
Minimum Initial (s)			8.0		16.0	16.0
Minimum Split (s)			13.0		21.0	21.0
Total Split (s)	0.0	0.0	60.0	0.0	30.0	90.0
Total Split (%)	0.0%	0.0%	66.7%	0.0%	33.3%	100.0%
Maximum Green (s)			55.0		25.0	85.0
Yellow Time (s)			4.0		4.0	4.0
All-Red Time (s)			1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	5.0	4.0	5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)			2.0		2.0	2.0
Recall Mode			C-Max		None	C-Min
v/c Ratio		0.17	0.33	0.90	0.79	0.40
Control Delay		0.2	7.6	9.9	40.6	0.2
Queue Delay		0.0	0.0	0.0	0.0	0.0
Total Delay		0.2	7.6	9.9	40.6	0.2
Queue Length 50th (ft)		0	86	0	172	0
Queue Length 95th (ft)		0	127	0	m217	0
Internal Link Dist (ft)	656		544			790
Turn Bay Length (ft)				300	250	
Base Capacity (vph)		1790	2227	1524	473	3343
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		0.17	0.33	0.90	0.66	0.40

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 13 (14%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 24: Route 24 NB On/Off Ramps & Route 140 (Exit 12A)



HCM Signalized Intersection Capacity Analysis
24: Route 24 NB On/Off Ramps & Route 140 (Exit 12A) 2030 No-Build Conditions - AM Peak Hour

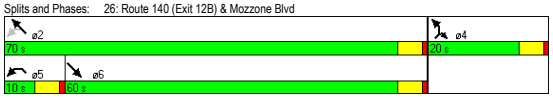
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	285	640	1175	285	1225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	15	12	12	12	12
Total Lost time (s)		4.0	5.0	4.0	5.0	5.0
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95
Frt		0.86	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1790	3374	1524	1703	3343
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1790	3374	1524	1703	3343
Peak-hour factor, PHF	0.92	0.92	0.86	0.86	0.92	0.92
Adj. Flow (vph)	0	310	744	1366	310	1332
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	310	744	1366	310	1332
Heavy Vehicles (%)	0%	1%	7%	6%	6%	8%
Turn Type		Free		Free	Prot	
Protected Phases			2		1	6
Permitted Phases		Free		Free		
Actuated Green, G (s)		90.0	59.4	90.0	20.6	90.0
Effective Green, g (s)		90.0	59.4	90.0	20.6	90.0
Actuated g/C Ratio		1.00	0.66	1.00	0.23	1.00
Clearance Time (s)			5.0		5.0	5.0
Vehicle Extension (s)			2.0		2.0	2.0
Lane Grp Cap (vph)		1790	2227	1524	390	3343
v/s Ratio Prot			0.22		0.18	0.40
v/s Ratio Perm		0.17		c0.90		
v/c Ratio		0.17	0.33	0.90	0.79	0.40
Uniform Delay, d1		0.0	6.7	0.0	32.7	0.0
Progression Factor		1.00	1.00	1.00	0.93	1.00
Incremental Delay, d2		0.2	0.4	8.6	6.7	0.2
Delay (s)		0.2	7.1	8.6	37.1	0.2
Level of Service		A	A	A	D	A
Approach Delay (s)	0.2		8.1			7.2
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (vph)	970	20	35	980	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		150	0		0	0
Storage Lanes		0	1		1	1
Taper Length (ft)		25	25		25	25
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	1723			724	1178	
Travel Time (s)	39.2			16.5	26.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1076	0	0	1103	5	16
Turn Type			pm+pt			Prot
Protected Phases	6		5	2	4	4
Permitted Phases			2			
Detector Phase	6		5	2	4	4
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	15.0		10.0	10.0	15.0	15.0
Total Split (s)	60.0	0.0	10.0	70.0	20.0	20.0
Total Split (%)	66.7%	0.0%	11.1%	77.8%	22.2%	22.2%
Maximum Green (s)	55.0		5.0	65.0	15.0	15.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	4.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	C-Min		None	C-Min	None	None
v/c Ratio	0.33			0.38	0.04	0.13
Control Delay	1.4			0.9	39.6	20.5
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	1.4			0.9	39.6	20.5
Queue Length 50th (ft)	0			2	3	0
Queue Length 95th (ft)	81			28	14	20
Internal Link Dist (ft)	1643			644	1098	
Turn Bay Length (ft)						
Base Capacity (vph)	3267			2884	295	277
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	0.33			0.38	0.02	0.06

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 16 (18%), Referenced to phase 2:NWTL and 6:SET, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	

Splits and Phases: 26: Route 140 (Exit 12B) & Mozzone Blvd



Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (vph)	970	20	35	980	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3528			3533	1770	1583
Flt Permitted	1.00			0.88	0.95	1.00
Satd. Flow (perm)	3528			3115	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1054	22	38	1065	5	16
RTOR Reduction (vph)	1	0	0	0	0	16
Lane Group Flow (vph)	1075	0	0	1103	5	0
Turn Type			pm+pt			Prot
Protected Phases	6		5	2	4	4
Permitted Phases			2			
Actuated Green, G (s)	77.3			77.3	2.7	2.7
Effective Green, g (s)	77.3			77.3	2.7	2.7
Actuated g/C Ratio	0.86			0.86	0.03	0.03
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	3030			2675	53	47
v/s Ratio Prot	0.30				c0.00	0.00
v/s Ratio Perm				c0.35		
v/c Ratio	0.35			0.41	0.09	0.01
Uniform Delay, d1	1.3			1.4	42.5	42.4
Progression Factor	1.00			0.39	1.00	1.00
Incremental Delay, d2	0.3			0.1	0.8	0.1
Delay (s)	1.6			0.6	43.2	42.4
Level of Service	A			A	D	D
Approach Delay (s)	1.6			0.6	42.6	
Approach LOS	A			A	D	

Intersection Summary			
HCM Average Control Delay	1.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

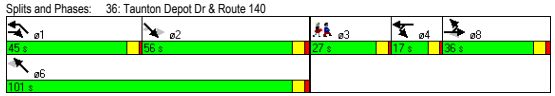
Lanes, Volumes, Timings
36: Taunton Depot Dr & Route 140

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR	ø3
Lane Configurations													
Volume (vph)	60	0	65	5	0	0	5	895	125	85	730	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	12	12	
Storage Length (ft)	0		100	0		0	180		130	320		350	
Storage Lanes	1		1	0		0	1		1	1		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		846			205			2224			1723		
Travel Time (s)		19.2			4.7			50.5			39.2		
Peak Hour Factor	0.85	0.85	0.85	0.50	0.50	0.50	0.90	0.90	0.90	0.93	0.93	0.93	
Heavy Vehicles (%)	9%	0%	4%	0%	0%	0%	0%	4%	5%	0%	6%	0%	
Shared Lane Traffic (%)	50%												
Lane Group Flow (vph)	35	36	76	0	10	0	0	1000	139	91	785	0	
Turn Type	Split		pm+ov	Split			Perm		Perm	pm+pt			
Protected Phases	8	8	1	4	4			2		1	6		3
Permitted Phases			8				2		2	6			
Detector Phase	8	8	1	4	4		2	2	2	1	6		
Switch Phase													
Minimum Initial (s)	6.0	6.0	6.0	4.0	4.0		6.0	6.0	6.0	6.0	20.0		7.0
Minimum Split (s)	12.0	12.0	11.0	9.0	9.0		12.0	12.0	12.0	11.0	26.0		27.0
Total Split (s)	36.0	36.0	45.0	17.0	17.0	0.0	56.0	56.0	56.0	45.0	101.0	0.0	27.0
Total Split (%)	19.9%	19.9%	24.9%	9.4%	9.4%	0.0%	30.9%	30.9%	30.9%	24.9%	55.8%	0.0%	15%
Maximum Green (s)	30.0	30.0	40.0	12.0	12.0		50.0	50.0	50.0	40.0	95.0		22.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0		2.0	2.0	2.0	1.0	2.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	5.0	5.0	5.0	4.0	6.0	6.0	6.0	5.0	6.0	4.0	
Lead/Lag			Lead	Lag	Lag		Lag	Lag	Lag	Lead			Lead
Lead-Lag Optimize?				Yes	Yes								Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		4.0	4.0	4.0	2.0	4.0		3.0
Recall Mode	None	None	None	None	None		Min	Min	Min	None	Min		None
Walk Time (s)													7.0
Flash Dont Walk (s)													15.0
Pedestrian Calls (#/hr)													2
v/c Ratio	0.26	0.27	0.19		0.08			0.51	0.15	0.23	0.31		
Control Delay	45.7	45.8	9.6		45.8			15.5	9.8	8.2	7.3		
Queue Delay	0.0	0.0	0.0		0.0			0.0	0.0	0.0	0.0		
Total Delay	45.7	45.8	9.6		45.8			15.5	9.8	8.2	7.3		
Queue Length 50th (ft)	14	15	0		4			122	16	8	45		
Queue Length 95th (ft)	62	64	36		15			448	96	64	253		
Internal Link Dist (ft)		766			125			2144			1643		
Turn Bay Length (ft)			100						130	320			
Base Capacity (vph)	584	584	1000		304			2164	1023	988	3241		
Starvation Cap Reductn	0	0	0		0			0	0	0	0		
Spillback Cap Reductn	0	0	0		0			0	0	0	0		
Storage Cap Reductn	0	0	0		0			0	0	0	0		
Reduced v/c Ratio	0.06	0.06	0.08		0.03			0.46	0.14	0.09	0.24		

Intersection Summary	
Area Type:	Other
Cycle Length: 181	
Actuated Cycle Length: 84.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 36: Taunton Depot Dr & Route 140



HCM Signalized Intersection Capacity Analysis
36: Taunton Depot Dr & Route 140

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	60	0	65	5	0	0	5	895	125	85	730	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)	6.0	6.0	5.0		5.0			6.0	6.0	5.0	6.0	
Lane Util. Factor	0.95	0.95	1.00		1.00			0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85		1.00			1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00		0.95			1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1573	1573	1553		2046			3471	1538	1805	3406	
Flt Permitted	0.95	0.95	1.00		0.95			0.95	1.00	0.20	1.00	
Satd. Flow (perm)	1573	1573	1553		2046			3300	1538	376	3406	
Peak-hour factor, PHF	0.85	0.85	0.85	0.50	0.50	0.50	0.90	0.90	0.90	0.93	0.93	0.93
Adj. Flow (vph)	71	0	76	10	0	0	6	994	139	91	785	0
RTOR Reduction (vph)	0	0	65	0	0	0	0	0	21	0	0	0
Lane Group Flow (vph)	35	36	11	0	10	0	0	1000	118	91	785	0
Heavy Vehicles (%)	9%	0%	4%	0%	0%	0%	0%	4%	5%	0%	6%	0%
Turn Type	Split		pm+ov	Split			Perm		Perm	pm+pt		
Protected Phases	8	8	1	4	4			2		1	6	
Permitted Phases			8				2		2	6		
Actuated Green, G (s)	6.0	6.0	13.0		0.8			50.2	50.2	62.2	62.2	
Effective Green, g (s)	6.0	6.0	13.0		0.8			50.2	50.2	62.2	62.2	
Actuated g/C Ratio	0.06	0.06	0.14		0.01			0.53	0.53	0.66	0.66	
Clearance Time (s)	6.0	6.0	5.0		5.0			6.0	6.0	5.0	6.0	
Vehicle Extension (s)	2.0	2.0	2.0		2.0			4.0	4.0	2.0	4.0	
Lane Grp Cap (vph)	100	100	215		17			1762	821	355	2254	
v/s Ratio Prot	0.02	c0.02	0.00		c0.00					0.02	c0.23	
v/s Ratio Perm			0.00					c0.30	0.08	0.15		
v/c Ratio	0.35	0.36	0.05		0.59			0.57	0.14	0.26	0.35	
Uniform Delay, d1	42.1	42.2	35.1		46.4			14.6	11.1	7.5	7.0	
Progression Factor	1.00	1.00	1.00		1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.8	0.0		29.3			0.5	0.1	0.1	0.1	
Delay (s)	42.9	43.0	35.2		75.7			15.2	11.2	7.7	7.1	
Level of Service	D	D	D		E			B	B	A	A	
Approach Delay (s)		38.9			75.7			14.7			7.2	
Approach LOS		D			E			B			A	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	94.0	Sum of lost time (s)	31.0
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

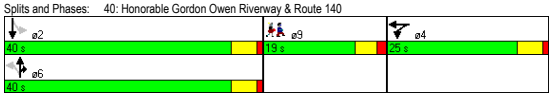
Lanes, Volumes, Timings
40: Honorable Gordon Owen Riverway & Route 140

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	0	0	0	220	0	5	0	650	290	10	400	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	13	12	12	11	12	12	13	12	
Storage Length (ft)	0		0	0		0	0		175	0		0	
Storage Lanes	0		0	0		0	0		1	0		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		220			991			547			1888		
Travel Time (s)		5.0			22.5			12.4			42.9		
Peak Hour Factor	0.92	0.92	0.92	0.84	0.84	0.84	0.93	0.93	0.93	0.89	0.89	0.89	
Heavy Vehicles (%)	0%	0%	0%	8%	0%	0%	0%	6%	4%	8%	5%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	0	0	0	268	0	0	699	312	0	460	0	
Turn Type				Split			Perm		Prot	Perm			
Protected Phases				4	4			6	6		2		9
Permitted Phases							6			2			
Detector Phase				4	4		6	6	6	2	2		
Switch Phase													
Minimum Initial (s)				6.0	6.0		6.0	6.0	6.0	6.0	6.0		1.0
Minimum Split (s)				11.0	11.0		11.0	11.0	11.0	11.0	11.0		19.0
Total Split (s)	0.0	0.0	0.0	25.0	25.0	0.0	40.0	40.0	40.0	40.0	40.0	0.0	19.0
Total Split (%)	0.0%	0.0%	0.0%	29.8%	29.8%	0.0%	47.6%	47.6%	47.6%	47.6%	47.6%	0.0%	23%
Maximum Green (s)				20.0	20.0		35.0	35.0	35.0	35.0	35.0		14.0
Yellow Time (s)				4.0	4.0		4.0	4.0	4.0	4.0	4.0		3.5
All-Red Time (s)				1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0	
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)				4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0
Recall Mode				None	None		None	None	None	None	None		None
Walk Time (s)													7.0
Flash Dont Walk (s)													7.0
Pedestrian Calls (#/hr)													1
v/c Ratio					0.63			0.74	0.32		0.46		
Control Delay					30.1			20.4	3.8		12.8		
Queue Delay					0.0			0.0	0.0		0.0		
Total Delay					30.1			20.4	3.8		12.8		
Queue Length 50th (ft)					86			156	7		81		
Queue Length 95th (ft)					191			#584	65		276		
Internal Link Dist (ft)		140			911			467			1808		
Turn Bay Length (ft)									175				
Base Capacity (vph)					582			1019	1021		1080		
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					0.46			0.69	0.31		0.43		

Intersection Summary	
Area Type:	Other
Cycle Length: 84	
Actuated Cycle Length: 61.8	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 40: Honorable Gordon Owen Riverway & Route 140



HCM Signalized Intersection Capacity Analysis
40: Honorable Gordon Owen Riverway & Route 140

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	220	0	5	0	650	290	10	400	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	13	12	12	11	12	12	13	12
Total Lost time (s)					5.0			5.0	5.0		5.0	
Lane Util. Factor					1.00			1.00	1.00		1.00	
Frt					1.00			1.00	0.85		1.00	
Flt Protected					0.95			1.00	1.00		1.00	
Satd. Flow (prot)					1731			1733	1553		1866	
Flt Permitted					0.95			1.00	1.00		0.98	
Satd. Flow (perm)					1731			1733	1553		1836	
Peak-hour factor, PHF	0.92	0.92	0.92	0.84	0.84	0.84	0.93	0.93	0.93	0.89	0.89	0.89
Adj. Flow (vph)	0	0	0	262	0	6	0	699	312	11	449	0
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	128	0	0	0
Lane Group Flow (vph)	0	0	0	0	267	0	0	699	184	0	460	0
Heavy Vehicles (%)	0%	0%	0%	8%	0%	0%	0%	6%	4%	8%	5%	0%
Turn Type				Split			Perm		Prot	Perm		
Protected Phases				4	4			6	6		2	
Permitted Phases							6			2		
Actuated Green, G (s)					15.1			33.5	33.5		33.5	
Effective Green, g (s)					15.1			33.5	33.5		33.5	
Actuated g/C Ratio					0.23			0.51	0.51		0.51	
Clearance Time (s)					5.0			5.0	5.0		5.0	
Vehicle Extension (s)					4.0			4.0	4.0		4.0	
Lane Grp Cap (vph)					398			884	792		936	
v/s Ratio Prot					c0.15			c0.40	0.12			
v/s Ratio Perm											0.25	
v/c Ratio					0.67			0.79	0.23		0.49	
Uniform Delay, d1					23.0			13.2	8.9		10.5	
Progression Factor					1.00			1.00	1.00		1.00	
Incremental Delay, d2					4.8			5.2	0.2		0.6	
Delay (s)					27.9			18.4	9.2		11.1	
Level of Service					C			B	A		B	
Approach Delay (s)		0.0			27.9			15.5			11.1	
Approach LOS		A			C			B			B	

Intersection Summary					
HCM Average Control Delay		16.3	HCM Level of Service		B
HCM Volume to Capacity ratio		0.75			
Actuated Cycle Length (s)		65.7	Sum of lost time (s)		17.1
Intersection Capacity Utilization		55.0%	ICU Level of Service		B
Analysis Period (min)		15			
c Critical Lane Group					

Lanes, Volumes, Timings
43: Route 44/Dean Street & Longmeadow Street

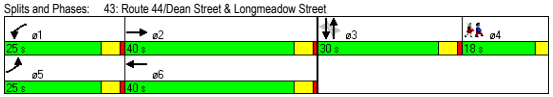
2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø4
Lane Configurations													
Volume (vph)	10	810	285	185	640	95	115	350	270	125	220	15	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	16	10	12	13	12	11	16	12	11	12	
Storage Length (ft)	100		70	100		70	0		50	0		100	
Storage Lanes	1		1	1		1	0		1	0		1	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		1663			1440			2994			1249		
Travel Time (s)		37.8			32.7			68.0			28.4		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.86	0.86	0.86	0.68	0.68	0.68	
Heavy Vehicles (%)	18%	3%	3%	5%	4%	2%	8%	6%	3%	3%	8%	20%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	11	1165	0	197	782	0	0	855	0	0	530	0	
Turn Type	Prot			Prot			Perm			Perm			
Protected Phases	5	2		1	6			3			3		4
Permitted Phases							3			3			
Detector Phase	5	2		1	6		3	3		3	3		
Switch Phase													
Minimum Initial (s)	9.0	12.0		9.0	12.0		8.0	8.0		8.0	8.0		8.0
Minimum Split (s)	14.0	17.0		14.0	17.0		13.0	13.0		13.0	13.0		18.0
Total Split (s)	25.0	40.0	0.0	25.0	40.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	18.0
Total Split (%)	22.1%	35.4%	0.0%	22.1%	35.4%	0.0%	26.5%	26.5%	0.0%	26.5%	26.5%	0.0%	16%
Maximum Green (s)	20.0	35.0		20.0	35.0		25.0	25.0		25.0	25.0		15.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	4.0	5.0		4.0	5.0		4.0	4.0		4.0	4.0		0.2
Recall Mode	None	Min		None	Min		None	None		None	None		None
Walk Time (s)													8.0
Flash Dont Walk (s)													7.0
Pedestrian Calls (#/hr)													6
v/c Ratio	0.08	0.91		0.70	0.40			1.43			2.36dl		
Control Delay	45.3	40.8		52.0	13.8			230.3			98.4		
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0		
Total Delay	45.3	40.8		52.0	13.8			230.3			98.4		
Queue Length 50th (ft)	6	321		108	105			~337			~180		
Queue Length 95th (ft)	27	#626		#230	284			#542			#238		
Internal Link Dist (ft)		1583			1360			2914			1169		
Turn Bay Length (ft)	100			100									
Base Capacity (vph)	302	1274		339	1964			598			492		
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	0.04	0.91		0.58	0.40			1.43			1.08		

Intersection Summary

Area Type: Other
Cycle Length: 113
Actuated Cycle Length: 95.4
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
~ 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 43: Route 44/Dean Street & Longmeadow Street



HCM Signalized Intersection Capacity Analysis
43: Route 44/Dean Street & Longmeadow Street

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	810	285	185	640	95	115	350	270	125	220	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	16	10	12	13	12	11	16	12	11	12
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frt	1.00	0.96		1.00	0.98			0.94			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1428	3368		1604	3412			3110			3193	
Flt Permitted	0.95	1.00		0.95	1.00			0.64			0.57	
Satd. Flow (perm)	1428	3368		1604	3412			2001			1853	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.86	0.86	0.86	0.68	0.68	0.68
Adj. Flow (vph)	11	862	303	197	681	101	134	407	314	184	324	22
RTOR Reduction (vph)	0	28	0	0	7	0	0	71	0	0	3	0
Lane Group Flow (vph)	11	1137	0	197	775	0	0	784	0	0	527	0
Heavy Vehicles (%)	18%	3%	3%	5%	4%	2%	8%	6%	3%	3%	8%	20%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			3			3	
Permitted Phases							3			3		
Actuated Green, G (s)	1.5	39.4		16.8	54.7			25.2			25.2	
Effective Green, g (s)	1.5	39.4		16.8	54.7			25.2			25.2	
Actuated g/C Ratio	0.01	0.39		0.16	0.54			0.25			0.25	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	4.0	5.0		4.0	5.0			4.0			4.0	
Lane Grp Cap (vph)	21	1302		264	1832			495			458	
v/s Ratio Prot	0.01	c0.34		c0.12	0.23							
v/s Ratio Perm								c0.39			0.28	
v/c Ratio	0.52	0.87		0.75	0.42			1.58			2.36dl	
Uniform Delay, d1	49.8	28.9		40.5	14.1			38.4			38.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	27.4	7.3		11.6	0.3			272.5			90.3	
Delay (s)	77.3	36.3		52.1	14.5			310.8			128.7	
Level of Service	E	D		D	B			F			F	
Approach Delay (s)		36.6			22.0			310.8			128.7	
Approach LOS		D			C			F			F	

Intersection Summary

HCM Average Control Delay	112.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	101.9	Sum of lost time (s)	20.5
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

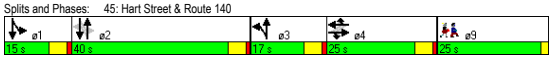
Lanes, Volumes, Timings
45: Hart Street & Route 140

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2	ø9
Lane Configurations														
Volume (vph)	25	165	270	120	110	245	135	625	60	160	530	10		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	11	11	12	12	12	11	11	11	12	12	12		
Storage Length (ft)	0		50	0		50	50		0	50		0		
Storage Lanes	0		1	0		1	1		0	1		0		
Taper Length (ft)	25		25	25		25	25		25	25		25		
Right Turn on Red			Yes			Yes			Yes			Yes		
Link Speed (mph)		30			30			35			35			
Link Distance (ft)		1373			971			2224			3692			
Travel Time (s)		31.2			22.1			43.3			71.9			
Peak Hour Factor	0.80	0.80	0.80	0.95	0.95	0.95	0.95	0.95	0.95	0.73	0.73	0.73		
Heavy Vehicles (%)	0%	6%	3%	1%	4%	3%	4%	5%	2%	10%	6%	13%		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	237	338	0	242	258	0	863	0	0	959	0		
Turn Type	Perm		Prot	Perm		Prot	pm+pt			pm+pt				
Protected Phases		4	4		4	4	3	2 3		1	1 2		2	9
Permitted Phases	4			4			2 3			1 2				
Detector Phase	4	4	4	4	4	4	3	2 3		1	1 2			
Switch Phase														
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	4.0			4.0			8.0	1.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	9.0			9.0			13.0	25.0
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	17.0	57.0	0.0	15.0	55.0	0.0	40.0	25.0
Total Split (%)	20.5%	20.5%	20.5%	20.5%	20.5%	20.5%	13.9%	46.7%	0.0%	12.3%	45.1%	0.0%	33%	20%
Maximum Green (s)	20.0	20.0	20.0	20.0	20.0	20.0	12.0			10.0			35.0	23.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0			4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0			1.0			1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0		
Lead/Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead			Lead			Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes			Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0			3.0	3.0
Recall Mode	Max	Max	Max	Max	Max	Max	None			None			None	None
Walk Time (s)														7.0
Flash Dont Walk (s)														16.0
Pedestrian Calls (#/hr)														4
v/c Ratio		0.91	0.80		1.48	0.64		0.78			0.99			
Control Delay		79.3	37.9		279.8	30.3		28.4			53.2			
Queue Delay		0.0	0.0		0.0	0.0		0.0			0.0			
Total Delay		79.3	37.9		279.8	30.3		28.4			53.2			
Queue Length 50th (ft)		143	111		~203	80		165			201			
Queue Length 95th (ft)		#315	#246		#452	#226		#400			#361			
Internal Link Dist (ft)		1293			891			2144			3612			
Turn Bay Length (ft)			50			50								
Base Capacity (vph)		260	421		163	401		1108			964			
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		0.91	0.80		1.48	0.64		0.78			0.99			

Intersection Summary	
Area Type:	Other
Cycle Length: 122	
Actuated Cycle Length: 102	
Natural Cycle: 150	
Control Type: Semi Act-Uncoord	
~ 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.	

Splits and Phases: 45: Hart Street & Route 140



HCM Signalized Intersection Capacity Analysis
45: Hart Street & Route 140

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	165	270	120	110	245	135	625	60	160	530	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12	11	11	11	12	12	12
Total Lost time (s)		5.0	5.0		5.0	5.0		5.0			5.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.95			0.95	
Frt		1.00	0.85		1.00	0.85		0.99			1.00	
Flt Protected		0.99	1.00		0.97	1.00		0.99			0.99	
Satd. Flow (prot)		1734	1516		1808	1568		3272			3328	
Flt Permitted		0.75	1.00		0.45	1.00		0.63			0.54	
Satd. Flow (perm)		1315	1516		826	1568		2069			1830	
Peak-hour factor, PHF	0.80	0.80	0.80	0.95	0.95	0.95	0.95	0.95	0.95	0.73	0.73	0.73
Adj. Flow (vph)	31	206	338	126	116	258	142	658	63	219	726	14
RTOR Reduction (vph)	0	0	122	0	0	91	0	4	0	0	1	0
Lane Group Flow (vph)	0	237	216	0	242	167	0	859	0	0	958	0
Heavy Vehicles (%)	0%	6%	3%	1%	4%	3%	4%	5%	2%	10%	6%	13%
Turn Type	Perm		Prot	Perm		Prot	pm+pt			pm+pt		
Protected Phases		4	4		4	4	3	2 3		1	1 2	
Permitted Phases	4			4			2 3			1 2		
Actuated Green, G (s)		20.2	20.2		20.2	20.2		47.4			45.4	
Effective Green, g (s)		20.2	20.2		20.2	20.2		47.4			45.4	
Actuated g/C Ratio		0.20	0.20		0.20	0.20		0.46			0.44	
Clearance Time (s)		5.0	5.0		5.0	5.0						
Vehicle Extension (s)		3.0	3.0		3.0	3.0						
Lane Grp Cap (vph)		257	296		161	306		1088			949	
v/s Ratio Prot			0.14			0.11		c0.09			c0.10	
v/s Ratio Perm		0.18			c0.29			0.27			c0.34	
v/c Ratio		0.92	0.73		1.50	0.55		0.79			1.01	
Uniform Delay, d1		40.9	39.1		41.7	37.5		23.8			29.0	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		39.2	14.8		255.9	6.8		3.9			31.7	
Delay (s)		80.1	53.9		297.6	44.4		27.7			60.7	
Level of Service		F	D		F	D		C			E	
Approach Delay (s)		64.7			166.9			27.7			60.7	
Approach LOS		E			F			C			E	

Intersection Summary					
HCM Average Control Delay		70.0	HCM Level of Service		E
HCM Volume to Capacity ratio		1.10			
Actuated Cycle Length (s)		103.5	Sum of lost time (s)		25.8
Intersection Capacity Utilization		81.9%	ICU Level of Service		D
Analysis Period (min)		15			
c Critical Lane Group					

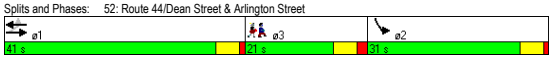
Lanes, Volumes, Timings
52: Route 44/Dean Street & Arlington Street

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	ø3
Lane Configurations							
Volume (vph)	30	800	655	115	275	50	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	16	12	14	12	
Storage Length (ft)	150			0	0	0	
Storage Lanes	1			0	1	0	
Taper Length (ft)	25			25	25	25	
Right Turn on Red				Yes		No	
Link Speed (mph)		30	30		30		
Link Distance (ft)		1036	1663		418		
Travel Time (s)		23.5	37.8		9.5		
Peak Hour Factor	0.87	0.87	0.86	0.86	0.81	0.81	
Heavy Vehicles (%)	3%	5%	5%	3%	4%	12%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	34	920	896	0	402	0	
Turn Type	Perm						
Protected Phases		1	1		2		3
Permitted Phases	1						
Detector Phase	1	1	1		2		
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		5.0		5.0
Minimum Split (s)	15.0	15.0	15.0		10.0		21.0
Total Split (s)	41.0	41.0	41.0	0.0	31.0	0.0	21.0
Total Split (%)	44.1%	44.1%	44.1%	0.0%	33.3%	0.0%	23%
Maximum Green (s)	36.0	36.0	36.0		26.0		15.0
Yellow Time (s)	4.0	4.0	4.0		4.0		4.0
All-Red Time (s)	1.0	1.0	1.0		1.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	4.0	5.0	4.0	
Lead/Lag	Lead	Lead	Lead				Lag
Lead-Lag Optimize?	Yes	Yes	Yes				Yes
Vehicle Extension (s)	3.0	3.0	3.0		3.0		1.0
Recall Mode	None	None	None		None		None
Walk Time (s)							5.0
Flash Dont Walk (s)							10.0
Pedestrian Calls (#/hr)							4
v/c Ratio	0.35	0.97	0.84		0.78		
Control Delay	29.3	43.8	26.6		36.0		
Queue Delay	0.0	0.0	0.0		0.0		
Total Delay	29.3	43.8	26.6		36.0		
Queue Length 50th (ft)	7	317	268		144		
Queue Length 95th (ft)	#57	#890	#795		287		
Internal Link Dist (ft)		956	1583		338		
Turn Bay Length (ft)	150						
Base Capacity (vph)	97	948	1061		684		
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	0.35	0.97	0.84		0.59		

Intersection Summary	
Area Type:	Other
Cycle Length: 93	
Actuated Cycle Length: 70.4	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 52: Route 44/Dean Street & Arlington Street



HCM Signalized Intersection Capacity Analysis
52: Route 44/Dean Street & Arlington Street

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	30	800	655	115	275	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	16	12	14	12
Total Lost time (s)	5.0	5.0	5.0		5.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.98		0.98	
Flt Protected	0.95	1.00	1.00		0.96	
Satd. Flow (prot)	1636	1810	2015		1809	
Flt Permitted	0.11	1.00	1.00		0.96	
Satd. Flow (perm)	187	1810	2015		1809	
Peak-hour factor, PHF	0.87	0.87	0.86	0.86	0.81	0.81
Adj. Flow (vph)	34	920	762	134	340	62
RTOR Reduction (vph)	0	0	6	0	0	0
Lane Group Flow (vph)	34	920	890	0	402	0
Heavy Vehicles (%)	3%	5%	5%	3%	4%	12%
Turn Type	Perm					
Protected Phases		1	1		2	
Permitted Phases	1					
Actuated Green, G (s)	36.9	36.9	36.9		20.1	
Effective Green, g (s)	36.9	36.9	36.9		20.1	
Actuated g/C Ratio	0.49	0.49	0.49		0.27	
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	92	887	987		483	
v/s Ratio Prot		c0.51	0.44		c0.22	
v/s Ratio Perm	0.18					
v/c Ratio	0.37	1.04	0.90		0.83	
Uniform Delay, d1	12.0	19.2	17.5		26.0	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	2.5	40.3	11.2		11.7	
Delay (s)	14.5	59.5	28.8		37.7	
Level of Service	B	E	C		D	
Approach Delay (s)		57.9	28.8		37.7	
Approach LOS		E	C		D	

Intersection Summary			
HCM Average Control Delay	42.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	75.3	Sum of lost time (s)	18.3
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

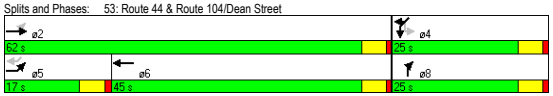
Lanes, Volumes, Timings
53: Route 44 & Route 104/Dean Street

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Volume (vph)	180	1000	0	0	725	20	0	0	30	5	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	16	12	12	12	12	16
Storage Length (ft)	50		0	0		50	0	0		0	50
Storage Lanes	1		0	0		0	0	1		1	1
Taper Length (ft)	25		25	25		25	25	25		25	25
Right Turn on Red			Yes			Yes					Yes
Link Speed (mph)		30			30		30			30	
Link Distance (ft)		825			1426		127			959	
Travel Time (s)		18.8			32.4		2.9			21.8	
Peak Hour Factor	0.85	0.85	0.85	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89
Heavy Vehicles (%)	3%	3%	0%	0%	4%	0%	0%	0%	7%	0%	4%
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	1388	0	0	810	0	0	0	0	40	202
Turn Type	pm+pt							custom	Perm		custom
Protected Phases	5	2			6			8		4	4
Permitted Phases	2								4		5
Detector Phase	5	2			6			8	4	4	4
Switch Phase											
Minimum Initial (s)	6.0	12.0			12.0			6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	17.0			17.0			11.0	11.0	11.0	11.0
Total Split (s)	17.0	62.0	0.0	0.0	45.0	0.0	0.0	25.0	25.0	25.0	25.0
Total Split (%)	19.5%	71.3%	0.0%	0.0%	51.7%	0.0%	0.0%	28.7%	28.7%	28.7%	28.7%
Maximum Green (s)	12.0	57.0			40.0			20.0	20.0	20.0	20.0
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	4.0	4.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead				Lag						
Lead-Lag Optimize?	Yes				Yes						
Vehicle Extension (s)	1.5	1.5			1.5			2.0	2.0	2.0	2.0
Recall Mode	None	Min			Min			None	None	None	None
v/c Ratio		0.82			0.33					0.18	0.61
Control Delay		12.4			4.1					30.2	22.6
Queue Delay		0.0			0.0					0.0	0.0
Total Delay		12.4			4.1					30.2	22.6
Queue Length 50th (ft)		152			47					16	35
Queue Length 95th (ft)		290			95					44	100
Internal Link Dist (ft)		745			1346		47			879	
Turn Bay Length (ft)											50
Base Capacity (vph)		2019			2516					521	616
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		0.69			0.32					0.08	0.33

Intersection Summary	
Area Type:	Other
Cycle Length: 87	
Actuated Cycle Length: 67.4	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 53: Route 44 & Route 104/Dean Street



HCM Signalized Intersection Capacity Analysis
53: Route 44 & Route 104/Dean Street

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Volume (vph)	180	1000	0	0	725	20	0	0	30	5	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	12	12	12	16
Total Lost time (s)		5.0			5.0					5.0	5.0
Lane Util. Factor		0.95			0.95					1.00	1.00
Frt		1.00			1.00					1.00	0.85
Flt Protected		0.99			1.00					0.95	1.00
Satd. Flow (prot)		3478			3461					1704	1760
Flt Permitted		0.68			1.00					0.95	1.00
Satd. Flow (perm)		2371			3461					1704	1760
Peak-hour factor, PHF	0.85	0.85	0.85	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89
Adj. Flow (vph)	212	1176	0	0	788	22	0	0	34	6	202
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	98
Lane Group Flow (vph)	0	1388	0	0	809	0	0	0	0	40	104
Heavy Vehicles (%)	3%	3%	0%	0%	4%	0%	0%	0%	7%	0%	4%
Turn Type	pm+pt							custom	Perm		custom
Protected Phases	5	2			6			8		4	4
Permitted Phases	2								4		5
Actuated Green, G (s)		48.2			48.2					8.9	8.9
Effective Green, g (s)		48.2			48.2					8.9	8.9
Actuated g/C Ratio		0.72			0.72					0.13	0.13
Clearance Time (s)		5.0			5.0					5.0	5.0
Vehicle Extension (s)		1.5			1.5					2.0	2.0
Lane Grp Cap (vph)		1703			2486					226	233
v/s Ratio Prot					0.23						c0.06
v/s Ratio Perm		c0.59								0.02	
v/c Ratio		0.82			0.33					0.18	0.45
Uniform Delay, d1		6.4			3.5					25.8	26.8
Progression Factor		1.00			1.00					1.00	1.00
Incremental Delay, d2		3.0			0.0					0.1	0.5
Delay (s)		9.4			3.5					26.0	27.3
Level of Service		A			A					C	C
Approach Delay (s)		9.4			3.5		0.0			27.1	
Approach LOS		A			A		A			C	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	67.1	Sum of lost time (s)	10.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

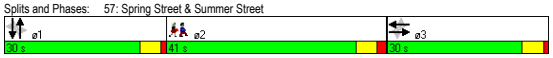
Lanes, Volumes, Timings
57: Spring Street & Summer Street

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	20	215	60	35	140	10	45	445	20	10	260	20	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	16	12	
Right Turn on Red			Yes			No			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		376			382			1581			384		
Travel Time (s)		8.5			8.7			35.9			8.7		
Peak Hour Factor	0.87	0.87	0.87	0.82	0.82	0.82	0.93	0.93	0.93	0.76	0.76	0.76	
Heavy Vehicles (%)	5%	4%	4%	3%	5%	13%	2%	5%	0%	0%	2%	5%	
Parking (#/hr)											0		
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	339	0	0	226	0	0	548	0	0	381	0	
Turn Type	Perm			Perm			Perm			Perm			
Protected Phases		3			3			1			1		2
Permitted Phases	3			3			1			1			
Detector Phase	3	3		3	3		1	1		1	1		
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0		15.0
Minimum Split (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0		21.0
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	41.0
Total Split (%)	29.7%	29.7%	0.0%	29.7%	29.7%	0.0%	29.7%	29.7%	0.0%	29.7%	29.7%	0.0%	41%
Maximum Green (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0		35.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	
Lead/Lag							Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		5.0
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													8.0
Pedestrian Calls (#/hr)													6
v/c Ratio		0.49			0.31			0.81			0.52		
Control Delay		18.8			16.7			31.2			19.6		
Queue Delay		0.0			0.0			0.0			0.1		
Total Delay		18.8			16.7			31.2			19.7		
Queue Length 50th (ft)		81			52			162			96		
Queue Length 95th (ft)		219			135			#498			207		
Internal Link Dist (ft)		296			302			1501			304		
Turn Bay Length (ft)													
Base Capacity (vph)		689			722			675			729		
Starvation Cap Reductn		0			0			0			32		
Spillback Cap Reductn		0			0			0			0		
Storage Cap Reductn		0			0			0			0		
Reduced v/c Ratio		0.49			0.31			0.81			0.55		

Intersection Summary	
Area Type:	Other
Cycle Length: 101	
Actuated Cycle Length: 64.2	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 57: Spring Street & Summer Street



HCM Signalized Intersection Capacity Analysis
57: Spring Street & Summer Street

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	215	60	35	140	10	45	445	20	10	260	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	12	12	12	12	12	16	12
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			0.99			0.99			0.99	
Flt Protected		1.00			0.99			1.00			1.00	
Satd. Flow (prot)		1770			2016			1800			1877	
Flt Permitted		0.97			0.90			0.94			0.98	
Satd. Flow (perm)		1724			1825			1704			1840	
Peak-hour factor, PHF	0.87	0.87	0.87	0.82	0.82	0.82	0.93	0.93	0.93	0.76	0.76	0.76
Adj. Flow (vph)	23	247	69	43	171	12	48	478	22	13	342	26
RTOR Reduction (vph)	0	8	0	0	0	0	0	1	0	0	2	0
Lane Group Flow (vph)	0	331	0	0	226	0	0	547	0	0	379	0
Heavy Vehicles (%)	5%	4%	4%	3%	5%	13%	2%	5%	0%	0%	2%	5%
Parking (#/hr)											0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Actuated Green, G (s)		25.4			25.4			25.4			25.4	
Effective Green, g (s)		25.4			25.4			25.4			25.4	
Actuated g/C Ratio		0.37			0.37			0.37			0.37	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		633			670			625			675	
v/s Ratio Prot												
v/s Ratio Perm		c0.19			0.12			c0.32			0.21	
v/c Ratio		0.52			0.34			0.87			0.56	
Uniform Delay, d1		17.2			15.8			20.4			17.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		3.1			1.4			15.7			3.4	
Delay (s)		20.2			17.2			36.1			20.8	
Level of Service		C			B			D			C	
Approach Delay (s)		20.2			17.2			36.1			20.8	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM Average Control Delay	25.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	69.2	Sum of lost time (s)	18.4
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
58: Route 44/Main Street & Union Street

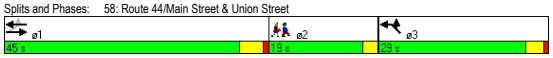
2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2	ø2
Lane Configurations												
Volume (vph)	10	530	305	0	485	10	0	0	450	10	20	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	16	12	16	12	12	12	12	16	15	
Right Turn on Red			Yes			Yes		Yes			Yes	
Link Speed (mph)		30			30		30		30			
Link Distance (ft)		913			784		606		384			
Travel Time (s)		20.8			17.8		13.8		8.7			
Peak Hour Factor	0.90	0.90	0.90	0.89	0.89	0.89	0.92	0.92	0.97	0.97	0.97	
Heavy Vehicles (%)	0%	5%	5%	0%	6%	14%	0%	0%	7%	0%	0%	
Parking (#/hr)			0			0						
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	939	0	0	556	0	0	0	464	31	0	
Turn Type	Perm									Prot		
Protected Phases		1			1				3	3		2
Permitted Phases	1											
Detector Phase	1	1			1				3	3		
Switch Phase												
Minimum Initial (s)	15.0	15.0			15.0				5.0	5.0		1.0
Minimum Split (s)	20.0	20.0			20.0				9.0	9.0		19.0
Total Split (s)	45.0	45.0	0.0	0.0	45.0	0.0	0.0	0.0	29.0	29.0	0.0	19.0
Total Split (%)	48.4%	48.4%	0.0%	0.0%	48.4%	0.0%	0.0%	0.0%	31.2%	31.2%	0.0%	20%
Maximum Green (s)	40.0	40.0			40.0				25.0	25.0		16.0
Yellow Time (s)	4.0	4.0			4.0				3.0	3.0		3.0
All-Red Time (s)	1.0	1.0			1.0				1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lead			Lead							Lag
Lead-Lag Optimize?	Yes	Yes			Yes							Yes
Vehicle Extension (s)	3.0	3.0			3.0				3.0	3.0		3.0
Recall Mode	Max	Max			Max				Max	Max		None
Walk Time (s)												7.0
Flash Dont Walk (s)												9.0
Pedestrian Calls (#/hr)												7
v/c Ratio		0.92			0.53				0.85	0.05		
Control Delay		33.4			16.1				42.5	12.3		
Queue Delay		0.0			0.0				0.0	0.0		
Total Delay		33.4			16.1				42.5	12.3		
Queue Length 50th (ft)		337			149				191	3		
Queue Length 95th (ft)		#860			356				#481	26		
Internal Link Dist (ft)		833			704		526		304			
Turn Bay Length (ft)												
Base Capacity (vph)		1023			1048				547	607		
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		0.92			0.53				0.85	0.05		

Intersection Summary	
Area Type:	Other
Cycle Length: 93	
Actuated Cycle Length: 77.8	
Natural Cycle: 110	
Control Type: Semi Act-Uncoord	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 58: Route 44/Main Street & Union Street



HCM Signalized Intersection Capacity Analysis
58: Route 44/Main Street & Union Street

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2
Lane Configurations											
Volume (vph)	10	530	305	0	485	10	0	0	450	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	16	12	16	12	12	12	12	16	15
Total Lost time (s)		5.0			5.0				4.0	4.0	
Lane Util. Factor		1.00			1.00				1.00	1.00	
Frt		0.95			1.00				1.00	0.85	
Flt Protected		1.00			1.00				0.95	1.00	
Satd. Flow (prot)		1951			2023				1687	1830	
Flt Permitted		0.99			1.00				0.95	1.00	
Satd. Flow (perm)		1938			2023				1687	1830	
Peak-hour factor, PHF	0.90	0.90	0.90	0.89	0.89	0.89	0.92	0.92	0.97	0.97	0.97
Adj. Flow (vph)	11	589	339	0	545	11	0	0	464	10	21
RTOR Reduction (vph)	0	19	0	0	0	0	0	0	0	14	0
Lane Group Flow (vph)	0	920	0	0	556	0	0	0	464	17	0
Heavy Vehicles (%)	0%	5%	5%	0%	6%	14%	0%	0%	7%	0%	0%
Parking (#/hr)			0			0					
Turn Type	Perm									Prot	
Protected Phases		1			1				3	3	
Permitted Phases	1										
Actuated Green, G (s)		40.3			40.3				25.2	25.2	
Effective Green, g (s)		40.3			40.3				25.2	25.2	
Actuated g/C Ratio		0.50			0.50				0.31	0.31	
Clearance Time (s)		5.0			5.0				4.0	4.0	
Vehicle Extension (s)		3.0			3.0				3.0	3.0	
Lane Grp Cap (vph)		974			1017				530	575	
v/s Ratio Prot					0.27				c0.28	0.01	
v/s Ratio Perm		c0.47									
v/c Ratio		0.94			0.55				0.88	0.03	
Uniform Delay, d1		18.9			13.7				26.0	19.0	
Progression Factor		1.00			1.00				1.00	1.00	
Incremental Delay, d2		18.2			2.1				18.1	0.1	
Delay (s)		37.1			15.8				44.1	19.1	
Level of Service		D			B				D	B	
Approach Delay (s)		37.1			15.8		0.0		42.5		
Approach LOS		D			B		A		D		

Intersection Summary			
HCM Average Control Delay	32.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	80.2	Sum of lost time (s)	14.7
Intersection Capacity Utilization	87.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

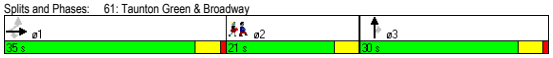
Lanes, Volumes, Timings
61: Taunton Green & Broadway

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	180	765	190	0	0	950	0	295	90	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	16	12	12	12	12	10	10	12	12	12	
Right Turn on Red	Yes		Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		304			913			579			302		
Travel Time (s)		6.9			20.8			13.2			6.9		
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.92	0.92	
Heavy Vehicles (%)	6%	6%	11%	0%	0%	6%	2%	6%	8%	0%	0%	0%	
Parking (#/hr)			0			0			0				
Shared Lane Traffic (%)													
Lane Group Flow (vph)	198	841	209	0	0	1033	0	328	100	0	0	0	
Turn Type	Perm		Perm			Free			Perm				
Protected Phases		1						3					2
Permitted Phases	1		1			Free			3				
Detector Phase	1	1	1					3	3				
Switch Phase													
Minimum Initial (s)	30.0	30.0	30.0					25.0	25.0				1.0
Minimum Split (s)	35.0	35.0	35.0					30.0	30.0				21.0
Total Split (s)	35.0	35.0	35.0	0.0	0.0	0.0	0.0	30.0	30.0	0.0	0.0	0.0	21.0
Total Split (%)	40.7%	40.7%	40.7%	0.0%	0.0%	0.0%	0.0%	34.9%	34.9%	0.0%	0.0%	0.0%	24%
Maximum Green (s)	30.0	30.0	30.0					25.0	25.0				17.0
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0				4.0
All-Red Time (s)	1.0	1.0	1.0					1.0	1.0				0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lead	Lead										Lag
Lead-Lag Optimize?	Yes	Yes	Yes										Yes
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0				2.0
Recall Mode	Max	Max	Max					Max	Max				Ped
Walk Time (s)													10.0
Flash Dont Walk (s)													7.0
Pedestrian Calls (#/hr)													7
v/c Ratio	0.29	0.71	0.32			0.41		0.67	0.23				
Control Delay	6.5	27.3	4.0			0.5		35.0	6.6				
Queue Delay	0.0	0.0	0.0			0.0		0.0	0.0				
Total Delay	6.5	27.3	4.0			0.5		35.0	6.6				
Queue Length 50th (ft)	13	205	0			0		156	0				
Queue Length 95th (ft)	m57	268	m39			0		249	35				
Internal Link Dist (ft)		224			833			499			222		
Turn Bay Length (ft)													
Base Capacity (vph)	692	1188	654			2547		486	436				
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	0.29	0.71	0.32			0.41		0.67	0.23				

Intersection Summary	
Area Type:	Other
Cycle Length: 86	
Actuated Cycle Length: 86	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 61: Taunton Green & Broadway



HCM Signalized Intersection Capacity Analysis
61: Taunton Green & Broadway

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	765	190	0	0	950	0	295	90	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	16	12	12	12	12	10	10	12	12	12
Total Lost time (s)	5.0	5.0	5.0			4.0		5.0	5.0			
Lane Util. Factor	1.00	0.95	1.00			0.88		1.00	1.00			
Frt	1.00	1.00	0.85			0.85		1.00	0.85			
Flt Protected	0.95	1.00	1.00			1.00		1.00	1.00			
Satd. Flow (prot)	1703	3406	1484			2547		1673	1256			
Flt Permitted	0.95	1.00	1.00			1.00		1.00	1.00			
Satd. Flow (perm)	1703	3406	1484			2547		1673	1256			
Peak-hour factor, PHF	0.91	0.91	0.91	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.92	0.92
Adj. Flow (vph)	198	841	209	0	0	1033	0	328	100	0	0	0
RTOR Reduction (vph)	98	0	136	0	0	0	0	0	71	0	0	0
Lane Group Flow (vph)	100	841	73	0	0	1033	0	328	29	0	0	0
Heavy Vehicles (%)	6%	6%	11%	0%	0%	6%	2%	6%	8%	0%	0%	0%
Parking (#/hr)			0			0			0			
Turn Type	Perm		Perm			Free			Perm			
Protected Phases		1						3				
Permitted Phases	1		1			Free			3			
Actuated Green, G (s)	30.0	30.0	30.0			86.0		25.0	25.0			
Effective Green, g (s)	30.0	30.0	30.0			86.0		25.0	25.0			
Actuated g/C Ratio	0.35	0.35	0.35			1.00		0.29	0.29			
Clearance Time (s)	5.0	5.0	5.0					5.0	5.0			
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0			
Lane Grp Cap (vph)	594	1188	518			2547		486	365			
v/s Ratio Prot		c0.25						c0.20				
v/s Ratio Perm	0.06		0.05			c0.41			0.02			
v/c Ratio	0.17	0.71	0.14			0.41		0.67	0.08			
Uniform Delay, d1	19.4	24.2	19.2			0.0		26.9	22.1			
Progression Factor	0.89	0.97	0.86			1.00		1.00	1.00			
Incremental Delay, d2	0.6	3.6	0.6			0.5		7.3	0.4			
Delay (s)	17.9	26.9	17.0			0.5		34.2	22.6			
Level of Service	B	C	B			A		C	C			
Approach Delay (s)		23.8			0.5			31.5			0.0	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
71: Court Street & Washington Street

2030 No-Build Conditions - AM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2
Lane Configurations							
Volume (vph)	360	20	620	270	35	410	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	14	10	9	12	12	
Storage Length (ft)	0	50		0	0		
Storage Lanes	1	1		1	1		
Taper Length (ft)	25	25		25	25		
Right Turn on Red		Yes		Yes			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1051		260			584	
Travel Time (s)	23.9		5.9			13.3	
Peak Hour Factor	0.88	0.88	0.87	0.87	0.85	0.85	
Heavy Vehicles (%)	9%	0%	3%	4%	0%	3%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	409	23	713	310	41	482	
Turn Type		Perm		Perm	Perm		
Protected Phases	3		1			1	2
Permitted Phases		3		1	1		
Detector Phase	3	3	1	1	1	1	
Switch Phase							
Minimum Initial (s)	5.0	5.0	10.0	10.0	10.0	10.0	3.0
Minimum Split (s)	10.0	10.0	15.0	15.0	15.0	15.0	18.0
Total Split (s)	25.0	25.0	55.0	55.0	55.0	55.0	18.0
Total Split (%)	25.5%	25.5%	56.1%	56.1%	56.1%	56.1%	18%
Maximum Green (s)	20.0	20.0	50.0	50.0	50.0	50.0	16.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag			Lead	Lead	Lead	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	4.0	4.0	4.0	4.0	0.7
Recall Mode	Max	Max	Max	Max	Max	Max	None
Walk Time (s)							7.0
Flash Dont Walk (s)							8.0
Pedestrian Calls (#/hr)							6
v/c Ratio	0.99	0.05	0.69	0.32	0.14	0.43	
Control Delay	76.5	21.2	17.1	2.3	10.5	11.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	76.5	21.2	17.1	2.3	10.5	11.5	
Queue Length 50th (ft)	202	6	203	0	8	109	
Queue Length 95th (ft)	#469	28	482	35	31	251	
Internal Link Dist (ft)	971		180			504	
Turn Bay Length (ft)		50					
Base Capacity (vph)	413	422	1038	966	292	1113	
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	0.99	0.05	0.69	0.32	0.14	0.43	

Intersection Summary	
Area Type:	Other
Cycle Length: 98	
Actuated Cycle Length: 83.4	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 71: Court Street & Washington Street

HCM Signalized Intersection Capacity Analysis
71: Court Street & Washington Street

2030 No-Build Conditions - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	360	20	620	270	35	410
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	14	10	9	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1723	1722	1398	1805	1845
Flt Permitted	0.95	1.00	1.00	1.00	0.25	1.00
Satd. Flow (perm)	1711	1723	1722	1398	484	1845
Peak-hour factor, PHF	0.88	0.88	0.87	0.87	0.85	0.85
Adj. Flow (vph)	409	23	713	310	41	482
RTOR Reduction (vph)	0	6	0	127	0	0
Lane Group Flow (vph)	409	17	713	183	41	482
Heavy Vehicles (%)	9%	0%	3%	4%	0%	3%
Turn Type		Perm		Perm	Perm	
Protected Phases	3		1			1
Permitted Phases		3		1	1	
Actuated Green, G (s)	20.1	20.1	50.3	50.3	50.3	50.3
Effective Green, g (s)	20.1	20.1	50.3	50.3	50.3	50.3
Actuated g/C Ratio	0.24	0.24	0.59	0.59	0.59	0.59
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	405	407	1019	827	286	1092
v/s Ratio Prot	c0.24		c0.41			0.26
v/s Ratio Perm		0.01		0.13	0.08	
v/c Ratio	1.01	0.04	0.70	0.22	0.14	0.44
Uniform Delay, d1	32.4	25.0	12.1	8.2	7.7	9.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	47.2	0.2	4.0	0.6	1.1	1.3
Delay (s)	79.7	25.2	16.1	8.8	8.8	10.9
Level of Service	E	C	B	A	A	B
Approach Delay (s)	76.8		13.9			10.7
Approach LOS	E		B			B

Intersection Summary			
HCM Average Control Delay	26.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	14.6
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
77: Tremont Street & Washington Street

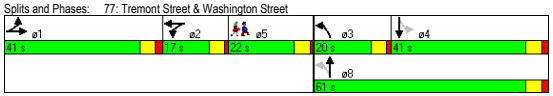
2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5
Lane Configurations													
Volume (vph)	450	155	50	35	125	50	85	380	60	30	240	365	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	14	12	16	12	12	12	13	12	12	12	11	12	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		698			192			1911			574		
Travel Time (s)		15.9			4.4			43.4			13.0		
Peak Hour Factor	0.97	0.97	0.97	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	
Heavy Vehicles (%)	4%	4%	10%	8%	1%	10%	8%	4%	6%	3%	6%	8%	
Shared Lane Traffic (%)	27%												
Lane Group Flow (vph)	339	337	0	0	226	0	0	590	0	0	691	0	
Turn Type	Split			Split			pm+pt			Perm			
Protected Phases	1	1		2	2		3	8			4		5
Permitted Phases							8			4			
Detector Phase	1	1		2	2		3	8		4	4		
Switch Phase													
Minimum Initial (s)	18.0	18.0		7.0	7.0		6.0	18.0		18.0	18.0		3.0
Minimum Split (s)	24.0	24.0		12.0	12.0		11.0	24.0		24.0	24.0		22.0
Total Split (s)	41.0	41.0	0.0	17.0	17.0	0.0	20.0	61.0	0.0	41.0	41.0	0.0	22.0
Total Split (%)	29.1%	29.1%	0.0%	12.1%	12.1%	0.0%	14.2%	43.3%	0.0%	29.1%	29.1%	0.0%	16%
Maximum Green (s)	35.0	35.0		12.0	12.0		15.0	55.0		35.0	35.0		17.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		1.0	1.0		1.0	2.0		2.0	2.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	5.0	6.0	4.0	6.0	6.0	4.0	
Lead/Lag	Lead	Lead		Lag	Lag		Lead			Lag	Lag		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None		None	None		None	Min		Min	Min		None
Walk Time (s)													7.0
Flash Dont Walk (s)													10.0
Pedestrian Calls (#/hr)													8
v/c Ratio	0.71	0.74			0.95			0.73			0.60		
Control Delay	43.7	45.3			89.8			32.4			18.4		
Queue Delay	0.0	0.0			0.0			0.0			0.0		
Total Delay	43.7	45.3			89.8			32.4			18.4		
Queue Length 50th (ft)	182	180			126			142			103		
Queue Length 95th (ft)	#441	#465			#448			303			239		
Internal Link Dist (ft)		618			112			1831			494		
Turn Bay Length (ft)													
Base Capacity (vph)	679	640			239			1291			1287		
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	0.50	0.53			0.95			0.46			0.54		

Intersection Summary

Area Type: Other
Cycle Length: 141
Actuated Cycle Length: 96.5
Natural Cycle: 95
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 77: Tremont Street & Washington Street



HCM Signalized Intersection Capacity Analysis
77: Tremont Street & Washington Street

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	450	155	50	35	125	50	85	380	60	30	240	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	12	16	12	12	12	13	12	12	12	11	12
Total Lost time (s)	6.0	6.0			5.0			6.0			6.0	
Lane Util. Factor	0.95	0.95			1.00			0.95			0.95	
Frt	1.00	0.98			0.97			0.98			0.91	
Flt Protected	0.95	0.98			0.99			0.99			1.00	
Satd. Flow (prot)	1759	1650			1748			3356			2973	
Flt Permitted	0.95	0.98			0.99			0.63			0.90	
Satd. Flow (perm)	1759	1650			1748			2123			2673	
Peak-hour factor, PHF	0.97	0.97	0.97	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92
Adj. Flow (vph)	464	160	52	38	134	54	96	427	67	33	261	397
RTOR Reduction (vph)	0	4	0	0	8	0	0	7	0	0	147	0
Lane Group Flow (vph)	339	333	0	0	218	0	0	583	0	0	544	0
Heavy Vehicles (%)	4%	4%	10%	8%	1%	10%	8%	4%	6%	3%	6%	8%
Turn Type	Split			Split			pm+pt			Perm		
Protected Phases	1	1		2	2		3	8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	26.3	26.3			12.8			36.4			36.4	
Effective Green, g (s)	26.3	26.3			12.8			36.4			36.4	
Actuated g/C Ratio	0.26	0.26			0.13			0.36			0.36	
Clearance Time (s)	6.0	6.0			5.0			6.0			6.0	
Vehicle Extension (s)	2.0	2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)	464	435			224			774			975	
v/s Ratio Prot	0.19	c0.20			c0.12							
v/s Ratio Perm								c0.27			0.20	
v/c Ratio	0.73	0.76			0.97			0.75			0.56	
Uniform Delay, d1	33.5	33.9			43.3			27.8			25.3	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	5.0	7.1			52.1			3.7			0.4	
Delay (s)	38.6	40.9			95.5			31.5			25.7	
Level of Service	D	D			F			C			C	
Approach Delay (s)		39.8			95.5			31.5			25.7	
Approach LOS		D			F			C			C	

Intersection Summary

HCM Average Control Delay	38.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	99.8	Sum of lost time (s)	24.3
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

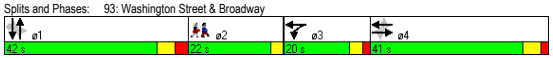
Lanes, Volumes, Timings
93: Washington Street & Broadway

2030 No-Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	275	90	5	20	95	5	5	520	15	10	370	225	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	12	12	12	12	12	12	12	12	12	12	
Storage Length (ft)	0		0	0		0	0		0	0		50	
Storage Lanes	0		0	0		0	0		1	0		1	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			No			Yes			No	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		1068			1376			92			2042		
Travel Time (s)		24.3			31.3			2.1			46.4		
Peak Hour Factor	0.88	0.88	0.88	0.72	0.72	0.72	0.87	0.87	0.87	0.89	0.89	0.89	
Heavy Vehicles (%)	5%	2%	25%	6%	1%	0%	6%	0%	0%	13%	7%	4%	
Parking (#/hr)									2				
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	420	0	0	167	0	0	621	0	0	427	253	
Turn Type	Perm			pm+pt			Perm			Perm		Perm	
Protected Phases		4		3	3 4			1			1		2
Permitted Phases	4			3 4			1			1		1	
Detector Phase	4	4		3	3 4		1	1		1	1	1	
Switch Phase													
Minimum Initial (s)	8.0	8.0		4.0			18.0	18.0		18.0	18.0	18.0	1.0
Minimum Split (s)	14.0	14.0		9.0			25.0	25.0		25.0	25.0	25.0	22.0
Total Split (s)	41.0	41.0	0.0	20.0	61.0	0.0	42.0	42.0	0.0	42.0	42.0	42.0	22.0
Total Split (%)	32.8%	32.8%	0.0%	16.0%	48.8%	0.0%	33.6%	33.6%	0.0%	33.6%	33.6%	33.6%	18%
Maximum Green (s)	35.0	35.0		15.0			35.0	35.0		35.0	35.0	35.0	19.0
Yellow Time (s)	4.0	4.0		3.0			4.0	4.0		4.0	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0		2.0			3.0	3.0		3.0	3.0	3.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	7.0	7.0	4.0	7.0	7.0	7.0	
Lead/Lag	Lag	Lag		Lead			Lead	Lead		Lead	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0		2.0			3.0	3.0		3.0	3.0	3.0	2.0
Recall Mode	None	None		None			Min	Min		Min	Min	Min	None
Walk Time (s)													7.0
Flash Dont Walk (s)													12.0
Pedestrian Calls (#/hr)													8
v/c Ratio		0.82			0.20			0.58			0.78	0.52	
Control Delay		46.0			15.4			31.5			43.1	33.4	
Queue Delay		0.0			0.0			0.0			0.0	0.0	
Total Delay		46.0			15.4			31.5			43.1	33.4	
Queue Length 50th (ft)		226			50			154			220	118	
Queue Length 95th (ft)		#565			99			285			#504	264	
Internal Link Dist (ft)		988			1296			12			1962		
Turn Bay Length (ft)												50	
Base Capacity (vph)		510			898			1250			634	568	
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		0.82			0.19			0.50			0.67	0.45	

Intersection Summary	
Area Type:	Other
Cycle Length: 125	
Actuated Cycle Length: 97.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 93: Washington Street & Broadway



HCM Signalized Intersection Capacity Analysis
93: Washington Street & Broadway

2030 No-Build Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	275	90	5	20	95	5	5	520	15	10	370	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		6.0			5.0			7.0			7.0	7.0
Lane Util. Factor		1.00			1.00			0.95			1.00	1.00
Frt		1.00			0.99			1.00			1.00	0.85
Flt Protected		0.96			0.99			1.00			1.00	1.00
Satd. Flow (prot)		1982			1840			3591			1771	1553
Flt Permitted		0.68			0.92			0.95			0.98	1.00
Satd. Flow (perm)		1392			1699			3413			1732	1553
Peak-hour factor, PHF	0.88	0.88	0.88	0.72	0.72	0.72	0.87	0.87	0.87	0.89	0.89	0.89
Adj. Flow (vph)	312	102	6	28	132	7	6	598	17	11	416	253
RTOR Reduction (vph)	0	1	0	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	419	0	0	167	0	0	620	0	0	427	253
Heavy Vehicles (%)	5%	2%	25%	6%	1%	0%	6%	0%	0%	13%	7%	4%
Parking (#/hr)									2			
Turn Type	Perm			pm+pt			Perm			Perm		Perm
Protected Phases		4		3	3 4			1			1	
Permitted Phases	4			3 4			1			1		1
Actuated Green, G (s)		35.7			45.0			30.8			30.8	30.8
Effective Green, g (s)		35.7			45.0			30.8			30.8	30.8
Actuated g/C Ratio		0.36			0.45			0.31			0.31	0.31
Clearance Time (s)		6.0						7.0			7.0	7.0
Vehicle Extension (s)		4.0						3.0			3.0	3.0
Lane Grp Cap (vph)		498			779			1053			535	479
v/s Ratio Prot					c0.02							
v/s Ratio Perm		c0.30			0.08			0.18			c0.25	0.16
v/c Ratio		0.84			0.21			0.59			0.80	0.53
Uniform Delay, d1		29.5			16.7			29.1			31.6	28.5
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		12.7			0.1			0.8			8.1	1.1
Delay (s)		42.1			16.7			30.0			39.8	29.6
Level of Service		D			B			C			D	C
Approach Delay (s)		42.1			16.7			30.0			36.0	
Approach LOS		D			B			C			D	

Intersection Summary			
HCM Average Control Delay	33.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	99.8	Sum of lost time (s)	24.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
25: Route 24 Slip Ramp & Route 140 (Exit 12A)

2030 No-Build Conditions - AM Peak Hour

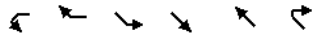
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	185	0	1830	1225	0
Sign Control	Yield			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.74	0.74	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	250	0	1968	1317	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					624	
pX, platoon unblocked						
vC, conflicting volume	2301	659	1317			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2301	659	1317			
tC, single (s)	6.8	7.1	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	100	35	100			
cM capacity (veh/h)	33	386	532			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	250	984	984	659	659
Volume Left	0	0	0	0	0
Volume Right	250	0	0	0	0
cSH	386	1700	1700	1700	1700
Volume to Capacity	0.65	0.58	0.58	0.39	0.39
Queue Length 95th (ft)	110	0	0	0	0
Control Delay (s)	30.0	0.0	0.0	0.0	0.0
Lane LOS	D				
Approach Delay (s)	30.0	0.0		0.0	
Approach LOS	D				

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	53.9%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
37: Route 140 (Exit 12B) &

2030 No-Build Conditions - AM Peak Hour



Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Volume (veh/h)	0	210	0	985	805	0
Sign Control	Yield			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	228	0	1071	875	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				724	631	
pX, platoon unblocked	0.99					
vC, conflicting volume	1410	438	875			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1393	438	875			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	60	100			
cM capacity (veh/h)	131	567	767			

Direction, Lane #	WB 1	SE 1	SE 2	NW 1	NW 2
Volume Total	228	535	535	438	438
Volume Left	0	0	0	0	0
Volume Right	228	0	0	0	0
cSH	567	1700	1700	1700	1700
Volume to Capacity	0.40	0.31	0.31	0.26	0.26
Queue Length 95th (ft)	48	0	0	0	0
Control Delay (s)	15.6	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	15.6	0.0		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	41.9%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
66: Cohannet Street & Taunton Green

2030 No-Build Conditions - AM Peak Hour

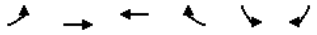
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL	NER
Lane Configurations											
Volume (veh/h)	0	135	10	0	0	0	590	230	90	0	430
Sign Control		Stop			Stop		Free			Free	
Grade		0%			0%		0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93	0.83	0.83
Hourly flow rate (vph)	0	145	11	0	0	0	634	247	97	0	518
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type							Raised			None	
Median storage veh)							1				
Upstream signal (ft)											
pX, platoon unblocked											
vC, conflicting volume	1824	2083	296	1599	1613	0	518				
vC1, stage 1 conf vol	1565	1565		0	0						
vC2, stage 2 conf vol	259	518		1599	1613						
vCu, unblocked vol	1824	2083	296	1599	1613	0	518				
tC, single (s)	7.1	6.6	6.2	7.1	6.5	6.2	4.2				
tC, 2 stage (s)	6.1	5.6		6.1	5.5						
tF (s)	3.5	4.1	3.3	3.5	4.0	3.3	2.3				
p0 queue free %	100	0	99	0	100	100	38				
cM capacity (veh/h)	45	19	748	0	57	1091	1028				

Direction, Lane #	EB 1	EB 2	SB 1	SB 2	SB 3	NE 1
Volume Total	145	11	317	317	344	518
Volume Left	0	0	317	317	0	0
Volume Right	0	11	0	0	97	518
cSH	19	748	1028	1028	1700	1700
Volume to Capacity	7.46	0.01	0.62	0.62	0.20	0.30
Queue Length 95th (ft)	Err	1	111	111	0	0
Control Delay (s)	Err	9.9	14.0	14.0	0.0	0.0
Lane LOS	F	A	B	B		
Approach Delay (s)	9310.1		9.1			0.0
Approach LOS	F					

Intersection Summary				
Average Delay	883.8			
Intersection Capacity Utilization	40.4%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
67: Taunton Green & Broadway

2030 No-Build Conditions - AM Peak Hour



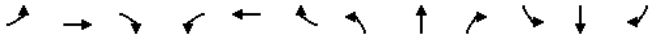
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	0	700	730	0	400
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.91	0.91	0.96	0.96
Hourly flow rate (vph)	0	0	769	802	0	417
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			302			
pX, platoon unblocked						
vC, conflicting volume	1571				769	385
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1571				769	385
tC, single (s)	4.1				6.8	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.4
p0 queue free %	100				100	31
cM capacity (veh/h)	425				342	605

Direction, Lane #	WB 1	WB 2	WB 3	SB 1
Volume Total	385	385	802	417
Volume Left	0	0	0	0
Volume Right	0	0	802	417
cSH	1700	1700	1700	605
Volume to Capacity	0.23	0.23	0.47	0.69
Queue Length 95th (ft)	0	0	0	135
Control Delay (s)	0.0	0.0	0.0	23.1
Lane LOS				C
Approach Delay (s)	0.0			23.1
Approach LOS				C

Intersection Summary				
Average Delay	4.8			
Intersection Capacity Utilization	50.8%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
70: Post Office Square & Court Street

2030 No-Build Conditions - AM Peak Hour



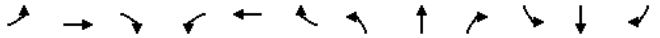
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	10	630	60	400	0	0	0	0	275	0
Sign Control		Free			Free			Yield			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.46	0.46	0.46	0.94	0.94	0.94	0.92	0.92	0.92	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	22	670	64	426	0	0	0	0	309	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					565							
pX, platoon unblocked												
vC, conflicting volume	64			22			1559	1404	0	1415	1426	64
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	64			22			1559	1404	0	1415	1426	64
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.1	3.3
p0 queue free %	100			57			0	100	100	100	0	100
cM capacity (veh/h)	1551			1562			0	80	1091	77	76	1006

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1
Volume Total	22	447	287	426	309
Volume Left	0	447	223	0	0
Volume Right	22	0	0	426	0
cSH	1700	1562	1562	1700	76
Volume to Capacity	0.01	0.43	0.43	0.25	4.08
Queue Length 95th (ft)	0	55	55	0	Err
Control Delay (s)	0.0	9.0	7.9	0.0	Err
Lane LOS		A	A		F
Approach Delay (s)	0.0	5.4			Err
Approach LOS					F

Intersection Summary				
Average Delay	2077.4			
Intersection Capacity Utilization	46.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
75: Frederick Marting Parkway & Washington Street

2030 No-Build Conditions - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	0	0	95	0	135	0	735	155	105	655	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.42	0.42	0.42	0.87	0.87	0.87	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	12	0	0	109	0	155	0	835	176	119	744	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								574			260	
pX, platoon unblocked	0.90	0.90	0.88	0.90	0.90	0.96	0.88			0.96		
vC, conflicting volume	1559	1997	747	1906	1912	506	750			1011		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1379	1865	644	1764	1771	389	647			918		
tC, single (s)	7.5	6.5	6.9	7.7	6.5	7.0	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	80	100	100	0	100	73	100			83		
cM capacity (veh/h)	60	55	370	39	63	580	834			688		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	12	109	155	418	594	119	750
Volume Left	12	109	0	0	0	119	0
Volume Right	0	0	155	0	176	0	6
cSH	60	39	580	834	1700	688	1700
Volume to Capacity	0.20	2.83	0.27	0.00	0.35	0.17	0.44
Queue Length 95th (ft)	17	305	27	0	0	16	0
Control Delay (s)	78.6	1045.0	13.5	0.0	0.0	11.3	0.0
Lane LOS	F	F	B			B	
Approach Delay (s)	78.6	439.5		0.0		1.6	
Approach LOS	F	F					

Intersection Summary				
Average Delay	54.9			
Intersection Capacity Utilization	75.0%	ICU Level of Service	D	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
78: Kilmer Street & Oak Street

2030 No-Build Conditions - AM Peak Hour

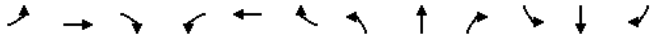
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	95	10	20	345	175	100
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.79	0.79
Hourly flow rate (vph)	119	12	25	431	222	127
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	766	285	348			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	766	285	348			
tC, single (s)	6.4	6.4	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.5	2.3			
p0 queue free %	67	98	98			
cM capacity (veh/h)	362	713	1178			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	131	456	348
Volume Left	119	25	0
Volume Right	12	0	127
cSH	379	1178	1700
Volume to Capacity	0.35	0.02	0.20
Queue Length 95th (ft)	38	2	0
Control Delay (s)	19.4	0.7	0.0
Lane LOS	C	A	
Approach Delay (s)	19.4	0.7	0.0
Approach LOS	C		

Intersection Summary			
Average Delay		3.0	
Intersection Capacity Utilization		47.0%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
87: Purchase Street & School Street

2030 No-Build Conditions - AM Peak Hour



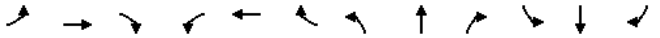
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	35	230	10	15	125	5	25	70	20	10	70	60
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.69	0.69	0.69	0.90	0.90	0.90
Hourly flow rate (vph)	41	271	12	17	142	6	36	101	29	11	78	67
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	148			282			643	541	276	618	544	145
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	148			282			643	541	276	618	544	145
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			99			88	76	96	96	82	93
cM capacity (veh/h)	1410			1292			300	428	755	308	426	908

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	324	165	167	156
Volume Left	41	17	36	11
Volume Right	12	6	29	67
cSH	1410	1292	421	533
Volume to Capacity	0.03	0.01	0.40	0.29
Queue Length 95th (ft)	2	1	46	30
Control Delay (s)	1.2	0.9	19.1	14.5
Lane LOS	A	A	C	B
Approach Delay (s)	1.2	0.9	19.1	14.5
Approach LOS			C	B

Intersection Summary			
Average Delay		7.4	
Intersection Capacity Utilization		40.3%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
88: Purchase Street & Washington Street

2030 No-Build Conditions - AM Peak Hour



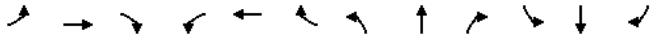
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	105	5	20	130	35	5	65	40	105	45	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.68	0.68	0.68	0.68	0.68	0.68	0.70	0.70	0.70
Hourly flow rate (vph)	0	152	7	29	191	51	7	96	59	150	64	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	243			159			478	457	156	538	435	217
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	243			159			478	457	156	538	435	217
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			98			98	80	93	58	87	98
cM capacity (veh/h)	1336			1432			435	489	895	357	507	828

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	159	272	162	229
Volume Left	0	29	7	150
Volume Right	7	51	59	14
cSH	1336	1432	582	405
Volume to Capacity	0.00	0.02	0.28	0.56
Queue Length 95th (ft)	0	2	28	84
Control Delay (s)	0.0	1.0	13.5	24.8
Lane LOS		A	B	C
Approach Delay (s)	0.0	1.0	13.5	24.8
Approach LOS			B	C

Intersection Summary				
Average Delay	9.9			
Intersection Capacity Utilization	38.9%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
89: Winter Street & School Street

2030 No-Build Conditions - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	220	10	75	370	20	25	35	65	20	40	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.63	0.63	0.63	0.84	0.84	0.84	0.56	0.56	0.56
Hourly flow rate (vph)	11	237	11	119	587	32	30	42	77	36	71	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	619			247			1158	1121	242	1203	1110	603
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	619			247			1158	1121	242	1203	1110	603
tC, single (s)	4.2			4.1			7.1	6.6	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.1	3.3	3.6	4.0	3.3
p0 queue free %	99			91			73	77	90	66	62	96
cM capacity (veh/h)	933			1324			109	182	790	105	190	503

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	258	738	149	125
Volume Left	11	119	30	36
Volume Right	11	32	77	18
cSH	933	1324	248	166
Volume to Capacity	0.01	0.09	0.60	0.75
Queue Length 95th (ft)	1	7	88	118
Control Delay (s)	0.5	2.2	39.2	73.1
Lane LOS	A	A	E	F
Approach Delay (s)	0.5	2.2	39.2	73.1
Approach LOS			E	F

Intersection Summary				
Average Delay	13.2			
Intersection Capacity Utilization	56.2%	ICU Level of Service		B
Analysis Period (min)	15			

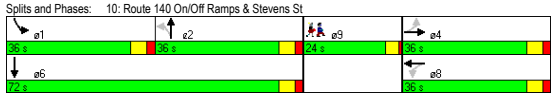
Lanes, Volumes, Timings
10: Route 140 On/Off Ramps & Stevens St

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	40	85	5	30	40	55	5	265	320	530	210	35	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	14	13	16	12	12	16	12	12	16	12	12	12	
Storage Length (ft)	0		0	0		0	0		0	200		0	
Storage Lanes	0		0	0		0	0		0	1		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		819			376			787			471		
Travel Time (s)		18.6			8.5			17.9			10.7		
Peak Hour Factor	0.76	0.76	0.76	0.84	0.84	0.84	0.89	0.89	0.89	0.80	0.80	0.80	
Heavy Vehicles (%)	0%	0%	0%	10%	0%	2%	0%	8%	0%	1%	1%	3%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	172	0	0	149	0	0	664	0	662	306	0	
Turn Type	Perm			Perm			Perm			Prot			
Protected Phases		4			8			2		1	6		9
Permitted Phases	4			8			2						
Detector Phase	4	4		8	8		2	2		1	6		
Switch Phase													
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0		4.0
Minimum Split (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0		24.0
Total Split (s)	36.0	36.0	0.0	36.0	36.0	0.0	36.0	36.0	0.0	36.0	72.0	0.0	24.0
Total Split (%)	27.3%	27.3%	0.0%	27.3%	27.3%	0.0%	27.3%	27.3%	0.0%	27.3%	54.5%	0.0%	18%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	66.0		20.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		3.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	
Lead/Lag							Lag	Lag		Lead			
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None		None	None		None	None		None	None		None
Walk Time (s)													7.0
Flash Dont Walk (s)													13.0
Pedestrian Calls (#/hr)													0
v/c Ratio		0.39			0.33			0.70		0.64	0.25		
Control Delay		28.8			18.7			18.9		22.9	4.8		
Queue Delay		0.0			0.0			0.0		0.0	0.0		
Total Delay		28.8			18.7			18.9		22.9	4.8		
Queue Length 50th (ft)		30			14			76		108	37		
Queue Length 95th (ft)		58			42			153		165	62		
Internal Link Dist (ft)		739			296			707			391		
Turn Bay Length (ft)										200			
Base Capacity (vph)		1529			1406			1635		1741	1761		
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		0.11			0.11			0.41		0.38	0.17		

Intersection Summary	
Area Type:	Other
Cycle Length: 132	
Actuated Cycle Length: 61.9	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 10: Route 140 On/Off Ramps & Stevens St



HCM Signalized Intersection Capacity Analysis
10: Route 140 On/Off Ramps & Stevens St

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	85	5	30	40	55	5	265	320	530	210	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	13	16	12	12	16	12	12	16	12	12	12
Total Lost time (s)		6.0			6.0			6.0		6.0	6.0	
Lane Util. Factor		0.95			0.95			0.95		0.97	1.00	
Frt		0.99			0.93			0.92		1.00	0.98	
Flt Protected		0.98			0.99			1.00		0.95	1.00	
Satd. Flow (prot)		3651			3227			3200		3467	1835	
Flt Permitted		0.82			0.84			0.95		0.95	1.00	
Satd. Flow (perm)		3042			2733			3044		3467	1835	
Peak-hour factor, PHF	0.76	0.76	0.76	0.84	0.84	0.84	0.89	0.89	0.89	0.80	0.80	0.80
Adj. Flow (vph)	53	112	7	36	48	65	6	298	360	662	262	44
RTOR Reduction (vph)	0	3	0	0	56	0	0	156	0	0	3	0
Lane Group Flow (vph)	0	169	0	0	93	0	0	508	0	662	303	0
Heavy Vehicles (%)	0%	0%	0%	10%	0%	2%	0%	8%	0%	1%	1%	3%
Turn Type	Perm			Perm			Perm			Prot		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		8.9			8.9			16.1		18.4	40.5	
Effective Green, g (s)		8.9			8.9			16.1		18.4	40.5	
Actuated g/C Ratio		0.14			0.14			0.26		0.30	0.66	
Clearance Time (s)		6.0			6.0			6.0		6.0	6.0	
Vehicle Extension (s)		2.0			2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		441			396			798		1039	1210	
v/s Ratio Prot										c0.19	0.17	
v/s Ratio Perm		c0.06			0.03			c0.17				
v/c Ratio		0.38			0.24			0.64		0.64	0.25	
Uniform Delay, d1		23.8			23.2			20.1		18.6	4.3	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.1			1.2		0.9	0.0	
Delay (s)		24.0			23.4			21.3		19.6	4.3	
Level of Service		C			C			C		B	A	
Approach Delay (s)		24.0			23.4			21.3			14.7	
Approach LOS		C			C			C			B	

Intersection Summary					
HCM Average Control Delay	18.4	HCM Level of Service	B		
HCM Volume to Capacity ratio	0.58				
Actuated Cycle Length (s)	61.4	Sum of lost time (s)	18.0		
Intersection Capacity Utilization	56.8%	ICU Level of Service	B		
Analysis Period (min)	15				
c Critical Lane Group					

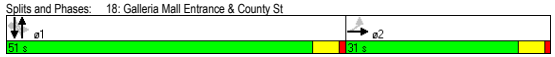
Lanes, Volumes, Timings
18: Galleria Mall Entrance & County St

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	315	155	45	0	0	0	25	65	0	165	145	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	14	12	12	12	12	12	16	12	12	16
Storage Length (ft)	0		0	0		0	200		0	0		0
Storage Lanes	0		0	0		0	1		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		396			269			674			311	
Travel Time (s)		9.0			6.1			15.3			7.1	
Peak Hour Factor	0.94	0.94	0.94	0.79	0.79	0.79	0.76	0.76	0.76	0.90	0.90	0.90
Heavy Vehicles (%)	1%	4%	0%	0%	0%	11%	0%	0%	0%	3%	1%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	548	0	0	0	0	0	119	0	0	344	506
Turn Type	Perm						Perm			Perm		Perm
Protected Phases		2						1			1	
Permitted Phases	2						1			1		1
Detector Phase	2	2					1	1		1	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0					8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	13.0	13.0					13.0	13.0		13.0	13.0	13.0
Total Split (s)	31.0	31.0	0.0	0.0	0.0	0.0	51.0	51.0	0.0	51.0	51.0	51.0
Total Split (%)	37.8%	37.8%	0.0%	0.0%	0.0%	0.0%	62.2%	62.2%	0.0%	62.2%	62.2%	62.2%
Maximum Green (s)	26.0	26.0					46.0	46.0		46.0	46.0	46.0
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag					Lead	Lead		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes					Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0					2.0	2.0		2.0	2.0	2.0
Recall Mode	None	None					Min	Min		Min	Min	Min
v/c Ratio		0.47						0.12			0.36	0.53
Control Delay		10.0						6.9			8.5	3.3
Queue Delay		0.0						0.0			0.0	0.0
Total Delay		10.0						6.9			8.5	3.3
Queue Length 50th (ft)		31						5			17	0
Queue Length 95th (ft)		71						13			41	34
Internal Link Dist (ft)		316			189			594			231	
Turn Bay Length (ft)												
Base Capacity (vph)		3345						2949			2720	1794
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		0.16						0.04			0.13	0.28

Intersection Summary	
Area Type:	Other
Cycle Length: 82	
Actuated Cycle Length: 29.5	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 18: Galleria Mall Entrance & County St



HCM Signalized Intersection Capacity Analysis
18: Galleria Mall Entrance & County St

2030 No-Build Conditions - PM Peak Hour

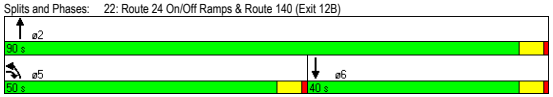
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	315	155	45	0	0	0	25	65	0	165	145	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	14	12	12	12	12	12	16	12	12	16
Total Lost time (s)		5.0						5.0			5.0	5.0
Lane Util. Factor		0.95						0.95			0.95	1.00
Frt		0.99						1.00			1.00	0.85
Flt Protected		0.97						0.99			0.97	1.00
Satd. Flow (prot)		3735						3561			3445	1794
Flt Permitted		0.97						0.82			0.77	1.00
Satd. Flow (perm)		3735						2950			2719	1794
Peak-hour factor, PHF	0.94	0.94	0.94	0.79	0.79	0.79	0.76	0.76	0.76	0.90	0.90	0.90
Adj. Flow (vph)	335	165	48	0	0	0	33	86	0	183	161	506
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	0	329
Lane Group Flow (vph)	0	539	0	0	0	0	0	119	0	0	344	177
Heavy Vehicles (%)	1%	4%	0%	0%	0%	11%	0%	0%	0%	3%	1%	2%
Turn Type	Perm						Perm			Perm		Perm
Protected Phases		2						1			1	
Permitted Phases	2						1			1		1
Actuated Green, G (s)		9.1						10.3			10.3	10.3
Effective Green, g (s)		9.1						10.3			10.3	10.3
Actuated g/C Ratio		0.31						0.35			0.35	0.35
Clearance Time (s)		5.0						5.0			5.0	5.0
Vehicle Extension (s)		2.0						2.0			2.0	2.0
Lane Grp Cap (vph)		1156						1034			953	629
v/s Ratio Prot												
v/s Ratio Perm		0.14						0.04			c0.13	0.10
v/c Ratio		0.47						0.12			0.36	0.28
Uniform Delay, d1		8.2						6.5			7.1	6.9
Progression Factor		1.00						1.00			1.00	1.00
Incremental Delay, d2		0.1						0.0			0.1	0.1
Delay (s)		8.3						6.5			7.2	7.0
Level of Service		A						A			A	A
Approach Delay (s)		8.3			0.0			6.5			7.1	
Approach LOS		A			A			A			A	

Intersection Summary					
HCM Average Control Delay	7.5	HCM Level of Service		A	
HCM Volume to Capacity ratio	0.41				
Actuated Cycle Length (s)	29.4	Sum of lost time (s)		10.0	
Intersection Capacity Utilization	45.8%	ICU Level of Service		A	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	1440	285	965	1085	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	12	12	12	12	12
Storage Length (ft)	0	0	250			200
Storage Lanes	0	2	1			0
Taper Length (ft)	25	25	25			25
Right Turn on Red		No				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	729			870	625	
Travel Time (s)	16.6			19.8	14.2	
Peak Hour Factor	0.96	0.96	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	0%	3%	2%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1500	310	1049	1543	0
Turn Type		Over	Prot			
Protected Phases		5	5	2	6	
Permitted Phases						
Detector Phase		5	5	2	6	
Switch Phase						
Minimum Initial (s)		4.0	4.0	4.0	4.0	
Minimum Split (s)		9.0	9.0	21.0	21.0	
Total Split (s)	0.0	50.0	50.0	90.0	40.0	0.0
Total Split (%)	0.0%	55.6%	55.6%	100.0%	44.4%	0.0%
Maximum Green (s)		45.0	45.0	85.0	35.0	
Yellow Time (s)		4.0	4.0	4.0	4.0	
All-Red Time (s)		1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	4.0
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	
Recall Mode		None	None	C-Min	C-Min	
Walk Time (s)				5.0	5.0	
Flash Dont Walk (s)				11.0	11.0	
Pedestrian Calls (#/hr)				0	0	
v/c Ratio		1.10	0.34	0.30	1.13	
Control Delay		79.5	18.0	0.2	94.0	
Queue Delay		0.0	0.0	0.0	0.0	
Total Delay		79.5	18.0	0.2	94.0	
Queue Length 50th (ft)		~554	137	0	~535	
Queue Length 95th (ft)		#699	167	0	#674	
Internal Link Dist (ft)	649			790	545	
Turn Bay Length (ft)			250			
Base Capacity (vph)		1367	903	3505	1360	
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		1.10	0.34	0.30	1.13	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection	
Natural Cycle: 130	
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.	

Splits and Phases: 22: Route 24 On/Off Ramps & Route 140 (Exit 12B)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	1440	285	965	1085	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	15	12	12	12	12	12
Total Lost time (s)		5.0	5.0	5.0	5.0	
Lane Util. Factor		0.88	1.00	0.95	0.95	
Frt		0.85	1.00	1.00	0.96	
Flt Protected		1.00	0.95	1.00	1.00	
Satd. Flow (prot)		2733	1805	3505	3414	
Flt Permitted		1.00	0.95	1.00	1.00	
Satd. Flow (perm)		2733	1805	3505	3414	
Peak-hour factor, PHF	0.96	0.96	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1500	310	1049	1179	364
RTOR Reduction (vph)	0	0	0	0	32	0
Lane Group Flow (vph)	0	1500	310	1049	1511	0
Heavy Vehicles (%)	2%	4%	0%	3%	2%	2%
Turn Type		Over	Prot			
Protected Phases		5	5	2	6	
Permitted Phases						
Actuated Green, G (s)		45.0	45.0	90.0	35.0	
Effective Green, g (s)		45.0	45.0	90.0	35.0	
Actuated g/C Ratio		0.50	0.50	1.00	0.39	
Clearance Time (s)		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1367	903	3505	1328	
v/s Ratio Prot		c0.55	0.17	0.30	c0.44	
v/s Ratio Perm						
v/c Ratio		1.10	0.34	0.30	1.14	
Uniform Delay, d1		22.5	13.6	0.0	27.5	
Progression Factor		1.00	1.22	1.00	0.92	
Incremental Delay, d2		55.5	0.2	0.2	69.9	
Delay (s)		78.0	16.8	0.2	95.3	
Level of Service		E	B	A	F	
Approach Delay (s)	78.0			4.0	95.3	
Approach LOS	E			A	F	

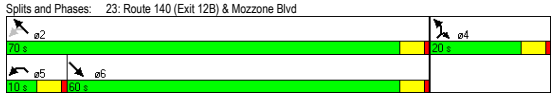
Intersection Summary			
HCM Average Control Delay	61.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	99.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (vph)	1200	190	225	995	175	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		150	0		0	0
Storage Lanes		0	1		1	1
Taper Length (ft)		25	25		25	25
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	1713			740	1061	
Travel Time (s)	38.9			16.8	24.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1511	0	0	1327	190	239
Turn Type			pm+pt			Prot
Protected Phases	6		5	2	4	4
Permitted Phases			2			
Detector Phase	6		5	2	4	4
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	15.0		10.0	15.0	15.0	15.0
Total Split (s)	60.0	0.0	10.0	70.0	20.0	20.0
Total Split (%)	66.7%	0.0%	11.1%	77.8%	22.2%	22.2%
Maximum Green (s)	55.0		5.0	65.0	15.0	15.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	4.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	C-Min		None	C-Min	None	None
v/c Ratio	0.59			1.30dl	0.72	0.66
Control Delay	6.6			35.1	52.4	23.4
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	6.6			35.1	52.4	23.4
Queue Length 50th (ft)	180			~383	102	46
Queue Length 95th (ft)	232			#560	#177	123
Internal Link Dist (ft)	1633			660	981	
Turn Bay Length (ft)						
Base Capacity (vph)	2574			1331	295	388
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	0.59			1.00	0.64	0.62

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 40 (44%), Referenced to phase 2:NWTL and 6:SET, Start of Green
Natural Cycle: 90
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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 23: Route 140 (Exit 12B) & Mozzone Blvd



Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (vph)	1200	190	225	995	175	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	0.98			1.00	1.00	0.85
Flt Protected	1.00			0.99	0.95	1.00
Satd. Flow (prot)	3466			3507	1770	1583
Flt Permitted	1.00			0.51	0.95	1.00
Satd. Flow (perm)	3466			1798	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1304	207	245	1082	190	239
RTOR Reduction (vph)	9	0	0	0	0	127
Lane Group Flow (vph)	1502	0	0	1327	190	112
Turn Type			pm+pt			Prot
Protected Phases	6		5	2	4	4
Permitted Phases			2			
Actuated Green, G (s)	66.6			66.6	13.4	13.4
Effective Green, g (s)	66.6			66.6	13.4	13.4
Actuated g/C Ratio	0.74			0.74	0.15	0.15
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2565			1331	264	236
v/s Ratio Prot	0.43				c0.11	0.07
v/s Ratio Perm				c0.74		
v/c Ratio	0.59			1.30dl	0.72	0.48
Uniform Delay, d1	5.4			11.6	36.5	35.1
Progression Factor	1.00			0.71	1.00	1.00
Incremental Delay, d2	1.0			23.6	9.0	1.5
Delay (s)	6.4			31.8	45.6	36.6
Level of Service	A			C	D	D
Approach Delay (s)	6.4			31.8	40.6	
Approach LOS	A			C	D	

Intersection Summary

HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	95.5%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

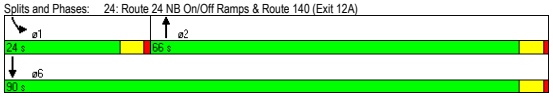
Lanes, Volumes, Timings
24: Route 24 NB On/Off Ramps & Route 140 (Exit 12A)

2030 No-Build Conditions - PM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	245	985	880	170	2390
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	12	12
Storage Length (ft)	0	0		300	250	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		30			30
Link Distance (ft)	736		624			870
Travel Time (s)	16.7		14.2			19.8
Peak Hour Factor	0.94	0.94	0.98	0.98	0.97	0.97
Heavy Vehicles (%)	0%	2%	3%	6%	6%	3%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	261	1005	898	175	2464
Turn Type		Free		Free	Prot	
Protected Phases			2		1	6
Permitted Phases		Free		Free		
Detector Phase			2		1	6
Switch Phase						
Minimum Initial (s)			8.0		16.0	16.0
Minimum Split (s)			13.0		21.0	21.0
Total Split (s)	0.0	0.0	66.0	0.0	24.0	90.0
Total Split (%)	0.0%	0.0%	73.3%	0.0%	26.7%	100.0%
Maximum Green (s)			61.0		19.0	85.0
Yellow Time (s)			4.0		4.0	4.0
All-Red Time (s)			1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	5.0	4.0	5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)			2.0		2.0	2.0
Recall Mode			C-Min		None	C-Min
v/c Ratio		0.15	0.41	0.59	0.56	0.70
Control Delay		0.2	6.2	1.7	35.7	0.1
Queue Delay		0.0	0.0	0.0	0.0	0.0
Total Delay		0.2	6.2	1.7	35.7	0.1
Queue Length 50th (ft)		0	103	0	97	0
Queue Length 95th (ft)		0	154	0	m75	m0
Internal Link Dist (ft)	656		544			790
Turn Bay Length (ft)				300	250	
Base Capacity (vph)		1772	2469	1524	360	3505
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		0.15	0.41	0.59	0.49	0.70

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 30 (33%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 24: Route 24 NB On/Off Ramps & Route 140 (Exit 12A)



HCM Signalized Intersection Capacity Analysis
24: Route 24 NB On/Off Ramps & Route 140 (Exit 12A)

2030 No-Build Conditions - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	245	985	880	170	2390
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	15	12	12	12	12
Total Lost time (s)		4.0	5.0	4.0	5.0	5.0
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95
Frt		0.86	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1772	3505	1524	1703	3505
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1772	3505	1524	1703	3505
Peak-hour factor, PHF	0.94	0.94	0.98	0.98	0.97	0.97
Adj. Flow (vph)	0	261	1005	898	175	2464
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	261	1005	898	175	2464
Heavy Vehicles (%)	0%	2%	3%	6%	6%	3%
Turn Type		Free		Free	Prot	
Protected Phases			2		1	6
Permitted Phases		Free		Free		
Actuated Green, G (s)		90.0	63.4	90.0	16.6	90.0
Effective Green, g (s)		90.0	63.4	90.0	16.6	90.0
Actuated g/C Ratio		1.00	0.70	1.00	0.18	1.00
Clearance Time (s)			5.0		5.0	5.0
Vehicle Extension (s)			2.0		2.0	2.0
Lane Grp Cap (vph)		1772	2469	1524	314	3505
v/s Ratio Prot			0.29		0.10	c0.70
v/s Ratio Perm		0.15		0.59		
v/c Ratio		0.15	0.41	0.59	0.56	0.70
Uniform Delay, d1		0.0	5.5	0.0	33.4	0.0
Progression Factor		1.00	1.00	1.00	1.04	1.00
Incremental Delay, d2		0.2	0.5	1.7	0.1	0.1
Delay (s)		0.2	6.0	1.7	34.8	0.1
Level of Service		A	A	A	C	A
Approach Delay (s)	0.2		4.0			2.4
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	2.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

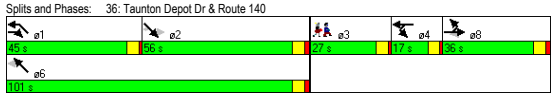
Lanes, Volumes, Timings
36: Taunton Depot Dr & Route 140

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR	ø3
Lane Configurations													
Volume (vph)	235	5	230	5	0	0	0	885	260	195	930	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	12	12	
Storage Length (ft)	0		100	0		0	180		130	320		350	
Storage Lanes	1		1	0		0	1		1	1		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		846			205			2224			1713		
Travel Time (s)		19.2			4.7			50.5			38.9		
Peak Hour Factor	0.93	0.93	0.93	0.63	0.63	0.63	0.98	0.98	0.98	0.94	0.94	0.94	
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	0%	2%	2%	0%	1%	0%	
Shared Lane Traffic (%)	49%												
Lane Group Flow (vph)	129	129	247	0	8	0	0	903	265	207	989	0	
Turn Type	Split		pm+ov	Split			Perm		Perm	pm+pt			
Protected Phases	8	8	1	4	4			2		1	6		3
Permitted Phases			8				2		2	6			
Detector Phase	8	8	1	4	4		2	2	2	1	6		
Switch Phase													
Minimum Initial (s)	6.0	6.0	6.0	4.0	4.0		6.0	6.0	6.0	6.0	20.0		4.0
Minimum Split (s)	12.0	12.0	11.0	9.0	9.0		12.0	12.0	12.0	11.0	26.0		27.0
Total Split (s)	36.0	36.0	45.0	17.0	17.0	0.0	56.0	56.0	56.0	45.0	101.0	0.0	27.0
Total Split (%)	19.9%	19.9%	24.9%	9.4%	9.4%	0.0%	30.9%	30.9%	30.9%	24.9%	55.8%	0.0%	15%
Maximum Green (s)	30.0	30.0	40.0	12.0	12.0		50.0	50.0	50.0	40.0	95.0		22.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0		2.0	2.0	2.0	1.0	2.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	5.0	5.0	5.0	4.0	6.0	6.0	6.0	5.0	6.0	4.0	
Lead/Lag			Lead	Lag	Lag		Lag	Lag	Lag	Lead			Lead
Lead-Lag Optimize?				Yes	Yes		Yes	Yes	Yes				Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		4.0	4.0	4.0	2.0	4.0		3.0
Recall Mode	None	None	None	None	None		Min	Min	Min	None	Min		None
Walk Time (s)													7.0
Flash Dont Walk (s)													15.0
Pedestrian Calls (#/hr)													6
v/c Ratio	0.50	0.50	0.33		0.06			0.60	0.36	0.48	0.43		
Control Delay	47.6	47.5	4.9		55.0			24.6	15.6	12.9	10.9		
Queue Delay	0.0	0.0	0.0		0.0			0.0	0.0	0.0	0.0		
Total Delay	47.6	47.5	4.9		55.0			24.6	15.6	12.9	10.9		
Queue Length 50th (ft)	55	55	0		3			147	44	27	88		
Queue Length 95th (ft)	203	203	61		20			507	219	157	393		
Internal Link Dist (ft)		766			125			2144			1633		
Turn Bay Length (ft)			100						130	320			
Base Capacity (vph)	669	672	1276		326			2348	1082	1005	3307		
Starvation Cap Reductn	0	0	0		0			0	0	0	0		
Spillback Cap Reductn	0	0	0		0			0	0	0	0		
Storage Cap Reductn	0	0	0		0			0	0	0	0		
Reduced v/c Ratio	0.19	0.19	0.19		0.02			0.38	0.24	0.21	0.30		

Intersection Summary	
Area Type:	Other
Cycle Length: 181	
Actuated Cycle Length: 85.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 36: Taunton Depot Dr & Route 140



HCM Signalized Intersection Capacity Analysis
36: Taunton Depot Dr & Route 140

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	235	5	230	5	0	0	0	885	260	195	930	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)	6.0	6.0	5.0		5.0			6.0	6.0	5.0	6.0	
Lane Util. Factor	0.95	0.95	1.00		1.00			0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85		1.00			1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00		0.95			1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1690	1599		2046			3539	1583	1805	3574	
Flt Permitted	0.95	0.95	1.00		0.95			1.00	1.00	0.17	1.00	
Satd. Flow (perm)	1681	1690	1599		2046			3539	1583	330	3574	
Peak-hour factor, PHF	0.93	0.93	0.93	0.63	0.63	0.63	0.98	0.98	0.98	0.94	0.94	0.94
Adj. Flow (vph)	253	5	247	8	0	0	0	903	265	207	989	0
RTOR Reduction (vph)	0	0	179	0	0	0	0	0	57	0	0	0
Lane Group Flow (vph)	129	129	68	0	8	0	0	903	208	207	989	0
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	0%	2%	2%	0%	1%	0%
Turn Type	Split		pm+ov	Split			Perm		Perm	pm+pt		
Protected Phases	8	8	1	4	4			2		1	6	
Permitted Phases			8				2		2	6		
Actuated Green, G (s)	13.2	13.2	25.5		0.7			37.3	37.3	54.6	54.6	
Effective Green, g (s)	13.2	13.2	25.5		0.7			37.3	37.3	54.6	54.6	
Actuated g/C Ratio	0.14	0.14	0.27		0.01			0.40	0.40	0.59	0.59	
Clearance Time (s)	6.0	6.0	5.0		5.0			6.0	6.0	5.0	6.0	
Vehicle Extension (s)	2.0	2.0	2.0		2.0			4.0	4.0	2.0	4.0	
Lane Grp Cap (vph)	239	240	438		15			1419	635	389	2098	
v/s Ratio Prot	c0.08	0.08	0.02		c0.00			c0.26		0.07	c0.28	
v/s Ratio Perm			0.02						0.13	0.24		
v/c Ratio	0.54	0.54	0.15		0.53			0.64	0.33	0.53	0.47	
Uniform Delay, d1	37.1	37.1	25.6		46.0			22.4	19.2	11.9	11.0	
Progression Factor	1.00	1.00	1.00		1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.2	1.2	0.1		17.0			1.1	0.4	0.7	0.2	
Delay (s)	38.3	38.2	25.6		63.0			23.5	19.6	12.6	11.2	
Level of Service	D	D	C		E			C	B	B	B	
Approach Delay (s)		32.1			63.0			22.6			11.4	
Approach LOS		C			E			C			B	

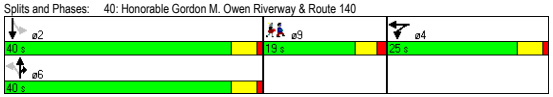
Intersection Summary			
HCM Average Control Delay	19.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	93.0	Sum of lost time (s)	30.5
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
40: Honorable Gordon M. Owen Riverway & Route 140 — 2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	0	0	0	470	0	5	0	525	340	15	675	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	13	12	12	11	12	12	13	12	
Storage Length (ft)	0		0	0		0	0		175	0		0	
Storage Lanes	0		0	0		0	0		1	0		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		220			991			547			1888		
Travel Time (s)		5.0			22.5			12.4			42.9		
Peak Hour Factor	0.92	0.92	0.92	0.82	0.82	0.82	0.96	0.96	0.96	0.89	0.89	0.89	
Heavy Vehicles (%)	2%	2%	2%	1%	0%	100%	0%	3%	1%	0%	2%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	0	0	0	579	0	0	547	354	0	775	0	
Turn Type				Split			Perm		Prot	Perm			
Protected Phases				4	4			6	6		2		9
Permitted Phases							6			2			
Detector Phase				4	4		6	6	6	2	2		
Switch Phase													
Minimum Initial (s)				6.0	6.0		6.0	6.0	6.0	6.0	6.0		1.0
Minimum Split (s)				11.0	11.0		11.0	11.0	11.0	11.0	11.0		19.0
Total Split (s)	0.0	0.0	0.0	25.0	25.0	0.0	40.0	40.0	40.0	40.0	40.0	0.0	19.0
Total Split (%)	0.0%	0.0%	0.0%	29.8%	29.8%	0.0%	47.6%	47.6%	47.6%	47.6%	47.6%	0.0%	23%
Maximum Green (s)				20.0	20.0		35.0	35.0	35.0	35.0	35.0		14.0
Yellow Time (s)				4.0	4.0		4.0	4.0	4.0	4.0	4.0		3.5
All-Red Time (s)				1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0	
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)				4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0
Recall Mode				None	None		None	None	None	None	None		None
Walk Time (s)													7.0
Flash Dont Walk (s)													7.0
Pedestrian Calls (#/hr)													1
v/c Ratio					1.06			0.60	0.36		0.80		
Control Delay					83.3			16.9	2.8		24.1		
Queue Delay					0.0			0.0	0.0		0.0		
Total Delay					83.3			16.9	2.8		24.1		
Queue Length 50th (ft)					~239			132	0		219		
Queue Length 95th (ft)					#527			360	48		#625		
Internal Link Dist (ft)		140			911			467			1808		
Turn Bay Length (ft)									175				
Base Capacity (vph)					546			929	1002		988		
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					1.06			0.59	0.35		0.78		

Intersection Summary	
Area Type:	Other
Cycle Length: 84	
Actuated Cycle Length: 68	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
~ 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.	

Splits and Phases: 40: Honorable Gordon M. Owen Riverway & Route 140



HCM Signalized Intersection Capacity Analysis
40: Honorable Gordon M. Owen Riverway & Route 140 — 2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	470	0	5	0	525	340	15	675	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	13	12	12	11	12	12	13	12
Total Lost time (s)					5.0			5.0	5.0		5.0	
Lane Util. Factor					1.00			1.00	1.00		1.00	
Frt					1.00			1.00	0.85		1.00	
Flt Protected					0.95			1.00	1.00		1.00	
Satd. Flow (prot)					1831			1783	1599		1924	
Flt Permitted					0.95			1.00	1.00		0.99	
Satd. Flow (perm)					1831			1783	1599		1897	
Peak-hour factor, PHF	0.92	0.92	0.92	0.82	0.82	0.82	0.96	0.96	0.96	0.89	0.89	0.89
Adj. Flow (vph)	0	0	0	573	0	6	0	547	354	17	758	0
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	184	0	0	0
Lane Group Flow (vph)	0	0	0	0	578	0	0	547	170	0	775	0
Heavy Vehicles (%)	2%	2%	2%	1%	0%	100%	0%	3%	1%	0%	2%	0%
Turn Type				Split			Perm		Prot	Perm		
Protected Phases				4	4			6	6		2	
Permitted Phases							6			2		
Actuated Green, G (s)					20.2			34.6	34.6		34.6	
Effective Green, g (s)					20.2			34.6	34.6		34.6	
Actuated g/C Ratio					0.28			0.48	0.48		0.48	
Clearance Time (s)					5.0			5.0	5.0		5.0	
Vehicle Extension (s)					4.0			4.0	4.0		4.0	
Lane Grp Cap (vph)					513			856	767		910	
v/s Ratio Prot					c0.32			0.31	0.11			
v/s Ratio Perm											c0.41	
v/c Ratio					1.13			0.64	0.22		0.85	
Uniform Delay, d1					26.0			14.1	10.9		16.5	
Progression Factor					1.00			1.00	1.00		1.00	
Incremental Delay, d2					79.6			1.8	0.2		8.0	
Delay (s)					105.6			15.8	11.1		24.5	
Level of Service					F			B	B		C	
Approach Delay (s)		0.0			105.6			14.0			24.5	
Approach LOS		A			F			B			C	

Intersection Summary					
HCM Average Control Delay		41.1	HCM Level of Service		D
HCM Volume to Capacity ratio		0.95			
Actuated Cycle Length (s)		72.1	Sum of lost time (s)		17.3
Intersection Capacity Utilization		82.2%	ICU Level of Service		E
Analysis Period (min)		15			
c Critical Lane Group					

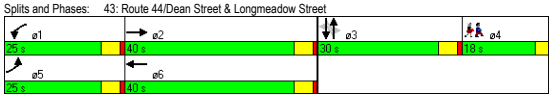
Lanes, Volumes, Timings
43: Route 44/Dean Street & Longmeadow Street

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø4
Lane Configurations													
Volume (vph)	10	815	350	405	765	220	75	330	220	150	235	10	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	16	10	12	13	12	11	16	12	11	12	
Storage Length (ft)	100		70	100		70	0		50	0		100	
Storage Lanes	1		1	1		1	0		1	0		1	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		1663			1440			2994			1249		
Travel Time (s)		37.8			32.7			68.0			28.4		
Peak Hour Factor	0.93	0.93	0.93	0.96	0.96	0.96	0.92	0.92	0.92	0.84	0.84	0.84	
Heavy Vehicles (%)	0%	3%	3%	2%	3%	3%	1%	2%	1%	1%	1%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	11	1252	0	422	1026	0	0	680	0	0	471	0	
Turn Type	Prot			Prot			Perm			Perm			
Protected Phases	5	2		1	6			3			3		4
Permitted Phases							3			3			
Detector Phase	5	2		1	6		3	3		3	3		
Switch Phase													
Minimum Initial (s)	9.0	12.0		9.0	12.0		8.0	8.0		8.0	8.0		8.0
Minimum Split (s)	14.0	17.0		14.0	17.0		13.0	13.0		13.0	13.0		18.0
Total Split (s)	25.0	40.0	0.0	25.0	40.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	18.0
Total Split (%)	22.1%	35.4%	0.0%	22.1%	35.4%	0.0%	26.5%	26.5%	0.0%	26.5%	26.5%	0.0%	16%
Maximum Green (s)	20.0	35.0		20.0	35.0		25.0	25.0		25.0	25.0		15.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	4.0	5.0		4.0	5.0		4.0	4.0		4.0	4.0		3.0
Recall Mode	None	Min		None	Min		None	None		None	None		None
Walk Time (s)													8.0
Flash Dont Walk (s)													7.0
Pedestrian Calls (#/hr)													4
v/c Ratio	0.07	1.02		1.25	0.51			1.08			2.36dl		
Control Delay	45.1	60.6		171.0	15.0			90.9			69.5		
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0		
Total Delay	45.1	60.6		171.0	15.0			90.9			69.5		
Queue Length 50th (ft)	6	374		~314	149			~216			145		
Queue Length 95th (ft)	27	#692		#615	396			#416			#281		
Internal Link Dist (ft)		1583			1360			2914			1169		
Turn Bay Length (ft)	100			100									
Base Capacity (vph)	344	1233		337	2002			631			491		
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	0.03	1.02		1.25	0.51			1.08			0.96		

Intersection Summary	
Area Type:	Other
Cycle Length: 113	
Actuated Cycle Length: 98.6	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
~ 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.	
dl Defacto Left Lane. Recode with 1 though lane as a left lane.	

Splits and Phases: 43: Route 44/Dean Street & Longmeadow Street



HCM Signalized Intersection Capacity Analysis
43: Route 44/Dean Street & Longmeadow Street

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	815	350	405	765	220	75	330	220	150	235	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	16	10	12	13	12	11	16	12	11	12
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frt	1.00	0.95		1.00	0.97			0.95			1.00	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1685	3347		1652	3388			3236			3379	
Flt Permitted	0.95	1.00		0.95	1.00			0.69			0.56	
Satd. Flow (perm)	1685	3347		1652	3388			2237			1922	
Peak-hour factor, PHF	0.93	0.93	0.93	0.96	0.96	0.96	0.92	0.92	0.92	0.84	0.84	0.84
Adj. Flow (vph)	11	876	376	422	797	229	82	359	239	179	280	12
RTOR Reduction (vph)	0	38	0	0	15	0	0	62	0	0	2	0
Lane Group Flow (vph)	11	1214	0	422	1011	0	0	618	0	0	469	0
Heavy Vehicles (%)	0%	3%	3%	2%	3%	3%	1%	2%	1%	1%	1%	0%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			3			3	
Permitted Phases							3			3		
Actuated Green, G (s)	1.6	39.3		20.1	57.8			25.1			25.1	
Effective Green, g (s)	1.6	39.3		20.1	57.8			25.1			25.1	
Actuated g/C Ratio	0.02	0.37		0.19	0.55			0.24			0.24	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	4.0	5.0		4.0	5.0			4.0			4.0	
Lane Grp Cap (vph)	26	1252		316	1863			534			459	
v/s Ratio Prot	0.01	c0.36		c0.26	0.30							
v/s Ratio Perm								c0.28			0.24	
v/c Ratio	0.42	0.97		1.34	0.54			1.16			2.36dl	
Uniform Delay, d1	51.3	32.3		42.5	15.2			40.0			40.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	14.4	18.6		171.0	0.6			89.9			47.9	
Delay (s)	65.7	50.9		213.5	15.7			129.9			87.9	
Level of Service	E	D		F	B			F			F	
Approach Delay (s)		51.1			73.4			129.9			87.9	
Approach LOS		D			E			F			F	

Intersection Summary					
HCM Average Control Delay	77.8	HCM Level of Service		E	
HCM Volume to Capacity ratio	1.11				
Actuated Cycle Length (s)	105.1	Sum of lost time (s)		20.6	
Intersection Capacity Utilization	102.4%	ICU Level of Service		G	
Analysis Period (min)	15				

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

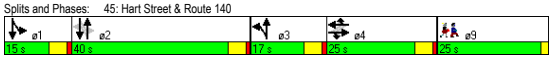
Lanes, Volumes, Timings
45: Hart Street & Route 140

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2	ø9
Lane Configurations														
Volume (vph)	35	105	170	105	170	240	260	770	115	120	880	10		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	11	11	12	12	12	11	11	11	12	12	12		
Storage Length (ft)	0		50	0		50	50		0	50		0		
Storage Lanes	0		1	0		1	1		0	1		0		
Taper Length (ft)	25		25	25		25	25		25	25		25		
Right Turn on Red			Yes			Yes			Yes			Yes		
Link Speed (mph)		30			30			35			35			
Link Distance (ft)		1373			971			2224			3692			
Travel Time (s)		31.2			22.1			43.3			71.9			
Peak Hour Factor	0.68	0.68	0.68	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96	0.96		
Heavy Vehicles (%)	0%	1%	2%	2%	1%	1%	1%	1%	1%	2%	3%	0%		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	205	250	0	290	253	0	1206	0	0	1052	0		
Turn Type	Perm		Prot	Perm		Prot	pm+pt			pm+pt				
Protected Phases		4	4		4	4	3	2 3		1	1 2		2	9
Permitted Phases	4			4			2 3			1 2				
Detector Phase	4	4	4	4	4	4	3	2 3		1	1 2			
Switch Phase														
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	4.0			4.0			8.0	1.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	9.0			9.0			13.0	25.0
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	17.0	57.0	0.0	15.0	55.0	0.0	40.0	25.0
Total Split (%)	20.5%	20.5%	20.5%	20.5%	20.5%	20.5%	13.9%	46.7%	0.0%	12.3%	45.1%	0.0%	33%	20%
Maximum Green (s)	20.0	20.0	20.0	20.0	20.0	20.0	12.0			10.0			35.0	23.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0			4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0			1.0			1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0		
Lead/Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead			Lead			Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes			Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0			3.0	3.0
Recall Mode	Max	Max	Max	Max	Max	Max	None			None			None	None
Walk Time (s)														7.0
Flash Dont Walk (s)														16.0
Pedestrian Calls (#/hr)														0
v/c Ratio		1.05	0.60		1.27	0.63		1.07			1.04			
Control Delay		118.3	23.2		184.3	29.8		72.8			63.5			
Queue Delay		0.0	0.0		0.0	0.0		0.0			0.0			
Total Delay		118.3	23.2		184.3	29.8		72.8			63.5			
Queue Length 50th (ft)		~139	65		~227	90		~307			~248			
Queue Length 95th (ft)		#180	83		#388	174		#398			#415			
Internal Link Dist (ft)		1293			891			2144			3612			
Turn Bay Length (ft)			50			50								
Base Capacity (vph)		195	418		229	403		1128			1007			
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		1.05	0.60		1.27	0.63		1.07			1.04			

Intersection Summary	
Area Type:	Other
Cycle Length: 122	
Actuated Cycle Length: 97	
Natural Cycle: 150	
Control Type: Semi Act-Uncoord	
~ 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.	

Splits and Phases: 45: Hart Street & Route 140



HCM Signalized Intersection Capacity Analysis
45: Hart Street & Route 140

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	105	170	105	170	240	260	770	115	120	880	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12	11	11	11	12	12	12
Total Lost time (s)		5.0	5.0		5.0	5.0		5.0			5.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.95			0.95	
Frt		1.00	0.85		1.00	0.85		0.98			1.00	
Flt Protected		0.99	1.00		0.98	1.00		0.99			0.99	
Satd. Flow (prot)		1801	1531		1839	1599		3365			3484	
Flt Permitted		0.52	1.00		0.59	1.00		0.58			0.51	
Satd. Flow (perm)		948	1531		1114	1599		1957			1795	
Peak-hour factor, PHF	0.68	0.68	0.68	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96	0.96
Adj. Flow (vph)	51	154	250	111	179	253	274	811	121	125	917	10
RTOR Reduction (vph)	0	0	102	0	0	73	0	6	0	0	1	0
Lane Group Flow (vph)	0	205	148	0	290	180	0	1200	0	0	1051	0
Heavy Vehicles (%)	0%	1%	2%	2%	1%	1%	1%	1%	1%	2%	3%	0%
Turn Type	Perm		Prot	Perm		Prot	pm+pt			pm+pt		
Protected Phases		4	4		4	4	3	2 3		1	1 2	
Permitted Phases	4			4			2 3			1 2		
Actuated Green, G (s)		20.0	20.0		20.0	20.0		47.0			45.0	
Effective Green, g (s)		20.0	20.0		20.0	20.0		47.0			45.0	
Actuated g/C Ratio		0.21	0.21		0.21	0.21		0.48			0.46	
Clearance Time (s)		5.0	5.0		5.0	5.0						
Vehicle Extension (s)		3.0	3.0		3.0	3.0						
Lane Grp Cap (vph)		195	316		230	330		1122			1007	
v/s Ratio Prot			0.10			0.11		c0.13			c0.11	
v/s Ratio Perm		0.22			c0.26			c0.39			0.38	
v/c Ratio		1.05	0.47		1.26	0.55		1.07			1.04	
Uniform Delay, d1		38.5	33.8		38.5	34.4		25.0			26.0	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		78.6	4.9		147.5	6.3		47.6			40.6	
Delay (s)		117.1	38.7		186.0	40.8		72.6			66.6	
Level of Service		F	D		F	D		E			E	
Approach Delay (s)		74.0			118.3			72.6			66.6	
Approach LOS		E			F			E			E	

Intersection Summary					
HCM Average Control Delay	78.5	HCM Level of Service		E	
HCM Volume to Capacity ratio	1.12				
Actuated Cycle Length (s)	97.0	Sum of lost time (s)		20.0	
Intersection Capacity Utilization	99.5%	ICU Level of Service		F	
Analysis Period (min)	15				
c Critical Lane Group					

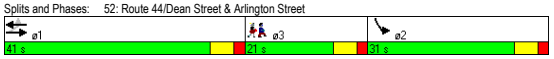
Lanes, Volumes, Timings
52: Route 44/Dean Street & Arlington Street

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	ø3
Lane Configurations							
Volume (vph)	20	795	750	85	385	70	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	16	12	14	12	
Storage Length (ft)	150			0	0	0	
Storage Lanes	1			0	1	0	
Taper Length (ft)	25			25	25	25	
Right Turn on Red				Yes		No	
Link Speed (mph)		30	30		30		
Link Distance (ft)		1036	1663		418		
Travel Time (s)		23.5	37.8		9.5		
Peak Hour Factor	0.89	0.89	0.98	0.98	0.97	0.97	
Heavy Vehicles (%)	0%	3%	3%	0%	1%	5%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	22	893	852	0	469	0	
Turn Type	Perm						
Protected Phases		1	1		2		3
Permitted Phases	1						
Detector Phase	1	1	1		2		
Switch Phase							
Minimum Initial (s)	9.0	9.0	9.0		4.0		5.0
Minimum Split (s)	15.0	15.0	15.0		10.0		21.0
Total Split (s)	41.0	41.0	41.0	0.0	31.0	0.0	21.0
Total Split (%)	44.1%	44.1%	44.1%	0.0%	33.3%	0.0%	23%
Maximum Green (s)	35.0	35.0	35.0		25.0		15.0
Yellow Time (s)	4.0	4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0	2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0	4.0	
Lead/Lag	Lead	Lead	Lead				Lag
Lead-Lag Optimize?	Yes	Yes	Yes				Yes
Vehicle Extension (s)	3.0	3.0	3.0		3.0		1.0
Recall Mode	None	None	None		None		None
Walk Time (s)							5.0
Flash Dont Walk (s)							10.0
Pedestrian Calls (#/hr)							2
v/c Ratio	0.23	1.02	0.86		0.79		
Control Delay	23.7	58.1	30.6		36.3		
Queue Delay	0.0	0.0	0.0		0.0		
Total Delay	23.7	58.1	30.6		36.3		
Queue Length 50th (ft)	5	373	309		178		
Queue Length 95th (ft)	32	#890	#802		#458		
Internal Link Dist (ft)		956	1583		338		
Turn Bay Length (ft)	150						
Base Capacity (vph)	95	877	986		636		
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	0.23	1.02	0.86		0.74		

Intersection Summary	
Area Type:	Other
Cycle Length: 93	
Actuated Cycle Length: 74.6	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 52: Route 44/Dean Street & Arlington Street



HCM Signalized Intersection Capacity Analysis
52: Route 44/Dean Street & Arlington Street

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	795	750	85	385	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	16	12	14	12
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.99		0.98	
Flt Protected	0.95	1.00	1.00		0.96	
Satd. Flow (prot)	1685	1845	2068		1874	
Flt Permitted	0.11	1.00	1.00		0.96	
Satd. Flow (perm)	200	1845	2068		1874	
Peak-hour factor, PHF	0.89	0.89	0.98	0.98	0.97	0.97
Adj. Flow (vph)	22	893	765	87	397	72
RTOR Reduction (vph)	0	0	4	0	0	0
Lane Group Flow (vph)	22	893	848	0	469	0
Heavy Vehicles (%)	0%	3%	3%	0%	1%	5%
Turn Type	Perm					
Protected Phases		1	1		2	
Permitted Phases	1					
Actuated Green, G (s)	35.5	35.5	35.5		23.6	
Effective Green, g (s)	35.5	35.5	35.5		23.6	
Actuated g/C Ratio	0.45	0.45	0.45		0.30	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	89	824	923		556	
v/s Ratio Prot		c0.48	0.41		c0.25	
v/s Ratio Perm	0.11					
v/c Ratio	0.25	1.08	0.92		0.84	
Uniform Delay, d1	13.7	22.0	20.6		26.2	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	1.5	56.5	13.7		11.2	
Delay (s)	15.1	78.5	34.4		37.4	
Level of Service	B	E	C		D	
Approach Delay (s)		77.0	34.4		37.4	
Approach LOS		E	C		D	

Intersection Summary			
HCM Average Control Delay	52.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	79.5	Sum of lost time (s)	20.4
Intersection Capacity Utilization	80.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

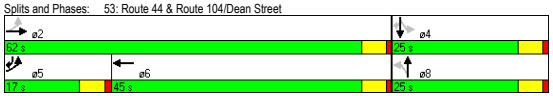
Lanes, Volumes, Timings
53: Route 44 & Route 104/Dean Street

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	1010	0	0	1035	15	15	10	5	65	15	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	16	12	12	12	12	12	16
Storage Length (ft)	50		0	0		50	0		0	0		50
Storage Lanes	1		0	0		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		825			1426			127			959	
Travel Time (s)		18.8			32.4			2.9			21.8	
Peak Hour Factor	0.97	0.97	0.97	0.84	0.84	0.84	0.75	0.75	0.75	0.93	0.93	0.93
Heavy Vehicles (%)	2%	2%	0%	0%	2%	6%	0%	0%	0%	0%	0%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1185	0	0	1250	0	0	40	0	0	86	306
Turn Type	pm+pt						Perm			Perm		pm+ov
Protected Phases	5	2			6			8			4	5
Permitted Phases	2						8			4		4
Detector Phase	5	2			6		8	8		4	4	5
Switch Phase												
Minimum Initial (s)	6.0	12.0			12.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	11.0	17.0			17.0		11.0	11.0		11.0	11.0	11.0
Total Split (s)	17.0	62.0	0.0	0.0	45.0	0.0	25.0	25.0	0.0	25.0	25.0	17.0
Total Split (%)	19.5%	71.3%	0.0%	0.0%	51.7%	0.0%	28.7%	28.7%	0.0%	28.7%	28.7%	19.5%
Maximum Green (s)	12.0	57.0			40.0		20.0	20.0		20.0	20.0	12.0
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lead				Lag							Lead
Lead-Lag Optimize?	Yes				Yes							Yes
Vehicle Extension (s)	1.5	1.5			1.5		2.0	2.0		2.0	2.0	1.5
Recall Mode	None	Min			Min		None	None		None	None	None
v/c Ratio		0.70			0.73			0.17			0.39	0.51
Control Delay		6.9			15.0			26.1			33.8	20.0
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay		6.9			15.0			26.1			33.8	20.0
Queue Length 50th (ft)		84			175			11			30	81
Queue Length 95th (ft)		148			270			34			81	175
Internal Link Dist (ft)		745			1346			47			879	
Turn Bay Length (ft)												50
Base Capacity (vph)		2005			2496			575			540	753
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		0.59			0.50			0.07			0.16	0.41

Intersection Summary	
Area Type:	Other
Cycle Length: 87	
Actuated Cycle Length: 59.7	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 53: Route 44 & Route 104/Dean Street



HCM Signalized Intersection Capacity Analysis
53: Route 44 & Route 104/Dean Street

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	1010	0	0	1035	15	15	10	5	65	15	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	12	12	12	12	16
Total Lost time (s)		5.0			5.0			5.0			5.0	5.0
Lane Util. Factor		0.95			0.95			1.00			1.00	1.00
Frt		1.00			1.00			0.98			1.00	0.85
Flt Protected		0.99			1.00			0.98			0.96	1.00
Satd. Flow (prot)		3518			3530			1810			1826	1794
Flt Permitted		0.58			1.00			0.80			0.74	1.00
Satd. Flow (perm)		2062			3530			1480			1403	1794
Peak-hour factor, PHF	0.97	0.97	0.97	0.84	0.84	0.84	0.75	0.75	0.75	0.93	0.93	0.93
Adj. Flow (vph)	144	1041	0	0	1232	18	20	13	7	70	16	306
RTOR Reduction (vph)	0	0	0	0	1	0	0	6	0	0	0	22
Lane Group Flow (vph)	0	1185	0	0	1249	0	0	34	0	0	86	284
Heavy Vehicles (%)	2%	2%	0%	0%	2%	6%	0%	0%	0%	0%	0%	2%
Turn Type	pm+pt						Perm			Perm		pm+ov
Protected Phases	5	2			6			8			4	5
Permitted Phases	2						8			4		4
Actuated Green, G (s)		43.2			29.7			7.0			7.0	15.5
Effective Green, g (s)		43.2			29.7			7.0			7.0	15.5
Actuated g/C Ratio		0.72			0.49			0.12			0.12	0.26
Clearance Time (s)		5.0			5.0			5.0			5.0	5.0
Vehicle Extension (s)		1.5			1.5			2.0			2.0	1.5
Lane Grp Cap (vph)		1685			1742			172			163	611
v/s Ratio Prot		c0.10			0.35							c0.07
v/s Ratio Perm		c0.41						0.02			0.06	0.09
v/c Ratio		0.70			0.72			0.20			0.53	0.47
Uniform Delay, d1		4.8			12.0			24.1			25.0	18.9
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		1.1			1.2			0.2			1.4	0.2
Delay (s)		6.0			13.1			24.3			26.5	19.1
Level of Service		A			B			C			C	B
Approach Delay (s)		6.0			13.1			24.3			20.7	
Approach LOS		A			B			C			C	

Intersection Summary					
HCM Average Control Delay	11.4	HCM Level of Service		B	
HCM Volume to Capacity ratio	0.68				
Actuated Cycle Length (s)	60.2	Sum of lost time (s)		10.0	
Intersection Capacity Utilization	81.9%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					

Lanes, Volumes, Timings
57: Spring Street & Summer Street

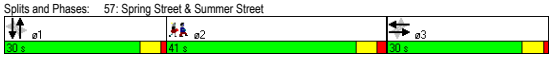
2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	40	215	110	15	245	10	60	370	10	10	350	30	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	16	12	
Right Turn on Red			Yes			No			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		376			382			1581			384		
Travel Time (s)		8.5			8.7			35.9			8.7		
Peak Hour Factor	0.80	0.80	0.80	0.76	0.76	0.76	0.85	0.85	0.85	0.93	0.93	0.93	
Heavy Vehicles (%)	2%	2%	1%	0%	1%	0%	0%	2%	0%	0%	1%	3%	
Parking (#/hr)											0		
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	457	0	0	355	0	0	518	0	0	419	0	
Turn Type	Perm			Perm			Perm			Perm			
Protected Phases		3			3			1			1		2
Permitted Phases	3			3			1			1			
Detector Phase	3	3		3	3		1	1		1	1		
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0		15.0
Minimum Split (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0		21.0
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	41.0
Total Split (%)	29.7%	29.7%	0.0%	29.7%	29.7%	0.0%	29.7%	29.7%	0.0%	29.7%	29.7%	0.0%	41%
Maximum Green (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0		35.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	
Lead/Lag							Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													8.0
Pedestrian Calls (#/hr)													8
v/c Ratio		0.68			0.44			0.81			0.57		
Control Delay		24.1			18.0			31.6			20.5		
Queue Delay		0.0			0.0			0.0			0.2		
Total Delay		24.1			18.0			31.6			20.7		
Queue Length 50th (ft)		120			87			153			108		
Queue Length 95th (ft)		#301			187			#435			289		
Internal Link Dist (ft)		296			302			1501			304		
Turn Bay Length (ft)													
Base Capacity (vph)		672			809			641			740		
Starvation Cap Reductn		0			0			0			40		
Spillback Cap Reductn		0			0			0			0		
Storage Cap Reductn		0			0			0			0		
Reduced v/c Ratio		0.68			0.44			0.81			0.60		

Intersection Summary	
Area Type:	Other
Cycle Length: 101	
Actuated Cycle Length: 64.2	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 57: Spring Street & Summer Street



HCM Signalized Intersection Capacity Analysis
57: Spring Street & Summer Street

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	215	110	15	245	10	60	370	10	10	350	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	12	12	12	12	12	16	12
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.96			1.00			1.00			0.99	
Flt Protected		0.99			1.00			0.99			1.00	
Satd. Flow (prot)		1782			2117			1850			1894	
Flt Permitted		0.93			0.96			0.87			0.98	
Satd. Flow (perm)		1672			2047			1620			1866	
Peak-hour factor, PHF	0.80	0.80	0.80	0.76	0.76	0.76	0.85	0.85	0.85	0.93	0.93	0.93
Adj. Flow (vph)	50	269	138	20	322	13	71	435	12	11	376	32
RTOR Reduction (vph)	0	13	0	0	0	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	444	0	0	355	0	0	517	0	0	416	0
Heavy Vehicles (%)	2%	2%	1%	0%	1%	0%	0%	2%	0%	0%	1%	3%
Parking (#/hr)											0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Actuated Green, G (s)		25.4			25.4			25.4			25.4	
Effective Green, g (s)		25.4			25.4			25.4			25.4	
Actuated g/C Ratio		0.37			0.37			0.37			0.37	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		614			751			595			685	
v/s Ratio Prot												
v/s Ratio Perm		c0.27			0.17			c0.32			0.22	
v/c Ratio		0.72			0.47			0.87			0.61	
Uniform Delay, d1		18.9			16.8			20.4			17.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		7.3			2.1			15.9			4.0	
Delay (s)		26.1			18.9			36.2			21.8	
Level of Service		C			B			D			C	
Approach Delay (s)		26.1			18.9			36.2			21.8	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM Average Control Delay	26.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	69.2	Sum of lost time (s)	18.4
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
58: Route 44/Main Street & Union Street

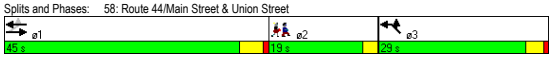
2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2	ø2
Lane Configurations												
Volume (vph)	15	480	395	0	510	20	0	0	395	25	15	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	16	12	16	12	12	12	12	16	15	
Right Turn on Red			Yes			Yes		Yes			Yes	
Link Speed (mph)		30			30		30		30			
Link Distance (ft)		913			784		606		384			
Travel Time (s)		20.8			17.8		13.8		8.7			
Peak Hour Factor	0.93	0.93	0.93	0.86	0.86	0.86	0.92	0.92	0.91	0.91	0.91	
Heavy Vehicles (%)	7%	3%	1%	0%	4%	0%	0%	0%	2%	4%	0%	
Parking (#/hr)			0			0						
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	957	0	0	616	0	0	0	434	43	0	
Turn Type	Perm									Prot		
Protected Phases		1			1				3	3		2
Permitted Phases	1											
Detector Phase	1	1			1				3	3		
Switch Phase												
Minimum Initial (s)	15.0	15.0			15.0				5.0	5.0		1.0
Minimum Split (s)	20.0	20.0			20.0				9.0	9.0		19.0
Total Split (s)	45.0	45.0	0.0	0.0	45.0	0.0	0.0	0.0	29.0	29.0	0.0	19.0
Total Split (%)	48.4%	48.4%	0.0%	0.0%	48.4%	0.0%	0.0%	0.0%	31.2%	31.2%	0.0%	20%
Maximum Green (s)	40.0	40.0			40.0				25.0	25.0		16.0
Yellow Time (s)	4.0	4.0			4.0				3.0	3.0		3.0
All-Red Time (s)	1.0	1.0			1.0				1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lead			Lead							Lag
Lead-Lag Optimize?	Yes	Yes			Yes							Yes
Vehicle Extension (s)	3.0	3.0			3.0				3.0	3.0		3.0
Recall Mode	Max	Max			Max				Max	Max		None
Walk Time (s)												7.0
Flash Dont Walk (s)												9.0
Pedestrian Calls (#/hr)												12
v/c Ratio		0.92			0.58				0.76	0.07		
Control Delay		33.1			16.8				35.3	15.4		
Queue Delay		0.0			0.0				0.2	0.0		
Total Delay		33.1			16.8				35.5	15.4		
Queue Length 50th (ft)		340			170				172	8		
Queue Length 95th (ft)		#867			381				#426	38		
Internal Link Dist (ft)		833			704		526		304			
Turn Bay Length (ft)												
Base Capacity (vph)		1041			1071				574	590		
Starvation Cap Reductn		0			0				9	0		
Spillback Cap Reductn		0			0				0	0		
Storage Cap Reductn		0			0				0	0		
Reduced v/c Ratio		0.92			0.58				0.77	0.07		

Intersection Summary	
Area Type:	Other
Cycle Length: 93	
Actuated Cycle Length: 77.8	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 58: Route 44/Main Street & Union Street



HCM Signalized Intersection Capacity Analysis
58: Route 44/Main Street & Union Street

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2
Lane Configurations											
Volume (vph)	15	480	395	0	510	20	0	0	395	25	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	16	12	16	12	12	12	12	16	15
Total Lost time (s)		5.0			5.0				4.0	4.0	
Lane Util. Factor		1.00			1.00				1.00	1.00	
Frt		0.94			0.99				1.00	0.85	
Flt Protected		1.00			1.00				0.95	1.00	
Satd. Flow (prot)		1979			2063				1770	1785	
Flt Permitted		0.99			1.00				0.95	1.00	
Satd. Flow (perm)		1956			2063				1770	1785	
Peak-hour factor, PHF	0.93	0.93	0.93	0.86	0.86	0.86	0.92	0.92	0.91	0.91	0.91
Adj. Flow (vph)	16	516	425	0	593	23	0	0	434	27	16
RTOR Reduction (vph)	0	27	0	0	1	0	0	0	0	11	0
Lane Group Flow (vph)	0	930	0	0	615	0	0	0	434	32	0
Heavy Vehicles (%)	7%	3%	1%	0%	4%	0%	0%	0%	2%	4%	0%
Parking (#/hr)			0			0					
Turn Type	Perm									Prot	
Protected Phases		1			1				3	3	
Permitted Phases	1										
Actuated Green, G (s)		40.3			40.3				25.2	25.2	
Effective Green, g (s)		40.3			40.3				25.2	25.2	
Actuated g/C Ratio		0.50			0.50				0.31	0.31	
Clearance Time (s)		5.0			5.0				4.0	4.0	
Vehicle Extension (s)		3.0			3.0				3.0	3.0	
Lane Grp Cap (vph)		983			1037				556	561	
v/s Ratio Prot					0.30				c0.25	0.02	
v/s Ratio Perm		c0.48									
v/c Ratio		0.95			0.59				0.78	0.06	
Uniform Delay, d1		18.9			14.1				25.0	19.2	
Progression Factor		1.00			1.00				1.00	1.00	
Incremental Delay, d2		18.3			2.5				10.4	0.2	
Delay (s)		37.3			16.6				35.4	19.4	
Level of Service		D			B				D	B	
Approach Delay (s)		37.3			16.6		0.0		34.0		
Approach LOS		D			B		A		C		

Intersection Summary			
HCM Average Control Delay	30.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	80.2	Sum of lost time (s)	14.7
Intersection Capacity Utilization	91.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

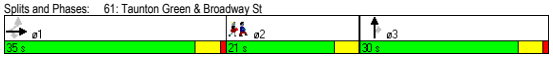
Lanes, Volumes, Timings
61: Taunton Green & Broadway St

2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	170	895	335	0	0	1125	0	200	130	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	16	12	12	12	12	10	10	12	12	12	
Right Turn on Red	Yes		Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		304			913			579			302		
Travel Time (s)		6.9			20.8			13.2			6.9		
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.88	0.88	0.88	0.92	0.92	0.92	
Heavy Vehicles (%)	2%	3%	2%	0%	0%	2%	0%	2%	2%	0%	0%	0%	
Parking (#/hr)			0			0			0				
Shared Lane Traffic (%)													
Lane Group Flow (vph)	183	962	360	0	0	1223	0	227	148	0	0	0	
Turn Type	Perm		Perm			Free			Perm				
Protected Phases		1						3					2
Permitted Phases	1		1			Free			3				
Detector Phase	1	1	1					3	3				
Switch Phase													
Minimum Initial (s)	30.0	30.0	30.0					25.0	25.0				1.0
Minimum Split (s)	35.0	35.0	35.0					30.0	30.0				21.0
Total Split (s)	35.0	35.0	35.0	0.0	0.0	0.0	0.0	30.0	30.0	0.0	0.0	0.0	21.0
Total Split (%)	40.7%	40.7%	40.7%	0.0%	0.0%	0.0%	0.0%	34.9%	34.9%	0.0%	0.0%	0.0%	24%
Maximum Green (s)	30.0	30.0	30.0					25.0	25.0				17.0
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0				4.0
All-Red Time (s)	1.0	1.0	1.0					1.0	1.0				0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lead	Lead										Lag
Lead-Lag Optimize?	Yes	Yes	Yes										Yes
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0				2.0
Recall Mode	Max	Max	Max					Max	Max				Ped
Walk Time (s)													10.0
Flash Dont Walk (s)													7.0
Pedestrian Calls (#/hr)													8
v/c Ratio	0.26	0.79	0.45			0.46		0.45	0.30				
Control Delay	7.0	30.1	4.0			0.6		28.3	6.0				
Queue Delay	0.0	0.0	0.0			0.0		0.0	0.0				
Total Delay	7.0	30.1	4.0			0.6		28.3	6.0				
Queue Length 50th (ft)	16	242	0			0		100	0				
Queue Length 95th (ft)	58	316	50			0		162	40				
Internal Link Dist (ft)		224			833			499			222		
Turn Bay Length (ft)													
Base Capacity (vph)	705	1223	798			2647		506	492				
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	0.26	0.79	0.45			0.46		0.45	0.30				

Intersection Summary	
Area Type:	Other
Cycle Length: 86	
Actuated Cycle Length: 86	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	

Splits and Phases: 61: Taunton Green & Broadway St



HCM Signalized Intersection Capacity Analysis
61: Taunton Green & Broadway St

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	895	335	0	0	1125	0	200	130	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	16	12	12	12	12	10	10	12	12	12
Total Lost time (s)	5.0	5.0	5.0			4.0		5.0	5.0			
Lane Util. Factor	1.00	0.95	1.00			0.88		1.00	1.00			
Frt	1.00	1.00	0.85			0.85		1.00	0.85			
Flt Protected	0.95	1.00	1.00			1.00		1.00	1.00			
Satd. Flow (prot)	1770	3505	1615			2647		1739	1330			
Flt Permitted	0.95	1.00	1.00			1.00		1.00	1.00			
Satd. Flow (perm)	1770	3505	1615			2647		1739	1330			
Peak-hour factor, PHF	0.93	0.93	0.93	0.92	0.92	0.92	0.88	0.88	0.88	0.92	0.92	0.92
Adj. Flow (vph)	183	962	360	0	0	1223	0	227	148	0	0	0
RTOR Reduction (vph)	87	0	234	0	0	0	0	0	105	0	0	0
Lane Group Flow (vph)	96	962	126	0	0	1223	0	227	43	0	0	0
Heavy Vehicles (%)	2%	3%	2%	0%	0%	2%	0%	2%	2%	0%	0%	0%
Parking (#/hr)			0			0			0			
Turn Type	Perm		Perm			Free			Perm			
Protected Phases		1						3				
Permitted Phases	1		1			Free			3			
Actuated Green, G (s)	30.0	30.0	30.0			86.0		25.0	25.0			
Effective Green, g (s)	30.0	30.0	30.0			86.0		25.0	25.0			
Actuated g/C Ratio	0.35	0.35	0.35			1.00		0.29	0.29			
Clearance Time (s)	5.0	5.0	5.0					5.0	5.0			
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0			
Lane Grp Cap (vph)	617	1223	563			2647		506	387			
v/s Ratio Prot		c0.27						0.13				
v/s Ratio Perm	0.05		0.08			c0.46			0.03			
v/c Ratio	0.16	0.79	0.22			0.46		0.45	0.11			
Uniform Delay, d1	19.3	25.1	19.8			0.0		24.9	22.4			
Progression Factor	0.92	0.98	0.86			1.00		1.00	1.00			
Incremental Delay, d2	0.5	5.1	0.9			0.6		2.9	0.6			
Delay (s)	18.3	29.7	17.9			0.6		27.7	22.9			
Level of Service	B	C	B			A		C	C			
Approach Delay (s)		25.5			0.6			25.8			0.0	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
71: Court Street & Washington Street

2030 No-Build Conditions - PM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2
Lane Configurations							
Volume (vph)	435	20	565	240	50	680	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	14	10	9	12	12	
Storage Length (ft)	0	50		0	0		
Storage Lanes	1	1		1	1		
Taper Length (ft)	25	25		25	25		
Right Turn on Red		Yes		Yes			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1051		260			584	
Travel Time (s)	23.9		5.9			13.3	
Peak Hour Factor	0.94	0.94	0.92	0.92	0.95	0.95	
Heavy Vehicles (%)	3%	0%	1%	2%	8%	1%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	463	21	614	261	53	716	
Turn Type		Perm		Perm	Perm		
Protected Phases	3		1			1	2
Permitted Phases		3		1	1		
Minimum Split (s)	10.0	10.0	15.0	15.0	15.0	15.0	17.0
Total Split (s)	25.0	25.0	55.0	55.0	55.0	55.0	17.0
Total Split (%)	25.8%	25.8%	56.7%	56.7%	56.7%	56.7%	18%
Maximum Green (s)	20.0	20.0	50.0	50.0	50.0	50.0	15.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag			Lead	Lead	Lead	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes	Yes
Walk Time (s)							7.0
Flash Dont Walk (s)							8.0
Pedestrian Calls (#/hr)							10
v/c Ratio	1.24	0.06	0.68	0.30	0.22	0.74	
Control Delay	164.1	25.3	22.3	2.6	15.9	24.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	164.1	25.3	22.3	2.6	15.9	24.1	
Queue Length 50th (ft)	~357	7	269	0	17	329	
Queue Length 95th (ft)	#548	28	396	37	43	477	
Internal Link Dist (ft)	971		180			504	
Turn Bay Length (ft)		50					
Base Capacity (vph)	373	360	905	861	240	970	
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	1.24	0.06	0.68	0.30	0.22	0.74	

Intersection Summary

Area Type: Other
Cycle Length: 97
Actuated Cycle Length: 97
Offset: 0 (0%), Referenced to phase 2:Ped and 6:, Start of Green
Natural Cycle: 90
Control Type: Pretimed
~ 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.

Splits and Phases: 71: Court Street & Washington Street

HCM Signalized Intersection Capacity Analysis
71: Court Street & Washington Street

2030 No-Build Conditions - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	435	20	565	240	50	680
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	14	10	9	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1811	1723	1756	1425	1671	1881
Flt Permitted	0.95	1.00	1.00	1.00	0.27	1.00
Satd. Flow (perm)	1811	1723	1756	1425	466	1881
Peak-hour factor, PHF	0.94	0.94	0.92	0.92	0.95	0.95
Adj. Flow (vph)	463	21	614	261	53	716
RTOR Reduction (vph)	0	5	0	126	0	0
Lane Group Flow (vph)	463	16	614	135	53	716
Heavy Vehicles (%)	3%	0%	1%	2%	8%	1%
Turn Type		Perm		Perm	Perm	
Protected Phases	3		1			1
Permitted Phases		3		1	1	
Actuated Green, G (s)	20.0	20.0	50.0	50.0	50.0	50.0
Effective Green, g (s)	20.0	20.0	50.0	50.0	50.0	50.0
Actuated g/C Ratio	0.21	0.21	0.52	0.52	0.52	0.52
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	373	355	905	735	240	970
v/s Ratio Prot	c0.26		0.35			c0.38
v/s Ratio Perm		0.01		0.09	0.11	
v/c Ratio	1.24	0.05	0.68	0.18	0.22	0.74
Uniform Delay, d1	38.5	30.9	17.5	12.6	12.8	18.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	129.4	0.2	4.1	0.5	2.1	5.0
Delay (s)	167.9	31.1	21.6	13.1	15.0	23.4
Level of Service	F	C	C	B	B	C
Approach Delay (s)	162.0		19.1			22.8
Approach LOS	F		B			C

Intersection Summary

HCM Average Control Delay	52.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	97.0	Sum of lost time (s)	27.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
77: Tremont Street & Washington Street

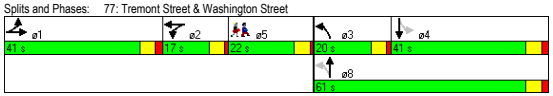
2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5
Lane Configurations													
Volume (vph)	505	175	100	25	130	35	105	315	60	35	355	515	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	14	12	16	12	12	12	13	12	12	12	11	12	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		698			192			1911			574		
Travel Time (s)		15.9			4.4			43.4			13.0		
Peak Hour Factor	0.97	0.97	0.97	0.81	0.81	0.81	0.94	0.94	0.94	0.88	0.88	0.88	
Heavy Vehicles (%)	1%	2%	2%	0%	2%	3%	3%	6%	0%	0%	4%	2%	
Shared Lane Traffic (%)	22%												
Lane Group Flow (vph)	406	398	0	0	234	0	0	511	0	0	1028	0	
Turn Type	Split			Split			pm+pt			Perm			
Protected Phases	1	1		2	2		3	8			4		5
Permitted Phases							8			4			
Detector Phase	1	1		2	2		3	8		4	4		
Switch Phase													
Minimum Initial (s)	18.0	18.0		7.0	7.0		6.0	18.0		18.0	18.0		3.0
Minimum Split (s)	24.0	24.0		12.0	12.0		11.0	24.0		24.0	24.0		22.0
Total Split (s)	41.0	41.0	0.0	17.0	17.0	0.0	20.0	61.0	0.0	41.0	41.0	0.0	22.0
Total Split (%)	29.1%	29.1%	0.0%	12.1%	12.1%	0.0%	14.2%	43.3%	0.0%	29.1%	29.1%	0.0%	16%
Maximum Green (s)	35.0	35.0		12.0	12.0		15.0	55.0		35.0	35.0		17.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		1.0	1.0		1.0	2.0		2.0	2.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	5.0	6.0	4.0	6.0	6.0	4.0	
Lead/Lag	Lead	Lead		Lag	Lag		Lead			Lag	Lag		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None		None	None		None	Min		Min	Min		None
Walk Time (s)													7.0
Flash Dont Walk (s)													10.0
Pedestrian Calls (#/hr)													11
v/c Ratio	0.78	0.81			1.06			1.15dl			0.83		
Control Delay	47.0	48.6			121.6			35.9			29.6		
Queue Delay	0.0	0.0			0.0			0.0			0.0		
Total Delay	47.0	48.6			121.6			35.9			29.6		
Queue Length 50th (ft)	222	213			~140			138			240		
Queue Length 95th (ft)	#574	#574			#399			283			440		
Internal Link Dist (ft)		618			112			1831			494		
Turn Bay Length (ft)													
Base Capacity (vph)	631	594			221			952			1244		
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	0.64	0.67			1.06			0.54			0.83		

Intersection Summary	
Area Type:	Other
Cycle Length: 141	
Actuated Cycle Length: 103.6	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	

~ 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 77: Tremont Street & Washington Street



HCM Signalized Intersection Capacity Analysis
77: Tremont Street & Washington Street

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	505	175	100	25	130	35	105	315	60	35	355	515
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	12	16	12	12	12	13	12	12	12	11	12
Total Lost time (s)	6.0	6.0			5.0			6.0			6.0	
Lane Util. Factor	0.95	0.95			1.00			0.95			0.95	
Frt	1.00	0.96			0.98			0.98			0.91	
Flt Protected	0.95	0.99			0.99			0.99			1.00	
Satd. Flow (prot)	1811	1681			1806			3350			3102	
Flt Permitted	0.95	0.99			0.99			0.51			0.91	
Satd. Flow (perm)	1811	1681			1806			1728			2822	
Peak-hour factor, PHF	0.97	0.97	0.97	0.81	0.81	0.81	0.94	0.94	0.94	0.88	0.88	0.88
Adj. Flow (vph)	521	180	103	31	160	43	112	335	64	40	403	585
RTOR Reduction (vph)	0	9	0	0	5	0	0	8	0	0	140	0
Lane Group Flow (vph)	406	389	0	0	229	0	0	503	0	0	888	0
Heavy Vehicles (%)	1%	2%	2%	0%	2%	3%	3%	6%	0%	0%	4%	2%
Turn Type	Split			Split			pm+pt			Perm		
Protected Phases	1	1		2	2		3	8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	29.8	29.8			12.4			40.6			40.6	
Effective Green, g (s)	29.8	29.8			12.4			40.6			40.6	
Actuated g/C Ratio	0.28	0.28			0.12			0.38			0.38	
Clearance Time (s)	6.0	6.0			5.0			6.0			6.0	
Vehicle Extension (s)	2.0	2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)	503	467			209			654			1068	
v/s Ratio Prot	0.22	c0.23			c0.13							
v/s Ratio Perm								0.29			c0.31	
v/c Ratio	0.81	0.83			1.09			1.15dl			0.83	
Uniform Delay, d1	36.1	36.4			47.4			29.2			30.2	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	8.7	11.6			89.7			4.9			5.4	
Delay (s)	44.8	48.0			137.1			34.1			35.6	
Level of Service	D	D			F			C			D	
Approach Delay (s)		46.4			137.1			34.1			35.6	
Approach LOS		D			F			C			D	

Intersection Summary			
HCM Average Control Delay	47.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	107.3	Sum of lost time (s)	24.5
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Lanes, Volumes, Timings
93: Washington Street & Broadway

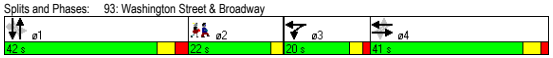
2030 No-Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	285	145	5	35	145	5	5	505	60	20	480	375	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	12	12	12	12	12	12	12	12	12	12	
Storage Length (ft)	0		0	0		0	0		0	0		50	
Storage Lanes	0		0	0		0	0		1	0		1	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			No			Yes			No	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		1068			1376			92			2042		
Travel Time (s)		24.3			31.3			2.1			46.4		
Peak Hour Factor	0.92	0.92	0.92	0.84	0.84	0.84	0.98	0.98	0.98	0.95	0.95	0.95	
Heavy Vehicles (%)	3%	2%	0%	3%	3%	50%	29%	4%	15%	9%	4%	3%	
Parking (#/hr)									2				
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	473	0	0	221	0	0	581	0	0	526	395	
Turn Type	Perm			pm+pt			Perm			Perm		Perm	
Protected Phases		4		3	3 4			1			1		2
Permitted Phases	4			3 4			1			1		1	
Detector Phase	4	4		3	3 4		1	1		1	1	1	
Switch Phase													
Minimum Initial (s)	8.0	8.0		4.0			18.0	18.0		18.0	18.0	18.0	1.0
Minimum Split (s)	14.0	14.0		9.0			25.0	25.0		25.0	25.0	25.0	22.0
Total Split (s)	41.0	41.0	0.0	20.0	61.0	0.0	42.0	42.0	0.0	42.0	42.0	42.0	22.0
Total Split (%)	32.8%	32.8%	0.0%	16.0%	48.8%	0.0%	33.6%	33.6%	0.0%	33.6%	33.6%	33.6%	18%
Maximum Green (s)	35.0	35.0		15.0			35.0	35.0		35.0	35.0	35.0	19.0
Yellow Time (s)	4.0	4.0		3.0			4.0	4.0		4.0	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0		2.0			3.0	3.0		3.0	3.0	3.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	7.0	7.0	4.0	7.0	7.0	7.0	
Lead/Lag	Lag	Lag		Lead			Lead	Lead		Lead	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0		2.0			3.0	3.0		3.0	3.0	3.0	2.0
Recall Mode	None	None		None			Max	Max		Max	Max	Max	None
Walk Time (s)													7.0
Flash Dont Walk (s)													12.0
Pedestrian Calls (#/hr)													9
v/c Ratio		0.98			0.29			0.54			0.88	0.74	
Control Delay		72.1			16.9			30.7			51.1	41.5	
Queue Delay		0.0			0.0			0.0			0.0	0.0	
Total Delay		72.1			16.9			30.7			51.1	41.5	
Queue Length 50th (ft)		286			72			147			303	213	
Queue Length 95th (ft)		#674			155			279			#689	#493	
Internal Link Dist (ft)		988			1296			12			1962		
Turn Bay Length (ft)												50	
Base Capacity (vph)		483			823			1085			598	535	
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		0.98			0.27			0.54			0.88	0.74	

Intersection Summary	
Area Type:	Other
Cycle Length: 125	
Actuated Cycle Length: 103.6	
Natural Cycle: 110	
Control Type: Semi Act-Uncoord	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 93: Washington Street & Broadway



HCM Signalized Intersection Capacity Analysis
93: Washington Street & Broadway

2030 No-Build Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	285	145	5	35	145	5	5	505	60	20	480	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		6.0			5.0			7.0			7.0	7.0
Lane Util. Factor		1.00			1.00			0.95			1.00	1.00
Frt		1.00			1.00			0.98			1.00	0.85
Flt Protected		0.97			0.99			1.00			1.00	1.00
Satd. Flow (prot)		2029			1798			3371			1820	1568
Flt Permitted		0.67			0.89			0.94			0.96	1.00
Satd. Flow (perm)		1414			1623			3164			1752	1568
Peak-hour factor, PHF	0.92	0.92	0.92	0.84	0.84	0.84	0.98	0.98	0.98	0.95	0.95	0.95
Adj. Flow (vph)	310	158	5	42	173	6	5	515	61	21	505	395
RTOR Reduction (vph)	0	0	0	0	0	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	473	0	0	221	0	0	574	0	0	526	395
Heavy Vehicles (%)	3%	2%	0%	3%	3%	50%	29%	4%	15%	9%	4%	3%
Parking (#/hr)									2			
Turn Type	Perm			pm+pt			Perm			Perm		Perm
Protected Phases		4		3	3 4			1			1	
Permitted Phases	4			3 4			1			1		1
Actuated Green, G (s)		35.3			46.4			35.3			35.3	35.3
Effective Green, g (s)		35.3			46.4			35.3			35.3	35.3
Actuated g/C Ratio		0.33			0.44			0.33			0.33	0.33
Clearance Time (s)		6.0						7.0			7.0	7.0
Vehicle Extension (s)		4.0						3.0			3.0	3.0
Lane Grp Cap (vph)		472			730			1056			585	523
v/s Ratio Prot					c0.03							
v/s Ratio Perm		c0.33			0.10			0.18			c0.30	0.25
v/c Ratio		1.00			0.30			0.54			0.90	0.76
Uniform Delay, d1		35.2			19.2			28.7			33.6	31.4
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		41.9			0.1			2.0			19.3	9.8
Delay (s)		77.2			19.3			30.7			52.8	41.2
Level of Service		E			B			C			D	D
Approach Delay (s)		77.2			19.3			30.7			47.8	
Approach LOS		E			B			C			D	

Intersection Summary					
HCM Average Control Delay		46.8	HCM Level of Service	D	
HCM Volume to Capacity ratio		0.86			
Actuated Cycle Length (s)		105.8	Sum of lost time (s)	24.1	
Intersection Capacity Utilization		90.1%	ICU Level of Service	E	
Analysis Period (min)		15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
25: Route 24 Slip Ramp & Route 140 (Exit 12A)

2030 No-Build Conditions - PM Peak Hour

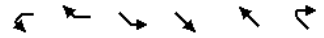
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	205	0	1850	2425	0
Sign Control	Yield			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.97	0.97	0.95	0.95
Hourly flow rate (vph)	0	244	0	1907	2553	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					624	
pX, platoon unblocked	0.05	0.05	0.05			
vC, conflicting volume	3506	1276	2553			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	13593	0	0			
tC, single (s)	6.8	7.0	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	0	52	78			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	244	954	954	1276	1276
Volume Left	0	0	0	0	0
Volume Right	244	0	0	0	0
cSH	52	1700	1700	1700	1700
Volume to Capacity	4.74	0.56	0.56	0.75	0.75
Queue Length 95th (ft)	Err	0	0	0	0
Control Delay (s)	Err	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	Err	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	518.8		
Intersection Capacity Utilization	86.4%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
38: Rt. 24 SB Slip Ramp & Route 140 (Exit 12B)

2030 No-Build Conditions - PM Peak Hour



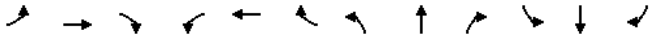
Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Volume (veh/h)	0	250	0	1420	965	0
Sign Control	Yield			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	272	0	1543	1049	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				740	625	
pX, platoon unblocked	0.82					
vC, conflicting volume	1821	524	1049			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1562	524	1049			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	45	100			
cM capacity (veh/h)	84	498	659			

Direction, Lane #	WB 1	SE 1	SE 2	NW 1	NW 2
Volume Total	272	772	772	524	524
Volume Left	0	0	0	0	0
Volume Right	272	0	0	0	0
cSH	498	1700	1700	1700	1700
Volume to Capacity	0.55	0.45	0.45	0.31	0.31
Queue Length 95th (ft)	81	0	0	0	0
Control Delay (s)	20.6	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	20.6	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
66: Cohannet Street & Taunton Green

2030 No-Build Conditions - PM Peak Hour



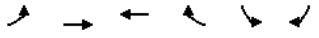
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	255	30	0	0	0	0	0	420	775	450	100
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.99	0.99	0.99	0.94	0.94	0.94
Hourly flow rate (vph)	0	274	32	0	0	0	0	0	424	824	479	106
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			Raised	
Median storage veh)											1	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2393	2605	532	2297	2234	0	585			424		
vC1, stage 1 conf vol	2181	2181		0	0							
vC2, stage 2 conf vol	212	424		2297	2234							
vCu, unblocked vol	2393	2605	532	2297	2234	0	585			424		
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 %	100	0	94	0	100	100	100			27		
cM capacity (veh/h)	10	7	546	0	20	1085	1000			1135		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2	SB 3
Volume Total	274	32	424	412	412	585
Volume Left	0	0	0	412	412	0
Volume Right	0	32	424	0	0	106
cSH	7	546	1700	1135	1135	1700
Volume to Capacity	41.34	0.06	0.25	0.73	0.73	0.34
Queue Length 95th (ft)	Err	5	0	170	170	0
Control Delay (s)	Err	12.0	0.0	16.1	16.1	0.0
Lane LOS	F	B		C	C	
Approach Delay (s)	8947.7		0.0	9.4		
Approach LOS	F					

Intersection Summary				
Average Delay	1287.4			
Intersection Capacity Utilization	71.5%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
67: Post Office Square & Broadway

2030 No-Build Conditions - PM Peak Hour



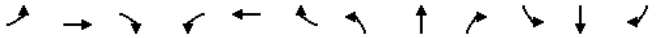
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	0	925	555	0	545
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.95	0.95	0.89	0.89
Hourly flow rate (vph)	0	0	974	584	0	612
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			302			
pX, platoon unblocked						
vC, conflicting volume	974				974	487
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	974				974	487
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	0
cM capacity (veh/h)	704				253	527

Direction, Lane #	WB 1	WB 2	WB 3	SB 1
Volume Total	487	487	584	612
Volume Left	0	0	0	0
Volume Right	0	0	584	612
cSH	1700	1700	1700	527
Volume to Capacity	0.29	0.29	0.34	1.16
Queue Length 95th (ft)	0	0	0	536
Control Delay (s)	0.0	0.0	0.0	118.7
Lane LOS				F
Approach Delay (s)	0.0			118.7
Approach LOS				F

Intersection Summary			
Average Delay	33.5		
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
70: Post Office Square & Court Street

2030 No-Build Conditions - PM Peak Hour



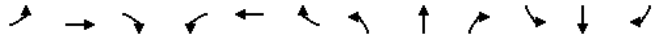
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	25	940	125	365	0	0	0	0	340	20
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.92	0.92	0.92	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	29	1011	134	392	0	0	0	0	378	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					565							
pX, platoon unblocked												
vC, conflicting volume	134			29			2367	2156	0	2170	2185	134
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	134			29			2367	2156	0	2170	2185	134
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			36			0	100	100	100	0	98
cM capacity (veh/h)	1463			1584			0	18	1091	17	17	920

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1
Volume Total	29	674	471	392	400
Volume Left	0	674	337	0	0
Volume Right	29	0	0	392	22
cSH	1700	1584	1584	1700	18
Volume to Capacity	0.02	0.64	0.64	0.23	22.83
Queue Length 95th (ft)	0	124	124	0	Err
Control Delay (s)	0.0	11.2	10.2	0.0	Err
Lane LOS		B	B		F
Approach Delay (s)	0.0	8.0			Err
Approach LOS					F

Intersection Summary				
Average Delay	2039.9			
Intersection Capacity Utilization	61.8%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
75: Frederick Martin Parkway & Washington Street

2030 No-Build Conditions - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	5	95	0	175	5	645	315	240	845	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Hourly flow rate (vph)	0	0	10	104	0	192	5	694	339	255	899	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								574			260	
pX, platoon unblocked	0.72	0.72	0.72	0.72	0.72		0.72					
vC, conflicting volume	1959	2453	899	2293	2283	516	899			1032		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2142	2832	660	2609	2595	516	660			1032		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	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 %	100	100	97	0	100	62	99			62		
cM capacity (veh/h)	9	8	294	6	11	509	671			675		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	10	104	192	352	685	255	899
Volume Left	0	104	0	5	0	255	0
Volume Right	10	0	192	0	339	0	0
cSH	294	6	509	671	1700	675	1700
Volume to Capacity	0.03	17.70	0.38	0.01	0.40	0.38	0.53
Queue Length 95th (ft)	3	Err	44	1	0	44	0
Control Delay (s)	17.7	Err	16.3	0.3	0.0	13.5	0.0
Lane LOS	C	F	C	A		B	
Approach Delay (s)	17.7	3528.7		0.1		3.0	
Approach LOS	C	F					

Intersection Summary				
Average Delay	420.5			
Intersection Capacity Utilization	94.5%	ICU Level of Service	F	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
78: Kilmer Street & Oak Street

2030 No-Build Conditions - PM Peak Hour

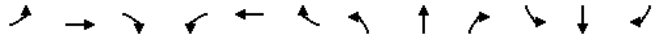
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	80	20	25	210	355	85
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.72	0.72	0.72	0.72	0.91	0.91
Hourly flow rate (vph)	111	28	35	292	390	93
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	798	437	484			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	798	437	484			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	67	96	97			
cM capacity (veh/h)	341	624	1090			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	139	326	484
Volume Left	111	35	0
Volume Right	28	0	93
cSH	375	1090	1700
Volume to Capacity	0.37	0.03	0.28
Queue Length 95th (ft)	42	2	0
Control Delay (s)	20.1	1.2	0.0
Lane LOS	C	A	
Approach Delay (s)	20.1	1.2	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		3.4		
Intersection Capacity Utilization		44.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
87: Purchase Street & School Street

2030 No-Build Conditions - PM Peak Hour



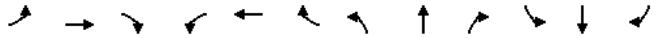
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	65	325	20	5	90	5	30	90	40	20	135	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.72	0.72	0.72	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	69	346	21	7	125	7	37	110	49	24	165	79
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	132			367			799	641	356	741	648	128
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	132			367			799	641	356	741	648	128
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 %	95			99			79	71	93	89	55	91
cM capacity (veh/h)	1453			1203			173	372	692	231	369	921

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	436	139	195	268
Volume Left	69	7	37	24
Volume Right	21	7	49	79
cSH	1453	1203	338	420
Volume to Capacity	0.05	0.01	0.58	0.64
Queue Length 95th (ft)	4	0	86	108
Control Delay (s)	1.6	0.4	29.2	27.5
Lane LOS	A	A	D	D
Approach Delay (s)	1.6	0.4	29.2	27.5
Approach LOS			D	D

Intersection Summary				
Average Delay		13.3		
Intersection Capacity Utilization		50.5%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
88: Purchase Street & Washington Street

2030 No-Build Conditions - PM Peak Hour



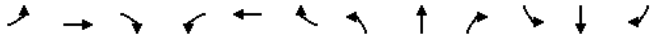
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	70	50	240	105	5	40	90	35	5	90	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.81	0.81	0.81	0.88	0.88	0.88	0.77	0.77	0.77
Hourly flow rate (vph)	11	74	53	296	130	6	45	102	40	6	117	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	136			128			913	851	101	939	874	133
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	136			128			913	851	101	939	874	133
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			80			65	57	96	95	49	99
cM capacity (veh/h)	1461			1452			130	236	952	133	229	922

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	138	432	188	130
Volume Left	11	296	45	6
Volume Right	53	6	40	6
cSH	1461	1452	227	230
Volume to Capacity	0.01	0.20	0.82	0.57
Queue Length 95th (ft)	1	19	156	78
Control Delay (s)	0.6	6.1	67.7	39.3
Lane LOS	A	A	F	E
Approach Delay (s)	0.6	6.1	67.7	39.3
Approach LOS			F	E

Intersection Summary				
Average Delay	23.1			
Intersection Capacity Utilization	48.2%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
89: Winter Street & School Street

2030 No-Build Conditions - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	250	15	180	400	25	25	45	85	25	65	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.72	0.72	0.72	0.85	0.85	0.85	0.78	0.78	0.78	0.88	0.88	0.88
Hourly flow rate (vph)	7	347	21	212	471	29	32	58	109	28	74	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	500			368			1334	1295	358	1418	1291	485
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	500			368			1334	1295	358	1418	1291	485
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			82			48	57	84	48	45	97
cM capacity (veh/h)	1075			1196			62	134	682	55	134	586

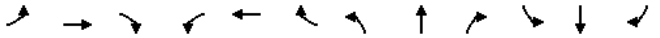
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	375	712	199	119
Volume Left	7	212	32	28
Volume Right	21	29	109	17
cSH	1075	1196	179	109
Volume to Capacity	0.01	0.18	1.11	1.10
Queue Length 95th (ft)	0	16	248	185
Control Delay (s)	0.2	4.1	152.7	190.5
Lane LOS	A	A	F	F
Approach Delay (s)	0.2	4.1	152.7	190.5
Approach LOS			F	F

Intersection Summary				
Average Delay	39.9			
Intersection Capacity Utilization	67.6%	ICU Level of Service		C
Analysis Period (min)	15			

Norton

HCM Unsignalized Intersection Capacity Analysis
1: Route 123 & N. Worcester Street

2030 No-Build Condition - AM Peak Hour



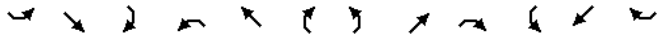
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	355	135	50	310	50	175	115	120	70	60	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.81	0.81	0.81	0.79	0.79	0.79	0.67	0.67	0.67
Hourly flow rate (vph)	16	390	148	62	383	62	222	146	152	104	90	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	444			538			1094	1065	464	1259	1108	414
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	444			538			1094	1065	464	1259	1108	414
tC, single (s)	4.2			4.1			7.1	6.6	6.2	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.6	4.1	3.4
p0 queue free %	98			94			0	28	74	0	53	98
cM capacity (veh/h)	1060			1040			112	204	592	41	189	624

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	555	506	519	209
Volume Left	16	62	222	104
Volume Right	148	62	152	15
cSH	1060	1040	176	69
Volume to Capacity	0.02	0.06	2.96	3.02
Queue Length 95th (ft)	1	5	1176	Err
Control Delay (s)	0.4	1.7	935.4	Err
Lane LOS	A	A	F	F
Approach Delay (s)	0.4	1.7	935.4	Err
Approach LOS			F	F

Intersection Summary				
Average Delay	1439.8			
Intersection Capacity Utilization	77.3%	ICU Level of Service		D
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
2: S Worcester St & S. Worcerster Street

2030 No-Build Condition - AM Peak Hour



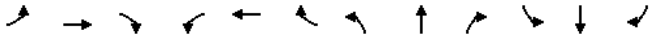
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	35	225	0	0	360	75	0	0	5	10	0	50
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.56	0.56	0.56	0.69	0.69	0.69
Hourly flow rate (vph)	39	250	0	0	400	83	0	0	9	14	0	72
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	483			250			842	811	250	778	769	442
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	483			250			842	811	250	778	769	442
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.3	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.7	4.0	3.3
p0 queue free %	96			100			100	100	99	95	100	88
cM capacity (veh/h)	1074			1327			246	304	794	279	322	616

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	289	483	9	87
Volume Left	39	0	0	14
Volume Right	0	83	9	72
cSH	1074	1327	794	513
Volume to Capacity	0.04	0.00	0.01	0.17
Queue Length 95th (ft)	3	0	1	15
Control Delay (s)	1.5	0.0	9.6	13.4
Lane LOS	A		A	B
Approach Delay (s)	1.5	0.0	9.6	13.4
Approach LOS			A	B

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	57.6%	ICU Level of Service		B
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
9: John B. Scott Blvd & Harvey Street

2030 No-Build Condition - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	185	5	5	220	0	15	0	10	5	0	5
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.75	0.75	0.75	0.69	0.69	0.69
Hourly flow rate (vph)	0	201	5	5	232	0	20	0	13	7	0	7

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	207	237	33	14
Volume Left (vph)	0	5	20	7
Volume Right (vph)	5	0	13	7
Hadj (s)	0.11	0.06	0.32	0.23
Departure Headway (s)	4.4	4.3	5.2	5.2
Degree Utilization, x	0.25	0.28	0.05	0.02
Capacity (veh/h)	803	811	629	628
Control Delay (s)	8.9	9.0	8.5	8.3
Approach Delay (s)	8.9	9.0	8.5	8.3
Approach LOS	A	A	A	A

Intersection Summary				
Delay			8.9	
HCM Level of Service			A	
Intersection Capacity Utilization			25.6%	ICU Level of Service
Analysis Period (min)			15	

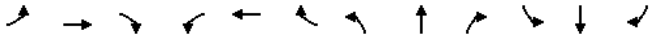
HCM Unsignalized Intersection Capacity Analysis
14: Barrows St & S. Worcester St

2030 No-Build Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	40	85	195	60	35	45
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.72	0.72	0.72	0.72	0.70	0.70
Hourly flow rate (vph)	56	118	271	83	50	64
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	477	312			354	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	477	312			354	
tC, single (s)	6.5	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	89	84			96	
cM capacity (veh/h)	514	723			1216	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	174	354	114
Volume Left	56	0	50
Volume Right	118	83	0
cSH	640	1700	1216
Volume to Capacity	0.27	0.21	0.04
Queue Length 95th (ft)	27	0	3
Control Delay (s)	12.7	0.0	3.7
Lane LOS	B		A
Approach Delay (s)	12.7	0.0	3.7
Approach LOS	B		

Intersection Summary					
Average Delay			4.1		
Intersection Capacity Utilization			35.7%	ICU Level of Service	A
Analysis Period (min)			15		



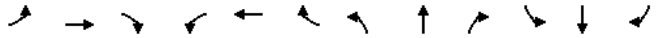
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	170	20	5	165	10	60	155	5	10	40	0
Peak Hour Factor	0.86	0.86	0.86	0.75	0.75	0.75	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	198	23	7	220	13	67	172	6	11	44	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	227	240	244	56
Volume Left (vph)	6	7	67	11
Volume Right (vph)	23	13	6	0
Hadj (s)	-0.03	0.11	0.16	0.23
Departure Headway (s)	5.1	5.2	5.4	5.8
Degree Utilization, x	0.32	0.35	0.37	0.09
Capacity (veh/h)	658	649	616	546
Control Delay (s)	10.5	11.0	11.5	9.4
Approach Delay (s)	10.5	11.0	11.5	9.4
Approach LOS	B	B	B	A

Intersection Summary				
Delay		10.9		
HCM Level of Service		B		
Intersection Capacity Utilization		36.9%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
1: Route 123 & N. Worcester Street

2030 No-Build Condition - PM Peak Hour



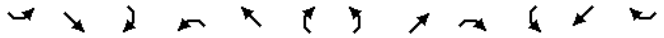
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	295	245	150	425	75	155	70	115	65	155	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.89	0.89	0.89	0.93	0.93	0.93	0.88	0.88	0.88
Hourly flow rate (vph)	15	304	253	169	478	84	167	75	124	74	176	23
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	562			557			1429	1360	430	1479	1444	520
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	562			557			1429	1360	430	1479	1444	520
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			83			0	38	80	0	0	96
cM capacity (veh/h)	1020			1019			0	122	627	38	109	549

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	572	730	366	273
Volume Left	15	169	167	74
Volume Right	253	84	124	23
cSH	1020	1019	0	75
Volume to Capacity	0.02	0.17	Err	3.62
Queue Length 95th (ft)	1	15	Err	Err
Control Delay (s)	0.4	3.9	Err	Err
Lane LOS	A	A	F	F
Approach Delay (s)	0.4	3.9	Err	Err
Approach LOS			F	F

Intersection Summary				
Average Delay			Err	
Intersection Capacity Utilization			109.1%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
2: S Worcester St & S. Worcerster Street

2030 No-Build Condition - PM Peak Hour



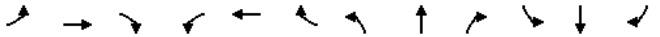
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	75	475	5	5	250	35	0	0	5	40	0	85
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.88	0.88	0.88	0.44	0.44	0.44	0.67	0.67	0.67
Hourly flow rate (vph)	82	522	5	6	284	40	0	0	11	60	0	127
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	324			527			1132	1025	525	1016	1008	304
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	324			527			1132	1025	525	1016	1008	304
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 %	93			99			100	100	98	70	100	83
cM capacity (veh/h)	1247			1050			143	220	557	199	225	738

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	610	330	11	187
Volume Left	82	6	0	60
Volume Right	5	40	11	127
cSH	1247	1050	557	396
Volume to Capacity	0.07	0.01	0.02	0.47
Queue Length 95th (ft)	5	0	2	61
Control Delay (s)	1.8	0.2	11.6	21.9
Lane LOS	A	A	B	C
Approach Delay (s)	1.8	0.2	11.6	21.9
Approach LOS			B	C

Intersection Summary				
Average Delay			4.7	
Intersection Capacity Utilization			69.1%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
9: John B. Scott Blvd & Harvey Street

2030 No-Build Condition - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	310	15	10	190	0	5	5	5	0	0	5
Peak Hour Factor	0.87	0.87	0.87	0.88	0.88	0.88	0.75	0.75	0.75	0.42	0.42	0.42
Hourly flow rate (vph)	6	356	17	11	216	0	7	7	7	0	0	12

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	379	227	20	12
Volume Left (vph)	6	11	7	0
Volume Right (vph)	17	0	7	12
Hadj (s)	0.00	0.04	-0.02	-0.60
Departure Headway (s)	4.2	4.4	5.2	4.6
Degree Utilization, x	0.44	0.28	0.03	0.02
Capacity (veh/h)	841	794	613	674
Control Delay (s)	10.5	9.1	8.4	7.7
Approach Delay (s)	10.5	9.1	8.4	7.7
Approach LOS	B	A	A	A

Intersection Summary				
Delay			9.9	
HCM Level of Service			A	
Intersection Capacity Utilization			30.7%	ICU Level of Service
Analysis Period (min)			15	A

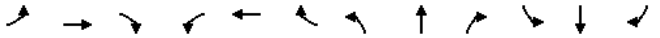
HCM Unsignalized Intersection Capacity Analysis
14: Barrows St & S. Worcester St

2030 No-Build Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	110	55	105	55	45	140
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.86	0.86	0.79	0.79
Hourly flow rate (vph)	129	65	122	64	57	177
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	445	154			186	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	445	154			186	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	76	93			96	
cM capacity (veh/h)	549	887			1401	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	194	186	234
Volume Left	129	0	57
Volume Right	65	64	0
cSH	629	1700	1401
Volume to Capacity	0.31	0.11	0.04
Queue Length 95th (ft)	33	0	3
Control Delay (s)	13.3	0.0	2.1
Lane LOS	B		A
Approach Delay (s)	13.3	0.0	2.1
Approach LOS	B		

Intersection Summary				
Average Delay			5.0	
Intersection Capacity Utilization			38.2%	ICU Level of Service
Analysis Period (min)			15	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	200	95	15	165	15	35	65	10	10	130	5
Peak Hour Factor	0.86	0.86	0.86	0.88	0.88	0.88	0.86	0.86	0.86	0.96	0.96	0.96
Hourly flow rate (vph)	6	233	110	17	188	17	41	76	12	10	135	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	349	222	128	151
Volume Left (vph)	6	17	41	10
Volume Right (vph)	110	17	12	5
Hadj (s)	-0.16	-0.01	0.05	0.01
Departure Headway (s)	4.9	5.2	5.7	5.6
Degree Utilization, x	0.47	0.32	0.20	0.24
Capacity (veh/h)	699	644	558	573
Control Delay (s)	12.2	10.6	10.1	10.3
Approach Delay (s)	12.2	10.6	10.1	10.3
Approach LOS	B	B	B	B

Intersection Summary				
Delay		11.1		
HCM Level of Service		B		
Intersection Capacity Utilization		41.1%	ICU Level of Service	A
Analysis Period (min)		15		

Raynham

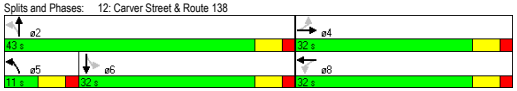
Lanes, Volumes, Timings
12: Carver Street & Route 138

2030 No-Build Condition- AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	25	40	15	45	175	45	1255	5	50	515	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12	12	11	12	12	11	12
Storage Length (ft)	250		70	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			737			2001			1020	
Travel Time (s)		5.7			16.8			45.5			23.2	
Peak Hour Factor	0.84	0.84	0.84	0.92	0.92	0.92	0.95	0.95	0.95	0.88	0.88	0.88
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	7%	7%	7%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	268	78	0	0	255	0	0	1373	0	0	699	0
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	16.0		16.0	16.0	
Total Split (s)	32.0	32.0	0.0	32.0	32.0	0.0	11.0	43.0	0.0	32.0	32.0	0.0
Total Split (%)	42.7%	42.7%	0.0%	42.7%	42.7%	0.0%	14.7%	57.3%	0.0%	42.7%	42.7%	0.0%
Maximum Green (s)	26.0	26.0		26.0	26.0		5.0	37.0		26.0	26.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	C-Min		C-Min	C-Min	
v/c Ratio	0.91	0.15			0.49			0.82			0.57	
Control Delay	61.3	9.3			21.6			21.0			14.3	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	61.3	9.3			21.6			21.0			14.3	
Queue Length 50th (ft)	114	10			81			274			109	
Queue Length 95th (ft)	#207	32			140			#448			166	
Internal Link Dist (ft)		171			657			1921			940	
Turn Bay Length (ft)	250											
Base Capacity (vph)	345	623			613			1669			1231	
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	0.78	0.13			0.42			0.82			0.57	

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 12: Carver Street & Route 138



HCM Signalized Intersection Capacity Analysis
12: Carver Street & Route 138

2030 No-Build Condition- AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	25	40	15	45	175	45	1255	5	50	515	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	13	12	12	11	12	12	11	12
Total Lost time (s)	6.0	6.0			6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.91			0.90			1.00			0.99	
Flt Protected	0.95	1.00			1.00			1.00			1.00	
Satd. Flow (prot)	1787	1708			1743			3380			3208	
Flt Permitted	0.53	1.00			0.98			0.90			0.70	
Satd. Flow (perm)	995	1708			1716			3057			2242	
Peak-hour factor, PHF	0.84	0.84	0.84	0.92	0.92	0.92	0.95	0.95	0.95	0.88	0.88	0.88
Adj. Flow (vph)	268	30	48	16	49	190	47	1321	5	57	585	57
RTOR Reduction (vph)	0	34	0	0	20	0	0	0	0	0	6	0
Lane Group Flow (vph)	268	44	0	0	235	0	0	1373	0	0	693	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	7%	7%	7%
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.0	22.0			22.0			41.0			41.0	
Effective Green, g (s)	22.0	22.0			22.0			41.0			41.0	
Actuated g/C Ratio	0.29	0.29			0.29			0.55			0.55	
Clearance Time (s)	6.0	6.0			6.0			6.0			6.0	
Vehicle Extension (s)	2.0	2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)	292	501			503			1671			1226	
v/s Ratio Prot		0.03										
v/s Ratio Perm	c0.27				0.14			c0.45			0.31	
v/c Ratio	0.92	0.09			0.47			0.82			0.57	
Uniform Delay, d1	25.6	19.2			21.7			14.0			11.2	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	31.3	0.0			0.2			3.2			1.9	
Delay (s)	56.9	19.3			21.9			17.2			13.0	
Level of Service	E	B			C			B			B	
Approach Delay (s)		48.4			21.9			17.2			13.0	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM Average Control Delay	20.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

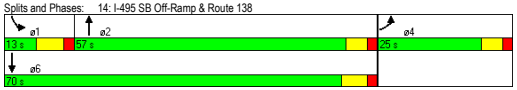
Lanes, Volumes, Timings
14: I-495 SB Off-Ramp & Route 138

2030 No-Build Condition- AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	255	0	175	0	0	0	0	1440	230	65	435	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	16	14	16	16	16	12	12	16	10	12	12
Storage Length (ft)	0		500	0		0	0		0	200		0
Storage Lanes	1		1	0		0	0		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1388			1423			507			722	
Travel Time (s)		31.5			32.3			11.5			16.4	
Peak Hour Factor	0.77	0.77	0.77	0.92	0.92	0.92	0.25	0.96	0.96	0.79	0.79	0.25
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	0%	3%	3%	8%	8%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	331	0	227	0	0	0	0	1740	0	82	551	0
Turn Type	Prot		Free							Prot		
Protected Phases	4							2		1	6	
Permitted Phases			Free									
Detector Phase	4							2		1	6	
Switch Phase												
Minimum Initial (s)	10.0							10.0		5.0	10.0	
Minimum Split (s)	22.0							22.0		12.0	23.0	
Total Split (s)	25.0	0.0	0.0	0.0	0.0	0.0	0.0	57.0	0.0	13.0	70.0	0.0
Total Split (%)	26.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	60.0%	0.0%	13.7%	73.7%	0.0%
Maximum Green (s)	19.0							51.0		6.0	63.0	
Yellow Time (s)	4.0							4.0		5.0	5.0	
All-Red Time (s)	2.0							2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0	4.0	7.0	7.0	4.0
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Recall Mode	None							C-Max		None	C-Max	
v/c Ratio	0.93		0.14					0.94		0.80	0.25	
Control Delay	71.6		0.2					33.0		99.6	1.2	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay	71.6		0.2					33.0		99.6	1.2	
Queue Length 50th (ft)	197		0					490		48	3	
Queue Length 95th (ft)	#275		0					#682		m#102	4	
Internal Link Dist (ft)		1308			1343			427			642	
Turn Bay Length (ft)			500							200		
Base Capacity (vph)	360		1610					1842		102	2223	
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	0.92		0.14					0.94		0.80	0.25	

Intersection Summary	
Area Type:	Other
Cycle Length: 95	
Actuated Cycle Length: 95	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 14: I-495 SB Off-Ramp & Route 138



HCM Signalized Intersection Capacity Analysis
14: I-495 SB Off-Ramp & Route 138

2030 No-Build Condition- AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	255	0	175	0	0	0	0	1440	230	65	435	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	16	14	16	16	16	12	12	16	10	12	12
Total Lost time (s)	6.0		4.0					6.0		7.0	7.0	
Lane Util. Factor	1.00		1.00					0.95		1.00	0.95	
Frt	1.00		0.85					0.98		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1799		1610					3432		1560	3343	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1799		1610					3432		1560	3343	
Peak-hour factor, PHF	0.77	0.77	0.77	0.92	0.92	0.92	0.25	0.96	0.96	0.79	0.79	0.25
Adj. Flow (vph)	331	0	227	0	0	0	0	1500	240	82	551	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	331	0	227	0	0	0	0	1740	0	82	551	0
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	0%	3%	3%	8%	8%	0%
Turn Type	Prot		Free							Prot		
Protected Phases	4							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	18.8		95.0					51.0		6.2	63.2	
Effective Green, g (s)	18.8		95.0					51.0		6.2	63.2	
Actuated g/C Ratio	0.20		1.00					0.54		0.07	0.67	
Clearance Time (s)	6.0							6.0		7.0	7.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	356		1610					1842		102	2224	
v/s Ratio Prot	c0.18							c0.51		c0.05	0.16	
v/s Ratio Perm			0.14									
v/c Ratio	0.93		0.14					0.94		0.80	0.25	
Uniform Delay, d1	37.5		0.0					20.7		43.8	6.4	
Progression Factor	1.00		1.00					1.00		1.29	0.15	
Incremental Delay, d2	30.0		0.2					11.4		31.1	0.2	
Delay (s)	67.4		0.2					32.1		87.6	1.2	
Level of Service	E		A					C		F	A	
Approach Delay (s)		40.1			0.0			32.1			12.4	
Approach LOS		D			A			C			B	

Intersection Summary					
HCM Average Control Delay	29.4	HCM Level of Service		C	
HCM Volume to Capacity ratio	0.93				
Actuated Cycle Length (s)	95.0	Sum of lost time (s)		19.0	
Intersection Capacity Utilization	81.3%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					

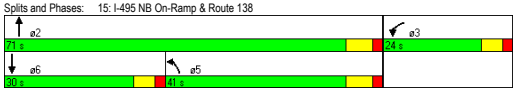
Lanes, Volumes, Timings
15: I-495 NB On-Ramp & Route 138

2030 No-Build Condition- AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	110	0	180	335	1345	0	0	375	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	10	12	12	12	12	16
Storage Length (ft)	0		0	0		300	225		0	0		0
Storage Lanes	0		0	1		1	1		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1384			1299			722			1195	
Travel Time (s)		31.5			29.5			16.4			27.2	
Peak Hour Factor	0.25	0.25	0.25	0.91	0.91	0.91	0.91	0.91	0.25	0.25	0.80	0.80
Heavy Vehicles (%)	0%	0%	0%	4%	4%	4%	3%	3%	0%	0%	9%	9%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	121	0	198	368	1478	0	0	800	0
Turn Type				Prot		Free	Prot					
Protected Phases				3			5	2			6	
Permitted Phases						Free						
Detector Phase				3			5	2			6	
Switch Phase												
Minimum Initial (s)				5.0			5.0	10.0			10.0	
Minimum Split (s)				22.0			12.0	23.0			22.0	
Total Split (s)	0.0	0.0	0.0	24.0	0.0	0.0	41.0	71.0	0.0	0.0	30.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	25.3%	0.0%	0.0%	43.2%	74.7%	0.0%	0.0%	31.6%	0.0%
Maximum Green (s)				18.0			34.0	64.0			24.0	
Yellow Time (s)				4.0			5.0	5.0			4.0	
All-Red Time (s)				2.0			2.0	2.0			2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	6.0	4.0	4.0	7.0	7.0	4.0	4.0	6.0	4.0
Lead/Lag							Lag				Lead	
Lead-Lag Optimize?							Yes				Yes	
Vehicle Extension (s)				3.0			3.0	3.0			3.0	
Recall Mode				None			None	C-Min			C-Min	
v/c Ratio				0.53		0.11	0.81	0.56			0.64	
Control Delay				47.1		0.1	28.3	4.9			34.8	
Queue Delay				0.0		0.0	0.0	0.0			0.0	
Total Delay				47.1		0.1	28.3	4.9			34.8	
Queue Length 50th (ft)				70		0	169	141			244	
Queue Length 95th (ft)				120		0	m147	m146			288	
Internal Link Dist (ft)		1304			1219			642			1115	
Turn Bay Length (ft)						300	225					
Base Capacity (vph)				373		1760	586	2616			1257	
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				0.32		0.11	0.63	0.56			0.64	

Intersection Summary	
Area Type:	Other
Cycle Length: 95	
Actuated Cycle Length: 95	
Offset: 93 (98%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 15: I-495 NB On-Ramp & Route 138



HCM Signalized Intersection Capacity Analysis
15: I-495 NB On-Ramp & Route 138

2030 No-Build Condition- AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	110	0	180	335	1345	0	0	375	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	10	12	12	12	12	16
Total Lost time (s)				6.0		4.0	7.0	7.0			6.0	
Lane Util. Factor				1.00		1.00	1.00	0.95			0.95	
Frt				1.00		0.85	1.00	1.00			0.94	
Flt Protected				0.95		1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1967		1760	1636	3505			3106	
Flt Permitted				0.95		1.00	0.95	1.00			1.00	
Satd. Flow (perm)				1967		1760	1636	3505			3106	
Peak-hour factor, PHF	0.25	0.25	0.25	0.91	0.91	0.91	0.91	0.91	0.25	0.25	0.80	0.80
Adj. Flow (vph)	0	0	0	121	0	198	368	1478	0	0	469	331
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	121	0	198	368	1478	0	0	800	0
Heavy Vehicles (%)	0%	0%	0%	4%	4%	4%	3%	3%	0%	0%	9%	9%
Turn Type				Prot		Free	Prot					
Protected Phases				3			5	2			6	
Permitted Phases						Free						
Actuated Green, G (s)				11.1		95.0	26.5	70.9			38.4	
Effective Green, g (s)				11.1		95.0	26.5	70.9			38.4	
Actuated g/C Ratio				0.12		1.00	0.28	0.75			0.40	
Clearance Time (s)				6.0			7.0	7.0			6.0	
Vehicle Extension (s)				3.0			3.0	3.0			3.0	
Lane Grp Cap (vph)				230		1760	456	2616			1255	
v/s Ratio Prot				c0.06			c0.22	0.42			c0.26	
v/s Ratio Perm						0.11						
v/c Ratio				0.53		0.11	0.81	0.56			0.64	
Uniform Delay, d1				39.5		0.0	31.9	5.3			22.7	
Progression Factor				1.00		1.00	0.73	0.79			1.30	
Incremental Delay, d2				2.2		0.1	3.8	0.3			2.1	
Delay (s)				41.6		0.1	27.1	4.5			31.7	
Level of Service				D		A	C	A			C	
Approach Delay (s)		0.0			15.9			9.0			31.7	
Approach LOS		A			B			A			C	

Intersection Summary			
HCM Average Control Delay	15.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

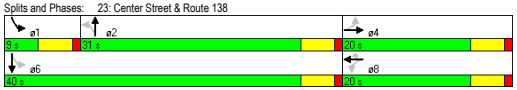
Lanes, Volumes, Timings
23: Center Street & Route 138

2030 No-Build Condition- AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	0	140	0	1160	40	90	475	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	14	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		60	0		200	200		0
Storage Lanes	0		0	0		1	0		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			No			No			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		129			915			1524			2001	
Travel Time (s)		2.9			20.8			34.6			45.5	
Peak Hour Factor	0.92	0.92	0.92	0.90	0.92	0.90	0.92	0.93	0.93	0.86	0.86	0.92
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	4%	4%	8%	8%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	22	156	0	1290	0	0	657	0
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0	20.0	20.0	20.0		9.0	20.0	
Total Split (s)	20.0	20.0	0.0	20.0	20.0	20.0	31.0	31.0	0.0	9.0	40.0	0.0
Total Split (%)	33.3%	33.3%	0.0%	33.3%	33.3%	33.3%	51.7%	51.7%	0.0%	15.0%	66.7%	0.0%
Maximum Green (s)	15.0	15.0		15.0	15.0	15.0	26.0	26.0		4.0	35.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max		None	Max	
v/c Ratio					0.08	0.53		0.54			0.43	
Control Delay					18.6	26.9		7.2			6.8	
Queue Delay					0.0	0.0		0.0			0.0	
Total Delay					18.6	26.9		7.2			6.8	
Queue Length 50th (ft)					6	47		111			50	
Queue Length 95th (ft)					21	94		201			95	
Internal Link Dist (ft)		49			835			1444			1921	
Turn Bay Length (ft)						60						
Base Capacity (vph)					371	417		2395			1516	
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					0.06	0.37		0.54			0.43	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 56.5	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	

Splits and Phases: 23: Center Street & Route 138



HCM Signalized Intersection Capacity Analysis
23: Center Street & Route 138

2030 No-Build Condition- AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	0	140	0	1160	40	90	475	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	14	12	12	12	12	12	12	12	12
Total Lost time (s)					5.0	5.0		5.0			5.0	
Lane Util. Factor					1.00	1.00		0.95			0.95	
Frt					1.00	0.85		1.00			1.00	
Flt Protected					0.95	1.00		1.00			0.99	
Satd. Flow (prot)					1752	1568		3454			3316	
Flt Permitted					0.76	1.00		1.00			0.65	
Satd. Flow (perm)					1397	1568		3454			2185	
Peak-hour factor, PHF	0.92	0.92	0.92	0.90	0.92	0.90	0.92	0.93	0.93	0.86	0.86	0.92
Adj. Flow (vph)	0	0	0	22	0	156	0	1247	43	105	552	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	22	156	0	1290	0	0	657	0
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	4%	4%	8%	8%	2%
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)					9.3	9.3		38.1			38.1	
Effective Green, g (s)					9.3	9.3		38.1			38.1	
Actuated g/C Ratio					0.16	0.16		0.66			0.66	
Clearance Time (s)					5.0	5.0		5.0			5.0	
Vehicle Extension (s)					3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)					226	254		2293			1450	
v/s Ratio Prot								c0.37				
v/s Ratio Perm					0.02	c0.10					0.30	
v/c Ratio					0.10	0.61		0.56			0.45	
Uniform Delay, d1					20.5	22.4		5.2			4.6	
Progression Factor					1.00	1.00		1.00			1.00	
Incremental Delay, d2					0.2	4.4		1.0			0.2	
Delay (s)					20.7	26.7		6.2			4.9	
Level of Service					C	C		A			A	
Approach Delay (s)		0.0			26.0			6.2			4.9	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	10.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
36: Elm Street & Route 138

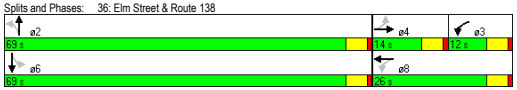
2030 No-Build Condition- AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	20	25	225	5	60	5	1140	205	40	340	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	160		0	0		0	0		205
Storage Lanes	0		0	1		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		820			1216			1195			808	
Travel Time (s)		18.6			27.6			27.2			18.4	
Confl. Peds. (#/hr)			1	1								
Peak Hour Factor	0.83	0.83	0.83	0.69	0.69	0.69	0.94	0.94	0.94	0.82	0.82	0.82
Heavy Vehicles (%)	2%	2%	2%	7%	7%	7%	3%	3%	3%	13%	13%	13%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	102	0	326	94	0	0	1436	0	0	494	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		30.0	30.0		30.0	30.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		35.0	35.0		35.0	35.0	
Total Split (s)	14.0	14.0	0.0	12.0	26.0	0.0	69.0	69.0	0.0	69.0	69.0	0.0
Total Split (%)	14.7%	14.7%	0.0%	12.6%	27.4%	0.0%	72.6%	72.6%	0.0%	72.6%	72.6%	0.0%
Maximum Green (s)	9.0	9.0		7.0	21.0		64.0	64.0		64.0	64.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lead	Lead		Lag								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	
v/c Ratio		0.66		0.83	0.22			0.72			0.36	
Control Delay		62.1		54.6	30.2			8.2			9.4	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		62.1		54.6	30.2			8.2			9.4	
Queue Length 50th (ft)		58		178	44			181			68	
Queue Length 95th (ft)		#125		#254	68			161			73	
Internal Link Dist (ft)		740			1136			1115			728	
Turn Bay Length (ft)				160								
Base Capacity (vph)		160		395	429			2201			1504	
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		0.64		0.83	0.22			0.65			0.33	

Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 28 (29%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 36: Elm Street & Route 138



HCM Signalized Intersection Capacity Analysis
36: Elm Street & Route 138

2030 No-Build Condition- AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	20	25	225	5	60	5	1140	205	40	340	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.96		1.00	0.86			0.98			0.99	
Flt Protected		0.98		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1798		1686	1529			3424			3150	
Flt Permitted		0.80		0.67	1.00			0.95			0.70	
Satd. Flow (perm)		1478		1194	1529			3266			2231	
Peak-hour factor, PHF	0.83	0.83	0.83	0.69	0.69	0.69	0.94	0.94	0.94	0.82	0.82	0.82
Adj. Flow (vph)	48	24	30	326	7	87	5	1213	218	49	415	30
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	102	0	326	94	0	0	1436	0	0	494	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	2%	2%	2%	7%	7%	7%	3%	3%	3%	13%	13%	13%
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		10.0		26.6	26.6			58.4			58.4	
Effective Green, g (s)		10.0		26.6	26.6			58.4			58.4	
Actuated g/C Ratio		0.11		0.28	0.28			0.61			0.61	
Clearance Time (s)		5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0			4.0			4.0	
Lane Grp Cap (vph)		156		394	428			2008			1371	
v/s Ratio Prot				c0.10	0.06							
v/s Ratio Perm		0.07		c0.13				c0.44			0.22	
v/c Ratio		0.65		0.83	0.22			0.72			0.36	
Uniform Delay, d1		40.8		33.0	26.2			12.6			9.1	
Progression Factor		1.00		1.00	1.00			0.51			1.00	
Incremental Delay, d2		9.5		13.3	0.3			1.9			0.7	
Delay (s)		50.3		46.3	26.5			8.3			9.8	
Level of Service		D		D	C			A			A	
Approach Delay (s)		50.3			41.9			8.3			9.8	
Approach LOS		D			D			A			A	

Intersection Summary

HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		

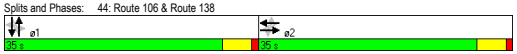
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	365	25	180	355	165	60	755	375	85	170	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1742			2236			4525			923	
Travel Time (s)		39.6			50.8			102.8			21.0	
Confl. Peds. (#/hr)			3									
Peak Hour Factor	0.88	0.88	0.88	0.89	0.89	0.89	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	3%	3%	3%	9%	9%	9%	3%	3%	3%	10%	10%	10%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	545	0	0	786	0	0	1294	0	0	392	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Detector Phase	2	2		2	2		1	1		1	1	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0		13.0	13.0	
Total Split (s)	35.0	35.0	0.0	35.0	35.0	0.0	35.0	35.0	0.0	35.0	35.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lead		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
v/c Ratio		0.58			0.85			0.92			0.48	
Control Delay		17.9			26.6			29.5			12.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		17.9			26.6			29.5			12.0	
Queue Length 50th (ft)		87			137			246			41	
Queue Length 95th (ft)		129			#238			#397			78	
Internal Link Dist (ft)		1662			2156			4445			843	
Turn Bay Length (ft)												
Base Capacity (vph)		1000			981			1406			816	
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		0.55			0.80			0.92			0.48	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 68.5
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 44: Route 106 & Route 138

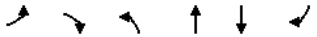


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	365	25	180	355	165	60	755	375	85	170	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.96			0.95			0.95	
Flt Protected		0.99			0.99			1.00			0.99	
Satd. Flow (prot)		3441			3154			3331			3098	
Flt Permitted		0.65			0.67			0.91			0.55	
Satd. Flow (perm)		2266			2141			3030			1709	
Peak-hour factor, PHF	0.88	0.88	0.88	0.89	0.89	0.89	0.92	0.92	0.92	0.93	0.93	0.93
Adj. Flow (vph)	102	415	28	202	399	185	65	821	408	91	183	118
RTOR Reduction (vph)	0	6	0	0	43	0	0	76	0	0	66	0
Lane Group Flow (vph)	0	539	0	0	743	0	0	1218	0	0	326	0
Confl. Peds. (#/hr)			3									
Heavy Vehicles (%)	3%	3%	3%	9%	9%	9%	3%	3%	3%	10%	10%	10%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		28.4			28.4			30.1			30.1	
Effective Green, g (s)		28.4			28.4			30.1			30.1	
Actuated g/C Ratio		0.41			0.41			0.44			0.44	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		939			888			1331			751	
v/s Ratio Prot												
v/s Ratio Perm		0.24			c0.35			c0.40			0.19	
v/c Ratio		0.57			0.84			0.92			0.43	
Uniform Delay, d1		15.4			18.0			18.0			13.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.0			7.2			10.1			0.5	
Delay (s)		16.4			25.2			28.1			13.8	
Level of Service		B			C			C			B	
Approach Delay (s)		16.4			25.2			28.1			13.8	
Approach LOS		B			C			C			B	

Intersection Summary					
HCM Average Control Delay	23.4	HCM Level of Service		C	
HCM Volume to Capacity ratio	0.88				
Actuated Cycle Length (s)	68.5	Sum of lost time (s)		10.0	
Intersection Capacity Utilization	95.8%	ICU Level of Service		F	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis
10: Dog Track driveway & Route 138

2030 No-Build Condition- AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	5	25	45	1245	360	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.68	0.68	0.91	0.91	0.79	0.79
Hourly flow rate (vph)	7	37	49	1368	456	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1923	456	456			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1923	456	456			
tC, single (s)	7.2	6.7	4.2			
tC, 2 stage (s)						
tF (s)	4.2	3.8	2.3			
p0 queue free %	84	93	95			
cM capacity (veh/h)	45	516	1059			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	44	1418	456
Volume Left	7	49	0
Volume Right	37	0	0
cSH	188	1059	1700
Volume to Capacity	0.23	0.05	0.27
Queue Length 95th (ft)	22	4	0
Control Delay (s)	29.9	2.3	0.0
Lane LOS	D	A	
Approach Delay (s)	29.9	2.3	0.0
Approach LOS	D		

Intersection Summary			
Average Delay		2.4	
Intersection Capacity Utilization		100.3%	ICU Level of Service G
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
24: Britton Street & Route 138

2030 No-Build Condition- AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	30	25	1175	20	5	485
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.57	0.57	0.88	0.88	0.96	0.96
Hourly flow rate (vph)	53	44	1335	23	5	505
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1862	1347			1358	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1862	1347			1358	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	35	77			99	
cM capacity (veh/h)	80	187			491	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	96	1358	510
Volume Left	53	0	5
Volume Right	44	23	0
cSH	108	1700	491
Volume to Capacity	0.89	0.80	0.01
Queue Length 95th (ft)	133	0	1
Control Delay (s)	131.2	0.0	0.3
Lane LOS	F		A
Approach Delay (s)	131.2	0.0	0.3
Approach LOS	F		

Intersection Summary			
Average Delay		6.5	
Intersection Capacity Utilization		73.1%	ICU Level of Service D
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
27: Britton Street & Route 138

2030 No-Build Condition- AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	30	5	5	1160	495	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	0.89	0.89
Hourly flow rate (vph)	30	5	5	1160	556	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1729	559	562			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1729	559	562			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	69	99	99			
cM capacity (veh/h)	97	529	1000			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	35	1165	562
Volume Left	30	5	0
Volume Right	5	0	6
cSH	109	1000	1700
Volume to Capacity	0.32	0.01	0.33
Queue Length 95th (ft)	31	0	0
Control Delay (s)	52.7	0.2	0.0
Lane LOS	F	A	
Approach Delay (s)	52.7	0.2	0.0
Approach LOS	F		

Intersection Summary			
Average Delay		1.2	
Intersection Capacity Utilization		75.0%	ICU Level of Service D
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
50: Wilbur Street & Route 138

2030 No-Build Condition- AM Peak Hour

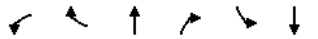
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	5	1260	5	0	380
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.63	0.94	0.94	0.85	0.85
Hourly flow rate (vph)	8	8	1340	5	0	447
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1790	1343			1346	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1790	1343			1346	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	91	96			100	
cM capacity (veh/h)	90	188			481	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	16	1346	447
Volume Left	8	0	0
Volume Right	8	5	0
cSH	122	1700	481
Volume to Capacity	0.13	0.79	0.00
Queue Length 95th (ft)	11	0	0
Control Delay (s)	39.0	0.0	0.0
Lane LOS	E		
Approach Delay (s)	39.0	0.0	0.0
Approach LOS	E		

Intersection Summary			
Average Delay		0.3	
Intersection Capacity Utilization		76.6%	ICU Level of Service D
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
52: Robinson Street & Route 138

2030 No-Build Condition- AM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	20	1265	0	5	385
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.56	0.56	0.91	0.91	0.79	0.79
Hourly flow rate (vph)	0	36	1390	0	6	487
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1890	1390			1390	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1890	1390			1390	
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	80			99	
cM capacity (veh/h)	77	176			499	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	36	1390	494
Volume Left	0	0	6
Volume Right	36	0	0
cSH	176	1700	499
Volume to Capacity	0.20	0.82	0.01
Queue Length 95th (ft)	18	0	1
Control Delay (s)	30.6	0.0	0.4
Lane LOS	D		A
Approach Delay (s)	30.6	0.0	0.4
Approach LOS	D		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

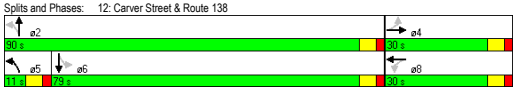
Lanes, Volumes, Timings
12: Carver Street & Route 138 — 2030 No-Build Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	85	100	60	70	40	70	775	45	110	1395	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12	12	11	12	12	11	12
Storage Length (ft)	250		70	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			737			2001			1020	
Travel Time (s)		5.7			16.8			45.5			23.2	
Confl. Peds. (#/hr)						5	2					
Peak Hour Factor	0.92	0.92	0.92	0.79	0.79	0.79	0.88	0.88	0.88	0.98	0.98	0.98
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	4%	4%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	168	201	0	0	216	0	0	1012	0	0	1759	0
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	16.0		16.0	16.0	
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	11.0	90.0	0.0	79.0	79.0	0.0
Total Split (%)	25.0%	25.0%	0.0%	25.0%	25.0%	0.0%	9.2%	75.0%	0.0%	65.8%	65.8%	0.0%
Maximum Green (s)	24.0	24.0		24.0	24.0		5.0	84.0		73.0	73.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	C-Min		C-Min	C-Min	
v/c Ratio	0.91	0.54			0.97			0.74			1.03	
Control Delay	95.4	39.5			99.7			15.2			47.8	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	95.4	39.5			99.7			15.2			47.8	
Queue Length 50th (ft)	128	109			158			231			~769	
Queue Length 95th (ft)	#262	188			#252			304			#911	
Internal Link Dist (ft)		171			657			1921			940	
Turn Bay Length (ft)	250											
Base Capacity (vph)	189	381			228			1363			1712	
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	0.89	0.53			0.95			0.74			1.03	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 150
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.

Splits and Phases: 12: Carver Street & Route 138



HCM Signalized Intersection Capacity Analysis
12: Carver Street & Route 138 — 2030 No-Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	85	100	60	70	40	70	775	45	110	1395	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	13	12	12	11	12	12	11	12
Total Lost time (s)	6.0	6.0			6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	
Frt	1.00	0.92			0.97			0.99			0.98	
Flt Protected	0.95	1.00			0.98			1.00			1.00	
Satd. Flow (prot)	1787	1728			1823			3317			3345	
Flt Permitted	0.50	1.00			0.59			0.58			0.72	
Satd. Flow (perm)	945	1728			1095			1928			2415	
Peak-hour factor, PHF	0.92	0.92	0.92	0.79	0.79	0.79	0.88	0.88	0.88	0.98	0.98	0.98
Adj. Flow (vph)	168	92	109	76	89	51	80	881	51	112	1423	224
RTOR Reduction (vph)	0	35	0	0	10	0	0	3	0	0	7	0
Lane Group Flow (vph)	168	166	0	0	206	0	0	1009	0	0	1752	0
Confl. Peds. (#/hr)						5	2					
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	4%	4%	4%	2%	2%	2%
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.3	23.3			23.3			84.7			84.7	
Effective Green, g (s)	23.3	23.3			23.3			84.7			84.7	
Actuated g/C Ratio	0.19	0.19			0.19			0.71			0.71	
Clearance Time (s)	6.0	6.0			6.0			6.0			6.0	
Vehicle Extension (s)	2.0	2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)	183	336			213			1361			1705	
v/s Ratio Prot		0.10										
v/s Ratio Perm	0.18				c0.19			0.52			c0.73	
v/c Ratio	0.92	0.49			0.97			0.74			1.03	
Uniform Delay, d1	47.4	43.1			48.0			10.9			17.7	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	42.8	0.4			51.8			1.9			29.1	
Delay (s)	90.2	43.5			99.8			12.8			46.8	
Level of Service	F	D			F			B			D	
Approach Delay (s)		64.7			99.8			12.8			46.8	
Approach LOS		E			F			B			D	

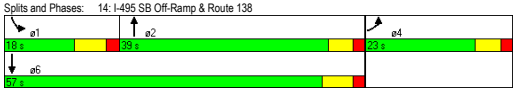
Intersection Summary			
HCM Average Control Delay	41.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	114.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	0	515	0	0	0	0	850	140	105	1230	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	12	12	16	10	12	12
Storage Length (ft)	0		500	0		0	0		0	300		0
Storage Lanes	1		1	0		0	0		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1388			1423			507			722	
Travel Time (s)		31.5			32.3			11.5			16.4	
Peak Hour Factor	0.81	0.81	0.81	0.25	0.25	0.25	0.25	0.95	0.95	0.98	0.98	0.25
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	0%	3%	3%	2%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	272	0	636	0	0	0	0	1042	0	107	1255	0
Turn Type	Prot		Free							Prot		
Protected Phases	4							2		1	6	
Permitted Phases			Free									
Detector Phase	4							2		1	6	
Switch Phase												
Minimum Initial (s)	10.0							10.0		5.0	10.0	
Minimum Split (s)	22.0							22.0		12.0	23.0	
Total Split (s)	23.0	0.0	0.0	0.0	0.0	0.0	0.0	39.0	0.0	18.0	57.0	0.0
Total Split (%)	28.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	48.8%	0.0%	22.5%	71.3%	0.0%
Maximum Green (s)	17.0							33.0		11.0	50.0	
Yellow Time (s)	4.0							4.0		5.0	5.0	
All-Red Time (s)	2.0							2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0	4.0	7.0	7.0	4.0
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Recall Mode	None							C-Min		None	C-Min	
v/c Ratio	0.74		0.36					0.62		0.55	0.54	
Control Delay	43.3		0.6					19.0		40.2	11.9	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay	43.3		0.6					19.0		40.2	11.9	
Queue Length 50th (ft)	127		0					216		59	174	
Queue Length 95th (ft)	179		0					298		m73	m204	
Internal Link Dist (ft)		1308			1343			427			642	
Turn Bay Length (ft)			500							300		
Base Capacity (vph)	418		1760					1683		227	2304	
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	0.65		0.36					0.62		0.47	0.54	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 14: I-495 SB Off-Ramp & Route 138



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	0	515	0	0	0	0	850	140	105	1230	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	12	12	16	10	12	12
Total Lost time (s)	6.0		4.0					6.0		7.0	7.0	
Lane Util. Factor	1.00		1.00					0.95		1.00	0.95	
Frt	1.00		0.85					0.98		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1967		1760					3431		1652	3539	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1967		1760					3431		1652	3539	
Peak-hour factor, PHF	0.81	0.81	0.81	0.25	0.25	0.25	0.25	0.95	0.95	0.98	0.98	0.25
Adj. Flow (vph)	272	0	636	0	0	0	0	895	147	107	1255	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	272	0	636	0	0	0	0	1042	0	107	1255	0
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	0%	3%	3%	2%	2%	0%
Turn Type	Prot		Free							Prot		
Protected Phases	4							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	14.9		80.0					37.9		8.2	52.1	
Effective Green, g (s)	14.9		80.0					37.9		8.2	52.1	
Actuated g/C Ratio	0.19		1.00					0.47		0.10	0.65	
Clearance Time (s)	6.0							6.0		7.0	7.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	366		1760					1625		169	2305	
v/s Ratio Prot	c0.14							c0.30		0.06	c0.35	
v/s Ratio Perm			0.36									
v/c Ratio	0.74		0.36					0.64		0.63	0.54	
Uniform Delay, d1	30.7		0.0					15.9		34.5	7.5	
Progression Factor	1.00		1.00					1.00		1.04	1.42	
Incremental Delay, d2	7.9		0.6					2.0		4.2	0.5	
Delay (s)	38.7		0.6					17.9		39.9	11.2	
Level of Service	D		A					B		D	B	
Approach Delay (s)		12.0			0.0			17.9			13.4	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

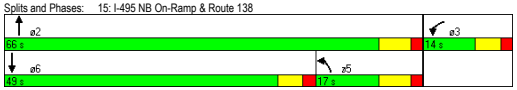
Lanes, Volumes, Timings
15: I-495 NB On-Ramp & Route 138

2030 No-Build Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	140	0	80	145	900	0	0	1195	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	10	12	12	12	12	16
Storage Length (ft)	0		0	0		300	225		0	0		0
Storage Lanes	0		0	1		1	1		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1384			1299			722			1195	
Travel Time (s)		31.5			29.5			16.4			27.2	
Peak Hour Factor	0.25	0.25	0.25	0.78	0.78	0.78	0.92	0.92	0.25	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	3%	3%	3%	4%	4%	0%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	179	0	103	158	978	0	0	1505	0
Turn Type				Prot		Free	Prot					
Protected Phases				3			5	2			6	
Permitted Phases						Free						
Detector Phase				3			5	2			6	
Switch Phase												
Minimum Initial (s)				5.0			5.0	10.0			10.0	
Minimum Split (s)				11.0			12.0	23.0			22.0	
Total Split (s)	0.0	0.0	0.0	14.0	0.0	0.0	17.0	66.0	0.0	0.0	49.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	17.5%	0.0%	0.0%	21.3%	82.5%	0.0%	0.0%	61.3%	0.0%
Maximum Green (s)				8.0			10.0	59.0			43.0	
Yellow Time (s)				4.0			5.0	5.0			4.0	
All-Red Time (s)				2.0			2.0	2.0			2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	6.0	4.0	4.0	7.0	7.0	4.0	4.0	6.0	4.0
Lead/Lag							Lag				Lead	
Lead-Lag Optimize?							Yes				Yes	
Vehicle Extension (s)				3.0			3.0	3.0			3.0	
Recall Mode				None			None	C-Min			C-Min	
v/c Ratio				0.85		0.06	0.76	0.39			0.83	
Control Delay				71.6		0.1	50.4	3.4			20.6	
Queue Delay				0.0		0.0	0.0	0.0			0.0	
Total Delay				71.6		0.1	50.4	3.4			20.6	
Queue Length 50th (ft)				90		0	82	46			357	
Queue Length 95th (ft)				#164		0	m#169	81			481	
Internal Link Dist (ft)		1304			1219			642			1115	
Turn Bay Length (ft)						300	225					
Base Capacity (vph)				210		1777	211	2560			1853	
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				0.85		0.06	0.75	0.38			0.81	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 76 (95%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 15: I-495 NB On-Ramp & Route 138



HCM Signalized Intersection Capacity Analysis
15: I-495 NB On-Ramp & Route 138

2030 No-Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	140	0	80	145	900	0	0	1195	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	10	12	12	12	12	16
Total Lost time (s)				6.0		4.0	7.0	7.0			6.0	
Lane Util. Factor				1.00		1.00	1.00	0.95			0.95	
Frt				1.00		0.85	1.00	1.00			0.97	
Flt Protected				0.95		1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1986		1777	1620	3471			3448	
Flt Permitted				0.95		1.00	0.95	1.00			1.00	
Satd. Flow (perm)				1986		1777	1620	3471			3448	
Peak-hour factor, PHF	0.25	0.25	0.25	0.78	0.78	0.78	0.92	0.92	0.25	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	179	0	103	158	978	0	0	1245	260
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	179	0	103	158	978	0	0	1505	0
Heavy Vehicles (%)	0%	0%	0%	3%	3%	3%	4%	4%	0%	2%	2%	2%
Turn Type				Prot		Free	Prot					
Protected Phases				3			5	2			6	
Permitted Phases						Free						
Actuated Green, G (s)				8.5		80.0	10.2	58.5			42.3	
Effective Green, g (s)				8.5		80.0	10.2	58.5			42.3	
Actuated g/C Ratio				0.11		1.00	0.13	0.73			0.53	
Clearance Time (s)				6.0			7.0	7.0			6.0	
Vehicle Extension (s)				3.0			3.0	3.0			3.0	
Lane Grp Cap (vph)				211		1777	207	2538			1823	
v/s Ratio Prot				c0.09			c0.10	0.28			c0.44	
v/s Ratio Perm						0.06						
v/c Ratio				0.85		0.06	0.76	0.39			0.83	
Uniform Delay, d1				35.1		0.0	33.7	4.0			15.8	
Progression Factor				1.00		1.00	0.86	0.77			1.07	
Incremental Delay, d2				25.8		0.1	12.2	0.3			3.4	
Delay (s)				60.9		0.1	41.3	3.4			20.3	
Level of Service				E		A	D	A			C	
Approach Delay (s)		0.0			38.7			8.7			20.3	
Approach LOS		A			D			A			C	

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
23: Center Street & Route 138

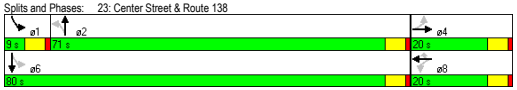
2030 No-Build Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	30	0	110	0	795	40	315	1280	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	14	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		60	0		200	200		0
Storage Lanes	0		0	0		1	0		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			No			No			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		155			915			1524			2001	
Travel Time (s)		3.5			20.8			34.6			45.5	
Peak Hour Factor	0.38	0.38	0.38	0.82	0.82	0.82	0.90	0.90	0.90	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	7%	7%	7%	3%	3%	3%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	37	134	0	927	0	0	1627	0
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0	20.0	20.0	20.0		9.0	20.0	
Total Split (s)	20.0	20.0	0.0	20.0	20.0	20.0	71.0	71.0	0.0	9.0	80.0	0.0
Total Split (%)	20.0%	20.0%	0.0%	20.0%	20.0%	20.0%	71.0%	71.0%	0.0%	9.0%	80.0%	0.0%
Maximum Green (s)	15.0	15.0		15.0	15.0	15.0	66.0	66.0		4.0	75.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max		None	Max	
v/c Ratio					0.21	0.69		0.35			0.99	
Control Delay					40.8	58.9		4.2			32.5	
Queue Delay					0.0	0.0		0.0			0.0	
Total Delay					40.8	58.9		4.2			32.5	
Queue Length 50th (ft)					21	81		83			~446	
Queue Length 95th (ft)					47	129		112			#715	
Internal Link Dist (ft)		75			835			1444			1921	
Turn Bay Length (ft)						60						
Base Capacity (vph)					207	232		2673			1648	
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					0.18	0.58		0.35			0.99	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 97.7	
Natural Cycle: 100	
Control Type: Semi Act-Uncoord	

~ 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.

Splits and Phases: 23: Center Street & Route 138



HCM Signalized Intersection Capacity Analysis
23: Center Street & Route 138

2030 No-Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	30	0	110	0	795	40	315	1280	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	14	12	12	12	12	12	12	12	12
Total Lost time (s)					5.0	5.0		5.0			5.0	
Lane Util. Factor					1.00	1.00		0.95			0.95	
Frt					1.00	0.85		0.99			1.00	
Flt Protected					0.95	1.00		1.00			0.99	
Satd. Flow (prot)					1687	1509		3480			3505	
Flt Permitted					0.76	1.00		1.00			0.61	
Satd. Flow (perm)					1345	1509		3480			2144	
Peak-hour factor, PHF	0.38	0.38	0.38	0.82	0.82	0.82	0.90	0.90	0.90	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	37	0	134	0	883	44	321	1306	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	37	134	0	927	0	0	1627	0
Heavy Vehicles (%)	0%	0%	0%	7%	7%	7%	3%	3%	3%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)					12.7	12.7		75.1			75.1	
Effective Green, g (s)					12.7	12.7		75.1			75.1	
Actuated g/C Ratio					0.13	0.13		0.77			0.77	
Clearance Time (s)					5.0	5.0		5.0			5.0	
Vehicle Extension (s)					3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)					175	196		2672			1646	
v/s Ratio Prot								0.27				
v/s Ratio Perm					0.03	c0.09					c0.76	
v/c Ratio					0.21	0.68		0.35			0.99	
Uniform Delay, d1					38.1	40.6		3.6			10.9	
Progression Factor					1.00	1.00		1.00			1.00	
Incremental Delay, d2					0.6	9.5		0.4			19.3	
Delay (s)					38.7	50.1		3.9			30.2	
Level of Service					D	D		A			C	
Approach Delay (s)		0.0			47.6			3.9			30.2	
Approach LOS		A			D			A			C	

Intersection Summary			
HCM Average Control Delay	22.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	97.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
36: Elm Street & Route 138

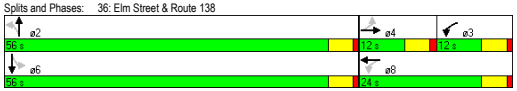
2030 No-Build Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	10	40	350	15	25	30	600	325	45	1045	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	160		0	0		0	0		205
Storage Lanes	0		0	1		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		820			1216			1195			808	
Travel Time (s)		18.6			27.6			27.2			18.4	
Peak Hour Factor	0.75	0.75	0.75	0.88	0.88	0.88	0.91	0.91	0.91	0.95	0.95	0.95
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	79	0	398	45	0	0	1049	0	0	1163	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		30.0	30.0		30.0	30.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		35.0	35.0		35.0	35.0	
Total Split (s)	12.0	12.0	0.0	12.0	24.0	0.0	56.0	56.0	0.0	56.0	56.0	0.0
Total Split (%)	15.0%	15.0%	0.0%	15.0%	30.0%	0.0%	70.0%	70.0%	0.0%	70.0%	70.0%	0.0%
Maximum Green (s)	7.0	7.0		7.0	19.0		51.0	51.0		51.0	51.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lead	Lead		Lag								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	
v/c Ratio		0.48		0.80	0.09			0.65			0.68	
Control Delay		43.8		42.2	22.1			8.7			14.3	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		43.8		42.2	22.1			8.7			14.3	
Queue Length 50th (ft)		37		172	16			72			204	
Queue Length 95th (ft)		67		#376	42			92			218	
Internal Link Dist (ft)		740			1136			1115			728	
Turn Bay Length (ft)				160								
Base Capacity (vph)		171		500	525			1837			1941	
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		0.46		0.80	0.09			0.57			0.60	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 36 (45%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 36: Elm Street & Route 138



HCM Signalized Intersection Capacity Analysis
36: Elm Street & Route 138

2030 No-Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	10	40	350	15	25	30	600	325	45	1045	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frt		0.91		1.00	0.91			0.95			1.00	
Flt Protected		0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1703		1770	1689			3257			3525	
Flt Permitted		0.93		0.76	1.00			0.88			0.86	
Satd. Flow (perm)		1600		1417	1689			2882			3046	
Peak-hour factor, PHF	0.75	0.75	0.75	0.88	0.88	0.88	0.91	0.91	0.91	0.95	0.95	0.95
Adj. Flow (vph)	13	13	53	398	17	28	33	659	357	47	1100	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	79	0	398	45	0	0	1049	0	0	1163	0
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.1		25.8	25.8			44.2			44.2	
Effective Green, g (s)		7.1		25.8	25.8			44.2			44.2	
Actuated g/C Ratio		0.09		0.32	0.32			0.55			0.55	
Clearance Time (s)		5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0			4.0			4.0	
Lane Grp Cap (vph)		142		517	545			1592			1683	
v/s Ratio Prot				c0.13	0.03							
v/s Ratio Perm		0.05		c0.12				0.36			c0.38	
v/c Ratio		0.56		0.77	0.08			0.66			0.69	
Uniform Delay, d1		34.9		24.3	18.9			12.6			13.0	
Progression Factor		1.00		1.00	1.00			0.58			1.00	
Incremental Delay, d2		4.7		6.8	0.1			2.1			2.4	
Delay (s)		39.6		31.1	18.9			9.4			15.3	
Level of Service		D		C	B			A			B	
Approach Delay (s)		39.6			29.9			9.4			15.3	
Approach LOS		D			C			A			B	

Intersection Summary

HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	96.8%	ICU Level of Service	F
Analysis Period (min)	15		

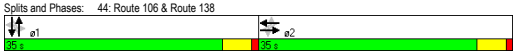
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	260	50	420	405	120	70	325	225	145	640	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1742			2236			4525			923	
Travel Time (s)		39.6			50.8			102.8			21.0	
Confl. Peds. (#/hr)												1
Peak Hour Factor	0.79	0.79	0.79	0.94	0.94	0.94	0.89	0.89	1.00	0.94	0.94	0.94
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	5%	5%	5%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	493	0	0	1006	0	0	669	0	0	963	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Detector Phase	2	2		2	2		1	1		1	1	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0		13.0	13.0	
Total Split (s)	35.0	35.0	0.0	35.0	35.0	0.0	35.0	35.0	0.0	35.0	35.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lead		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
v/c Ratio		0.56			1.23dl			0.64			0.96	
Control Delay		17.0			77.6			15.2			40.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		17.0			77.6			15.2			40.9	
Queue Length 50th (ft)		75			~258			85			198	
Queue Length 95th (ft)		98			#376			138			#333	
Internal Link Dist (ft)		1662			2156			4445			843	
Turn Bay Length (ft)												
Base Capacity (vph)		887			927			1040			1005	
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		0.56			1.09			0.64			0.96	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
~ 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 44: Route 106 & Route 138



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	260	50	420	405	120	70	325	225	145	640	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.98			0.95			0.98	
Flt Protected		0.99			0.98			0.99			0.99	
Satd. Flow (prot)		3436			3299			3245			3402	
Flt Permitted		0.59			0.63			0.68			0.67	
Satd. Flow (perm)		2032			2124			2214			2303	
Peak-hour factor, PHF	0.79	0.79	0.79	0.94	0.94	0.94	0.89	0.89	1.00	0.94	0.94	0.94
Adj. Flow (vph)	101	329	63	447	431	128	79	365	225	154	681	128
RTOR Reduction (vph)	0	17	0	0	17	0	0	91	0	0	17	0
Lane Group Flow (vph)	0	476	0	0	989	0	0	578	0	0	946	0
Confl. Peds. (#/hr)												1
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	5%	5%	5%	3%	3%	3%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		30.0			30.0			30.0			30.0	
Effective Green, g (s)		30.0			30.0			30.0			30.0	
Actuated g/C Ratio		0.43			0.43			0.43			0.43	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		871			910			949			987	
v/s Ratio Prot												
v/s Ratio Perm		0.23			c0.47			0.26			c0.41	
v/c Ratio		0.55			1.23dl			0.61			0.96	
Uniform Delay, d1		14.9			20.0			15.5			19.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.9			56.4			1.3			19.2	
Delay (s)		15.8			76.4			16.8			38.6	
Level of Service		B			E			B			D	
Approach Delay (s)		15.8			76.4			16.8			38.6	
Approach LOS		B			E			B			D	

Intersection Summary

HCM Average Control Delay	42.5	HCM Level of Service	D
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	99.0%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
13: Dog Track driveway & Route 138

2030 No-Build Condition - PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	5	65	30	605	1085	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.68	0.68	0.90	0.90	0.91	0.91
Hourly flow rate (vph)	7	96	33	672	1192	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1931	1192	1192			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1931	1192	1192			
tC, single (s)	6.7	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.8	3.3	2.3			
p0 queue free %	87	58	94			
cM capacity (veh/h)	57	230	572			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	103	706	1192
Volume Left	7	33	0
Volume Right	96	0	0
cSH	189	572	1700
Volume to Capacity	0.55	0.06	0.70
Queue Length 95th (ft)	71	5	0
Control Delay (s)	44.8	1.6	0.0
Lane LOS	E	A	
Approach Delay (s)	44.8	1.6	0.0
Approach LOS	E		

Intersection Summary			
Average Delay		2.9	
Intersection Capacity Utilization		68.1%	ICU Level of Service C
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
24: Britton Street & Route 138

2030 No-Build Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	35	20	825	30	25	1300
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.75	0.75	0.85	0.85	0.97	0.97
Hourly flow rate (vph)	47	27	971	35	26	1340
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2380	988			1006	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2380	988			1006	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	91			96	
cM capacity (veh/h)	36	300			689	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	73	1006	1366
Volume Left	47	0	26
Volume Right	27	35	0
cSH	54	1700	689
Volume to Capacity	1.37	0.59	0.04
Queue Length 95th (ft)	166	0	3
Control Delay (s)	375.6	0.0	2.0
Lane LOS	F		A
Approach Delay (s)	375.6	0.0	2.0
Approach LOS	F		

Intersection Summary			
Average Delay		12.4	
Intersection Capacity Utilization		98.5%	ICU Level of Service F
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
27: Britton Street & Route 138

2030 No-Build Condition - PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	15	5	5	810	1260	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.88	0.88	0.96	0.96
Hourly flow rate (vph)	18	6	6	920	1312	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2265	1333	1354			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2265	1333	1354			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	59	97	99			
cM capacity (veh/h)	45	190	505			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	926	1354
Volume Left	18	6	0
Volume Right	6	0	42
cSH	55	505	1700
Volume to Capacity	0.44	0.01	0.80
Queue Length 95th (ft)	41	1	0
Control Delay (s)	113.3	0.4	0.0
Lane LOS	F	A	
Approach Delay (s)	113.3	0.4	0.0
Approach LOS	F		

Intersection Summary			
Average Delay		1.3	
Intersection Capacity Utilization		78.7%	ICU Level of Service D
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
50: Wilbur Street & Route 138

2030 No-Build Condition - PM Peak Hour

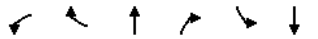
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	5	615	10	10	1130
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.39	0.39	0.97	0.97	0.96	0.96
Hourly flow rate (vph)	13	13	634	10	10	1177
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1837	639			644	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1837	639			644	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	85	97			99	
cM capacity (veh/h)	83	479			941	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	26	644	1188
Volume Left	13	0	10
Volume Right	13	10	0
cSH	142	1700	941
Volume to Capacity	0.18	0.38	0.01
Queue Length 95th (ft)	16	0	1
Control Delay (s)	35.9	0.0	0.4
Lane LOS	E		A
Approach Delay (s)	35.9	0.0	0.4
Approach LOS	E		

Intersection Summary			
Average Delay		0.7	
Intersection Capacity Utilization		77.4%	ICU Level of Service D
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
52: Robinson Street & Route 138

2030 No-Build Condition - PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	15	620	0	10	1140
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.63	0.90	0.90	0.91	0.91
Hourly flow rate (vph)	0	24	689	0	11	1253
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1964	689			689	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1964	689			689	
tC, single (s)	6.4	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	100	95			99	
cM capacity (veh/h)	69	436			915	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	24	689	1264
Volume Left	0	0	11
Volume Right	24	0	0
cSH	436	1700	915
Volume to Capacity	0.05	0.41	0.01
Queue Length 95th (ft)	4	0	1
Control Delay (s)	13.7	0.0	0.5
Lane LOS	B		A
Approach Delay (s)	13.7	0.0	0.5
Approach LOS	B		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

Easton

Lanes, Volumes, Timings
1: Main Street & Route 138

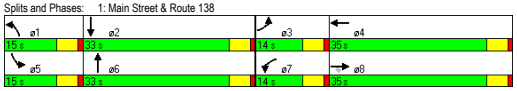
No-Build Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	370	365	220	45	140	120	120	735	50	70	330	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	11	11	11	12	11	11	12	11	11
Storage Length (ft)	150		230	90		140	140		140	115		150
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			35			40			40	
Link Distance (ft)		1725			3218			4953			2928	
Travel Time (s)		26.1			62.7			84.4			49.9	
Peak Hour Factor	0.89	0.89	0.89	0.88	0.88	0.88	0.92	0.92	0.92	0.88	0.88	0.88
Heavy Vehicles (%)	11%	1%	4%	10%	6%	6%	4%	5%	2%	5%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	416	410	247	51	295	0	130	853	0	80	449	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8									
Detector Phase	3	8	8	7	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	15.0		7.0	15.0	
Minimum Split (s)	12.0	21.0	21.0	12.0	23.0		12.0	23.0		12.0	21.0	
Total Split (s)	14.0	35.0	35.0	14.0	35.0	0.0	15.0	33.0	0.0	15.0	33.0	0.0
Total Split (%)	14.4%	36.1%	36.1%	14.4%	36.1%	0.0%	15.5%	34.0%	0.0%	15.5%	34.0%	0.0%
Maximum Green (s)	9.0	30.0	30.0	9.0	30.0		10.0	28.0		10.0	28.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)					7.0			7.0				
Flash Dont Walk (s)					8.0			8.0				
Pedestrian Calls (#/hr)					0			0				
v/c Ratio	2.21	0.72	0.38	0.33	0.38		0.66	0.75		0.44	0.45	
Control Delay	586.8	35.5	5.3	45.7	15.1		56.1	31.7		47.1	25.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	586.8	35.5	5.3	45.7	15.1		56.1	31.7		47.1	25.1	
Queue Length 50th (ft)	~387	212	0	27	36		70	223		43	98	
Queue Length 95th (ft)	#616	330	52	66	67		#169	#374		92	155	
Internal Link Dist (ft)		1645			3138			4873			2848	
Turn Bay Length (ft)	150		230	90			140			115		
Base Capacity (vph)	188	699	749	183	1263		223	1189		220	1203	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	2.21	0.59	0.33	0.28	0.23		0.58	0.72		0.36	0.37	

Intersection Summary

Area Type: Other
Cycle Length: 97
Actuated Cycle Length: 81.4
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
~ 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.

Splits and Phases: 1: Main Street & Route 138



HCM Signalized Intersection Capacity Analysis
1: Main Street & Route 138

No-Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	370	365	220	45	140	120	120	735	50	70	330	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	11	11	11	12	11	11	12	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1626	1818	1553	1586	3064		1736	3298		1719	3310	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1626	1818	1553	1586	3064		1736	3298		1719	3310	
Peak-hour factor, PHF	0.89	0.89	0.89	0.88	0.88	0.88	0.92	0.92	0.92	0.88	0.88	0.88
Adj. Flow (vph)	416	410	247	51	159	136	130	799	54	80	375	74
RTOR Reduction (vph)	0	0	172	0	103	0	0	5	0	0	17	0
Lane Group Flow (vph)	416	410	75	51	192	0	130	848	0	80	432	0
Heavy Vehicles (%)	11%	1%	4%	10%	6%	6%	4%	5%	2%	5%	3%	2%
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8									
Actuated Green, G (s)	9.4	25.5	25.5	4.3	20.4		9.3	28.1		6.6	25.4	
Effective Green, g (s)	9.4	25.5	25.5	4.3	20.4		9.3	28.1		6.6	25.4	
Actuated g/C Ratio	0.11	0.30	0.30	0.05	0.24		0.11	0.33		0.08	0.30	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	181	549	469	81	740		191	1097		134	995	
v/s Ratio Prot	c0.26	c0.23		0.03	0.06		c0.07	c0.26		0.05	0.13	
v/s Ratio Perm			0.05									
v/c Ratio	2.30	0.75	0.16	0.63	0.26		0.68	0.77		0.60	0.43	
Uniform Delay, d1	37.6	26.6	21.6	39.3	25.9		36.2	25.3		37.7	23.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	601.4	4.8	0.1	10.5	0.1		7.7	3.7		4.7	0.4	
Delay (s)	638.9	31.4	21.7	49.8	26.0		43.9	29.0		42.4	24.2	
Level of Service	F	C	C	D	C		D	C		D	C	
Approach Delay (s)		264.7			29.5			31.0			26.9	
Approach LOS		F			C			C			C	

Intersection Summary

HCM Average Control Delay	115.6	HCM Level of Service		F	
HCM Volume to Capacity ratio	0.96				
Actuated Cycle Length (s)	84.5	Sum of lost time (s)		15.0	
Intersection Capacity Utilization	72.6%	ICU Level of Service		C	
Analysis Period (min)	15				

c Critical Lane Group

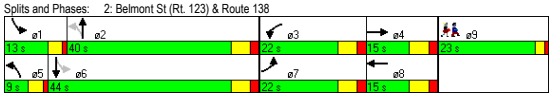
Lanes, Volumes, Timings
2: Belmont St (Rt. 123) & Route 138

No-Build Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	20	55	35	250	50	190	85	690	435	195	305	15	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	11	13	12	11	12	12	12	11	12	11	12	13	
Storage Length (ft)	0		0	475		0	0		0	200		300	
Storage Lanes	1		0	2		0	1		0	1		1	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		45			45			45			45		
Link Distance (ft)		387			2550			980			872		
Travel Time (s)		5.9			38.6			14.8			13.2		
Peak Hour Factor	0.72	0.72	0.72	0.82	0.82	0.82	0.93	0.93	0.93	0.92	0.92	0.92	
Heavy Vehicles (%)	13%	7%	0%	3%	15%	13%	0%	3%	3%	5%	4%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	28	125	0	305	293	0	91	1210	0	212	348	0	
Turn Type	Prot			Prot			pm+pt			pm+pt			
Protected Phases	7	4		3	8		5	2		1	6		9
Permitted Phases							2			6			
Detector Phase	7	4		3	8		5	2		1	6		
Switch Phase													
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
Minimum Split (s)	22.0	10.0		22.0	10.0		8.0	10.0		8.0	10.0		23.0
Total Split (s)	22.0	15.0	0.0	22.0	15.0	0.0	9.0	40.0	0.0	13.0	44.0	0.0	23.0
Total Split (%)	19.5%	13.3%	0.0%	19.5%	13.3%	0.0%	8.0%	35.4%	0.0%	11.5%	38.9%	0.0%	20%
Maximum Green (s)	16.0	9.0		16.0	9.0		5.0	34.0		9.0	38.0		20.0
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	4.0	6.0	4.0	4.0	6.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max		None
Walk Time (s)													6.0
Flash Dont Walk (s)													14.0
Pedestrian Calls (#/hr)													2
v/c Ratio	0.27	0.69		0.72	0.74		0.17	0.91		0.65	0.20		
Control Delay	55.8	61.7		57.1	37.6		14.0	40.9		39.4	21.6		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	55.8	61.7		57.1	37.6		14.0	40.9		39.4	21.6		
Queue Length 50th (ft)	20	74		109	118		23	377		100	66		
Queue Length 95th (ft)	38	#112		141	#240		72	#650		#295	157		
Internal Link Dist (ft)		307			2470			900			792		
Turn Bay Length (ft)				475						200			
Base Capacity (vph)	219	182		465	395		531	1328		324	1735		
Starvation Cap Reductn	0	0		0	0		0	0		0	0		
Spillback Cap Reductn	0	0		0	0		0	0		0	0		
Storage Cap Reductn	0	0		0	0		0	0		0	0		
Reduced v/c Ratio	0.13	0.69		0.66	0.74		0.17	0.91		0.65	0.20		

Intersection Summary	
Area Type:	Other
Cycle Length: 113	
Actuated Cycle Length: 113	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection	
Natural Cycle: 140	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 2: Belmont St (Rt. 123) & Route 138



HCM Signalized Intersection Capacity Analysis
2: Belmont St (Rt. 123) & Route 138

No-Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	55	35	250	50	190	85	690	435	195	305	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	13	12	11	12	12	12	11	12	11	12	13
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	0.88		1.00	0.94		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1544	1772		3286	1476		1805	3191		1662	3453	
Flt Permitted	0.95	1.00		0.95	1.00		0.54	1.00		0.09	1.00	
Satd. Flow (perm)	1544	1772		3286	1476		1032	3191		161	3453	
Peak-hour factor, PHF	0.72	0.72	0.72	0.82	0.82	0.82	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	28	76	49	305	61	232	91	742	468	212	332	16
RTOR Reduction (vph)	0	20	0	0	106	0	0	82	0	0	3	0
Lane Group Flow (vph)	28	105	0	305	187	0	91	1128	0	212	345	0
Heavy Vehicles (%)	13%	7%	0%	3%	15%	13%	0%	3%	3%	5%	4%	0%
Turn Type	Prot			Prot			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)	5.2	12.7		14.6	22.1		45.1	39.5		60.7	51.1	
Effective Green, g (s)	5.2	12.7		14.6	22.1		45.1	39.5		60.7	51.1	
Actuated g/C Ratio	0.05	0.11		0.13	0.20		0.40	0.35		0.54	0.45	
Clearance Time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	71	199		425	289		450	1115		315	1561	
v/s Ratio Prot	0.02	0.06		c0.09	c0.13		0.01	c0.35		c0.10	0.10	
v/s Ratio Perm							0.07			0.26		
v/c Ratio	0.39	0.53		0.72	0.65		0.20	1.01		0.67	0.22	
Uniform Delay, d1	52.4	47.3		47.2	41.9		21.5	36.8		27.1	18.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.49	1.21	
Incremental Delay, d2	3.6	2.7		5.7	4.9		0.2	29.9		5.2	0.3	
Delay (s)	56.0	50.0		52.9	46.8		21.7	66.6		45.4	23.1	
Level of Service	E	D		D	D		C	E		D	C	
Approach Delay (s)		51.1			49.9			63.5			31.6	
Approach LOS		D			D			E			C	

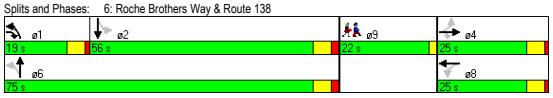
Intersection Summary			
HCM Average Control Delay	52.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	113.0	Sum of lost time (s)	29.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
6: Roche Brothers Way & Route 138 — No-Build Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	80	0	65	5	0	5	190	990	0	0	350	90	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	16	12	10	11	11	12	11	11	
Storage Length (ft)	0		100	0		0	350		0	0		0	
Storage Lanes	0		1	0		0	0		0	0		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		635			332			1623			2417		
Travel Time (s)		14.4			7.5			36.9			54.9		
Peak Hour Factor	0.82	0.82	0.82	0.63	0.63	0.63	0.85	0.85	0.85	0.84	0.84	0.84	
Heavy Vehicles (%)	4%	0%	6%	2%	0%	3%	3%	3%	0%	0%	4%	6%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	98	79	0	16	0	0	1389	0	0	524	0	
Turn Type	Perm		pm+ov	Perm			pm+pt			Perm			
Protected Phases		4	1		8		1	6			2		9
Permitted Phases	4		4	8			6			2			
Detector Phase	4	4	1	8	8		1	6		2	2		
Switch Phase													
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		6.0	10.0		10.0	10.0		7.0
Minimum Split (s)	21.0	21.0	11.0	21.0	21.0		11.0	21.0		21.0	21.0		22.0
Total Split (s)	25.0	25.0	19.0	25.0	25.0	0.0	19.0	75.0	0.0	56.0	56.0	0.0	22.0
Total Split (%)	20.5%	20.5%	15.6%	20.5%	20.5%	0.0%	15.6%	61.5%	0.0%	45.9%	45.9%	0.0%	18%
Maximum Green (s)	20.0	20.0	14.0	20.0	20.0		14.0	69.0		50.0	50.0		20.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	2.0		2.0	2.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	5.0	6.0	4.0	6.0	6.0	4.0	
Lead/Lag			Lead				Lead			Lag	Lag		
Lead-Lag Optimize?			Yes				Yes			Yes	Yes		
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None	None	None	None		None	Min		Min	Min		None
Walk Time (s)													7.0
Flash Dont Walk (s)													13.0
Pedestrian Calls (#/hr)													2
v/c Ratio		0.58	0.18		0.07			0.78			0.26		
Control Delay		53.8	8.8		28.9			14.8			10.1		
Queue Delay		0.0	0.0		0.0			0.0			0.0		
Total Delay		53.8	8.8		28.9			14.8			10.1		
Queue Length 50th (ft)		50	0		4			136			56		
Queue Length 95th (ft)		115	31		17			#468			148		
Internal Link Dist (ft)		555			252			1543			2337		
Turn Bay Length (ft)			100										
Base Capacity (vph)		308	568		381			1924			2052		
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		0.32	0.14		0.04			0.72			0.26		

Intersection Summary	
Area Type:	Other
Cycle Length: 122	
Actuated Cycle Length: 91.1	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 6: Roche Brothers Way & Route 138



HCM Signalized Intersection Capacity Analysis
6: Roche Brothers Way & Route 138 — No-Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	0	65	5	0	5	190	990	0	0	350	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	12	10	11	11	12	11	11
Total Lost time (s)		5.0	5.0		5.0			6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00			0.95			0.95	
Frt		1.00	0.85		0.93			1.00			0.97	
Flt Protected		0.95	1.00		0.98			0.99			1.00	
Satd. Flow (prot)		1736	1524		1911			3361			3240	
Flt Permitted		0.75	1.00		0.85			0.71			1.00	
Satd. Flow (perm)		1365	1524		1667			2422			3240	
Peak-hour factor, PHF	0.82	0.82	0.82	0.63	0.63	0.63	0.85	0.85	0.85	0.84	0.84	0.84
Adj. Flow (vph)	98	0	79	8	0	8	224	1165	0	0	417	107
RTOR Reduction (vph)	0	0	65	0	7	0	0	0	0	0	13	0
Lane Group Flow (vph)	0	98	14	0	9	0	0	1389	0	0	511	0
Heavy Vehicles (%)	4%	0%	6%	2%	0%	3%	3%	3%	0%	0%	4%	6%
Turn Type	Perm		pm+ov	Perm			pm+pt			Perm		
Protected Phases		4	1		8		1	6			2	
Permitted Phases	4		4	8			6			2		
Actuated Green, G (s)		11.3	16.1		11.3			66.2			56.4	
Effective Green, g (s)		11.3	16.1		11.3			66.2			56.4	
Actuated g/C Ratio		0.12	0.17		0.12			0.71			0.60	
Clearance Time (s)		5.0	5.0		5.0			6.0			6.0	
Vehicle Extension (s)		2.0	2.0		2.0			2.0			2.0	
Lane Grp Cap (vph)		165	344		201			1763			1954	
v/s Ratio Prot			0.00					c0.04			0.16	
v/s Ratio Perm		c0.07	0.01		0.01			c0.52				
v/c Ratio		0.59	0.04		0.04			0.79			0.26	
Uniform Delay, d1		38.9	32.3		36.3			9.0			8.7	
Progression Factor		1.00	1.00		1.00			1.00			1.00	
Incremental Delay, d2		3.8	0.0		0.0			2.2			0.0	
Delay (s)		42.7	32.3		36.4			11.2			8.8	
Level of Service		D	C		D			B			A	
Approach Delay (s)		38.1			36.4			11.2			8.8	
Approach LOS		D			D			B			A	

Intersection Summary					
HCM Average Control Delay	13.1	HCM Level of Service		B	
HCM Volume to Capacity ratio	0.75				
Actuated Cycle Length (s)	93.5	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	67.4%	ICU Level of Service		C	
Analysis Period (min)	15				
c Critical Lane Group					

Lanes, Volumes, Timings
49: Roosevelt Circle & Route 138

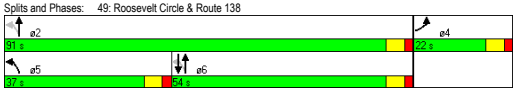
No-Build Condition - AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø2
Lane Configurations							
Volume (vph)	40	15	5	895	540	55	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	0	50			0	
Storage Lanes	1	0	1			0	
Taper Length (ft)	25	25	25			25	
Right Turn on Red		Yes				Yes	
Link Speed (mph)	30			40	45		
Link Distance (ft)	613			872	4953		
Travel Time (s)	13.9			14.9	75.0		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	59	0	5	973	647	0	
Turn Type			pm+pt				
Protected Phases	4		5	2 6	6		2
Permitted Phases			2 6				
Detector Phase	4		5	2 6	6		
Switch Phase							
Minimum Initial (s)	4.0		4.0		4.0		4.0
Minimum Split (s)	22.0		22.0		22.0		22.0
Total Split (s)	22.0	0.0	37.0	145.0	54.0	0.0	91.0
Total Split (%)	19.5%	0.0%	32.7%	128.3%	47.8%	0.0%	81%
Maximum Green (s)	16.0		31.0		48.0		85.0
Yellow Time (s)	4.0		4.0		4.0		4.0
All-Red Time (s)	2.0		2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	4.0	
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0		3.0		3.0		3.0
Recall Mode	None		None		C-Max		C-Min
Walk Time (s)	5.0		5.0		5.0		5.0
Flash Dont Walk (s)	11.0		11.0		11.0		11.0
Pedestrian Calls (#/hr)	0		0		0		0
v/c Ratio	0.41		0.01	0.61	0.42		
Control Delay	47.7		0.4	3.6	5.2		
Queue Delay	0.0		0.0	0.7	0.0		
Total Delay	47.7		0.4	4.4	5.2		
Queue Length 50th (ft)	32		0	32	98		
Queue Length 95th (ft)	72		m0	m188	286		
Internal Link Dist (ft)	533			792	4873		
Turn Bay Length (ft)			50				
Base Capacity (vph)	257		856	1583	1526		
Starvation Cap Reductn	0		0	291	0		
Spillback Cap Reductn	0		0	0	0		
Storage Cap Reductn	0		0	0	0		
Reduced v/c Ratio	0.23		0.01	0.75	0.42		

Intersection Summary	
Area Type:	Other
Cycle Length: 113	
Actuated Cycle Length: 113	
Offset: 41 (36%), Referenced to phase 2:NBTL and 6:NBSB, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 49: Roosevelt Circle & Route 138



HCM Signalized Intersection Capacity Analysis
49: Roosevelt Circle & Route 138

No-Build Condition - AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	40	15	5	895	540	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	
Lane Util. Factor	1.00		1.00	1.00	1.00	
Frt	0.96		1.00	1.00	0.99	
Flt Protected	0.96		0.95	1.00	1.00	
Satd. Flow (prot)	1731		1770	1863	1839	
Flt Permitted	0.96		0.35	1.00	1.00	
Satd. Flow (perm)	1731		655	1863	1839	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	16	5	973	587	60
RTOR Reduction (vph)	13	0	0	0	1	0
Lane Group Flow (vph)	46	0	5	973	646	0
Turn Type			pm+pt			
Protected Phases	4		5	2 6	6	
Permitted Phases			2 6			
Actuated Green, G (s)	7.4		93.6	93.6	86.5	
Effective Green, g (s)	7.4		93.6	93.6	86.5	
Actuated g/C Ratio	0.07		0.83	0.83	0.77	
Clearance Time (s)	6.0		6.0		6.0	
Vehicle Extension (s)	3.0		3.0		3.0	
Lane Grp Cap (vph)	113		553	1543	1408	
v/s Ratio Prot	c0.03		0.00	c0.52	0.35	
v/s Ratio Perm			0.01			
v/c Ratio	0.41		0.01	0.63	0.46	
Uniform Delay, d1	50.7		2.7	3.5	4.8	
Progression Factor	1.00		0.18	0.66	1.00	
Incremental Delay, d2	2.4		0.0	1.0	1.1	
Delay (s)	53.1		0.5	3.3	5.9	
Level of Service	D		A	A	A	
Approach Delay (s)	53.1			3.3	5.9	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	113.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
3: Elm St & Route 138

No-Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	120	30	35	10	15	25	30	1245	15	0	415	45
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.68	0.68	0.68	0.91	0.91	0.91	0.89	0.89	0.89
Hourly flow rate (vph)	143	36	42	15	22	37	33	1368	16	0	466	51
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1982	1942	492	1993	1959	1376	517			1385		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1982	1942	492	1993	1959	1376	517			1385		
tC, single (s)	7.1	6.5	6.2	7.1	6.6	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.1	3.3	2.2			2.2		
p0 queue free %	0	43	93	35	61	79	97			100		
cM capacity (veh/h)	25	63	575	23	57	176	1039			501		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	220	74	1418	517
Volume Left	143	15	33	0
Volume Right	42	37	16	51
cSH	35	59	1039	501
Volume to Capacity	6.33	1.25	0.03	0.00
Queue Length 95th (ft)	Err	156	2	0
Control Delay (s)	Err	313.9	1.6	0.0
Lane LOS	F	F	A	
Approach Delay (s)	9999.0	313.9	1.6	0.0
Approach LOS	F	F		

Intersection Summary				
Average Delay			999.7	
Intersection Capacity Utilization			114.3%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
10: Lincoln Street & Main Street

No-Build Condition - AM Peak Hour

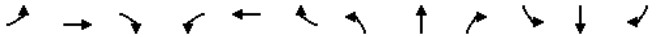
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	470	15	145	110	60	5	60	480	90	45	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.87	0.87	0.87	0.80	0.80	0.80	0.87	0.87	0.87
Hourly flow rate (vph)	5	516	16	167	126	69	6	75	600	103	52	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	126			533			1062	995	525	1067	1038	161
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	126			533			1062	995	525	1067	1038	161
tC, single (s)	4.1			4.1			7.3	6.5	6.2	7.1	6.7	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.7	4.0	3.3	3.5	4.1	3.3
p0 queue free %	100			84			95	63	0	0	72	99
cM capacity (veh/h)	1472			1025			129	204	553	0	182	889

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	538	362	681	161
Volume Left	5	167	6	103
Volume Right	16	69	600	6
cSH	1472	1025	454	0
Volume to Capacity	0.00	0.16	1.50	Err
Queue Length 95th (ft)	0	14	891	Err
Control Delay (s)	0.1	5.1	260.4	Err
Lane LOS	A	A	F	F
Approach Delay (s)	0.1	5.1	260.4	Err
Approach LOS			F	F

Intersection Summary				
Average Delay			Err	
Intersection Capacity Utilization			97.4%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
11: Lincoln Street & Barrows Street

No-Build Condition - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	485	0	0	120	0	0	0	5	0	0	75
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.92	0.92	0.88	0.88	0.88	0.88	0.88	0.92	0.92	0.59
Hourly flow rate (vph)	151	505	0	0	136	0	0	0	6	0	0	127
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	136			505			1071	944	505	949	944	136
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	136			505			1071	944	505	949	944	136
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 %	90			100			100	100	99	100	100	86
cM capacity (veh/h)	1448			1059			157	235	567	221	235	915

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	656	136	6	127
Volume Left	151	0	0	0
Volume Right	0	0	6	127
cSH	1448	1700	567	915
Volume to Capacity	0.10	0.08	0.01	0.14
Queue Length 95th (ft)	9	0	1	12
Control Delay (s)	2.7	0.0	11.4	9.6
Lane LOS	A		B	A
Approach Delay (s)	2.7	0.0	11.4	9.6
Approach LOS			B	A

Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	51.5%	ICU Level of Service	A	
Analysis Period (min)	15			

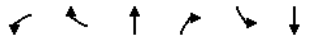
HCM Unsignalized Intersection Capacity Analysis
12: Union Street & Route 138

No-Build Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	65	90	1095	255	75	380
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.89	0.89	0.81	0.81
Hourly flow rate (vph)	74	102	1230	287	93	469
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2028	1374			1517	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2028	1374			1517	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	42			79	
cM capacity (veh/h)	50	176			437	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	176	1517	562
Volume Left	74	0	93
Volume Right	102	287	0
cSH	86	1700	437
Volume to Capacity	2.05	0.89	0.21
Queue Length 95th (ft)	388	0	20
Control Delay (s)	588.6	0.0	6.3
Lane LOS	F		A
Approach Delay (s)	588.6	0.0	6.3
Approach LOS	F		

Intersection Summary			
Average Delay	47.5		
Intersection Capacity Utilization	99.9%	ICU Level of Service	F
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	45	15	150	95	50	150
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.86	0.86	0.73	0.73
Hourly flow rate (vph)	51	17	174	110	68	205
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	572	230			285	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	572	230			285	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	89	98			95	
cM capacity (veh/h)	446	797			1277	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	68	285	274
Volume Left	51	0	68
Volume Right	17	110	0
cSH	502	1700	1277
Volume to Capacity	0.14	0.17	0.05
Queue Length 95th (ft)	12	0	4
Control Delay (s)	13.3	0.0	2.4
Lane LOS	B		A
Approach Delay (s)	13.3	0.0	2.4
Approach LOS	B		

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
1: Main Street & Rte 138

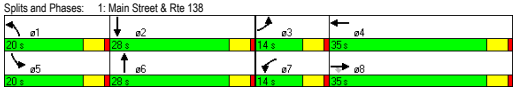
No-Build Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	195	270	105	360	85	290	480	85	135	625	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	11	11	11	12	12	11	12	11	11
Storage Length (ft)	150		230	90		140	140		140	115		150
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			35			40			40	
Link Distance (ft)		1725			3218			4944			2928	
Travel Time (s)		26.1			62.7			84.3			49.9	
Peak Hour Factor	0.82	0.82	0.82	0.85	0.85	0.85	0.90	0.90	0.90	0.89	0.89	0.89
Heavy Vehicles (%)	2%	1%	2%	1%	1%	2%	2%	5%	0%	4%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	213	238	329	124	524	0	322	627	0	152	994	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8									
Detector Phase	3	8	8	7	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	15.0		7.0	15.0	
Minimum Split (s)	12.0	12.0	12.0	12.0	21.0		12.0	21.0		12.0	20.0	
Total Split (s)	14.0	35.0	35.0	14.0	35.0	0.0	20.0	28.0	0.0	20.0	28.0	0.0
Total Split (%)	14.4%	36.1%	36.1%	14.4%	36.1%	0.0%	20.6%	28.9%	0.0%	20.6%	28.9%	0.0%
Maximum Green (s)	9.0	30.0	30.0	9.0	30.0		15.0	23.0		15.0	23.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)					5.0			5.0				
Flash Dont Walk (s)					11.0			11.0				
Pedestrian Calls (#/hr)					0			0				
v/c Ratio	1.12	0.64	0.56	0.70	0.76		1.02	0.57		0.66	1.06	
Control Delay	139.3	38.9	7.4	59.6	37.0		92.0	26.9		48.5	77.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	139.3	38.9	7.4	59.6	37.0		92.0	26.9		48.5	77.2	
Queue Length 50th (ft)	~130	116	0	64	129		~174	138		77	~293	
Queue Length 95th (ft)	#252	168	43	#141	170		#372	226		139	#455	
Internal Link Dist (ft)		1645			3138			4864			2848	
Turn Bay Length (ft)	150		230	90			140			115		
Base Capacity (vph)	190	651	778	186	1220		317	1097		311	936	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	1.12	0.37	0.42	0.67	0.43		1.02	0.57		0.49	1.06	

Intersection Summary

Area Type: Other
Cycle Length: 97
Actuated Cycle Length: 83.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
~ 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.

Splits and Phases: 1: Main Street & Rte 138



HCM Signalized Intersection Capacity Analysis
1: Main Street & Rte 138

No-Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	195	270	105	360	85	290	480	85	135	625	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	11	11	11	12	12	11	12	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1818	1583	1728	3350		1770	3385		1736	3248	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1818	1583	1728	3350		1770	3385		1736	3248	
Peak-hour factor, PHF	0.82	0.82	0.82	0.85	0.85	0.85	0.90	0.90	0.90	0.89	0.89	0.89
Adj. Flow (vph)	213	238	329	124	424	100	322	533	94	152	702	292
RTOR Reduction (vph)	0	0	262	0	25	0	0	13	0	0	44	0
Lane Group Flow (vph)	213	238	67	124	499	0	322	614	0	152	950	0
Heavy Vehicles (%)	2%	1%	2%	1%	1%	2%	2%	5%	0%	4%	3%	2%
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8									
Actuated Green, G (s)	9.0	17.2	17.2	8.6	16.8		15.0	26.9		11.2	23.1	
Effective Green, g (s)	9.0	17.2	17.2	8.6	16.8		15.0	26.9		11.2	23.1	
Actuated g/C Ratio	0.11	0.21	0.21	0.10	0.20		0.18	0.32		0.13	0.28	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	190	373	325	177	671		316	1085		232	894	
v/s Ratio Prot	c0.12	0.13		0.07	c0.15		c0.18	c0.18		0.09	c0.29	
v/s Ratio Perm			0.04									
v/c Ratio	1.12	0.64	0.21	0.70	0.74		1.02	0.57		0.66	1.06	
Uniform Delay, d1	37.5	30.5	27.7	36.4	31.5		34.4	23.7		34.5	30.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	101.5	2.6	0.1	9.8	3.9		55.6	0.8		5.0	48.1	
Delay (s)	139.0	33.1	27.8	46.2	35.4		90.0	24.5		39.5	78.5	
Level of Service	F	C	C	D	D		F	C		D	E	
Approach Delay (s)		59.8			37.5			46.7			73.3	
Approach LOS		E			D			D			E	

Intersection Summary

HCM Average Control Delay	56.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	83.9	Sum of lost time (s)	25.0
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Belmont St & Route 138

No-Build Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	70	125	275	500	150	170	230	395	300	220	650	60	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	11	13	12	11	13	12	11	12	12	11	12	13	
Storage Length (ft)	0		0	475		0	0		0	200		300	
Storage Lanes	1		0	2		0	1		0	1		1	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		45			45			45			45		
Link Distance (ft)		387			2550			908			876		
Travel Time (s)		5.9			38.6			13.8			13.3		
Peak Hour Factor	0.89	0.89	0.89	0.88	0.88	0.88	0.93	0.93	0.93	0.91	0.91	0.91	
Heavy Vehicles (%)	0%	0%	0%	1%	0%	2%	0%	4%	1%	5%	3%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	79	449	0	568	363	0	247	748	0	242	780	0	
Turn Type	Prot			Prot			pm+pt			pm+pt			
Protected Phases	7	4		3	8		5	2		1	6		9
Permitted Phases							2			6			
Detector Phase	7	4		3	8		5	2		1	6		
Switch Phase													
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
Minimum Split (s)	22.0	10.0		22.0	10.0		10.0	10.0		10.0	10.0		23.0
Total Split (s)	22.0	26.0	0.0	22.0	26.0	0.0	14.0	27.0	0.0	15.0	28.0	0.0	23.0
Total Split (%)	19.5%	23.0%	0.0%	19.5%	23.0%	0.0%	12.4%	23.9%	0.0%	13.3%	24.8%	0.0%	20%
Maximum Green (s)	16.0	20.0		16.0	20.0		8.0	21.0		9.0	22.0		20.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max		None
Walk Time (s)													6.0
Flash Dont Walk (s)													14.0
Pedestrian Calls (#/hr)													5
v/c Ratio	0.49	1.18		1.20	0.76		0.62	0.85		0.61	0.92		
Control Delay	58.2	137.1		150.3	48.0		32.5	43.4		29.9	47.4		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	58.2	137.1		150.3	48.0		32.5	43.4		29.9	47.4		
Queue Length 50th (ft)	56	~338		~258	224		96	213		65	275		
Queue Length 95th (ft)	101	#532		#356	#410		#355	#379		m#272	#467		
Internal Link Dist (ft)		307			2470			828			796		
Turn Bay Length (ft)				475						200			
Base Capacity (vph)	247	382		474	477		400	880		396	847		
Starvation Cap Reductn	0	0		0	0		0	0		0	0		
Spillback Cap Reductn	0	0		0	0		0	0		0	0		
Storage Cap Reductn	0	0		0	0		0	0		0	0		
Reduced v/c Ratio	0.32	1.18		1.20	0.76		0.62	0.85		0.61	0.92		

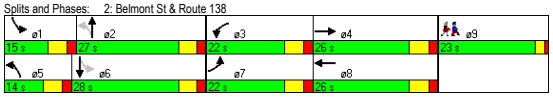
Intersection Summary	
Area Type:	Other
Cycle Length: 113	
Actuated Cycle Length: 113	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	

~ 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.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Belmont St & Route 138



HCM Signalized Intersection Capacity Analysis
2: Belmont St & Route 138

No-Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	125	275	500	150	170	230	395	300	220	650	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	13	12	11	13	12	11	12	12	11	12	13
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.90		1.00	0.92		1.00	0.94		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	1761		3351	1788		1745	3287		1662	3469	
Flt Permitted	0.95	1.00		0.95	1.00		0.18	1.00		0.17	1.00	
Satd. Flow (perm)	1745	1761		3351	1788		324	3287		294	3469	
Peak-hour factor, PHF	0.89	0.89	0.89	0.88	0.88	0.88	0.93	0.93	0.93	0.91	0.91	0.91
Adj. Flow (vph)	79	140	309	568	170	193	247	425	323	242	714	66
RTOR Reduction (vph)	0	69	0	0	33	0	0	119	0	0	6	0
Lane Group Flow (vph)	79	380	0	568	330	0	247	629	0	242	774	0
Heavy Vehicles (%)	0%	0%	0%	1%	0%	2%	0%	4%	1%	5%	3%	0%
Turn Type	Prot			Prot			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)	9.2	21.2		16.0	28.0		43.7	22.7		45.9	23.8	
Effective Green, g (s)	9.2	21.2		16.0	28.0		43.7	22.7		45.9	23.8	
Actuated g/C Ratio	0.08	0.19		0.14	0.25		0.39	0.20		0.41	0.21	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	142	330		474	443		389	660		387	731	
v/s Ratio Prot	0.05	c0.22		c0.17	0.18		0.12	0.19		c0.12	c0.22	
v/s Ratio Perm							0.13			0.13		
v/c Ratio	0.56	1.15		1.20	0.74		0.63	0.95		0.63	1.06	
Uniform Delay, d1	49.9	45.9		48.5	39.2		26.5	44.6		25.3	44.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.05	0.83	
Incremental Delay, d2	4.7	97.2		108.2	6.7		3.4	25.2		2.1	43.7	
Delay (s)	54.6	143.1		156.7	45.9		29.9	69.8		28.7	80.9	
Level of Service	D	F		F	D		C	E		C	F	
Approach Delay (s)		129.8			113.5			59.9			68.5	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM Average Control Delay	87.4	HCM Level of Service	F
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	113.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

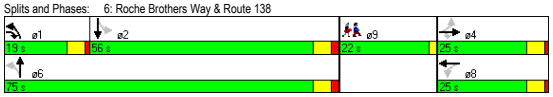
Lanes, Volumes, Timings
6: Roche Brothers Way & Route 138

No-Build Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	90	0	305	1	0	0	200	490	5	5	835	140	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	11	12	12	12	11	11	11	12	12	12	
Storage Length (ft)	0		100	0		0	0		0	0		0	
Storage Lanes	0		1	0		0	0		0	0		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		635			332			1623			2417		
Travel Time (s)		14.4			7.5			36.9			54.9		
Confl. Peds. (#/hr)	25		50	15		25	10		25	40		30	
Peak Hour Factor	0.90	0.90	0.90	0.25	0.25	0.25	0.82	0.82	0.82	0.90	0.90	0.90	
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	1%	4%	0%	0%	2%	1%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	100	339	0	4	0	0	848	0	0	1090	0	
Turn Type	Perm		pm+ov	Perm			pm+pt			Perm			
Protected Phases		4	1		8		1	6			2		9
Permitted Phases	4		4	8			6			2			
Detector Phase	4	4	1	8	8		1	6		2	2		
Switch Phase													
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		10.0	10.0		7.0
Minimum Split (s)	21.0	21.0	11.0	21.0	21.0		11.0	22.0		22.0	22.0		22.0
Total Split (s)	25.0	25.0	19.0	25.0	25.0	0.0	19.0	75.0	0.0	56.0	56.0	0.0	22.0
Total Split (%)	20.5%	20.5%	15.6%	20.5%	20.5%	0.0%	15.6%	61.5%	0.0%	45.9%	45.9%	0.0%	18%
Maximum Green (s)	20.0	20.0	14.0	20.0	20.0		14.0	69.0		50.0	50.0		20.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	2.0		2.0	2.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	5.0	6.0	4.0	6.0	6.0	4.0	
Lead/Lag			Lead				Lead			Lag	Lag		
Lead-Lag Optimize?			Yes				Yes			Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0		3.0
Recall Mode	None	None	None	None	None		None	Min		Min	Min		None
Walk Time (s)													7.0
Flash Dont Walk (s)													13.0
Pedestrian Calls (#/hr)													2
v/c Ratio		0.40	0.55		0.02			0.66			0.71		
Control Delay		36.6	7.3		33.0			12.7			18.7		
Queue Delay		0.0	0.0		0.0			0.0			0.0		
Total Delay		36.6	7.3		33.0			12.7			18.7		
Queue Length 50th (ft)		32	0		1			68			160		
Queue Length 95th (ft)		130	76		4			214			420		
Internal Link Dist (ft)		555			252			1543			2337		
Turn Bay Length (ft)			100										
Base Capacity (vph)		471	780		435			1740			2596		
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		0.21	0.43		0.01			0.49			0.42		

Intersection Summary	
Area Type:	Other
Cycle Length: 122	
Actuated Cycle Length: 68.1	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 6: Roche Brothers Way & Route 138



HCM Signalized Intersection Capacity Analysis
6: Roche Brothers Way & Route 138

No-Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	0	305	1	0	0	200	490	5	5	835	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	11	12	12	12	11	11	11	12	12	12
Total Lost time (s)		5.0	5.0		5.0			6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00			0.95			0.95	
Frpb, ped/bikes		1.00	0.93		1.00			1.00			0.99	
Flpb, ped/bikes		0.95	1.00		0.95			1.00			1.00	
Frt		1.00	0.85		1.00			1.00			0.98	
Flt Protected		0.95	1.00		0.95			0.99			1.00	
Satd. Flow (prot)		1710	1436		1722			3331			3442	
Flt Permitted		0.76	1.00		0.69			0.52			0.95	
Satd. Flow (perm)		1359	1436		1255			1758			3271	
Peak-hour factor, PHF	0.90	0.90	0.90	0.25	0.25	0.25	0.82	0.82	0.82	0.90	0.90	0.90
Adj. Flow (vph)	100	0	339	4	0	0	244	598	6	6	928	156
RTOR Reduction (vph)	0	0	257	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	100	82	0	4	0	0	848	0	0	1080	0
Confl. Peds. (#/hr)	25		50	15		25	10		25	40		30
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	1%	4%	0%	0%	2%	1%
Turn Type	Perm		pm+ov	Perm			pm+pt			Perm		
Protected Phases		4	1		8		1	6			2	
Permitted Phases	4		4	8			6			2		
Actuated Green, G (s)		9.9	16.9		9.9			44.8			32.8	
Effective Green, g (s)		9.9	16.9		9.9			44.8			32.8	
Actuated g/C Ratio		0.14	0.24		0.14			0.64			0.47	
Clearance Time (s)		5.0	5.0		5.0			6.0			6.0	
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		192	450		178			1284			1535	
v/s Ratio Prot			0.02					c0.07				
v/s Ratio Perm		c0.07	0.04		0.00			c0.36			0.33	
v/c Ratio		0.52	0.18		0.02			0.66			0.70	
Uniform Delay, d1		27.8	21.0		25.8			7.8			14.7	
Progression Factor		1.00	1.00		1.00			1.00			1.00	
Incremental Delay, d2		2.5	0.2		0.1			1.3			1.5	
Delay (s)		30.3	21.2		25.9			9.1			16.2	
Level of Service		C	C		C			A			B	
Approach Delay (s)		23.3			25.9			9.1			16.2	
Approach LOS		C			C			A			B	

Intersection Summary					
HCM Average Control Delay		15.0	HCM Level of Service		B
HCM Volume to Capacity ratio		0.62			
Actuated Cycle Length (s)		69.9	Sum of lost time (s)		15.2
Intersection Capacity Utilization		74.0%	ICU Level of Service		D
Analysis Period (min)		15			

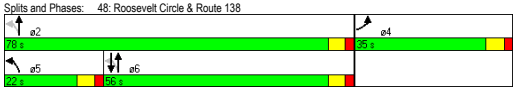
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø2
Lane Configurations							
Volume (vph)	160	50	0	605	830	155	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	0	50			0	
Storage Lanes	1	0	1			0	
Taper Length (ft)	25	25	25			25	
Right Turn on Red		Yes				Yes	
Link Speed (mph)	30			40	45		
Link Distance (ft)	1067			876	4944		
Travel Time (s)	24.3			14.9	74.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	228	0	0	658	1070	0	
Turn Type			pm+pt				
Protected Phases	4		5	2 6	6		2
Permitted Phases			2 6				
Detector Phase	4		5	2 6	6		
Switch Phase							
Minimum Initial (s)	4.0		4.0		4.0		4.0
Minimum Split (s)	22.0		22.0		22.0		22.0
Total Split (s)	35.0	0.0	22.0	134.0	56.0	0.0	78.0
Total Split (%)	31.0%	0.0%	19.5%	118.6%	49.6%	0.0%	69%
Maximum Green (s)	29.0		16.0		50.0		72.0
Yellow Time (s)	4.0		4.0		4.0		4.0
All-Red Time (s)	2.0		2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	4.0	
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	3.0		3.0		3.0		3.0
Recall Mode	None		None		C-Min		C-Max
Walk Time (s)	5.0		5.0		5.0		5.0
Flash Dont Walk (s)	11.0		11.0		11.0		11.0
Pedestrian Calls (#/hr)	0		0		0		0
v/c Ratio	0.74			0.49	0.81		
Control Delay	55.7			10.3	18.1		
Queue Delay	0.0			0.0	0.0		
Total Delay	55.7			10.3	18.1		
Queue Length 50th (ft)	150			152	452		
Queue Length 95th (ft)	220			m391	#955		
Internal Link Dist (ft)	987			796	4864		
Turn Bay Length (ft)							
Base Capacity (vph)	455			1346	1321		
Starvation Cap Reductn	0			0	0		
Spillback Cap Reductn	0			0	0		
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.50			0.49	0.81		

Intersection Summary

Area Type: Other
Cycle Length: 113
Actuated Cycle Length: 113
Offset: 93 (82%), Referenced to phase 2:NBTL and 6:NBSB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 48: Roosevelt Circle & Route 138

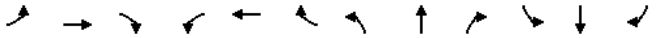


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	160	50	0	605	830	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			1.00	1.00	
Frt	0.97			1.00	0.98	
Flt Protected	0.96			1.00	1.00	
Satd. Flow (prot)	1737			1863	1823	
Flt Permitted	0.96			1.00	1.00	
Satd. Flow (perm)	1737			1863	1823	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	54	0	658	902	168
RTOR Reduction (vph)	11	0	0	0	3	0
Lane Group Flow (vph)	217	0	0	658	1067	0
Turn Type			pm+pt			
Protected Phases	4		5	2 6	6	
Permitted Phases			2 6			
Actuated Green, G (s)	19.4			81.6	81.6	
Effective Green, g (s)	19.4			81.6	81.6	
Actuated g/C Ratio	0.17			0.72	0.72	
Clearance Time (s)	6.0				6.0	
Vehicle Extension (s)	3.0				3.0	
Lane Grp Cap (vph)	298			1345	1316	
v/s Ratio Prot	c0.13			0.35	c0.59	
v/s Ratio Perm						
v/c Ratio	0.73			0.49	0.81	
Uniform Delay, d1	44.3			6.7	10.5	
Progression Factor	1.00			1.23	1.00	
Incremental Delay, d2	8.6			0.8	5.5	
Delay (s)	52.9			9.1	16.0	
Level of Service	D			A	B	
Approach Delay (s)	52.9			9.1	16.0	
Approach LOS	D			A	B	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	113.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Elm St & Route 138

No-Build Condition - PM Peak Hour



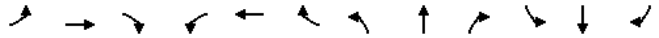
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	75	15	35	25	50	35	65	685	30	20	1000	185
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.86	0.86	0.86	0.88	0.88	0.88	0.85	0.85	0.85
Hourly flow rate (vph)	88	18	41	29	58	41	74	778	34	24	1176	218
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2345	2293	1285	2326	2384	795	1394			812		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2345	2293	1285	2326	2384	795	1394			812		
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 %	0	46	79	0	0	89	85			97		
cM capacity (veh/h)	0	33	199	11	29	386	491			823		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	147	128	886	1418
Volume Left	88	29	74	24
Volume Right	41	41	34	218
cSH	0	26	491	823
Volume to Capacity	Err	4.89	0.15	0.03
Queue Length 95th (ft)	Err	Err	13	2
Control Delay (s)	Err	Err	4.7	1.6
Lane LOS	F	F	A	A
Approach Delay (s)	Err	Err	4.7	1.6
Approach LOS	F	F		

Intersection Summary				
Average Delay			Err	
Intersection Capacity Utilization			95.4%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
10: Lincoln Street & Main Street

No-Build Condition - PM Peak Hour



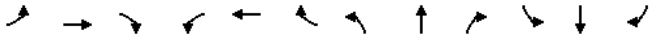
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	255	25	420	440	105	15	50	220	85	70	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.86	0.86	0.86	0.89	0.89	0.89	0.93	0.93	0.93
Hourly flow rate (vph)	6	300	29	488	512	122	17	56	247	91	75	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	512			329			1924	1815	315	1904	1891	573
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	512			329			1924	1815	315	1904	1891	573
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.6	4.0	3.3
p0 queue free %	99			60			0	0	66	0	0	98
cM capacity (veh/h)	1064			1236			0	47	723	0	42	523

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	335	1122	320	177
Volume Left	6	488	17	91
Volume Right	29	122	247	11
cSH	1064	1236	0	0
Volume to Capacity	0.01	0.40	Err	Err
Queue Length 95th (ft)	0	48	Err	Err
Control Delay (s)	0.2	7.8	Err	Err
Lane LOS	A	A	F	F
Approach Delay (s)	0.2	7.8	Err	Err
Approach LOS			F	F

Intersection Summary				
Average Delay			Err	
Intersection Capacity Utilization			107.3%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
11: Lincoln Street & Barrows Street

No-Build Condition - PM Peak Hour



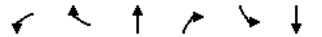
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	70	270	0	0	465	5	10	5	15	0	0	180
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.92	0.92	0.89	0.89	0.92	0.92	0.92	0.89	0.92	0.89
Hourly flow rate (vph)	83	321	0	0	522	6	11	5	16	0	0	202
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	528			321			1216	1016	321	1032	1013	525
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	528			321			1216	1016	321	1032	1013	525
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 %	92			100			88	98	98	100	100	64
cM capacity (veh/h)	1049			1238			94	219	719	192	220	556

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	405	528	33	202
Volume Left	83	0	11	0
Volume Right	0	6	16	202
cSH	1049	1700	201	556
Volume to Capacity	0.08	0.31	0.16	0.36
Queue Length 95th (ft)	6	0	14	41
Control Delay (s)	2.5	0.0	26.4	15.1
Lane LOS	A		D	C
Approach Delay (s)	2.5	0.0	26.4	15.1
Approach LOS			D	C

Intersection Summary				
Average Delay	4.2			
Intersection Capacity Utilization	64.0%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
12: Union Street & Route 138

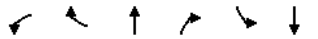
No-Build Condition - PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	185	125	595	170	130	1040
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.80	0.80	0.84	0.84	0.92	0.92
Hourly flow rate (vph)	231	156	708	202	141	1130
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2223	810			911	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2223	810			911	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	59			81	
cM capacity (veh/h)	39	382			752	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	388	911	1272
Volume Left	231	0	141
Volume Right	156	202	0
cSH	61	1700	752
Volume to Capacity	6.30	0.54	0.19
Queue Length 95th (ft)	Err	0	17
Control Delay (s)	Err	0.0	6.6
Lane LOS	F		A
Approach Delay (s)	Err	0.0	6.6
Approach LOS	F		

Intersection Summary			
Average Delay	1510.9		
Intersection Capacity Utilization	131.5%	ICU Level of Service	H
Analysis Period (min)	15		

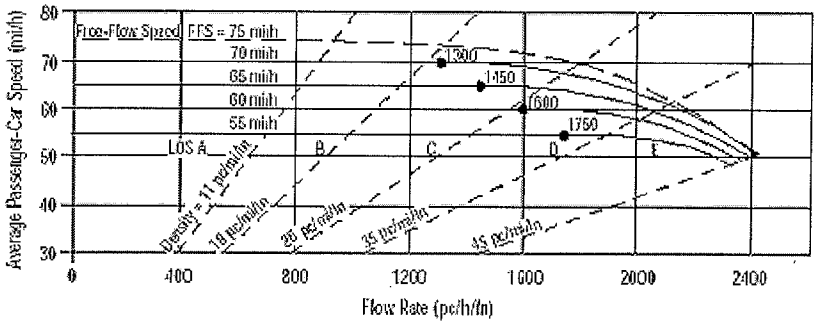


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	130	100	165	55	35	180
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.84	0.84	0.92	0.92	0.95	0.95
Hourly flow rate (vph)	155	119	179	60	37	189
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	472	209			239	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	472	209			239	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	71	86			97	
cM capacity (veh/h)	535	834			1340	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	274	239	226
Volume Left	155	0	37
Volume Right	119	60	0
cSH	634	1700	1340
Volume to Capacity	0.43	0.14	0.03
Queue Length 95th (ft)	54	0	2
Control Delay (s)	14.9	0.0	1.5
Lane LOS	B		A
Approach Delay (s)	14.9	0.0	1.5
Approach LOS	B		

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route I-93 South of F.B.P.*
Jurisdiction	*Braintree*
Analysis Year	*2030*

Project Description South Coast Rail

☐ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*8760*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.943*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*4*	
FFS (measured)	*58.3*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*58.3*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2369*	pc/h/ln
S		mi/h
D = v_p / S		pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

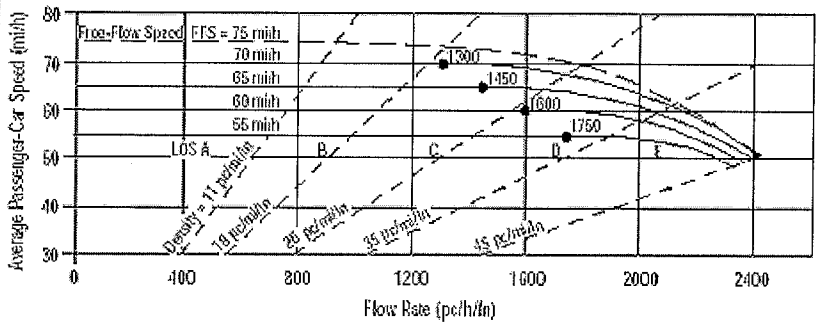
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		**Site Information**	
Analyst	*JBB*	Highway/Direction of Travel	*Northbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route I-93 South of F.B.P.*
Date Performed	*6/3/09*	Jurisdiction	*Braintree*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*5450*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

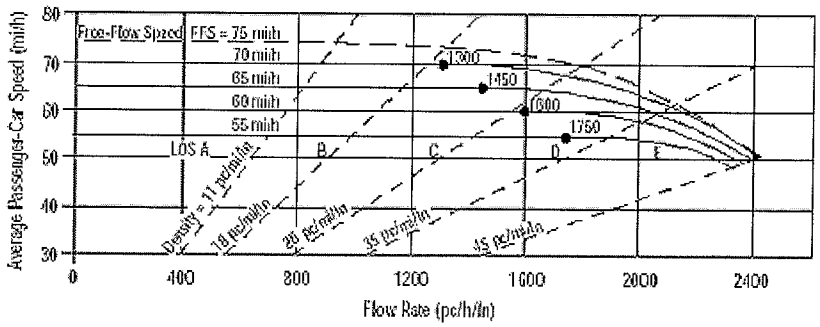
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*4*		f_N		mi/h
FFS (measured)	*58.3*	mi/h	FFS	*58.3*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1469*	pc/h/ln	Design LOS	
S	*58.3*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
D = v_p / S	*25.2*	pc/mi/ln	S	mi/h
LOS	*C*		D = v_p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route I-93 South of F.B.P.*
Jurisdiction	*Braintree*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5220*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*4*	
FFS (measured)	*59.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*59.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1422*	pc/h/ln
S	*59.0*	mi/h
D = v_p / S	*24.1*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

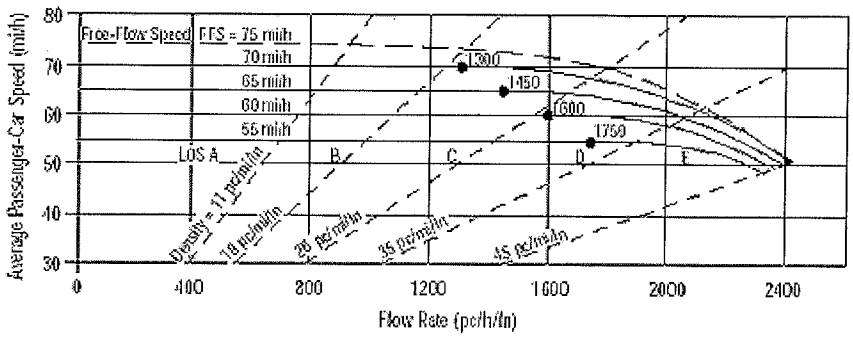
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/5/09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route I-93 South of F.B.P.*
Jurisdiction	*Braintree*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*8100*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*4*	
FFS (measured)	*59.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*59.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2161*	pc/h/ln
S	*54.4*	mi/h
D = v_p / S	*39.7*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

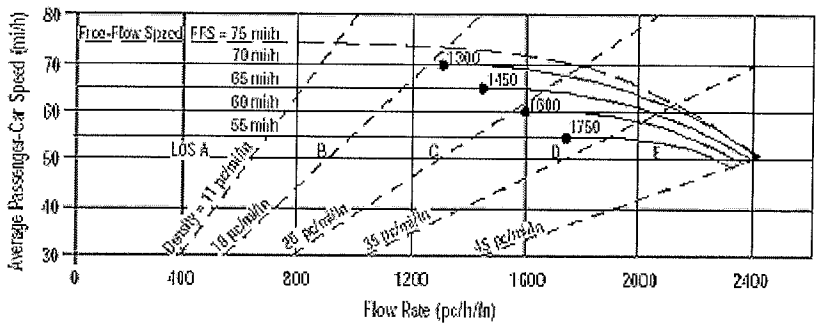
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		Site Information	
Analyst	*JBB*	Highway/Direction of Travel	*Northbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route I-93 South of Route 3*
Date Performed	*6/3/09*	Jurisdiction	*Braintree*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6645*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*4*	
FFS (measured)	*66.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*66.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1817*	pc/h/ln
S	*64.6*	mi/h
D = v_p / S	*28.1*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

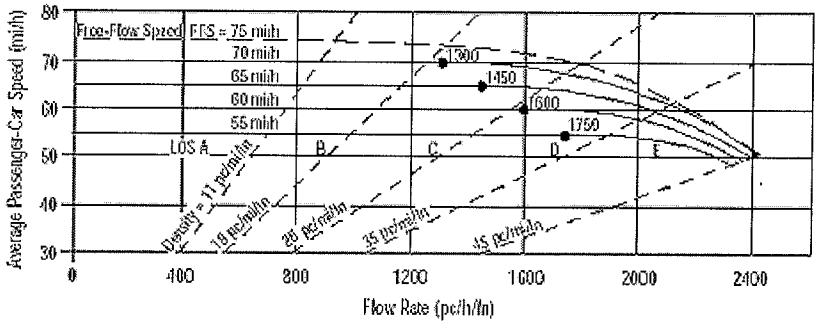
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route I-93 South of Route 3*
Jurisdiction	*Braintree*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4880*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*4*	
FFS (measured)	*66.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*66.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1309*	pc/h/ln
S	*66.0*	mi/h
D = v_p / S	*19.8*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

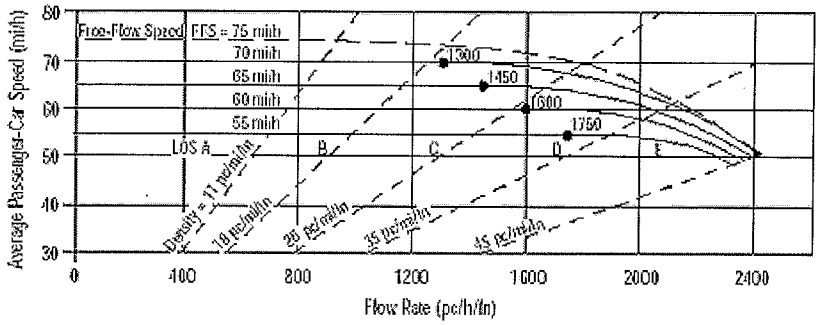
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		Site Information	
Analyst	*JBB*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route I-93 South of Route 3*
Date Performed	*6/3/09*	Jurisdiction	*Braintree*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7160*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*4*	
FFS (measured)	*64.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*64.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1891*	pc/h/ln
S	*62.2*	mi/h
D = v_p / S	*30.4*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

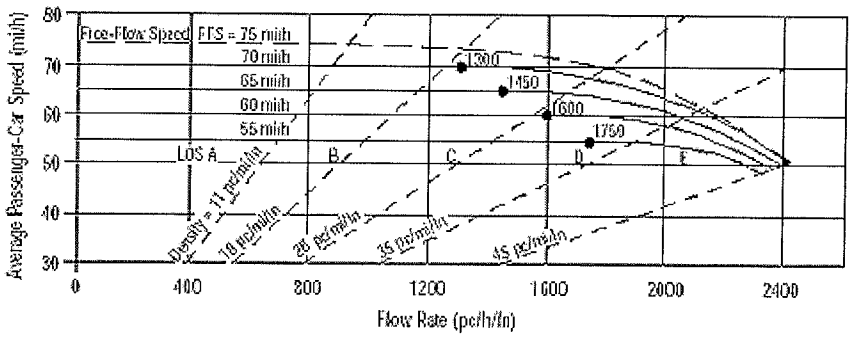
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route I-93 South of Route 3*
Jurisdiction	*Braintree*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*8235*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*4*	
FFS (measured)	*64.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*64.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2175*	pc/h/ln
S	*57.1*	mi/h
D = v_p / S	*38.1*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

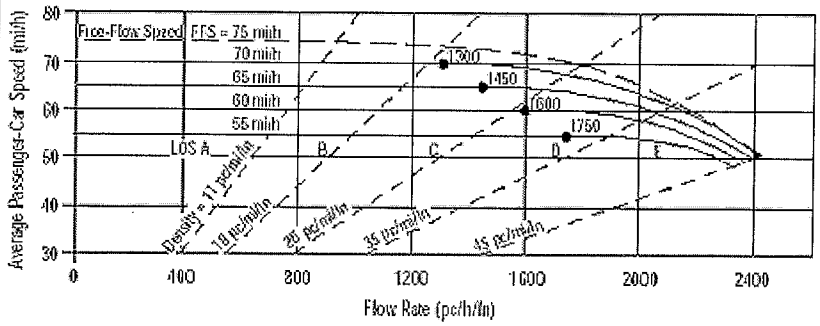
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 South of Route I-93*
Jurisdiction	*Randolph*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5700*	veh/h	Peak-Hour Factor, PHF	*0.89*
AADT		veh/day	%Trucks and Buses, P_T	*16*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.926*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*63.9*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*63.9*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2306*	pc/h/ln
S	*53.1*	mi/h
D = v_p / S	*43.4*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

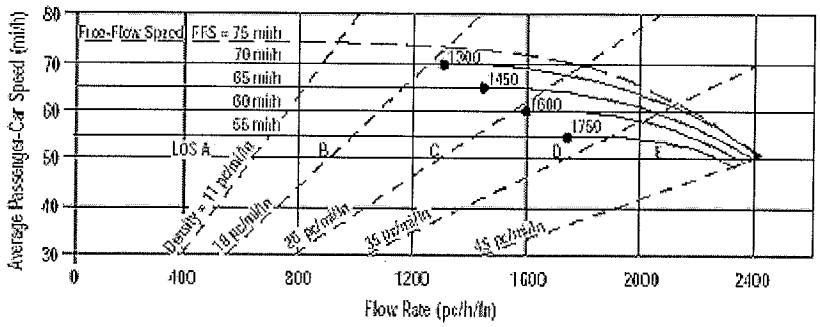
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		Site Information	
Analyst	*JBB*	Highway/Direction of Travel	*Northbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24 South of Route I-93*
Date Performed	*6/3/09*	Jurisdiction	*Randolph*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2875*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*63.9*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*63.9*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1034*	pc/h/ln
S	*63.9*	mi/h
D = v_p / S	*16.2*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

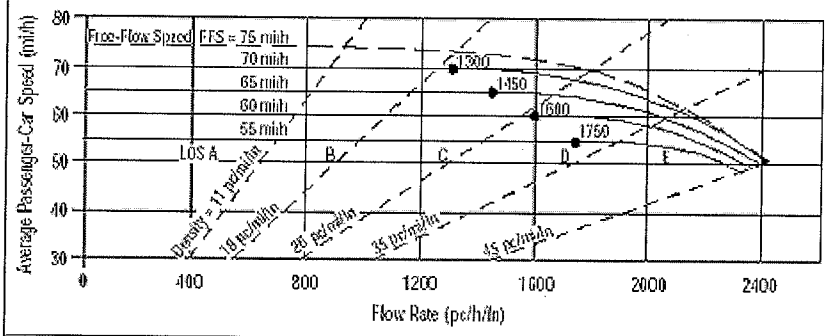
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 South of Route I-93*
Jurisdiction	*Randolph*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3520*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*65.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*65.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1306*	pc/h/ln
S	*65.8*	mi/h
D = v_p / S	*19.8*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

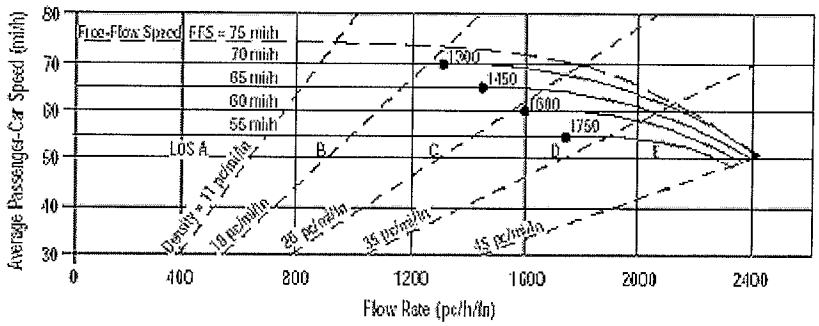
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 South of Route I-93*
Jurisdiction	*Randolph*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6830*	veh/h	Peak-Hour Factor, PHF	*0.98*	
AADT		veh/day	%Trucks and Buses, P_T	*6*	
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*	
Peak-Hr Direction Prop, D			General Terrain:	*Level*	
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*	
Driver type adjustment	*1.00*		Up/Down %		

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*65.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*65.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2393*	pc/h/ln
S		mi/h
D = v_p / S		pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

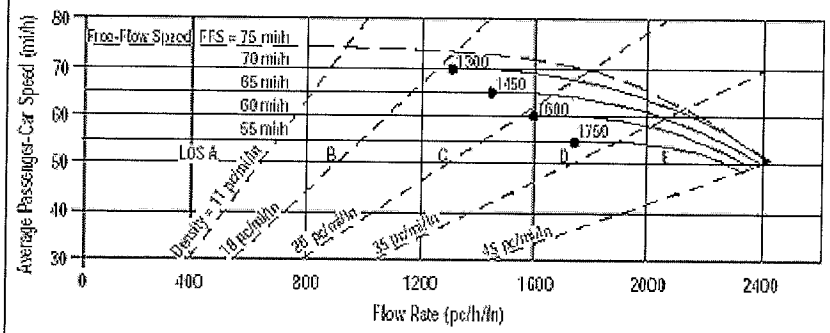
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24, South of Pond St.*
Jurisdiction	*Avon*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5985*	veh/h	Peak-Hour Factor, PHF	*0.99*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*66.4*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*66.4*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2116*	pc/h/ln
S	*60.0*	mi/h
D = v_p / S	*35.2*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

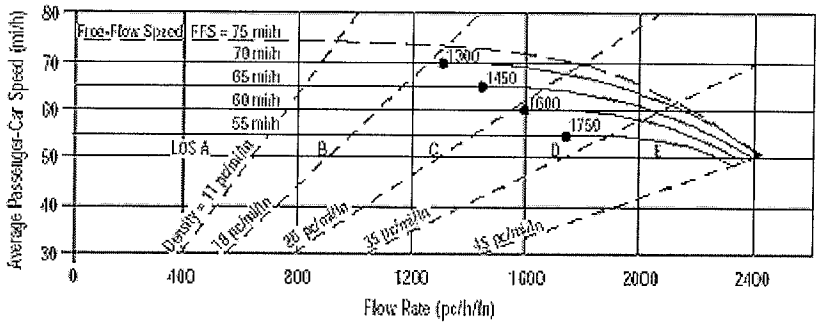
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24, South of Pond St.*
Jurisdiction	*Avon*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3445*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*70.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1225*	pc/h/ln
S	*70.0*	mi/h
D = v_p / S	*17.5*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

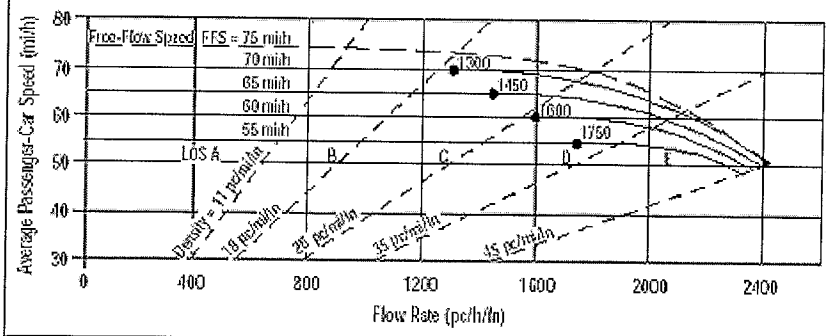
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24, South of Pond St.*
Jurisdiction	*Avon*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3180*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*9*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.957*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*67.1*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*67.1*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1142*	pc/h/ln
S	*67.1*	mi/h
D = v_p / S	*17.0*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

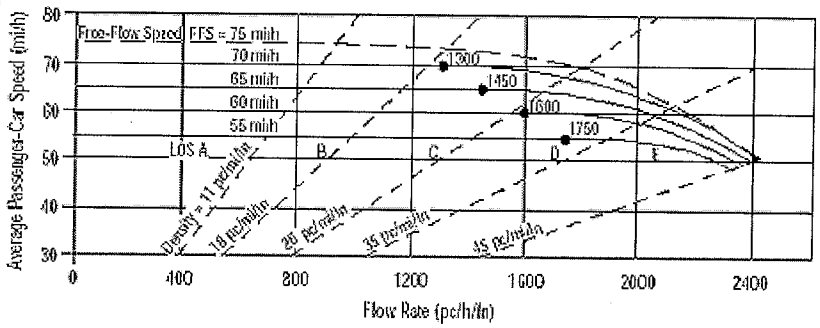
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24, South of Pond St.*
Jurisdiction	*Avon*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6715*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*67.1*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*67.1*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2365*	pc/h/ln
S	*52.9*	mi/h
D = v_p / S	*44.7*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

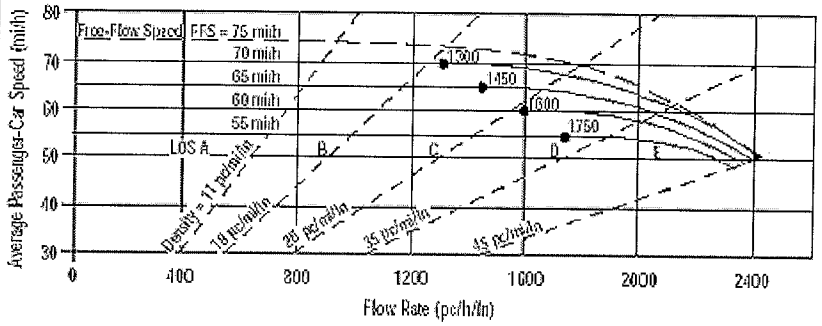
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 123*
Jurisdiction	*Brockton*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6050*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*67.1*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*67.1*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2183*	pc/h/ln
S	*58.8*	mi/h
D = v_p / S	*37.1*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

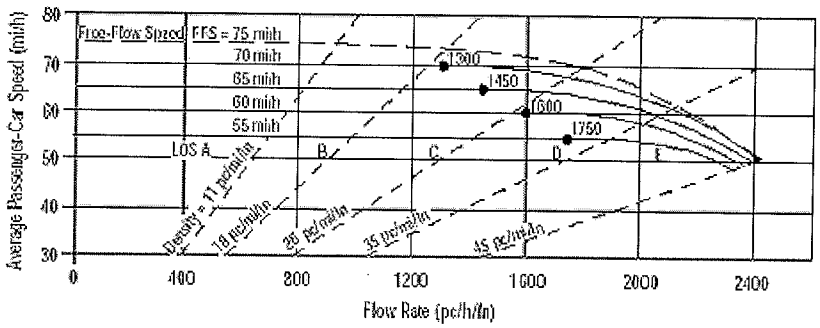
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 123*
Jurisdiction	*Brockton*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3435*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*67.1*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*67.1*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1235*	pc/h/ln
S	*67.1*	mi/h
D = v_p / S	*18.4*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

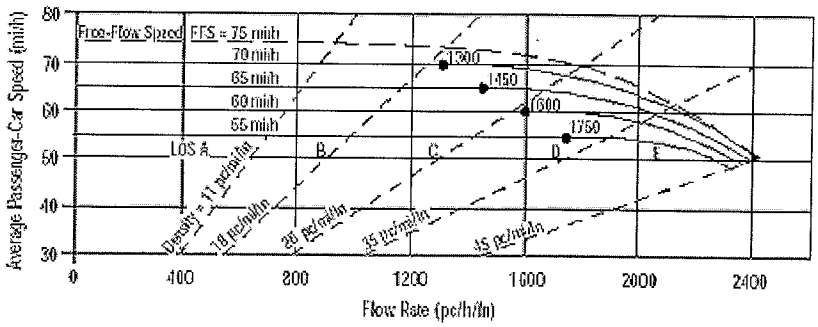
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of Route 123*
Jurisdiction	*Brockton*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2510*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*69.3*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.3*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*916*	pc/h/ln
S	*69.3*	mi/h
D = v_p / S	*13.2*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

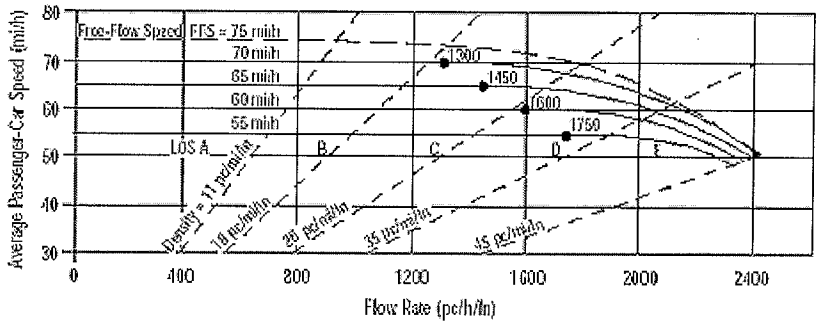
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		Site Information	
Analyst	*JBB*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24 North of Route 123*
Date Performed	*6/3/09*	Jurisdiction	*Brockton*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6100*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*69.3*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.3*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2116*	pc/h/ln
S	*61.9*	mi/h
D = v_p / S	*34.2*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

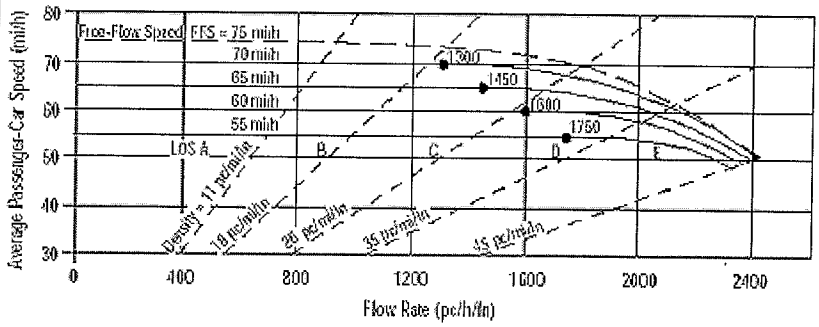
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route I-495*
Jurisdiction	*Raynham*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5910*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*66.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*66.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2114*	pc/h/ln
S	*60.3*	mi/h
D = v_p / S	*35.0*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

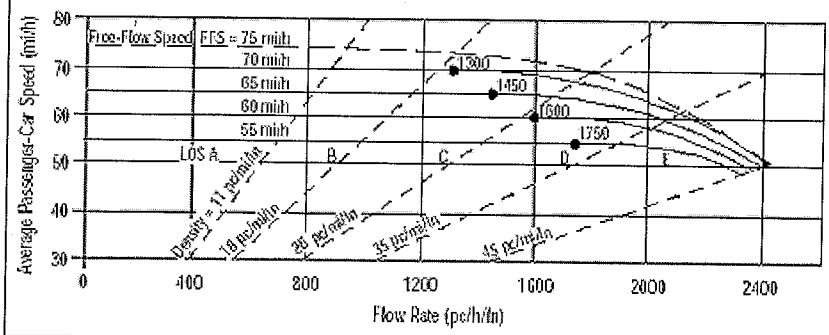
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of I-495*
Jurisdiction	*Raynham*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3720*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*66.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*66.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1344*	pc/h/ln
S	*66.8*	mi/h
D = v_p / S	*20.1*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

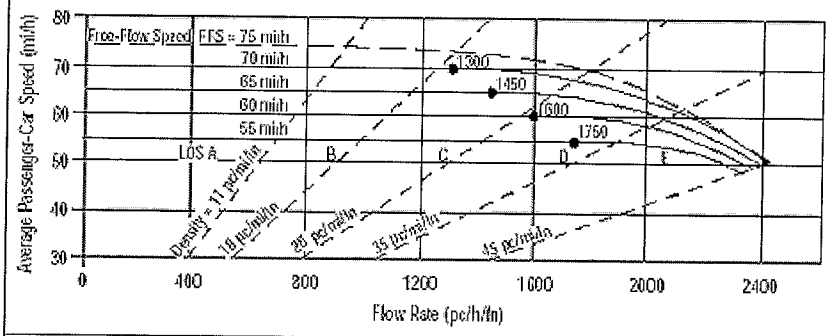
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of I-495*
Jurisdiction	*Raynham*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2900*	veh/h	Peak-Hour Factor, PHF	*0.97*	
AADT		veh/day	%Trucks and Buses, P_T	*10*	
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*	
Peak-Hr Direction Prop, D			General Terrain:	*Level*	
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*	
Driver type adjustment	*1.00*		Up/Down %		

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*63.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*63.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1046*	pc/h/ln
S	*63.0*	mi/h
D = v_p / S	*16.6*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

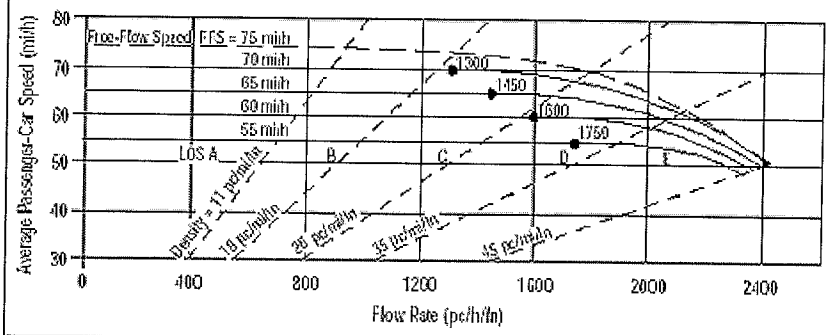
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of I-495*
Jurisdiction	*Raynham*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5355*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*63.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*63.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1876*	pc/h/ln
S	*61.6*	mi/h
D = v_p / S	*30.4*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

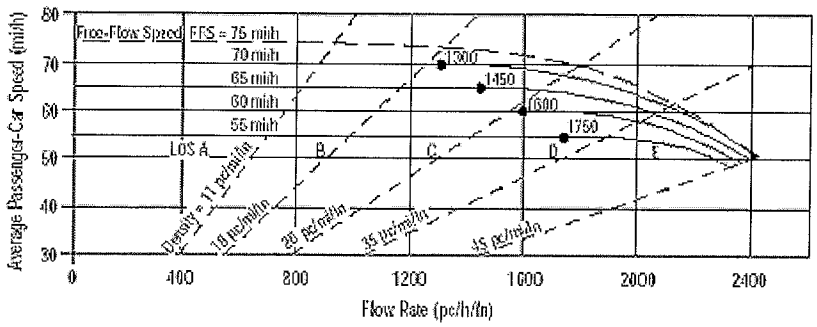
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*7/7/09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 44*
Jurisdiction	*Taunton*
Analysis Year	*2030*

Project Description South Coast Rail

☐ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5105*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*71.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*71.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1851*	pc/h/ln
S	*67.9*	mi/h
D = v_p / S	*27.3*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

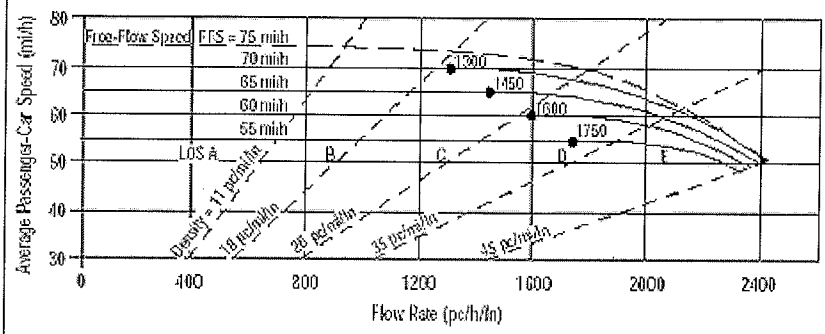
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*7/7/09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 44*
Jurisdiction	*Taunton*
Analysis Year	*2030*

Project Description South Coast Rail

☐ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3705*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*71.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*71.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1394*	pc/h/ln
S	*70.9*	mi/h
D = v_p / S	*19.6*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

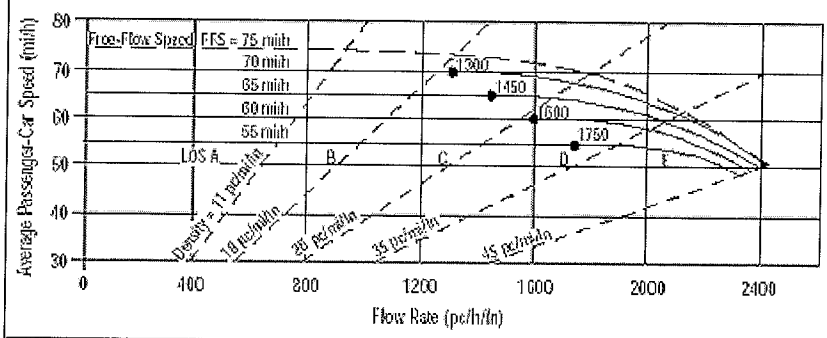
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*7/7/09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of Route 44*
Jurisdiction	*Taunton*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3320*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*69.7*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.7*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1216*	pc/h/ln
S	*69.7*	mi/h
D = v_p / S	*17.4*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

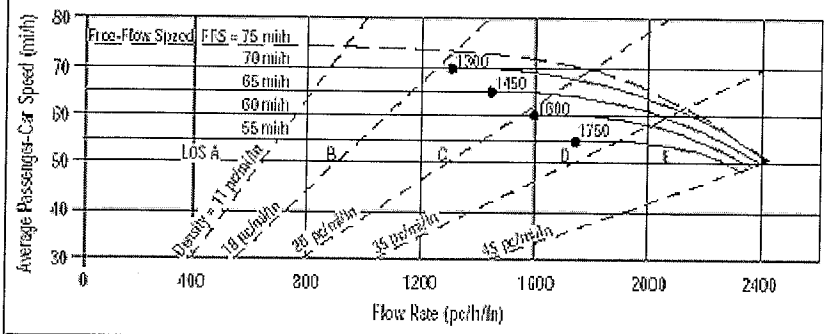
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*7/7/09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of Route 44*
Jurisdiction	*Taunton*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5070*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.943*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*69.7*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.7*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1828*	pc/h/ln
S	*67.3*	mi/h
D = v_p / S	*27.2*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

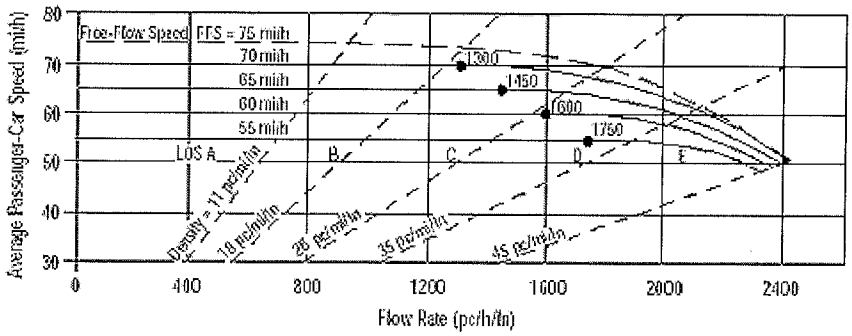
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/5/09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 South of Route 140*
Jurisdiction	*Taunton*
Analysis Year	*2030*

Project Description South Coast Rail

☐ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3535*	veh/h	Peak-Hour Factor, PHF	*0.91*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*69.2*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.2*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1981*	pc/h/ln
S	*64.7*	mi/h
D = v_p / S	*30.6*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

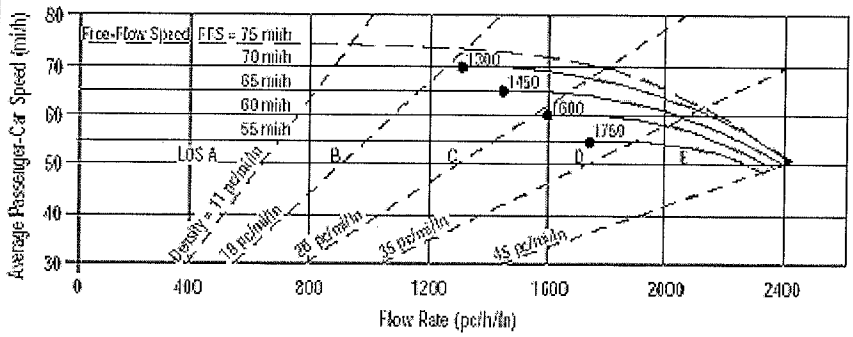
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/5/09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 South of Route 140*
Jurisdiction	*Taunton*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3560*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*69.2*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.2*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1952*	pc/h/ln
S	*65.2*	mi/h
D = v_p / S	*30.0*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

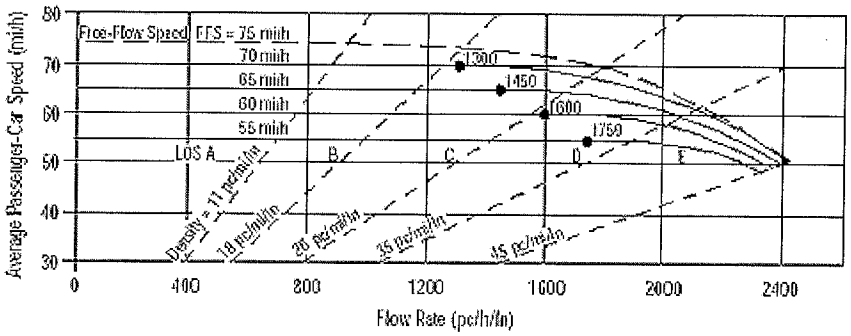
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/5/09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 South of Route 140*
Jurisdiction	*Taunton*
Analysis Year	*2030*

Project Description South Coast Rail

☐ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3285*	veh/h	Peak-Hour Factor, PHF	*0.92*
AADT		veh/day	%Trucks and Buses, P_T	*9*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.957*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*70.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1866*	pc/h/ln
S	*67.0*	mi/h
D = v_p / S	*27.8*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

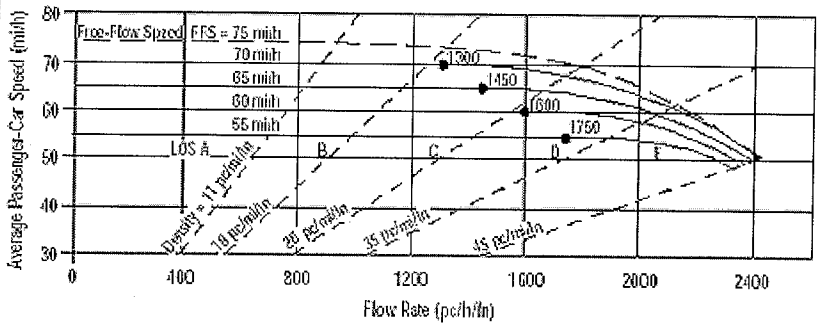
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 South of Route 140*
Jurisdiction	*Taunton*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3705*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*70.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2010*	pc/h/ln
S	*64.7*	mi/h
D = v_p / S	*31.1*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

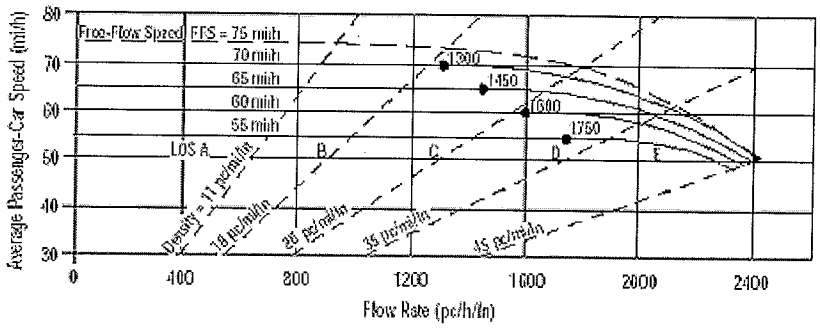
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Eastbound*
From/To	*Route 140 South of Route 24*
Jurisdiction	*Taunton*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*1320*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*65.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*745*	pc/h/ln
S	*65.0*	mi/h
D = v_p / S	*11.5*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

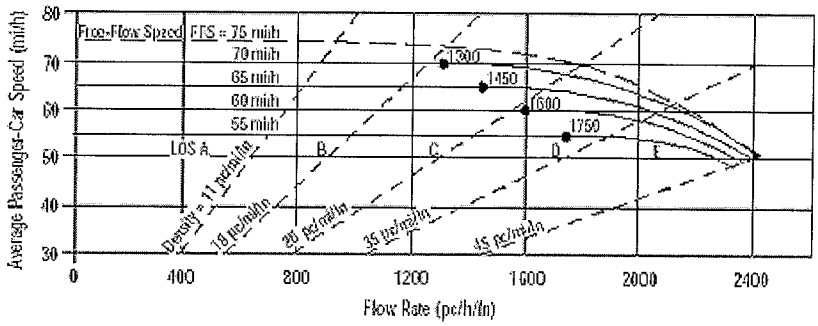
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Eastbound*
From/To	*Route 140 South of Route 24*
Jurisdiction	*Taunton*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2150*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*65.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1142*	pc/h/ln
S	*65.0*	mi/h
D = v_p / S	*17.6*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

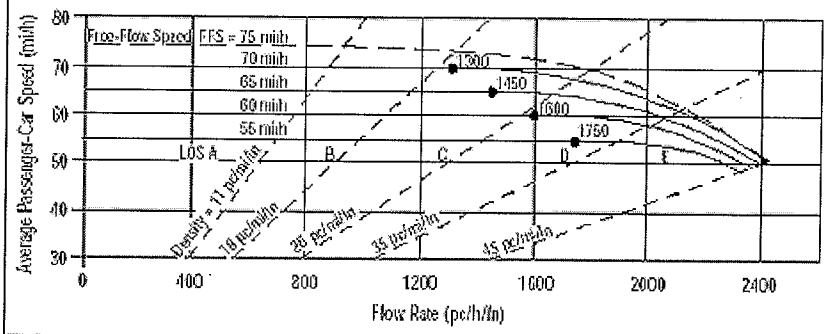
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Westbound*
From/To	*Route 140 South of Route 24*
Jurisdiction	*Taunton*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*1985*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*66.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*66.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1099*	pc/h/ln
S	*66.8*	mi/h
D = v_p / S	*16.5*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

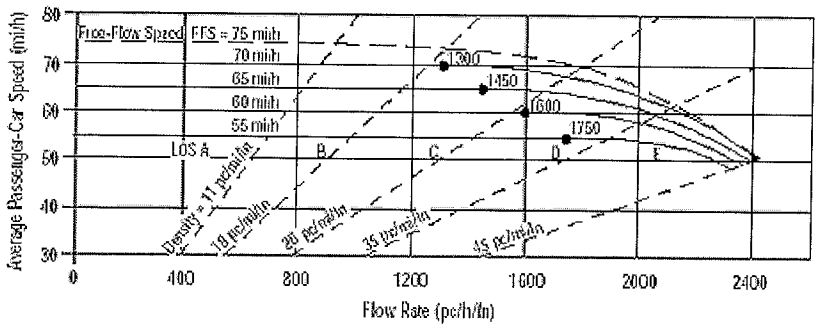
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Westbound*
From/To	*Route 140 South of Route 24*
Jurisdiction	*Taunton*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*1590*	veh/h	Peak-Hour Factor, PHF	*0.92*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*66.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*66.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*890*	pc/h/ln
S	*66.8*	mi/h
D = v_p / S	*13.3*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

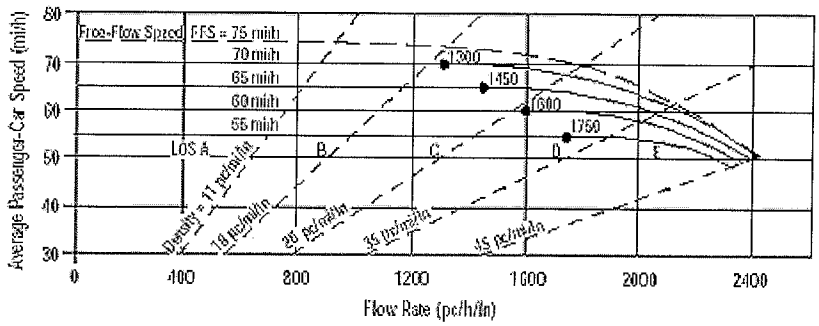
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 140 North of Hathaway Rd*
Jurisdiction	*New Bedford*
Analysis Year	*2030*

Project Description South Coast Rail

☐ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2300*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*9*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.957*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*69.3*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.3*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1278*	pc/h/ln
S	*69.3*	mi/h
D = v_p / S	*18.4*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

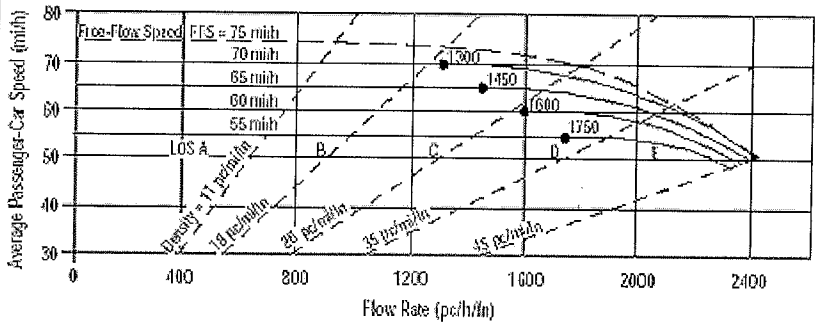
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 140 North of Hathaway Rd*
Jurisdiction	*New Bedford*
Analysis Year	*2030*

Project Description South Coast Rail

☐ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2390*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*69.3*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.3*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1322*	pc/h/ln
S	*69.3*	mi/h
D = v_p / S	*19.1*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

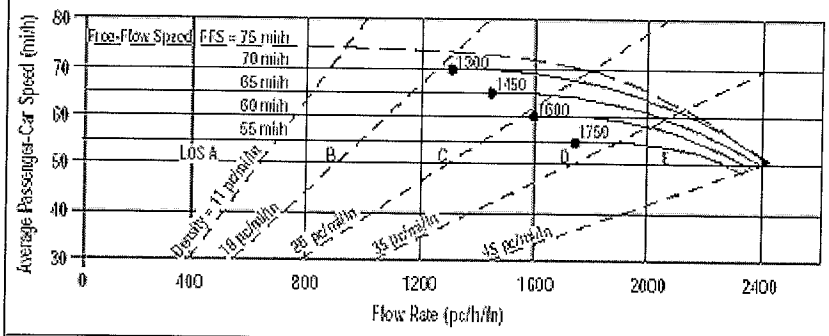
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		Site Information	
Analyst	*JBB*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 140 North of Hathaway Rd*
Date Performed	*6/3/09*	Jurisdiction	*New Bedford*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030*

Project Description South Coast Rail

☐ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2465*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*62.2*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*62.2*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1365*	pc/h/ln
S	*62.2*	mi/h
D = v_p / S	*21.9*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

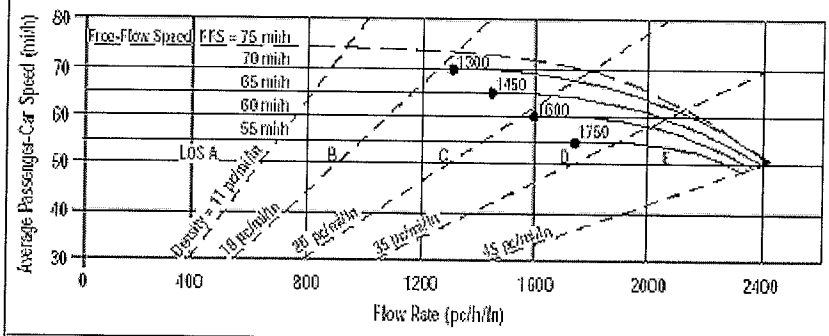
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 140 North of Hathaway Rd*
Jurisdiction	*New Bedford*
Analysis Year	*2030*

Project Description South Coast Rail

☐ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2545*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*62.2*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*62.2*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1366*	pc/h/ln
S	*62.2*	mi/h
D = v_p / S	*22.0*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

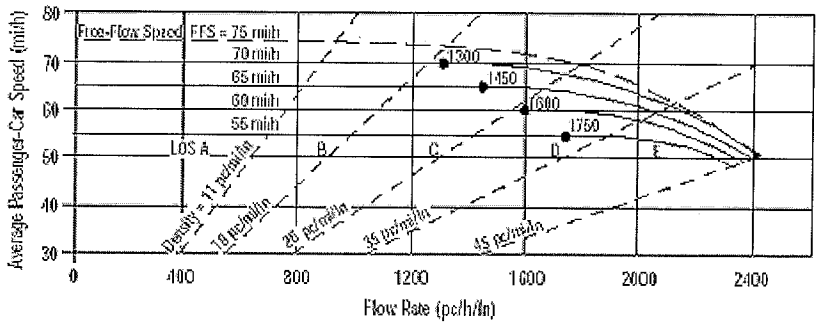
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 at Freetown Line*
Jurisdiction	*Fall River*
Analysis Year	*2030*

Project Description South Coast Rail

☐ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4840*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*70.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2770*	pc/h/ln
S		mi/h
D = v_p / S		pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

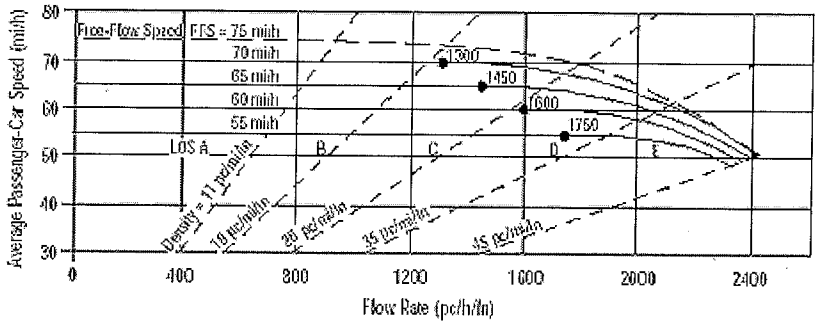
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 at Freetown Line*
Jurisdiction	*Fall River*
Analysis Year	*2030*

Project Description South Coast Rail

☐ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2585*	veh/h	Peak-Hour Factor, PHF	*0.86*
AADT		veh/day	%Trucks and Buses, P_T	*3*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.985*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*70.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1525*	pc/h/ln
S	*70.5*	mi/h
D = v_p / S	*21.6*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

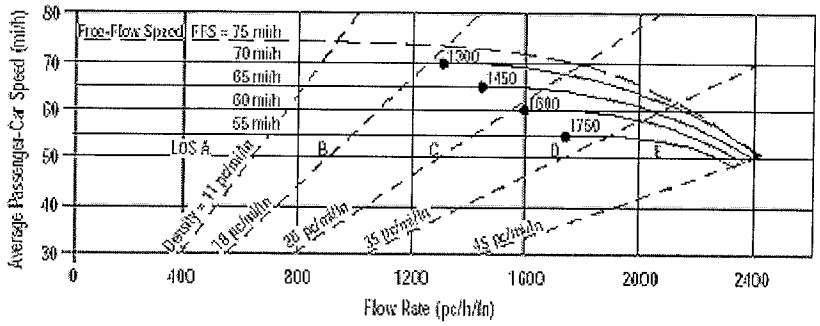
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 at Freetown Line*
Jurisdiction	*Fall River*
Analysis Year	*2030*

Project Description South Coast Rail

☐ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2740*	veh/h	Peak-Hour Factor, PHF	*0.92*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*62.5*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*62.5*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1541*	pc/h/ln
S	*62.5*	mi/h
D = v_p / S	*24.7*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

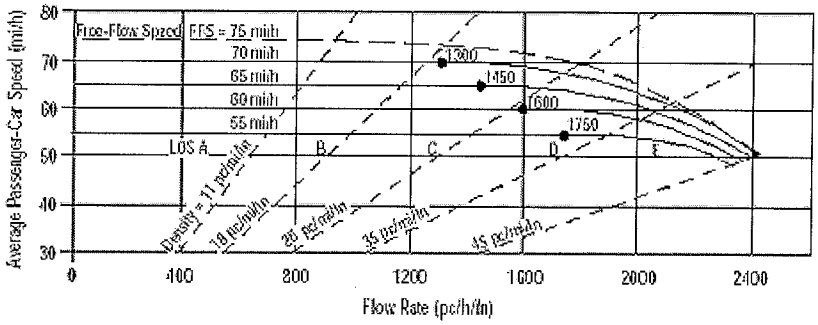
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*6/3/09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 at Freetown Line*
Jurisdiction	*Fall River*
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5490*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*62.5*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*62.5*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*3040*	pc/h/ln
S		mi/h
D = v_p / S		pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

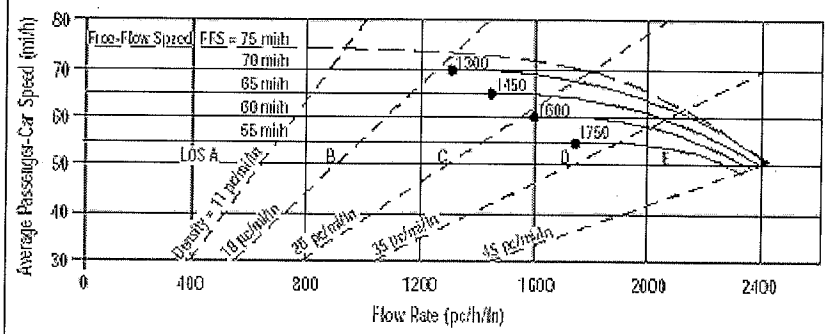
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*7/28/2009*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 140*
Jurisdiction	
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5020*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*71.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*71.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2717*	pc/h/ln
S		mi/h
D = v_p / S		pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

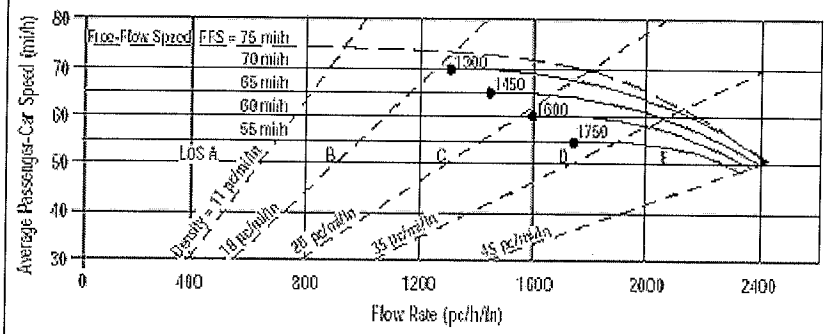
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*7/28/2009*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 140*
Jurisdiction	
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3740*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*2*	
FFS (measured)	*71.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*71.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2111*	pc/h/ln
S	*62.8*	mi/h
D = v_p / S	*33.6*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

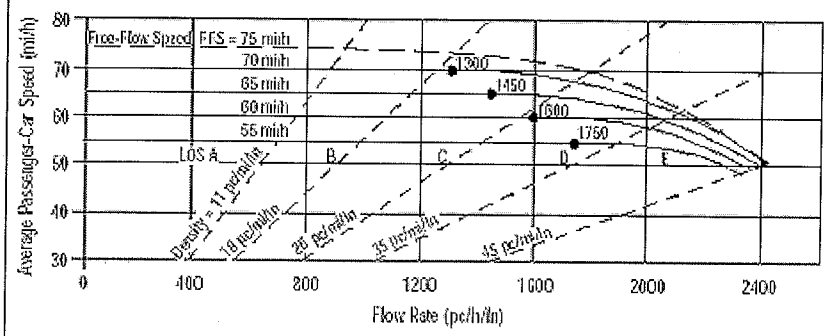
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*7/28/2009*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of Route 140*
Jurisdiction	
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3520*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*69.7*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.7*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1925*	pc/h/ln
S	*66.0*	mi/h
D = v_p / S	*29.2*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

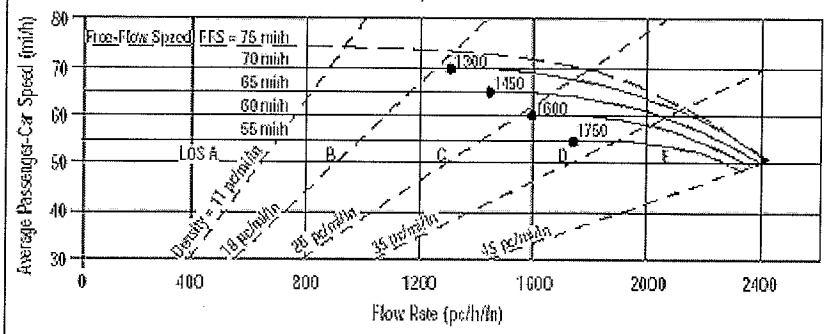
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*7/28/2009*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of Route 140*
Jurisdiction	
Analysis Year	*2030*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5240*	veh/h	Peak-Hour Factor, PHF	*0.98*	
AADT		veh/day	%Trucks and Buses, P_T	*10*	
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*	
Peak-Hr Direction Prop, D			General Terrain:	*Level*	
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*	
Driver type adjustment	*1.00*		Up/Down %		

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*69.7*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.7*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2807*	pc/h/ln
S		mi/h
D = v_p / S		pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

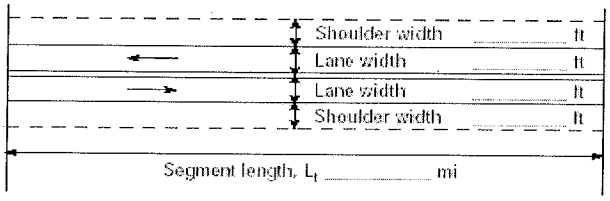
E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*JBB*	Highway	*Route 138*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Foundry Street/Robinson Street*
Date Performed	*5/14/08*	Jurisdiction	*Easton*
Analysis Time Period	*AM Peak*	Analysis Year	*2008*

Project Description: *South Coast Rail - EIR/EIS*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*1570* veh/h
Directional split	*77 / 23*
Peak-hour factor, PHF	*0.94*
No-passing zone	*0*
% Trucks and Buses , P_T	*7%*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*0*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.993*
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	*1682*
v_p * highest directional split proportion[2] (pc/h)	*1295*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*42 mi/h*	Base free-flow speed, $BFFS_{FM}$	*mi/h*
Observed volume, V_f	*487 veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*mi/h*
Free-flow speed, FFS $FFS=S_{FM}+0.00776(V_f/f_{HV})$	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*mi/h*
		Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	*45.8 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*1.7*
Average travel speed, ATS (*mi/h*) $ATS=FFS-0.00776v_p-f_{np}$	*31.1*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.993*
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	*1682*
v_p * highest directional split proportion[2] (pc/h)	*1295*
Base percent time-spent-following, BPTSF(%) $BPTSF=100(1-e^{-0.000879v_p})$	*77.2*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*0.0*
Percent time-spent-following, PTSF(%) $PTSF=BPTSF+f_{d/np}$	*77.2*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*D*
Volume to capacity ratio v/c $v/c=V_p/3,200$	*0.53*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*) $VMT_{15}=0.25L_t(V/PHF)$	*835*
Peak-hour vehicle-miles of travel, VMT_{60} (veh- *mi*) $VMT_{60}=V*L_t$	*3140*
Peak 15-min total travel time, TT_{15}(veh-h) $TT_{15}=VMT_{15}/ATS$	*26.9*

Notes

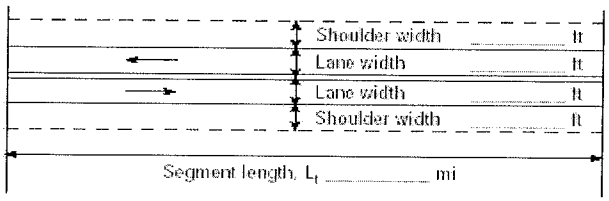
1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*JBB*	Highway	*Route 138*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Foundry Street/Robinson Street*
Date Performed	*5/14/08*	Jurisdiction	*Easton*
Analysis Time Period	*PM Peak*	Analysis Year	*2008*

Project Description: *South Coast Rail - EIR/EIS*

Input Data



☐ Class I highway ☐ Class II highway

Terrain ☐ Level ☐ Rolling

Two-way hourly volume	*1750* veh/h
Directional split	*64 / 36*
Peak-hour factor, PHF	*0.92*
No-passing zone	*0*
% Trucks and Buses , P_T	*7 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*0*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.993*
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	*1915*
v_p * highest directional split proportion[2] (pc/h)	*1226*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*42 mi/h*	Base free-flow speed, $BFFS_{FM}$	*mi/h*
Observed volume, V_f	*296 veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*mi/h*
Free-flow speed, FFS $FFS=S_{FM}+0.00776(V_f/f_{HV})$	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*mi/h*
		Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	*44.3 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*1.7*
Average travel speed, ATS (*mi/h*) $ATS=FFS-0.00776v_p-f_{np}$	*27.8*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.993*
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	*1915*
v_p * highest directional split proportion[2] (pc/h)	*1226*
Base percent time-spent-following, BPTSF(%) $BPTSF=100(1-e^{-0.000879v_p})$	*81.4*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*0.0*
Percent time-spent-following, PTSF(%) $PTSF=BPTSF+f_{d/np}$	*81.4*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*D*
Volume to capacity ratio v/c $v/c=V_p/3{,}200$	*0.60*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*) $VMT_{15}=0.25L_t(V/PHF)$	*951*
Peak-hour vehicle-miles of travel, VMT_{60} (veh- *mi*) $VMT_{60}=V*L_t$	*3500*
Peak 15-min total travel time, TT_{15}(veh-h) $TT_{15}=VMT_{15}/ATS$	*34.3*

Notes

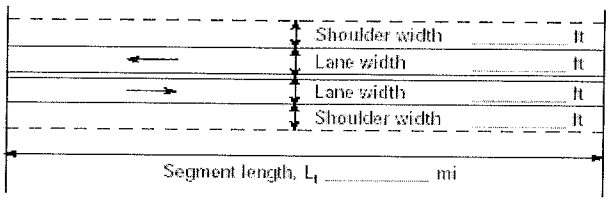
1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JBB	Highway	Route 138
Agency or Company	Coler & Colantonio, Inc.	From/To	Washington Street / Bay Street
Date Performed	5/14/09	Jurisdiction	Taunton
Analysis Time Period	AM Peak	Analysis Year	2030

Project Description: South Coast Rail - EIR/EIS

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	1510 veh/h
Directional split	50 / 50
Peak-hour factor, PHF	0.96
No-passing zone	0
% Trucks and Buses , P_T	4 %
% Recreational vehicles, P_R	0%
Access points/ mi	5

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.996
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	1579
v_p * highest directional split proportion[2] (pc/h)	790

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	37 mi/h	Base free-flow speed, $BFFS_{FM}$	mi/h
Observed volume, V_f	495 veh/h	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	mi/h
Free-flow speed, FFS $FFS=S_{FM}+0.00776(V_f/f_{HV})$	mi/h	Adj. for access points, f_A (Exhibit 20-6)	mi/h
		Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	40.9 mi/h

Adj. for no-passing zones, f_{np} (mi/h) (Exhibit 20-11)	1.7
Average travel speed, ATS (mi/h) $ATS=FFS-0.00776v_p-f_{np}$	26.9

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.996
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	1579
v_p * highest directional split proportion[2] (pc/h)	790
Base percent time-spent-following, BPTSF(%) $BPTSF=100(1-e^{-0.000879v_p})$	75.0
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	0.0
Percent time-spent-following, PTSF(%) $PTSF=BPTSF+f_{d/np}$	75.0

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	D
Volume to capacity ratio v/c $v/c=V_p/3{,}200$	0.49
Peak 15-min veh-miles of travel, VMT_{15} (veh- mi) $VMT_{15}=0.25L_t(V/PHF)$	157
Peak-hour vehicle-miles of travel, VMT_{60} (veh- mi) $VMT_{60}=V*L_t$	604
Peak 15-min total travel time, TT_{15}(veh-h) $TT_{15}=VMT_{15}/ATS$	5.8

Notes

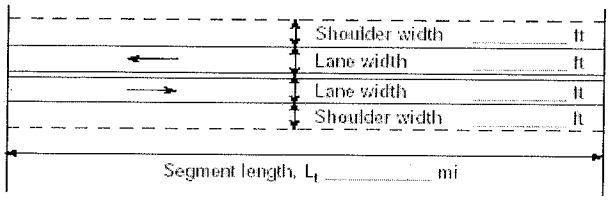
1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JBB	Highway	Route 138
Agency or Company	Coler & Colantonio, Inc.	From/To	Washington Street / Bay Street
Date Performed	5/14/09	Jurisdiction	Taunton
Analysis Time Period	PM Peak	Analysis Year	2008

Project Description: South Coast Rail - EIR/EIS

Input Data



☐ Class I highway ☐ Class II highway

Terrain ☐ Level ☐ Rolling

Two-way hourly volume	1760 veh/h
Directional split	56 / 44
Peak-hour factor, PHF	0.97
No-passing zone	0
% Trucks and Buses , P_T	4 %
% Recreational vehicles, P_R	0%
Access points/ mi	5

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.996
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	1822
v_p * highest directional split proportion[2] (pc/h)	1020

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	37 mi/h	Base free-flow speed, $BFFS_{FM}$	mi/h
Observed volume, V_f	408 veh/h	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	mi/h
Free-flow speed, FFS $FFS=S_{FM}+0.00776(V_f/f_{HV})$	mi/h	Adj. for access points, f_A (Exhibit 20-6)	mi/h
		Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	40.2 mi/h

Adj. for no-passing zones, f_{np} (mi/h) (Exhibit 20-11)	1.7
Average travel speed, ATS (mi/h) $ATS=FFS-0.00776v_p-f_{np}$	24.3

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.996
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	1822
v_p * highest directional split proportion[2] (pc/h)	1020
Base percent time-spent-following, BPTSF(%) $BPTSF=100(1-e^{-0.000879v_p})$	79.8
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	0.0
Percent time-spent-following, PTSF(%) $PTSF=BPTSF+f_{d/np}$	79.8

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	D
Volume to capacity ratio v/c $v/c=V_p/3{,}200$	0.57
Peak 15-min veh-miles of travel, VMT_{15} (veh- mi) $VMT_{15}=0.25L_t(V/PHF)$	181
Peak-hour vehicle-miles of travel, VMT_{60} (veh- mi) $VMT_{60}=V*L_t$	704
Peak 15-min total travel time, TT_{15}(veh-h) $TT_{15}=VMT_{15}/ATS$	7.4

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	918	42	79	1132	43	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	16
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt	0.993				0.946	
Flt Protected				0.997	0.971	
Satd. Flow (prot)	3485	0	0	3501	1978	0
Flt Permitted				0.997	0.971	
Satd. Flow (perm)	3485	0	0	3501	1978	0
Link Speed (mph)	45			45	30	
Link Distance (ft)	600			600	423	
Travel Time (s)	9.1			9.1	9.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	3%	0%	0%	3%	0%	0%
Adj. Flow (vph)	956	44	82	1179	45	30
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1000	0	0	1261	75	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			10	16	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	0.85	0.85
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 74.5% ICU Level of Service D
Analysis Period (min) 15

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	918	42	79	1132	43	29
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	956	44	82	1179	45	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1000		1732	500
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1000		1732	500
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			88		37	94
cM capacity (veh/h)			700		71	522

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	638	362	475	786	75
Volume Left	0	0	82	0	45
Volume Right	0	44	0	0	30
cSH	1700	1700	700	1700	109
Volume to Capacity	0.38	0.21	0.12	0.46	0.69
Queue Length 95th (ft)	0	0	10	0	90
Control Delay (s)	0.0	0.0	3.2	0.0	90.7
Lane LOS			A		F
Approach Delay (s)	0.0		1.2		90.7
Approach LOS					F

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1147	79	72	1022	36	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	16
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt	0.990				0.904	
Flt Protected				0.997	0.986	
Satd. Flow (prot)	3476	0	0	3501	1919	0
Flt Permitted				0.997	0.986	
Satd. Flow (perm)	3476	0	0	3501	1919	0
Link Speed (mph)	45			45	30	
Link Distance (ft)	600			600	423	
Travel Time (s)	9.1			9.1	9.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	0%	0%	3%	0%	0%
Adj. Flow (vph)	1207	83	76	1076	38	95
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1290	0	0	1152	133	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			10	16	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	0.85	0.85
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 82.1% ICU Level of Service E
Analysis Period (min) 15

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1147	79	72	1022	36	90
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1207	83	76	1076	38	95
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1291		1938	645
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1291		1938	645
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			86		25	77
cM capacity (veh/h)			544		51	420

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	805	486	434	717	133
Volume Left	0	0	76	0	38
Volume Right	0	83	0	0	95
cSH	1700	1700	544	1700	136
Volume to Capacity	0.47	0.29	0.14	0.42	0.98
Queue Length 95th (ft)	0	0	12	0	171
Control Delay (s)	0.0	0.0	4.1	0.0	133.9
Lane LOS			A		F
Approach Delay (s)	0.0		1.5		133.9
Approach LOS					F

Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	4	0	249	18	0	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.991			
Flt Protected	0.950					
Satd. Flow (prot)	2046	0	1883	0	0	1900
Flt Permitted	0.950					
Satd. Flow (perm)	2046	0	1883	0	0	1900
Link Speed (mph)	30		30			30
Link Distance (ft)	100		540			313
Travel Time (s)	2.3		12.3			7.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	4	0	277	20	0	330
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	0	297	0	0	330
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	16		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	0.85	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 25.6% ICU Level of Service A
Analysis Period (min) 15

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	4	0	249	18	0	297
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	4	0	277	20	0	330
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	617	287			297	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	617	287			297	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	457	757			1276	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	4	297	330
Volume Left	4	0	0
Volume Right	0	20	0
cSH	457	1700	1276
Volume to Capacity	0.01	0.17	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	13.0	0.0	0.0
Lane LOS	B		
Approach Delay (s)	13.0	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	25.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	63	4	388	20	2	432
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.992		0.993			
Flt Protected	0.955					
Satd. Flow (prot)	2040	0	1887	0	0	1900
Flt Permitted	0.955					
Satd. Flow (perm)	2040	0	1887	0	0	1900
Link Speed (mph)	30		30			30
Link Distance (ft)	100		540			313
Travel Time (s)	2.3		12.3			7.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	68	4	422	22	2	470
Shared Lane Traffic (%)						
Lane Group Flow (vph)	72	0	444	0	0	472
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	16		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	0.85	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 34.7% ICU Level of Service A
Analysis Period (min) 15

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	63	4	388	20	2	432
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	68	4	422	22	2	470
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	907	433			443	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	907	433			443	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	78	99			100	
cM capacity (veh/h)	308	627			1127	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	73	443	472
Volume Left	68	0	2
Volume Right	4	22	0
cSH	318	1700	1127
Volume to Capacity	0.23	0.26	0.00
Queue Length 95th (ft)	22	0	0
Control Delay (s)	19.7	0.0	0.1
Lane LOS	C		A
Approach Delay (s)	19.7	0.0	0.1
Approach LOS	C		

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	34.7%	ICU Level of Service	A
Analysis Period (min)	15		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*JGM*
Agency/Co.	*Coler & Colantonio*
Date Performed	*6/26/2009*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Whale's Tooth Access*
Jurisdiction	*New Bedford*
Analysis Year	*2030*

Project Description *South Coast Rail*

East/West Street: *Site Drive* | North/South Street: *Acushnet Avenue*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		*99*	*125*	*76*	*61*	
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*0*	*99*	*125*	*76*	*61*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				*9*		*18*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*0*	*0*	*0*	*9*	*0*	*18*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*67*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (vph)		*76*		*27*				
C (m) (vph)		*1357*		*683*				
v/c		*0.06*		*0.04*				
95% queue length		*0.18*		*0.12*				
Control Delay		*7.8*		*10.5*				
LOS		*A*		*B*				
Approach Delay	--	--	*10.5*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*JGM*
Agency/Co.	*Coler & Colantonio*
Date Performed	*6/26/2009*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Whale's Tooth Access*
Jurisdiction	*New Bedford*
Analysis Year	*2030*

Project Description *South Coast Rail*

East/West Street: *Site Drive* | North/South Street: *Acushnet Avenue*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		*83*	*6*	*21*	*127*	
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*0*	*83*	*6*	*21*	*127*	*0*
Percent Heavy Vehicles	*0*	--	--	*57*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				*122*		*79*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*0*	*0*	*0*	*122*	*0*	*79*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*10*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (vph)		*21*		*201*				
C (m) (vph)		*1222*		*800*				
v/c		*0.02*		*0.25*				
95% queue length		*0.05*		*0.99*				
Control Delay		*8.0*		*11.0*				
LOS		*A*		*B*				
Approach Delay	--	--	*11.0*					
Approach LOS	--	--	*B*					

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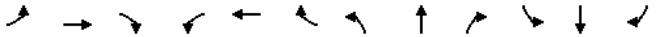
Capacity Analysis Results
Build Condition

Fall River



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	11	5	436	16	0	0	0	0	434	522	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	10	12	12	12	12	12	12	12	12
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		238			272			1959			1114	
Travel Time (s)		5.4			6.2			44.5			25.3	
Peak Hour Factor	0.57	0.57	0.57	0.88	0.88	0.88	0.92	0.92	0.92	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	0%	0%	2%	1%	0%
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	28	0	257	256	0	0	0	0	0	1092	0
Turn Type				Split						Perm		
Protected Phases		2		6	6						4	
Permitted Phases										4		
Detector Phase		2		6	6					4	4	
Switch Phase												
Minimum Initial (s)		4.0		12.0	12.0					12.0	12.0	
Minimum Split (s)		10.0		18.0	18.0					18.0	18.0	
Total Split (s)	0.0	16.0	0.0	20.0	20.0	0.0	0.0	0.0	0.0	25.0	25.0	0.0
Total Split (%)	0.0%	20.5%	0.0%	25.6%	25.6%	0.0%	0.0%	0.0%	0.0%	32.1%	32.1%	0.0%
Maximum Green (s)		10.0		14.0	14.0					19.0	19.0	
Yellow Time (s)		4.0		4.0	4.0					4.0	4.0	
All-Red Time (s)		2.0		2.0	2.0					2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Recall Mode		None		Min	Min					C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.18		0.74	0.69						0.60	
Control Delay		27.8		44.0	39.4						19.0	
Queue Delay		0.0		6.6	7.1						0.0	
Total Delay		27.8		50.6	46.5						19.0	
Queue Length 50th (ft)		9		115	112						155	
Queue Length 95th (ft)		19		#242	#227						#434	
Internal Link Dist (ft)		158			192			1879			1034	
Turn Bay Length (ft)												
Base Capacity (vph)		241		345	372						1812	
Starvation Cap Reductn		0		52	77						0	
Spillback Cap Reductn		0		0	0						0	
Storage Cap Reductn		0		0	0						0	
Reduced v/c Ratio		0.12		0.88	0.87						0.60	

Intersection Summary	
Area Type:	Other

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour 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)	17.0
Total Split (s)	17.0
Total Split (%)	22%
Maximum Green (s)	14.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	4.0
Pedestrian Calls (#/hr)	5
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	

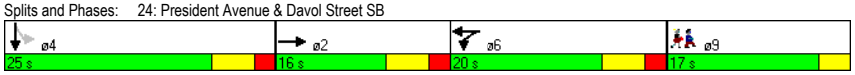
Intersection Summary

Lanes, Volumes, Timings
24: President Avenue & Davol Street SB

2030 Build Condition - AM Peak Hour

Cycle Length: 78
Actuated Cycle Length: 78
Offset: 5 (6%), Referenced to phase 4:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 24: President Avenue & Davol Street SB

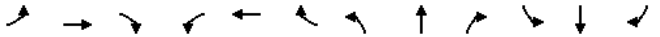


HCM Signalized Intersection Capacity Analysis
24: President Avenue & Davol Street SB

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	11	5	436	16	0	0	0	0	434	522	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	12	12	12	12	12	12	12	12
Total Lost time (s)		6.0		6.0	6.0						6.0	
Lane Util. Factor		1.00		0.95	0.95						0.95	
Frt		0.96		1.00	1.00						1.00	
Flt Protected		1.00		0.95	0.96						0.98	
Satd. Flow (prot)		1818		1569	1693						3477	
Flt Permitted		1.00		0.95	0.96						0.98	
Satd. Flow (perm)		1818		1569	1693						3477	
Peak-hour factor, PHF	0.57	0.57	0.57	0.88	0.88	0.88	0.92	0.92	0.92	0.88	0.88	0.88
Adj. Flow (vph)	0	19	9	495	18	0	0	0	0	493	593	6
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	19	0	257	256	0	0	0	0	0	1091	0
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	0%	0%	2%	1%	0%
Turn Type				Split						Perm		
Protected Phases		2		6	6						4	
Permitted Phases										4		
Actuated Green, G (s)		3.0		17.1	17.1						34.7	
Effective Green, g (s)		3.0		17.1	17.1						34.7	
Actuated g/C Ratio		0.04		0.22	0.22						0.44	
Clearance Time (s)		6.0		6.0	6.0						6.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		70		344	371						1547	
v/s Ratio Prot		c0.01		c0.16	0.15							
v/s Ratio Perm											0.31	
v/c Ratio		0.28		0.75	0.69						0.71	
Uniform Delay, d1		36.4		28.4	28.0						17.5	
Progression Factor		1.00		1.00	1.00						1.00	
Incremental Delay, d2		2.1		8.6	5.4						2.7	
Delay (s)		38.6		37.0	33.5						20.2	
Level of Service		D		D	C						C	
Approach Delay (s)		38.6			35.2			0.0			20.2	
Approach LOS		D			D			A			C	

Intersection Summary			
HCM Average Control Delay	25.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	23.2
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	412	0	0	352	203	100	492	308	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	11	12	12	11	12	12	12	12
Storage Length (ft)	0		0	0		165	0		125	0		0
Storage Lanes	0		0	0		1	0		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		272			959			475			333	
Travel Time (s)		6.2			21.8			10.8			7.6	
Peak Hour Factor	0.82	0.82	0.82	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	2%	0%	0%	3%	3%	1%	3%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	541	0	0	400	231	0	644	335	0	0	0
Turn Type	pm+pt					Perm	Perm		Perm			
Protected Phases	5	2			6			3				
Permitted Phases	2					6	3		3			
Detector Phase	5	2			6	6	3	3	3			
Switch Phase												
Minimum Initial (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0			
Minimum Split (s)	11.0	11.0			11.0	11.0	11.0	11.0	11.0			
Total Split (s)	12.0	30.0	0.0	0.0	18.0	18.0	35.0	35.0	35.0	0.0	0.0	0.0
Total Split (%)	16.0%	40.0%	0.0%	0.0%	24.0%	24.0%	46.7%	46.7%	46.7%	0.0%	0.0%	0.0%
Maximum Green (s)	7.0	25.0			13.0	13.0	30.0	30.0	30.0			
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.42			0.28	0.35		0.60	0.67			
Control Delay		18.2			16.5	18.8		23.4	28.2			
Queue Delay		0.7			0.0	0.0		0.0	0.0			
Total Delay		18.9			16.5	18.8		23.4	28.2			
Queue Length 50th (ft)		92			63	72		130	132			
Queue Length 95th (ft)		135			106	141		159	192			
Internal Link Dist (ft)		192			879			395			253	
Turn Bay Length (ft)						165			125			
Base Capacity (vph)		1273			1410	653		1349	633			
Starvation Cap Reductn		405			0	0		0	0			
Spillback Cap Reductn		0			0	0		0	0			
Storage Cap Reductn		0			0	0		0	0			
Reduced v/c Ratio		0.62			0.28	0.35		0.48	0.53			

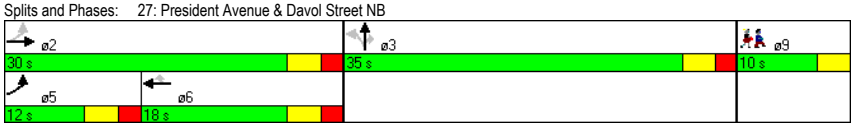
Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	10.0
Total Split (s)	10.0
Total Split (%)	13%
Maximum Green (s)	7.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	4.0
Flash Dont Walk (s)	3.0
Pedestrian Calls (#/hr)	7
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	

Lanes, Volumes, Timings
27: President Avenue & Davol Street NB

2030 Build Condition - AM Peak Hour

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green, Master Intersection	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Splits and Phases: 27: President Avenue & Davol Street NB



HCM Signalized Intersection Capacity Analysis
27: President Avenue & Davol Street NB

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	412	0	0	352	203	100	492	308	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	11	12	12	12	12
Total Lost time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		1.00			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3383			3388	1568		3371	1583			
Flt Permitted		0.90			1.00	1.00		0.99	1.00			
Satd. Flow (perm)		3057			3388	1568		3371	1583			
Peak-hour factor, PHF	0.82	0.82	0.82	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	502	0	0	400	231	109	535	335	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	541	0	0	400	231	0	644	335	0	0	0
Heavy Vehicles (%)	13%	2%	0%	0%	3%	3%	1%	3%	2%	0%	0%	0%
Turn Type	pm+pt					Perm	Perm		Perm			
Protected Phases	5	2			6			3				
Permitted Phases	2					6	3		3			
Actuated Green, G (s)		31.2			31.2	31.2		23.8	23.8			
Effective Green, g (s)		31.2			31.2	31.2		23.8	23.8			
Actuated g/C Ratio		0.42			0.42	0.42		0.32	0.32			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)		1272			1409	652		1070	502			
v/s Ratio Prot					0.12							
v/s Ratio Perm		c0.18				0.15		0.19	c0.21			
v/c Ratio		0.43			0.28	0.35		0.60	0.67			
Uniform Delay, d1		15.5			14.5	15.0		21.6	22.2			
Progression Factor		1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2		0.2			0.5	1.5		1.0	3.3			
Delay (s)		15.8			15.0	16.5		22.6	25.5			
Level of Service		B			B	B		C	C			
Approach Delay (s)		15.8			15.6			23.6			0.0	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	143	507	71	54	355	70	102	193	75	107	166	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	12	16	12	12	16	12	12	16	12
Storage Length (ft)	0		0	125		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		959			1952			265			1409	
Travel Time (s)		21.8			44.4			6.0			32.0	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.75	0.75	0.75
Heavy Vehicles (%)	2%	2%	3%	0%	2%	0%	9%	6%	9%	6%	3%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	0
Parking (#/hr)			5									
Shared Lane Traffic (%)												
Lane Group Flow (vph)	164	665	0	62	488	0	0	425	0	0	481	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Detector Phase	1	1		1	1		3	3		3	3	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Total Split (s)	39.0	39.0	0.0	39.0	39.0	0.0	29.0	29.0	0.0	29.0	29.0	0.0
Total Split (%)	43.3%	43.3%	0.0%	43.3%	43.3%	0.0%	32.2%	32.2%	0.0%	32.2%	32.2%	0.0%
Maximum Green (s)	35.0	35.0		35.0	35.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead		Lead	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	5.0	5.0		5.0	5.0		6.0	6.0		6.0	6.0	
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.62	0.71		0.47	0.52			0.89			1.01	
Control Delay	32.5	24.4		33.7	18.8			49.7			73.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	32.5	24.4		33.7	18.8			49.7			73.4	
Queue Length 50th (ft)	43	184		15	116			152			183	
Queue Length 95th (ft)	#172	#461		#81	298			#429			#398	
Internal Link Dist (ft)		879			1872			185			1329	
Turn Bay Length (ft)				125								
Base Capacity (vph)	280	989		140	993			478			476	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	

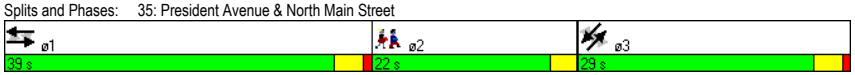
Lane Group	ø2
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	22.0
Total Split (s)	22.0
Total Split (%)	24%
Maximum Green (s)	19.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	10.0
Flash Dont Walk (s)	9.0
Pedestrian Calls (#/hr)	20
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.59	0.67		0.44	0.49			0.89			1.01	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 75.2	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 35: President Avenue & North Main Street



Lane Group	ø2
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	143	507	71	54	355	70	102	193	75	107	166	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	16	12	12	16	12	12	16	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.98			0.97			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	2070		1805	2066			1923			1961	
Flt Permitted	0.31	1.00		0.15	1.00			0.70			0.68	
Satd. Flow (perm)	584	2070		294	2066			1373			1360	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.75	0.75	0.75
Adj. Flow (vph)	164	583	82	62	408	80	117	222	86	143	221	117
RTOR Reduction (vph)	0	0	0	0	7	0	0	9	0	0	12	0
Lane Group Flow (vph)	164	665	0	62	481	0	0	416	0	0	469	0
Heavy Vehicles (%)	2%	2%	3%	0%	2%	0%	9%	6%	9%	6%	3%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	0
Parking (#/hr)			5									
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Actuated Green, G (s)	34.0	34.0		34.0	34.0			25.7			25.7	
Effective Green, g (s)	34.0	34.0		34.0	34.0			25.7			25.7	
Actuated g/C Ratio	0.44	0.44		0.44	0.44			0.33			0.33	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			6.0			6.0	
Lane Grp Cap (vph)	258	913		130	911			458			453	
v/s Ratio Prot		c0.32			0.23							
v/s Ratio Perm	0.28			0.21				0.30			c0.34	
v/c Ratio	0.64	0.73		0.48	0.53			0.91			1.04	
Uniform Delay, d1	16.7	17.7		15.3	15.7			24.6			25.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	7.0	3.6		5.7	1.1			23.3			51.7	
Delay (s)	23.7	21.3		20.9	16.8			47.8			77.4	
Level of Service	C	C		C	B			D			E	
Approach Delay (s)		21.8			17.2			47.8			77.4	
Approach LOS		C			B			D			E	

Intersection Summary			
HCM Average Control Delay	37.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	77.1	Sum of lost time (s)	17.4
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
2: Fall River Depot Station & Davol Street NB

2030 Build Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	51	765	210	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.91	0.91	0.92	0.92
Hourly flow rate (vph)	0	55	841	231	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1021
pX, platoon unblocked						
vC, conflicting volume	956	536			1071	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	956	536			1071	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	89			100	
cM capacity (veh/h)	256	489			646	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	55	560	511
Volume Left	0	0	0
Volume Right	55	0	231
cSH	489	1700	1700
Volume to Capacity	0.11	0.33	0.30
Queue Length 95th (ft)	10	0	0
Control Delay (s)	13.3	0.0	0.0
Lane LOS	B		
Approach Delay (s)	13.3	0.0	
Approach LOS	B		

Intersection Summary			
Average Delay		0.7	
Intersection Capacity Utilization		37.9%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
4: Ferry Street & Ponta Delgada

2030 Build Condition - AM Peak Hour

Movement	EBL	EBR	NBL	NBR	SWL	SWR
Lane Configurations						
Volume (veh/h)	280	48	11	68	30	193
Sign Control	Stop		Free		Free	
Grade	1%		1%		1%	
Peak Hour Factor	0.90	0.90	0.62	0.62	0.78	0.78
Hourly flow rate (vph)	311	53	18	110	38	247
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	307	162	286			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	307	162	286			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	54	94	99			
cM capacity (veh/h)	677	888	1288			

Direction, Lane #	EB 1	NB 1	SW 1
Volume Total	364	127	286
Volume Left	311	18	0
Volume Right	53	0	247
cSH	702	1288	1700
Volume to Capacity	0.52	0.01	0.17
Queue Length 95th (ft)	76	1	0
Control Delay (s)	15.5	1.2	0.0
Lane LOS	C	A	
Approach Delay (s)	15.5	1.2	0.0
Approach LOS	C		

Intersection Summary			
Average Delay		7.5	
Intersection Capacity Utilization		46.8%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
7: Anawan Street & Water Street

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	21	0	39	11	5	5	12	332	21	171	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.64	0.64	0.64	0.72	0.72	0.72	0.91	0.91	0.91	0.87	0.87	0.87
Hourly flow rate (vph)	0	33	0	54	15	7	5	13	365	24	197	24
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	478	646	209	480	476	196	221			378		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	478	646	209	480	476	196	221			378		
tC, single (s)	7.1	6.7	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.1	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	91	100	88	97	99	100			98		
cM capacity (veh/h)	476	365	837	457	479	851	1360			1164		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	33	76	384	245
Volume Left	0	54	5	24
Volume Right	0	7	365	24
cSH	365	481	1360	1164
Volume to Capacity	0.09	0.16	0.00	0.02
Queue Length 95th (ft)	7	14	0	2
Control Delay (s)	15.8	13.9	0.1	1.0
Lane LOS	C	B	A	A
Approach Delay (s)	15.8	13.9	0.1	1.0
Approach LOS	C	B		

Intersection Summary				
Average Delay	2.5			
Intersection Capacity Utilization	39.4%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
9: Central Street & Davol Street

2030 Build Condition - AM Peak Hour

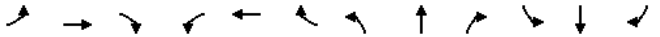
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	75	107	140	0	327	0	0	474	86
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.76	0.76	0.76	0.86	0.86	0.86	0.80	0.80	0.80
Hourly flow rate (vph)	0	0	0	99	141	184	0	380	0	0	592	108
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1281	1026	646	1026	1080	380	700			380		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1281	1026	646	1026	1080	380	700			380		
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 %	100	100	100	53	35	72	100			100		
cM capacity (veh/h)	49	236	475	211	216	662	906			1189		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	169	255	380	700
Volume Left	99	0	0	0
Volume Right	0	184	0	108
cSH	213	422	906	1700
Volume to Capacity	0.79	0.60	0.00	0.41
Queue Length 95th (ft)	142	96	0	0
Control Delay (s)	65.9	25.7	0.0	0.0
Lane LOS	F	D		
Approach Delay (s)	41.7		0.0	0.0
Approach LOS	E			

Intersection Summary				
Average Delay	11.8			
Intersection Capacity Utilization	46.5%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
10: Anawan Street & Davol Street

2030 Build Condition - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	40	147	192	27	33	21	11	153	75	237	296	33
Peak Hour Factor	0.94	0.94	0.94	0.76	0.76	0.76	0.84	0.84	0.84	0.81	0.81	0.81
Hourly flow rate (vph)	43	156	204	36	43	28	13	182	89	293	365	41

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	403	107	285	699
Volume Left (vph)	43	36	13	293
Volume Right (vph)	204	28	89	41
Hadj (s)	0.04	-0.02	-0.16	0.07
Departure Headway (s)	6.9	7.9	6.9	6.6
Degree Utilization, x	0.78	0.23	0.54	1.28
Capacity (veh/h)	507	399	494	534
Control Delay (s)	29.9	13.3	17.8	159.1
Approach Delay (s)	29.9	13.3	17.8	159.1
Approach LOS	D	B	C	F

Intersection Summary				
Delay			86.9	
HCM Level of Service			F	
Intersection Capacity Utilization			76.9%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
20: Battleship Cove Station driveway & Ponta Delgada

2030 Build Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	13	21	329	21	13	198
Sign Control	Stop		Free			Free
Grade	0%		0%			1%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	23	358	23	14	215
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	612	369			380	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	612	369			380	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	97			99	
cM capacity (veh/h)	451	677			1178	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	37	380	229
Volume Left	14	0	14
Volume Right	23	23	0
cSH	568	1700	1178
Volume to Capacity	0.07	0.22	0.01
Queue Length 95th (ft)	5	0	1
Control Delay (s)	11.8	0.0	0.6
Lane LOS	B		A
Approach Delay (s)	11.8	0.0	0.6
Approach LOS	B		

Intersection Summary				
Average Delay			0.9	
Intersection Capacity Utilization			31.1%	ICU Level of Service A
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
29: Turner Street & Davol Street NB

2030 Build Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	69	906	166	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.68	0.68	0.91	0.91	0.92	0.92
Hourly flow rate (vph)	0	101	996	182	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1087	589			1178	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1087	589			1178	
tC, single (s)	6.8	7.1			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	100	77			100	
cM capacity (veh/h)	214	434			600	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	101	664	514
Volume Left	0	0	0
Volume Right	101	0	182
cSH	434	1700	1700
Volume to Capacity	0.23	0.39	0.30
Queue Length 95th (ft)	22	0	0
Control Delay (s)	15.8	0.0	0.0
Lane LOS	C		
Approach Delay (s)	15.8	0.0	
Approach LOS	C		

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
30: Pearce Street & Davol Street NB

2030 Build Condition - AM Peak Hour

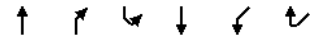
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	80	819	0	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.91	0.91	0.92	0.92
Hourly flow rate (vph)	0	87	900	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						475
pX, platoon unblocked						
vC, conflicting volume	900	450			900	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	900	450			900	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	84			100	
cM capacity (veh/h)	282	559			763	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	87	450	450
Volume Left	0	0	0
Volume Right	87	0	0
cSH	559	1700	1700
Volume to Capacity	0.16	0.26	0.26
Queue Length 95th (ft)	14	0	0
Control Delay (s)	12.6	0.0	0.0
Lane LOS	B		
Approach Delay (s)	12.6	0.0	
Approach LOS	B		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
85: Davol St. SB & U-turn to SB Davol St

2030 Build Condition - AM Peak Hour



Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	0	0	0	786	21	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.86	0.86	0.75	0.75
Hourly flow rate (vph)	0	0	0	914	28	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			0		457	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		457	0
tC, single (s)			4.1		7.1	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			100		94	100
cM capacity (veh/h)			1636		503	1091

Direction, Lane #	SB 1	SB 2	SW 1
Volume Total	457	457	28
Volume Left	0	0	28
Volume Right	0	0	0
cSH	1700	1700	503
Volume to Capacity	0.27	0.27	0.06
Queue Length 95th (ft)	0	0	4
Control Delay (s)	0.0	0.0	12.6
Lane LOS			B
Approach Delay (s)	0.0		12.6
Approach LOS			B

Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization		53.6%	ICU Level of Service A
Analysis Period (min)		15	

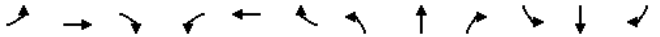
HCM Unsignalized Intersection Capacity Analysis
88: Davol St. NB & U-turn to NB Davol St

2030 Build Condition - AM Peak Hour

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	890	0	0	177	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.92	0.92	0.72	0.72
Hourly flow rate (vph)	0	989	0	0	246	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0				494	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				494	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				51	100
cM capacity (veh/h)	1636				507	1091

Direction, Lane #	NB 1	NB 2	NE 1
Volume Total	494	494	246
Volume Left	0	0	246
Volume Right	0	0	0
cSH	1700	1700	507
Volume to Capacity	0.29	0.29	0.49
Queue Length 95th (ft)	0	0	65
Control Delay (s)	0.0	0.0	18.6
Lane LOS			C
Approach Delay (s)	0.0		18.6
Approach LOS			C

Intersection Summary			
Average Delay		3.7	
Intersection Capacity Utilization		58.1%	ICU Level of Service B
Analysis Period (min)		15	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	431	5	0	0	0	0	546	541	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	10	12	12	12	12	12	12	12	12
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		238			272			1959			1114	
Travel Time (s)		5.4			6.2			44.5			25.3	
Peak Hour Factor	0.38	0.38	0.38	0.85	0.85	0.85	0.92	0.92	0.92	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%	0%
Shared Lane Traffic (%)				49%								
Lane Group Flow (vph)	0	0	0	259	254	0	0	0	0	0	1208	0
Turn Type				Perm						Perm		
Protected Phases		2			6						4	
Permitted Phases				6						4		
Detector Phase		2		6	6					4	4	
Switch Phase												
Minimum Initial (s)		4.0		12.0	12.0					12.0	12.0	
Minimum Split (s)		10.0		18.0	18.0					18.0	18.0	
Total Split (s)	0.0	16.0	0.0	20.0	20.0	0.0	0.0	0.0	0.0	25.0	25.0	0.0
Total Split (%)	0.0%	21.3%	0.0%	26.7%	26.7%	0.0%	0.0%	0.0%	0.0%	33.3%	33.3%	0.0%
Maximum Green (s)		10.0		14.0	14.0					19.0	19.0	
Yellow Time (s)		4.0		4.0	4.0					4.0	4.0	
All-Red Time (s)		2.0		2.0	2.0					2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0	4.0	6.0	6.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Recall Mode		None		Min	Min					C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio				0.47	0.43						0.77	
Control Delay				27.6	26.6						24.3	
Queue Delay				2.8	2.6						0.0	
Total Delay				30.4	29.2						24.4	
Queue Length 50th (ft)				116	111						210	
Queue Length 95th (ft)				174	168						#523	
Internal Link Dist (ft)		158			192			1879			1034	
Turn Bay Length (ft)												
Base Capacity (vph)				553	593						1576	
Starvation Cap Reductn				191	228						0	
Spillback Cap Reductn				0	0						11	
Storage Cap Reductn				0	0						0	
Reduced v/c Ratio				0.72	0.70						0.77	

Intersection Summary	
Area Type:	Other

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour 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)	14.0
Total Split (s)	14.0
Total Split (%)	19%
Maximum Green (s)	11.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	6.0
Pedestrian Calls (#/hr)	5
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

Lanes, Volumes, Timings
24: President Avenue & Davol Street SB

2030 Build Condition - PM Peak Hour

Cycle Length: 75
Actuated Cycle Length: 75
Offset: 5 (7%), Referenced to phase 4:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

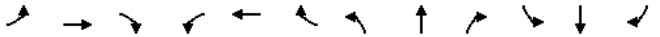
Splits and Phases: 24: President Avenue & Davol Street SB

HCM Signalized Intersection Capacity Analysis
24: President Avenue & Davol Street SB

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	431	5	0	0	0	0	546	541	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	12	12	12	12	12	12	12	12
Total Lost time (s)				6.0	6.0						6.0	
Lane Util. Factor				0.95	0.95						0.95	
Frt				1.00	1.00						1.00	
Flt Protected				0.95	0.95						0.98	
Satd. Flow (prot)				1600	1721						3453	
Flt Permitted				0.95	0.95						0.98	
Satd. Flow (perm)				1600	1715						3453	
Peak-hour factor, PHF	0.38	0.38	0.38	0.85	0.85	0.85	0.92	0.92	0.92	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	507	6	0	0	0	0	607	601	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	259	254	0	0	0	0	0	1208	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%	0%
Turn Type				Perm						Perm		
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)				25.9	25.9						31.9	
Effective Green, g (s)				25.9	25.9						31.9	
Actuated g/C Ratio				0.35	0.35						0.43	
Clearance Time (s)				6.0	6.0						6.0	
Vehicle Extension (s)				3.0	3.0						3.0	
Lane Grp Cap (vph)				553	592						1469	
v/s Ratio Prot												
v/s Ratio Perm				c0.16	0.15						0.35	
v/c Ratio				0.47	0.43						0.82	
Uniform Delay, d1				19.2	18.9						19.0	
Progression Factor				1.30	1.30						1.00	
Incremental Delay, d2				0.6	0.5						5.3	
Delay (s)				25.5	24.9						24.4	
Level of Service				C	C						C	
Approach Delay (s)		0.0			25.2			0.0			24.4	
Approach LOS		A			C			A			C	

Intersection Summary				
HCM Average Control Delay	24.6	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	17.2	
Intersection Capacity Utilization	52.9%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	37	509	0	0	291	364	146	666	371	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	11	12	12	11	12	12	12	12
Storage Length (ft)	0		0	0		165	0		125	0		0
Storage Lanes	0		0	0		1	0		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		272			959			475			333	
Travel Time (s)		6.2			21.8			10.8			7.6	
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.87	0.87	0.87	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	0%	0%	1%	1%	0%	1%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	593	0	0	327	409	0	934	426	0	0	0
Turn Type	pm+pt					Perm	Perm		Perm			
Protected Phases	5	2			6			3				
Permitted Phases	2					6	3		3			
Detector Phase	5	2			6	6	3	3	3			
Switch Phase												
Minimum Initial (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0			
Minimum Split (s)	11.0	11.0			11.0	11.0	11.0	11.0	11.0			
Total Split (s)	12.0	30.0	0.0	0.0	18.0	18.0	35.0	35.0	35.0	0.0	0.0	0.0
Total Split (%)	16.0%	40.0%	0.0%	0.0%	24.0%	24.0%	46.7%	46.7%	46.7%	0.0%	0.0%	0.0%
Maximum Green (s)	7.0	25.0			13.0	13.0	30.0	30.0	30.0			
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.53			0.27	0.72		0.72	0.70			
Control Delay		21.2			18.5	30.7		23.5	26.5			
Queue Delay		0.6			0.0	0.0		0.2	0.0			
Total Delay		21.9			18.5	30.7		23.6	26.5			
Queue Length 50th (ft)		37			57	168		183	157			
Queue Length 95th (ft)		m192			88	#299		235	242			
Internal Link Dist (ft)		192			879			395			253	
Turn Bay Length (ft)						165			125			
Base Capacity (vph)		1119			1232	570		1372	646			
Starvation Cap Reductn		223			0	0		0	0			
Spillback Cap Reductn		0			0	0		57	0			
Storage Cap Reductn		0			0	0		0	0			
Reduced v/c Ratio		0.66			0.27	0.72		0.71	0.66			

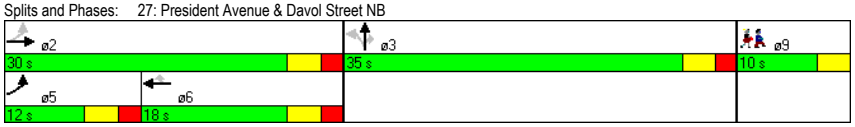
Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	10.0
Total Split (s)	10.0
Total Split (%)	13%
Maximum Green (s)	7.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	4.0
Flash Dont Walk (s)	3.0
Pedestrian Calls (#/hr)	10
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	

Lanes, Volumes, Timings
27: President Avenue & Davol Street NB

2030 Build Condition - PM Peak Hour

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green, Master Intersection	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 27: President Avenue & Davol Street NB



HCM Signalized Intersection Capacity Analysis
27: President Avenue & Davol Street NB

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	37	509	0	0	291	364	146	666	371	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	11	12	12	12	12
Total Lost time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		1.00			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3439			3455	1599		3430	1615			
Flt Permitted		0.91			1.00	1.00		0.99	1.00			
Satd. Flow (perm)		3135			3455	1599		3430	1615			
Peak-hour factor, PHF	0.92	0.92	0.92	0.89	0.89	0.89	0.87	0.87	0.87	0.92	0.92	0.92
Adj. Flow (vph)	40	553	0	0	327	409	168	766	426	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	593	0	0	327	409	0	934	426	0	0	0
Heavy Vehicles (%)	3%	1%	0%	0%	1%	1%	0%	1%	0%	0%	0%	0%
Turn Type	pm+pt					Perm	Perm		Perm			
Protected Phases	5	2			6			3				
Permitted Phases	2					6	3		3			
Actuated Green, G (s)		26.7			26.7	26.7		28.3	28.3			
Effective Green, g (s)		26.7			26.7	26.7		28.3	28.3			
Actuated g/C Ratio		0.36			0.36	0.36		0.38	0.38			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)		1116			1230	569		1294	609			
v/s Ratio Prot					0.09							
v/s Ratio Perm		0.19				c0.26		0.27	0.26			
v/c Ratio		0.53			0.27	0.72		0.72	0.70			
Uniform Delay, d1		19.2			17.2	20.9		20.0	19.8			
Progression Factor		1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2		0.3			0.5	7.6		2.0	3.5			
Delay (s)		19.5			17.7	28.5		22.0	23.3			
Level of Service		B			B	C		C	C			
Approach Delay (s)		19.5			23.7			22.4			0.0	
Approach LOS		B			C			C			A	

Intersection Summary			
HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

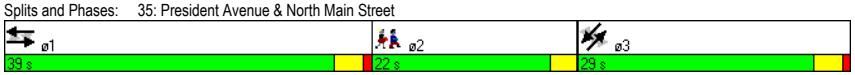
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	134	622	119	59	435	59	116	257	75	155	193	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	12	16	12	12	16	12	12	16	12
Storage Length (ft)	0		0	125		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		959			1952			265			1409	
Travel Time (s)		21.8			44.4			6.0			32.0	
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.92	0.92	0.92	0.96	0.96	0.96
Heavy Vehicles (%)	3%	1%	3%	5%	1%	2%	1%	1%	0%	1%	2%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	0
Parking (#/hr)			5									
Shared Lane Traffic (%)												
Lane Group Flow (vph)	149	823	0	69	581	0	0	487	0	0	458	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Detector Phase	1	1		1	1		3	3		3	3	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (s)	39.0	39.0	0.0	39.0	39.0	0.0	29.0	29.0	0.0	29.0	29.0	0.0
Total Split (%)	43.3%	43.3%	0.0%	43.3%	43.3%	0.0%	32.2%	32.2%	0.0%	32.2%	32.2%	0.0%
Maximum Green (s)	35.0	35.0		35.0	35.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead		Lead	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	5.0	5.0		5.0	5.0		6.0	6.0		6.0	6.0	
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.63	0.81		0.69	0.56			0.89			1.03	
Control Delay	32.2	25.7		57.1	17.1			43.8			76.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	32.2	25.7		57.1	17.1			43.8			76.5	
Queue Length 50th (ft)	41	256		20	148			178			179	
Queue Length 95th (ft)	#185	#724		#110	359			#510			#520	
Internal Link Dist (ft)		879			1872			185			1329	
Turn Bay Length (ft)				125								
Base Capacity (vph)	235	1016		100	1029			549			446	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	

Lane Group	ø2
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	22.0
Total Split (s)	22.0
Total Split (%)	24%
Maximum Green (s)	19.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	10.0
Flash Dont Walk (s)	9.0
Pedestrian Calls (#/hr)	13
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.63	0.81		0.69	0.56			0.89			1.03	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 72.4	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 35: President Avenue & North Main Street



Lane Group	ø2
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	134	622	119	59	435	59	116	257	75	155	193	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	16	12	12	16	12	12	16	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.98			0.98			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1752	2074		1719	2092			2060			2027	
Flt Permitted	0.26	1.00		0.11	1.00			0.74			0.60	
Satd. Flow (perm)	479	2074		204	2092			1551			1246	
Peak-hour factor, PHF	0.90	0.90	0.90	0.85	0.85	0.85	0.92	0.92	0.92	0.96	0.96	0.96
Adj. Flow (vph)	149	691	132	69	512	69	126	279	82	161	201	96
RTOR Reduction (vph)	0	0	0	0	5	0	0	7	0	0	10	0
Lane Group Flow (vph)	149	823	0	69	576	0	0	480	0	0	448	0
Heavy Vehicles (%)	3%	1%	3%	5%	1%	2%	1%	1%	0%	1%	2%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	0
Parking (#/hr)			5									
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Actuated Green, G (s)	35.4	35.4		35.4	35.4			25.3			25.3	
Effective Green, g (s)	35.4	35.4		35.4	35.4			25.3			25.3	
Actuated g/C Ratio	0.47	0.47		0.47	0.47			0.34			0.34	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			6.0			6.0	
Lane Grp Cap (vph)	227	982		97	990			525			421	
v/s Ratio Prot		c0.40			0.28							
v/s Ratio Perm	0.31			0.34				0.31			c0.36	
v/c Ratio	0.66	0.84		0.71	0.58			0.91			1.06	
Uniform Delay, d1	15.1	17.2		15.6	14.3			23.7			24.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	8.9	7.1		26.2	1.4			21.9			62.0	
Delay (s)	23.9	24.3		41.9	15.7			45.7			86.7	
Level of Service	C	C		D	B			D			F	
Approach Delay (s)		24.2			18.5			45.7			86.7	
Approach LOS		C			B			D			F	

Intersection Summary			
HCM Average Control Delay	38.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	74.8	Sum of lost time (s)	14.1
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
2: Fall River Depot Station driveway & North Davol Street

2030 Build Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	188	905	36	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.90	0.90	0.92	0.92
Hourly flow rate (vph)	0	204	1006	40	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						980
pX, platoon unblocked						
vC, conflicting volume	1026	523			1046	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1026	523			1046	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	59			100	
cM capacity (veh/h)	231	499			661	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	204	670	375
Volume Left	0	0	0
Volume Right	204	0	40
cSH	499	1700	1700
Volume to Capacity	0.41	0.39	0.22
Queue Length 95th (ft)	49	0	0
Control Delay (s)	17.1	0.0	0.0
Lane LOS	C		
Approach Delay (s)	17.1	0.0	
Approach LOS	C		

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Ferry Street & Ponta Delgada

2030 Build Condition - PM Peak Hour

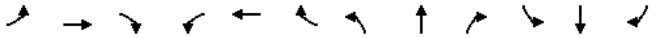
Movement	EBL	EBR	NBL	NBR	SWL	SWR
Lane Configurations						
Volume (veh/h)	165	32	16	17	29	303
Sign Control	Stop		Free		Free	
Grade	1%		1%		1%	
Peak Hour Factor	0.89	0.89	0.91	0.91	0.74	0.74
Hourly flow rate (vph)	185	36	18	19	39	409
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	298	244	449			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	298	244	449			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	73	96	98			
cM capacity (veh/h)	685	800	1122			

Direction, Lane #	EB 1	NB 1	SW 1
Volume Total	221	36	449
Volume Left	185	18	0
Volume Right	36	0	409
cSH	701	1122	1700
Volume to Capacity	0.32	0.02	0.26
Queue Length 95th (ft)	34	1	0
Control Delay (s)	12.5	4.1	0.0
Lane LOS	B	A	
Approach Delay (s)	12.5	4.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
7: Anawan Street & Water Street

2030 Build Condition - PM Peak Hour



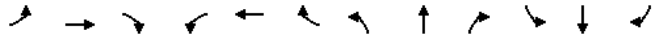
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	27	5	74	0	5	0	11	177	37	242	11
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.70	0.70	0.67	0.67	0.67	0.91	0.91	0.91	0.78	0.78	0.78
Hourly flow rate (vph)	0	39	7	110	0	7	0	12	195	47	310	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	529	619	317	548	529	109	324			207		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	529	619	317	548	529	109	324			207		
tC, single (s)	7.1	6.6	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.1	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	90	99	72	100	99	100			97		
cM capacity (veh/h)	448	383	728	401	442	950	1247			1359		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	46	118	207	372
Volume Left	0	110	0	47
Volume Right	7	7	195	14
cSH	413	416	1247	1359
Volume to Capacity	0.11	0.28	0.00	0.03
Queue Length 95th (ft)	9	29	0	3
Control Delay (s)	14.8	17.0	0.0	1.3
Lane LOS	B	C		A
Approach Delay (s)	14.8	17.0	0.0	1.3
Approach LOS	B	C		

Intersection Summary					
Average Delay			4.3		
Intersection Capacity Utilization			48.0%	ICU Level of Service	A
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis
9: Central Street & Davol Street

2030 Build Condition - PM Peak Hour



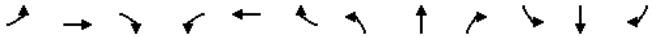
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	129	118	279	5	343	0	0	473	123
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.86	0.86	0.86	0.78	0.78	0.78	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	150	137	324	6	440	0	0	526	137
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1439	1046	594	1046	1115	440	662			440		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1439	1046	594	1046	1115	440	662			440		
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 %	100	100	100	27	33	48	99			100		
cM capacity (veh/h)	24	229	509	205	205	622	936			1131		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	219	393	446	662
Volume Left	150	0	6	0
Volume Right	0	324	0	137
cSH	205	459	936	1700
Volume to Capacity	1.07	0.86	0.01	0.39
Queue Length 95th (ft)	248	218	1	0
Control Delay (s)	130.4	44.4	0.2	0.0
Lane LOS	F	E	A	
Approach Delay (s)	75.1		0.2	0.0
Approach LOS	F			

Intersection Summary					
Average Delay			26.8		
Intersection Capacity Utilization			55.0%	ICU Level of Service	B
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis
10: Anawan Street & Davol Street

2030 Build Condition - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	125	94	56	102	45	60	5	164	91	182	380	39
Peak Hour Factor	0.87	0.87	0.87	0.76	0.76	0.76	0.94	0.94	0.94	0.85	0.85	0.85
Hourly flow rate (vph)	144	108	64	134	59	79	5	174	97	214	447	46

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	316	272	277	707
Volume Left (vph)	144	134	5	214
Volume Right (vph)	64	79	97	46
Hadj (s)	0.01	-0.06	-0.18	0.04
Departure Headway (s)	7.6	7.7	7.5	7.1
Degree Utilization, x	0.67	0.59	0.58	1.40
Capacity (veh/h)	449	433	449	502
Control Delay (s)	24.9	21.1	20.2	211.1
Approach Delay (s)	24.9	21.1	20.2	211.1
Approach LOS	C	C	C	F

Intersection Summary				
Delay			107.1	
HCM Level of Service			F	
Intersection Capacity Utilization			75.5%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
20: Battleship Cove Station driveway & Ponta Delgada

2030 Build Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	16	9	173	9	16	305
Sign Control	Stop		Free			Free
Grade	0%		0%			1%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	10	188	10	17	332
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	559	193			198	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	559	193			198	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	99			99	
cM capacity (veh/h)	484	849			1375	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	27	198	349
Volume Left	17	0	17
Volume Right	10	10	0
cSH	572	1700	1375
Volume to Capacity	0.05	0.12	0.01
Queue Length 95th (ft)	4	0	1
Control Delay (s)	11.6	0.0	0.5
Lane LOS	B		A
Approach Delay (s)	11.6	0.0	0.5
Approach LOS	B		

Intersection Summary				
Average Delay			0.9	
Intersection Capacity Utilization			39.1%	ICU Level of Service A
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
29: Turner Street & Davol Street NB

2030 Build Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	63	878	123	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.56	0.56	0.90	0.90	0.92	0.92
Hourly flow rate (vph)	0	112	976	137	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1044	556			1112	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1044	556			1112	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	76			100	
cM capacity (veh/h)	228	474			635	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	112	650	462
Volume Left	0	0	0
Volume Right	112	0	137
cSH	474	1700	1700
Volume to Capacity	0.24	0.38	0.27
Queue Length 95th (ft)	23	0	0
Control Delay (s)	14.9	0.0	0.0
Lane LOS	B		
Approach Delay (s)	14.9	0.0	
Approach LOS	B		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	38.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
30: Pearce Street & North Davol Street

2030 Build Condition - PM Peak Hour

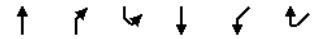
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	75	1108	0	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.67	0.67	0.86	0.86	0.92	0.92
Hourly flow rate (vph)	0	112	1288	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						475
pX, platoon unblocked						
vC, conflicting volume	1288	644			1288	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1288	644			1288	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	73			100	
cM capacity (veh/h)	158	418			545	

Direction, Lane #	WB 1	NB 1	NB 2
Volume Total	112	644	644
Volume Left	0	0	0
Volume Right	112	0	0
cSH	418	1700	1700
Volume to Capacity	0.27	0.38	0.38
Queue Length 95th (ft)	27	0	0
Control Delay (s)	16.7	0.0	0.0
Lane LOS	C		
Approach Delay (s)	16.7	0.0	
Approach LOS	C		

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
85: Davol St SB & U-Turn to SB U-turn to SB Davol St

2030 Build Condition - PM Peak Hour



Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	0	0	0	865	21	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	0	0	0	940	42	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			0		470	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		470	0
tC, single (s)			4.1		7.0	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			100		92	100
cM capacity (veh/h)			1636		502	1091

Direction, Lane #	SB 1	SB 2	SW 1
Volume Total	470	470	42
Volume Left	0	0	42
Volume Right	0	0	0
cSH	1700	1700	502
Volume to Capacity	0.28	0.28	0.08
Queue Length 95th (ft)	0	0	7
Control Delay (s)	0.0	0.0	12.8
Lane LOS			B
Approach Delay (s)	0.0		12.8
Approach LOS			B

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		56.5%	ICU Level of Service B
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
88: Davol St NB & U-turn to NB Davol St

2030 Build Condition - PM Peak Hour

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	915	0	0	86	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.92	0.92	0.89	0.89
Hourly flow rate (vph)	0	1028	0	0	97	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0				514	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				514	0
tC, single (s)	4.1				6.9	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				80	100
cM capacity (veh/h)	1636				488	1091

Direction, Lane #	NB 1	NB 2	NE 1
Volume Total	514	514	97
Volume Left	0	0	97
Volume Right	0	0	0
cSH	1700	1700	488
Volume to Capacity	0.30	0.30	0.20
Queue Length 95th (ft)	0	0	18
Control Delay (s)	0.0	0.0	14.2
Lane LOS			B
Approach Delay (s)	0.0		14.2
Approach LOS			B

Intersection Summary			
Average Delay		1.2	
Intersection Capacity Utilization		58.4%	ICU Level of Service B
Analysis Period (min)		15	

Freetown

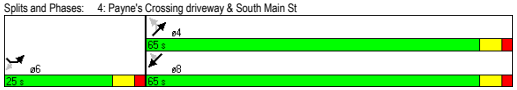
Lanes, Volumes, Timings
4: Payne's Crossing driveway & South Main St

2030 Build Conditions - AM Peak Hour

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Volume (vph)	5	5	5	327	489	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	200			0
Storage Lanes	2	1	1			1
Taper Length (ft)	25	25	25			25
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	381			1115	461	
Travel Time (s)	8.7			25.3	10.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	5	5	355	532	0
Turn Type		Perm	Perm			Perm
Protected Phases	6			4	8	
Permitted Phases		6	4			8
Detector Phase	6	6	4	4	8	8
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	25.0	25.0	65.0	65.0	65.0	65.0
Total Split (%)	27.8%	27.8%	72.2%	72.2%	72.2%	72.2%
Maximum Green (s)	19.0	19.0	59.0	59.0	59.0	59.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.02	0.05	0.01	0.24	0.36	
Control Delay	39.4	25.4	1.8	2.6	0.9	
Queue Delay	0.0	0.0	0.0	0.0	0.1	
Total Delay	39.4	25.4	1.8	2.6	1.0	
Queue Length 50th (ft)	1	0	0	35	2	
Queue Length 95th (ft)	7	11	2	58	12	
Internal Link Dist (ft)	301			1035	381	
Turn Bay Length (ft)			200			
Base Capacity (vph)	725	338	683	1496	1496	
Starvation Cap Reductn	0	0	0	0	249	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.01	0.01	0.01	0.24	0.43	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 33 (37%), Referenced to phase 4:NETL and 8:SWT, Start of Green	
Natural Cycle: 45	
Control Type: Actuated-Coordinated	

Splits and Phases: 4: Payne's Crossing driveway & South Main St



HCM Signalized Intersection Capacity Analysis
4: Payne's Crossing driveway & South Main St

2030 Build Conditions - AM Peak Hour

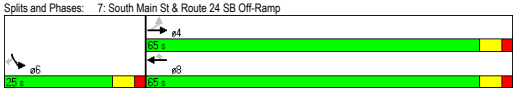
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Volume (vph)	5	5	5	327	489	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	1583	1770	1863	1863	
Flt Permitted	0.95	1.00	0.46	1.00	1.00	
Satd. Flow (perm)	3433	1583	851	1863	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	5	5	355	532	0
RTOR Reduction (vph)	0	5	0	0	0	0
Lane Group Flow (vph)	5	0	5	355	532	0
Turn Type		Perm	Perm			Perm
Protected Phases	6			4	8	
Permitted Phases		6	4			8
Actuated Green, G (s)	5.8	5.8	72.2	72.2	72.2	
Effective Green, g (s)	5.8	5.8	72.2	72.2	72.2	
Actuated g/C Ratio	0.06	0.06	0.80	0.80	0.80	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	221	102	683	1495	1495	
v/s Ratio Prot	c0.00			0.19	c0.29	
v/s Ratio Perm		0.00	0.01			
v/c Ratio	0.02	0.00	0.01	0.24	0.36	
Uniform Delay, d1	39.4	39.4	1.8	2.2	2.5	
Progression Factor	1.00	1.00	1.00	1.00	0.08	
Incremental Delay, d2	0.0	0.0	0.0	0.4	0.7	
Delay (s)	39.5	39.4	1.8	2.5	0.9	
Level of Service	D	D	A	A	A	
Approach Delay (s)	39.4			2.5	0.9	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	2.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	46	286	466	875	120	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	16	12
Storage Length (ft)	0			240	0	0
Storage Lanes	1			2	1	1
Taper Length (ft)	25			25	25	25
Right Turn on Red				Yes		Yes
Link Speed (mph)		30	30		30	
Link Distance (ft)		461	773		388	
Travel Time (s)		10.5	17.6		8.8	
Peak Hour Factor	0.85	0.85	0.87	0.87	0.91	0.91
Heavy Vehicles (%)	9%	11%	12%	2%	15%	24%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	54	336	536	1006	132	25
Turn Type	Perm			Perm		Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	65.0	65.0	65.0	65.0	25.0	25.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%
Maximum Green (s)	59.0	59.0	59.0	59.0	19.0	19.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	Min	Min
v/c Ratio	0.09	0.27	0.23	0.67	0.56	0.13
Control Delay	4.4	4.6	0.6	0.7	45.0	14.3
Queue Delay	0.0	0.0	0.0	1.2	0.0	0.0
Total Delay	4.4	4.6	0.6	1.9	45.0	14.3
Queue Length 50th (ft)	7	52	5	0	71	0
Queue Length 95th (ft)	18	74	m5	m0	122	21
Internal Link Dist (ft)		381	693		308	
Turn Bay Length (ft)				240		
Base Capacity (vph)	580	1256	2365	1507	376	295
Starvation Cap Reductn	0	0	0	271	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.27	0.23	0.81	0.35	0.08

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 20 (22%), Referenced to phase 4:EBTL and 8:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 7: South Main St & Route 24 SB Off-Ramp



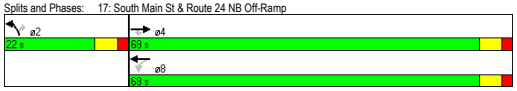
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	46	286	466	875	120	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	14	16	12
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1656	1712	3223	1689	1779	1302
Flt Permitted	0.45	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	789	1712	3223	1689	1779	1302
Peak-hour factor, PHF	0.85	0.85	0.87	0.87	0.91	0.91
Adj. Flow (vph)	54	336	536	1006	132	25
RTOR Reduction (vph)	0	0	0	268	0	22
Lane Group Flow (vph)	54	336	536	738	132	3
Heavy Vehicles (%)	9%	11%	12%	2%	15%	24%
Turn Type	Perm			Perm		Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	66.0	66.0	66.0	66.0	12.0	12.0
Effective Green, g (s)	66.0	66.0	66.0	66.0	12.0	12.0
Actuated g/C Ratio	0.73	0.73	0.73	0.73	0.13	0.13
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	579	1255	2364	1239	237	174
v/s Ratio Prot		0.20	0.17		c0.07	
v/s Ratio Perm	0.07			c0.44		0.00
v/c Ratio	0.09	0.27	0.23	0.60	0.56	0.02
Uniform Delay, d1	3.4	4.0	3.8	5.7	36.5	33.9
Progression Factor	0.94	0.90	0.13	1.08	1.00	1.00
Incremental Delay, d2	0.3	0.5	0.0	0.2	2.8	0.0
Delay (s)	3.6	4.1	0.5	6.3	39.3	33.9
Level of Service	A	A	A	A	D	C
Approach Delay (s)		4.0	4.3		38.5	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	333	63	120	1317	23	515
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	15	16	16
Storage Length (ft)		200	100		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)		25	25		25	25
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	773			446	481	
Travel Time (s)	17.6			10.1	10.9	
Peak Hour Factor	0.82	0.82	0.88	0.88	0.80	0.80
Heavy Vehicles (%)	7%	26%	10%	3%	33%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	406	77	136	1497	29	644
Turn Type		Perm	Perm			Perm
Protected Phases	4			8	2	
Permitted Phases		4	8			2
Detector Phase	4	4	8	8	2	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	68.0	68.0	68.0	68.0	22.0	22.0
Total Split (%)	75.6%	75.6%	75.6%	75.6%	24.4%	24.4%
Maximum Green (s)	62.0	62.0	62.0	62.0	16.0	16.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	Min	Min
v/c Ratio	0.32	0.07	0.21	1.03	0.13	0.92
Control Delay	4.1	0.5	5.8	47.4	32.9	28.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.1	0.5	5.8	47.4	32.9	28.7
Queue Length 50th (ft)	54	0	25	~954	14	68
Queue Length 95th (ft)	70	3	47	#1163	34	137
Internal Link Dist (ft)	693			366	401	
Turn Bay Length (ft)		200	100			
Base Capacity (vph)	1272	1063	633	1454	273	733
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	0.32	0.07	0.21	1.03	0.11	0.88

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green, Master Intersection	
Natural Cycle: 100	
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.	

Splits and Phases: 17: South Main St & Route 24 NB Off-Ramp



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	333	63	120	1317	23	515
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	15	16	16
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1776	1453	1641	2029	1538	1760
Flt Permitted	1.00	1.00	0.51	1.00	0.95	1.00
Satd. Flow (perm)	1776	1453	884	2029	1538	1760
Peak-hour factor, PHF	0.82	0.82	0.88	0.88	0.80	0.80
Adj. Flow (vph)	406	77	136	1497	29	644
RTOR Reduction (vph)	0	22	0	0	0	434
Lane Group Flow (vph)	406	55	136	1497	29	210
Heavy Vehicles (%)	7%	26%	10%	3%	33%	4%
Turn Type		Perm	Perm			Perm
Protected Phases	4			8	2	
Permitted Phases		4	8			2
Actuated Green, G (s)	64.5	64.5	64.5	64.5	13.5	13.5
Effective Green, g (s)	64.5	64.5	64.5	64.5	13.5	13.5
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.15	0.15
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1273	1041	634	1454	231	264
v/s Ratio Prot	0.23			c0.74	0.02	
v/s Ratio Perm		0.04	0.15			c0.12
v/c Ratio	0.32	0.05	0.21	1.03	0.13	0.79
Uniform Delay, d1	4.7	3.8	4.3	12.8	33.1	36.9
Progression Factor	0.66	0.29	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.1	0.8	31.5	0.2	15.1
Delay (s)	3.7	1.2	5.0	44.3	33.4	52.0
Level of Service	A	A	A	D	C	D
Approach Delay (s)	3.3			41.0	51.2	
Approach LOS	A			D	D	

Intersection Summary			
HCM Average Control Delay	36.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

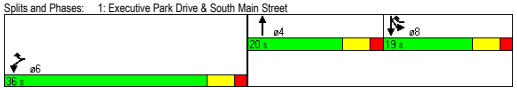
Lanes, Volumes, Timings
1: Executive Park Drive & South Main Street

2030 Build Condition - AM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	10	1404	242	40	197	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-3%		-3%			4%
Storage Length (ft)	0	0		0	200	
Storage Lanes	1	2		1	1	
Taper Length (ft)	100	100		100	100	
Right Turn on Red		No		No		
Link Speed (mph)	35		35			35
Link Distance (ft)	285		553			804
Travel Time (s)	5.6		10.8			15.7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	10%	2%	2%	10%	2%
Shared Lane Traffic (%)					10%	
Lane Group Flow (vph)	11	1478	297	0	186	201
Turn Type		pt+ov			Split	
Protected Phases	6	6 8	4		8	8
Permitted Phases						
Detector Phase	6	6 8	4		8	8
Switch Phase						
Minimum Initial (s)	6.0		6.0		6.0	6.0
Minimum Split (s)	12.0		12.0		12.0	12.0
Total Split (s)	36.0	55.0	20.0	0.0	19.0	19.0
Total Split (%)	48.0%	73.3%	26.7%	0.0%	25.3%	25.3%
Maximum Green (s)	30.0		14.0		13.0	13.0
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	C-Max		None		None	None
v/c Ratio	0.01	0.84	0.82		0.70	0.68
Control Delay	5.8	14.9	49.3		45.5	42.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	5.8	14.9	49.3		45.5	42.2
Queue Length 50th (ft)	1	118	133		86	93
Queue Length 95th (ft)	m4	192	#255		#181	#185
Internal Link Dist (ft)	205		473			724
Turn Bay Length (ft)					200	
Base Capacity (vph)	752	1763	371		265	297
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	0.01	0.84	0.80		0.70	0.68

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 6:WBL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 1: Executive Park Drive & South Main Street



HCM Signalized Intersection Capacity Analysis
1: Executive Park Drive & South Main Street

2030 Build Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	10	1404	242	40	197	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-3%		-3%			4%
Total Lost time (s)	5.0	5.0	5.0		6.0	6.0
Lane Util. Factor	1.00	0.88	1.00		0.95	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	0.99
Satd. Flow (prot)	1796	2623	1855		1528	1711
Flt Permitted	0.95	1.00	1.00		0.95	0.99
Satd. Flow (perm)	1796	2623	1855		1528	1711
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	1478	255	42	207	180
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	11	1478	297	0	186	201
Heavy Vehicles (%)	2%	10%	2%	2%	10%	2%
Turn Type		pt+ov			Split	
Protected Phases	6	6 8	4		8	8
Permitted Phases						
Actuated Green, G (s)	30.4	49.4	13.6		13.0	13.0
Effective Green, g (s)	31.4	50.4	14.6		13.0	13.0
Actuated g/C Ratio	0.42	0.67	0.19		0.17	0.17
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	752	1763	361		265	297
v/s Ratio Prot	0.01	c0.56	c0.16		0.12	0.12
v/s Ratio Perm						
v/c Ratio	0.01	0.84	0.82		0.70	0.68
Uniform Delay, d1	12.8	9.2	29.0		29.2	29.0
Progression Factor	0.44	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	3.4	14.0		8.1	6.0
Delay (s)	5.7	12.6	43.0		37.3	35.0
Level of Service	A	B	D		D	D
Approach Delay (s)	12.6		43.0			36.1
Approach LOS	B		D			D

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

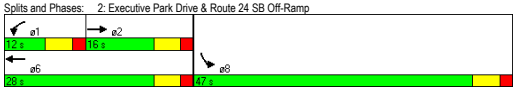
Lanes, Volumes, Timings
2: Executive Park Drive & Route 24 SB Off-Ramp

2030 Build Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	87	0	181	770	0	0	0	0	1575	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-1%			0%			5%	
Storage Length (ft)	0		0	0		0	0		0	0		300
Storage Lanes	0		1	2		0	0		0	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			No			Yes			Yes			No
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		307			406			405			737	
Travel Time (s)		6.0			7.9			7.9			14.4	
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
Heavy Vehicles (%)	2%	8%	8%	2%	8%	2%	2%	2%	2%	2%	2%	8%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	92	0	191	811	0	0	0	0	1658	0	0
Turn Type			Free	Prot						Prot		Free
Protected Phases		2		1	6					8		
Permitted Phases			Free									Free
Detector Phase		2		1	6					8		
Switch Phase												
Minimum Initial (s)		10.0		6.0	10.0					10.0		
Minimum Split (s)		16.0		12.0	16.0					16.0		
Total Split (s)	0.0	16.0	0.0	12.0	28.0	0.0	0.0	0.0	0.0	47.0	0.0	0.0
Total Split (%)	0.0%	21.3%	0.0%	16.0%	37.3%	0.0%	0.0%	0.0%	0.0%	62.7%	0.0%	0.0%
Maximum Green (s)		10.0		6.0	22.0					41.0		
Yellow Time (s)		4.0		4.0	4.0					4.0		
All-Red Time (s)		2.0		2.0	2.0					2.0		
Lost Time Adjust (s)	0.0	0.0	0.0	-1.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	5.0	5.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0					3.0		
Recall Mode		C-Max		None	C-Max					None		
v/c Ratio		0.20		0.59	0.77					0.92		
Control Delay		8.7		49.0	43.2					25.5		
Queue Delay		0.0		0.0	0.0					0.0		
Total Delay		8.7		49.0	43.2					25.5		
Queue Length 50th (ft)		4		50	188					329		
Queue Length 95th (ft)		m11		m62	m228					#506		
Internal Link Dist (ft)		227			326			325			657	
Turn Bay Length (ft)												
Base Capacity (vph)		458		322	1052					1830		
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		0.20		0.59	0.77					0.91		

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green, Master Intersection	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 2: Executive Park Drive & Route 24 SB Off-Ramp



HCM Signalized Intersection Capacity Analysis
2: Executive Park Drive & Route 24 SB Off-Ramp

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	87	0	181	770	0	0	0	0	1575	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-1%			0%			5%	
Total Lost time (s)		6.0		5.0	5.0					6.0		
Lane Util. Factor		0.95		0.97	0.95					0.97		
Frt		1.00		1.00	1.00					1.00		
Flt Protected		1.00		0.95	1.00					0.95		
Satd. Flow (prot)		3276		3450	3359					3347		
Flt Permitted		1.00		0.95	1.00					0.95		
Satd. Flow (perm)		3276		3450	3359					3347		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	92	0	191	811	0	0	0	0	1658	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	92	0	191	811	0	0	0	0	1658	0	0
Heavy Vehicles (%)	2%	8%	8%	2%	8%	2%	2%	2%	2%	2%	2%	8%
Turn Type			Free	Prot						Prot		Free
Protected Phases		2		1	6					8		
Permitted Phases			Free									Free
Actuated Green, G (s)		10.5		6.0	22.5					40.5		
Effective Green, g (s)		10.5		7.0	23.5					40.5		
Actuated g/C Ratio		0.14		0.09	0.31					0.54		
Clearance Time (s)		6.0		6.0	6.0					6.0		
Vehicle Extension (s)		3.0		3.0	3.0					3.0		
Lane Grp Cap (vph)		459		322	1052					1807		
v/s Ratio Prot		0.03		0.06	c0.24					c0.50		
v/s Ratio Perm												
v/c Ratio		0.20		0.59	0.77					0.92		
Uniform Delay, d1		28.5		32.6	23.3					15.7		
Progression Factor		0.27		1.32	1.65					1.00		
Incremental Delay, d2		0.7		2.0	3.7					7.8		
Delay (s)		8.5		45.1	42.2					23.6		
Level of Service		A		D	D					C		
Approach Delay (s)		8.5			42.7			0.0			23.6	
Approach LOS		A			D			A			C	

Intersection Summary			
HCM Average Control Delay	30.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

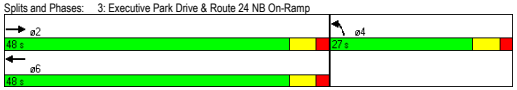
Lanes, Volumes, Timings
3: Executive Park Drive & Route 24 NB On-Ramp

2030 Build Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1575	0	0	170	0	785	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			-1%			-1%			0%	
Storage Length (ft)	0		0	0		0	400		615	0		0
Storage Lanes	0		0	0		1	1		1	0		0
Taper Length (ft)	100		100	100		100	100		100	100		100
Right Turn on Red			Yes			No			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		352			205			1194			650	
Travel Time (s)		6.9			4.0			23.3			12.7	
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
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	8%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1658	0	0	179	0	826	0	0	0	0	0
Turn Type						Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases						Free			Free			
Detector Phase		2			6		4					
Switch Phase												
Minimum Initial (s)		10.0			10.0		6.0					
Minimum Split (s)		16.0			16.0		12.0					
Total Split (s)	0.0	48.0	0.0	0.0	48.0	0.0	27.0	0.0	0.0	0.0	0.0	0.0
Total Split (%)	0.0%	64.0%	0.0%	0.0%	64.0%	0.0%	36.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)		42.0			42.0		21.0					
Yellow Time (s)		4.0			4.0		4.0					
All-Red Time (s)		2.0			2.0		2.0					
Lost Time Adjust (s)	0.0	-1.0	0.0	0.0	-1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	4.0	4.0	5.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0		3.0					
Recall Mode		C-Max			C-Max		None					
v/c Ratio		0.81			0.09		0.88					
Control Delay		6.9			7.3		38.1					
Queue Delay		0.0			0.0		0.0					
Total Delay		6.9			7.3		38.1					
Queue Length 50th (ft)		73			17		186					
Queue Length 95th (ft)		m126			31		#285					
Internal Link Dist (ft)		272			125			1114			570	
Turn Bay Length (ft)							400					
Base Capacity (vph)		2039			2059		956					
Starvation Cap Reductn		0			0		0					
Spillback Cap Reductn		0			0		0					
Storage Cap Reductn		0			0		0					
Reduced v/c Ratio		0.81			0.09		0.86					

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 20 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 3: Executive Park Drive & Route 24 NB On-Ramp



HCM Signalized Intersection Capacity Analysis
3: Executive Park Drive & Route 24 NB On-Ramp

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1575	0	0	170	0	785	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			-1%			-1%			0%	
Total Lost time (s)		5.0			5.0		5.0					
Lane Util. Factor		0.95			0.95		0.97					
Frt		1.00			1.00		1.00					
Flt Protected		1.00			1.00		0.95					
Satd. Flow (prot)		3522			3557		3259					
Flt Permitted		1.00			1.00		0.95					
Satd. Flow (perm)		3522			3557		3259					
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1658	0	0	179	0	826	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1658	0	0	179	0	826	0	0	0	0	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	8%	2%	2%	2%	2%	2%
Turn Type						Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases						Free			Free			
Actuated Green, G (s)		42.4			42.4		20.6					
Effective Green, g (s)		43.4			43.4		21.6					
Actuated g/C Ratio		0.58			0.58		0.29					
Clearance Time (s)		6.0			6.0		6.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		2038			2058		939					
v/s Ratio Prot		c0.47			0.05		c0.25					
v/s Ratio Perm												
v/c Ratio		0.81			0.09		0.88					
Uniform Delay, d1		12.6			7.0		25.5					
Progression Factor		0.39			1.00		1.00					
Incremental Delay, d2		1.8			0.1		9.4					
Delay (s)		6.6			7.1		34.9					
Level of Service		A			A		C					
Approach Delay (s)		6.6			7.1			34.9			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
2: Narrows Rd & South Main St

2030 Build Conditions - AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	145	48	17	182	379	100
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.75	0.75	0.79	0.79
Hourly flow rate (vph)	177	59	23	243	480	127
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					1115	
pX, platoon unblocked						
vC, conflicting volume	831	543	606			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	831	543	606			
tC, single (s)	6.5	6.4	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.5	2.3			
p0 queue free %	45	88	98			
cM capacity (veh/h)	320	506	934			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	235	265	606
Volume Left	177	23	0
Volume Right	59	0	127
cSH	352	934	1700
Volume to Capacity	0.67	0.02	0.36
Queue Length 95th (ft)	115	2	0
Control Delay (s)	33.6	1.0	0.0
Lane LOS	D	A	
Approach Delay (s)	33.6	1.0	0.0
Approach LOS	D		

Intersection Summary				
Average Delay			7.4	
Intersection Capacity Utilization			43.7%	ICU Level of Service A
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
5: Freetown Station driveway & S. Main St.

2030 Build Conditions - AM Peak Hour

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Volume (veh/h)	12	14	199	41	57	415
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	13	15	249	51	71	519
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	936	274			300	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	936	274			300	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	98			94	
cM capacity (veh/h)	278	764			1273	

Direction, Lane #	NW 1	NW 2	NE 1	SW 1
Volume Total	13	15	300	590
Volume Left	13	0	0	71
Volume Right	0	15	51	0
cSH	278	764	1700	1273
Volume to Capacity	0.05	0.02	0.18	0.06
Queue Length 95th (ft)	4	2	0	4
Control Delay (s)	18.6	9.8	0.0	1.5
Lane LOS	C	A		A
Approach Delay (s)	13.9		0.0	1.5
Approach LOS	B			

Intersection Summary				
Average Delay			1.4	
Intersection Capacity Utilization			51.3%	ICU Level of Service A
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
11: Copicut Rd & South Main St

2030 Build Conditions - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	40	5	194	5	5	432
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	43	5	242	6	6	540
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	798	246			249	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	798	246			249	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	88	99			100	
cM capacity (veh/h)	353	793			1317	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	49	249	546
Volume Left	43	0	6
Volume Right	5	6	0
cSH	377	1700	1317
Volume to Capacity	0.13	0.15	0.00
Queue Length 95th (ft)	11	0	0
Control Delay (s)	16.0	0.0	0.1
Lane LOS	C		A
Approach Delay (s)	16.0	0.0	0.1
Approach LOS	C		

Intersection Summary			
Average Delay		1.0	
Intersection Capacity Utilization		36.7%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
21: Ridge Hill Rd & South Main St

2030 Build Conditions - AM Peak Hour

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	20	5	155	70	0	20	35	546	267	75	1212	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.76	0.76	0.76	0.59	0.59	0.59	0.84	0.84	0.84	0.95	0.95	0.95
Hourly flow rate (vph)	26	7	204	119	0	34	42	650	318	79	1276	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								446				
pX, platoon unblocked	0.93	0.93		0.93	0.93	0.93				0.93		
vC, conflicting volume	2362	2488	1278	2536	2331	809	1281			968		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2426	2561	1278	2612	2393	758	1281			928		
tC, single (s)	7.1	7.0	6.2	7.3	6.5	6.4	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.4	3.3	3.7	4.0	3.5	2.3			2.3		
p0 queue free %	0	53	0	0	100	90	92			88		
cM capacity (veh/h)	16	14	202	0	26	346	506			663		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	237	153	1010	1360
Volume Left	26	119	42	79
Volume Right	204	34	318	5
cSH	76	0	506	663
Volume to Capacity	3.13	Err	0.08	0.12
Queue Length 95th (ft)	Err	Err	7	10
Control Delay (s)	Err	Err	2.9	5.7
Lane LOS	F	F	A	A
Approach Delay (s)	9999.0	Err	2.9	5.7
Approach LOS	F	F		

Intersection Summary			
Average Delay		Err	
Intersection Capacity Utilization		118.5%	ICU Level of Service H
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
30: South Main St & High St

2030 Build Conditions - AM Peak Hour

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	5	545	5	5	1247	5	0	0	0	60	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.97	0.97	0.97	0.25	0.25	0.25	0.64	0.64	0.64
Hourly flow rate (vph)	5	586	5	5	1286	5	0	0	0	94	0	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1291			591			1914	1901	1288	1898	1900	589
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1291			591			1914	1901	1288	1898	1900	589
tC, single (s)	4.1			5.1			7.1	6.5	6.2	7.3	6.5	6.4
tC, 2 stage (s)												
tF (s)	2.2			3.1			3.5	4.0	3.3	3.7	4.0	3.5
p0 queue free %	99			99			100	100	100	0	100	97
cM capacity (veh/h)	544			641			50	69	202	47	69	481

Direction, Lane #	NB 1	SB 1	SE 1	NW 1
Volume Total	597	1296	0	109
Volume Left	5	5	0	94
Volume Right	5	5	0	16
cSH	544	641	1700	54
Volume to Capacity	0.01	0.01	0.00	2.01
Queue Length 95th (ft)	1	1	0	267
Control Delay (s)	0.3	0.4	0.0	631.5
Lane LOS	A	A	A	F
Approach Delay (s)	0.3	0.4	0.0	631.5
Approach LOS			A	F

Intersection Summary				
Average Delay			34.8	
Intersection Capacity Utilization			79.7%	ICU Level of Service
Analysis Period (min)			15	

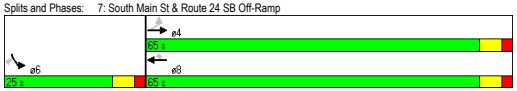
Lanes, Volumes, Timings
7: South Main St & Route 24 SB Off-Ramp

2030 Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	214	694	606	485	155	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	12	12
Storage Length (ft)	0			240	0	0
Storage Lanes	1			2	1	1
Taper Length (ft)	25			25	25	25
Right Turn on Red				Yes		Yes
Link Speed (mph)		30	30		30	
Link Distance (ft)		496	772		360	
Travel Time (s)		11.3	17.5		8.2	
Peak Hour Factor	0.88	0.88	0.94	0.94	0.79	0.79
Heavy Vehicles (%)	8%	6%	6%	3%	6%	13%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	243	789	645	516	196	90
Turn Type	Perm			Perm		Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	65.0	65.0	65.0	65.0	25.0	25.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%
Maximum Green (s)	59.0	59.0	59.0	59.0	19.0	19.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	Min	Min
v/c Ratio	0.49	0.63	0.27	0.39	0.69	0.29
Control Delay	9.0	9.1	4.4	1.0	47.5	9.4
Queue Delay	0.0	0.5	0.0	0.0	0.0	0.0
Total Delay	9.0	9.6	4.4	1.0	47.5	9.4
Queue Length 50th (ft)	31	275	43	5	105	0
Queue Length 95th (ft)	73	333	m64	m3	145	28
Internal Link Dist (ft)		416	692		280	
Turn Bay Length (ft)				240		
Base Capacity (vph)	498	1253	2382	1324	360	373
Starvation Cap Reductn	0	153	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	0.49	0.72	0.27	0.39	0.54	0.24

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 88 (98%), Referenced to phase 4:EBTL and 8:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 7: South Main St & Route 24 SB Off-Ramp



HCM Signalized Intersection Capacity Analysis
7: South Main St & Route 24 SB Off-Ramp

2030 Build Conditions - PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	214	694	606	485	155	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	14	12	12
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1671	1792	3406	1672	1703	1429
Flt Permitted	0.40	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	712	1792	3406	1672	1703	1429
Peak-hour factor, PHF	0.88	0.88	0.94	0.94	0.79	0.79
Adj. Flow (vph)	243	789	645	516	196	90
RTOR Reduction (vph)	0	0	0	155	0	75
Lane Group Flow (vph)	243	789	645	361	196	15
Heavy Vehicles (%)	8%	6%	6%	3%	6%	13%
Turn Type	Perm			Perm		Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	62.9	62.9	62.9	62.9	15.1	15.1
Effective Green, g (s)	62.9	62.9	62.9	62.9	15.1	15.1
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.17	0.17
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	498	1252	2380	1169	286	240
v/s Ratio Prot		c0.44	0.19		c0.12	
v/s Ratio Perm	0.34			0.22		0.01
v/c Ratio	0.49	0.63	0.27	0.31	0.69	0.06
Uniform Delay, d1	6.2	7.3	5.0	5.2	35.2	31.5
Progression Factor	0.76	0.82	0.78	0.92	1.00	1.00
Incremental Delay, d2	3.1	2.2	0.2	0.4	6.7	0.1
Delay (s)	7.8	8.2	4.1	5.2	41.9	31.6
Level of Service	A	A	A	A	D	C
Approach Delay (s)		8.1	4.6		38.6	
Approach LOS		A	A		D	

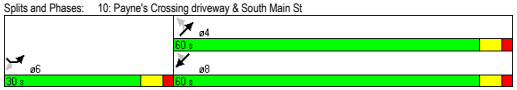
Intersection Summary			
HCM Average Control Delay	10.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
10: Payne's Crossing driveway & South Main St — 2030 Build Conditions - PM Peak Hour

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Volume (vph)	385	125	120	523	312	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	75	200			0
Storage Lanes	2	1	1			1
Taper Length (ft)	25	25	25			25
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	230			1086	496	
Travel Time (s)	5.2			24.7	11.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	418	136	130	568	339	397
Turn Type		Perm	Perm			Perm
Protected Phases	6			4	8	
Permitted Phases		6	4			8
Detector Phase	6	6	4	4	8	8
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	30.0	30.0	60.0	60.0	60.0	60.0
Total Split (%)	33.3%	33.3%	66.7%	66.7%	66.7%	66.7%
Maximum Green (s)	24.0	24.0	54.0	54.0	54.0	54.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.66	0.34	0.19	0.45	0.27	0.33
Control Delay	39.1	7.9	6.7	8.4	2.4	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	7.9	6.7	8.5	2.4	0.9
Queue Length 50th (ft)	115	0	23	126	11	0
Queue Length 95th (ft)	153	44	54	229	29	0
Internal Link Dist (ft)	150			1006	416	
Turn Bay Length (ft)		75	200			
Base Capacity (vph)	915	522	701	1272	1272	1207
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	14	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.26	0.19	0.45	0.27	0.33

Intersection Summary
Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 13 (14%), Referenced to phase 4:NETL and 8:SWT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 10: Payne's Crossing driveway & South Main St



HCM Signalized Intersection Capacity Analysis
10: Payne's Crossing driveway & South Main St — 2030 Build Conditions - PM Peak Hour

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Volume (vph)	385	125	120	523	312	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	1770	1863	1863	1583
Flt Permitted	0.95	1.00	0.55	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	1027	1863	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	418	136	130	568	339	397
RTOR Reduction (vph)	0	111	0	0	0	126
Lane Group Flow (vph)	418	25	130	568	339	271
Turn Type		Perm	Perm			Perm
Protected Phases	6			4	8	
Permitted Phases		6	4			8
Actuated Green, G (s)	16.5	16.5	61.5	61.5	61.5	61.5
Effective Green, g (s)	16.5	16.5	61.5	61.5	61.5	61.5
Actuated g/C Ratio	0.18	0.18	0.68	0.68	0.68	0.68
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	629	290	702	1273	1273	1082
v/s Ratio Prot	c0.12			c0.30	0.18	
v/s Ratio Perm		0.02	0.13			0.17
v/c Ratio	0.66	0.09	0.19	0.45	0.27	0.25
Uniform Delay, d1	34.2	30.5	5.2	6.5	5.5	5.4
Progression Factor	1.00	1.00	1.00	1.00	0.30	0.27
Incremental Delay, d2	2.7	0.1	0.6	1.1	0.5	0.5
Delay (s)	36.8	30.6	5.7	7.6	2.2	2.0
Level of Service	D	C	A	A	A	A
Approach Delay (s)	35.3			7.3	2.1	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

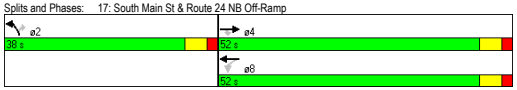
Lanes, Volumes, Timings
17: South Main St & Route 24 NB Off-Ramp

2030 Build Conditions - PM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	708	140	140	895	206	835
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	15	16	16
Storage Length (ft)		200	100		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)		25	25		25	25
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	772			440	420	
Travel Time (s)	17.5			10.0	9.5	
Peak Hour Factor	0.85	0.85	0.94	0.94	0.95	0.95
Heavy Vehicles (%)	4%	13%	4%	4%	16%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	833	165	149	952	217	879
Turn Type		Perm	Perm			Perm
Protected Phases	4			8	2	
Permitted Phases		4	8			2
Detector Phase	4	4	8	8	2	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	52.0	52.0	52.0	52.0	38.0	38.0
Total Split (%)	57.8%	57.8%	57.8%	57.8%	42.2%	42.2%
Maximum Green (s)	46.0	46.0	46.0	46.0	32.0	32.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	Min	Min
v/c Ratio	0.89	0.18	1.48	0.93	0.35	1.22
Control Delay	24.2	2.7	284.1	37.1	23.3	136.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.2	2.7	284.1	37.1	23.3	136.9
Queue Length 50th (ft)	185	4	~118	477	89	~574
Queue Length 95th (ft)	#511	18	#183	#756	148	#805
Internal Link Dist (ft)	692			360	340	
Turn Bay Length (ft)		200	100			
Base Capacity (vph)	934	899	101	1027	627	720
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	0.89	0.18	1.48	0.93	0.35	1.22

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green, Master Intersection	
Natural Cycle: 130	
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.	

Splits and Phases: 17: South Main St & Route 24 NB Off-Ramp



HCM Signalized Intersection Capacity Analysis
17: South Main St & Route 24 NB Off-Ramp

2030 Build Conditions - PM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	708	140	140	895	206	835
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	15	16	16
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1827	1620	1736	2010	1764	1794
Flt Permitted	1.00	1.00	0.11	1.00	0.95	1.00
Satd. Flow (perm)	1827	1620	197	2010	1764	1794
Peak-hour factor, PHF	0.85	0.85	0.94	0.94	0.95	0.95
Adj. Flow (vph)	833	165	149	952	217	879
RTOR Reduction (vph)	0	71	0	0	0	82
Lane Group Flow (vph)	833	94	149	952	217	797
Heavy Vehicles (%)	4%	13%	4%	4%	16%	2%
Turn Type		Perm	Perm			Perm
Protected Phases	4			8	2	
Permitted Phases		4	8			2
Actuated Green, G (s)	46.0	46.0	46.0	46.0	32.0	32.0
Effective Green, g (s)	46.0	46.0	46.0	46.0	32.0	32.0
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.36	0.36
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	934	828	101	1027	627	638
v/s Ratio Prot	0.46			0.47	0.12	
v/s Ratio Perm		0.06	c0.76			c0.44
v/c Ratio	0.89	0.11	1.48	0.93	0.35	1.25
Uniform Delay, d1	19.8	11.4	22.0	20.4	21.3	29.0
Progression Factor	0.62	0.82	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.4	0.2	259.5	15.2	0.3	125.0
Delay (s)	22.6	9.6	281.5	35.6	21.6	154.0
Level of Service	C	A	F	D	C	F
Approach Delay (s)	20.5			68.9	127.8	
Approach LOS	C			E	F	

Intersection Summary			
HCM Average Control Delay	74.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.39		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

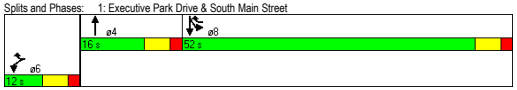
Lanes, Volumes, Timings
1: Executive Park Drive & South Main Street

2030 Build Condition - PM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	25	248	198	20	1440	266
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-3%		-3%			4%
Storage Length (ft)	0	0		0	200	
Storage Lanes	1	2		0	1	
Taper Length (ft)	25	25		25	25	
Right Turn on Red		No		No		
Link Speed (mph)	35		35			35
Link Distance (ft)	282		553			804
Travel Time (s)	5.5		10.8			15.7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	10%	2%	2%	10%	2%
Shared Lane Traffic (%)					41%	
Lane Group Flow (vph)	26	261	229	0	894	902
Turn Type		pt+ov			Split	
Protected Phases	6	6 8	4		8	8
Permitted Phases						
Detector Phase	6	6 8	4		8	8
Switch Phase						
Minimum Initial (s)	6.0		6.0		6.0	6.0
Minimum Split (s)	12.0		12.0		12.0	12.0
Total Split (s)	12.0	64.0	16.0	0.0	52.0	52.0
Total Split (%)	15.0%	80.0%	20.0%	0.0%	65.0%	65.0%
Maximum Green (s)	6.0		10.0		46.0	46.0
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		None		C-Max	C-Max
v/c Ratio	0.17	0.13	0.89		1.02	0.99
Control Delay	32.9	3.1	70.6		54.3	45.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	32.9	3.1	70.6		54.3	45.5
Queue Length 50th (ft)	12	16	114		~461	427
Queue Length 95th (ft)	34	26	#240		#736	#725
Internal Link Dist (ft)	202		473			724
Turn Bay Length (ft)					200	
Base Capacity (vph)	157	1934	257		879	915
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	0.17	0.13	0.89		1.02	0.99

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 33 (41%), Referenced to phase 8:SBTL, Start of Green	
Natural Cycle: 90	
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.	

Splits and Phases: 1: Executive Park Drive & South Main Street



HCM Signalized Intersection Capacity Analysis
1: Executive Park Drive & South Main Street

2030 Build Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	25	248	198	20	1440	266
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-3%		-3%			4%
Total Lost time (s)	5.0	5.0	5.0		6.0	6.0
Lane Util. Factor	1.00	0.88	1.00		0.95	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	0.97
Satd. Flow (prot)	1796	2623	1867		1528	1590
Flt Permitted	0.95	1.00	1.00		0.95	0.97
Satd. Flow (perm)	1796	2623	1867		1528	1590
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	261	208	21	1516	280
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	26	261	229	0	894	902
Heavy Vehicles (%)	2%	10%	2%	2%	10%	2%
Turn Type		pt+ov			Split	
Protected Phases	6	6 8	4		8	8
Permitted Phases						
Actuated Green, G (s)	6.0	58.0	10.0		46.0	46.0
Effective Green, g (s)	7.0	59.0	11.0		46.0	46.0
Actuated g/C Ratio	0.09	0.74	0.14		0.57	0.57
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	157	1934	257		879	914
v/s Ratio Prot	0.01	c0.10	c0.12		c0.59	0.57
v/s Ratio Perm						
v/c Ratio	0.17	0.13	0.89		1.02	0.99
Uniform Delay, d1	33.8	3.1	33.9		17.0	16.7
Progression Factor	0.89	0.97	1.00		1.00	1.00
Incremental Delay, d2	0.5	0.0	29.5		34.7	26.8
Delay (s)	30.7	3.0	63.4		51.7	43.5
Level of Service	C	A	E		D	D
Approach Delay (s)	5.5		63.4			47.6
Approach LOS	A		E			D

Intersection Summary			
HCM Average Control Delay	43.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

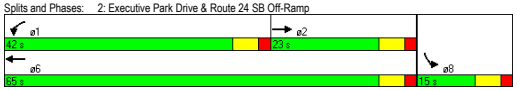
Lanes, Volumes, Timings
2: Executive Park Drive & Route 24 SB Off-Ramp

2030 Build Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	648	0	1398	135	0	0	0	0	235	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-1%			0%			5%	
Storage Length (ft)	0		0	0		0	0		0	0		300
Storage Lanes	0		1	2		0	0		0	2		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			Yes			Yes			No
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		307			406			405			737	
Travel Time (s)		6.0			7.9			7.9			14.4	
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
Heavy Vehicles (%)	2%	8%	8%	2%	8%	2%	2%	2%	2%	2%	2%	8%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	682	0	1472	142	0	0	0	0	247	0	0
Turn Type			Free	Prot						Prot		Free
Protected Phases		2		1	6					8		
Permitted Phases			Free									Free
Detector Phase		2		1	6					8		
Switch Phase												
Minimum Initial (s)		10.0		6.0	10.0					6.0		
Minimum Split (s)		16.0		12.0	16.0					12.0		
Total Split (s)	0.0	23.0	0.0	42.0	65.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0
Total Split (%)	0.0%	28.8%	0.0%	52.5%	81.3%	0.0%	0.0%	0.0%	0.0%	18.8%	0.0%	0.0%
Maximum Green (s)		17.0		36.0	59.0					9.0		
Yellow Time (s)		4.0		4.0	4.0					4.0		
All-Red Time (s)		2.0		2.0	2.0					2.0		
Lost Time Adjust (s)	0.0	0.0	0.0	-1.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	5.0	5.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0					3.0		
Recall Mode		C-Max		None	C-Max					None		
v/c Ratio		0.96		0.93	0.06					0.67		
Control Delay		23.3		27.0	2.1					43.8		
Queue Delay		0.0		0.0	0.0					0.0		
Total Delay		23.3		27.0	2.1					43.8		
Queue Length 50th (ft)		158		200	5					61		
Queue Length 95th (ft)		m156		#496	8					#99		
Internal Link Dist (ft)		227			326			325			657	
Turn Bay Length (ft)												
Base Capacity (vph)		712		1596	2527					377		
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		0.96		0.92	0.06					0.66		

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green, Master Intersection	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 2: Executive Park Drive & Route 24 SB Off-Ramp



HCM Signalized Intersection Capacity Analysis
2: Executive Park Drive & Route 24 SB Off-Ramp

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	648	0	1398	135	0	0	0	0	235	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			-1%			0%			5%	
Total Lost time (s)		6.0		5.0	5.0					6.0		
Lane Util. Factor		0.95		0.97	0.95					0.97		
Frt		1.00		1.00	1.00					1.00		
Flt Protected		1.00		0.95	1.00					0.95		
Satd. Flow (prot)		3276		3450	3359					3347		
Flt Permitted		1.00		0.95	1.00					0.95		
Satd. Flow (perm)		3276		3450	3359					3347		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	682	0	1472	142	0	0	0	0	247	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	682	0	1472	142	0	0	0	0	247	0	0
Heavy Vehicles (%)	2%	8%	8%	2%	8%	2%	2%	2%	2%	2%	2%	8%
Turn Type			Free	Prot						Prot		Free
Protected Phases		2		1	6					8		
Permitted Phases			Free									Free
Actuated Green, G (s)		17.4		35.8	59.2					8.8		
Effective Green, g (s)		17.4		36.8	60.2					8.8		
Actuated g/C Ratio		0.22		0.46	0.75					0.11		
Clearance Time (s)		6.0		6.0	6.0					6.0		
Vehicle Extension (s)		3.0		3.0	3.0					3.0		
Lane Grp Cap (vph)		713		1587	2528					368		
v/s Ratio Prot		c0.21		c0.43	0.04					c0.07		
v/s Ratio Perm												
v/c Ratio		0.96		0.93	0.06					0.67		
Uniform Delay, d1		30.9		20.3	2.6					34.2		
Progression Factor		0.50		0.80	0.78					1.00		
Incremental Delay, d2		4.1		8.6	0.0					4.8		
Delay (s)		19.6		24.9	2.0					39.0		
Level of Service		B		C	A					D		
Approach Delay (s)		19.6			22.9			0.0			39.0	
Approach LOS		B			C			A			D	

Intersection Summary			
HCM Average Control Delay	23.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

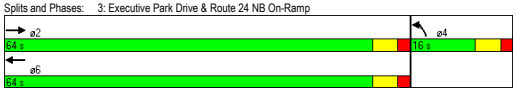
Lanes, Volumes, Timings
3: Executive Park Drive & Route 24 NB On-Ramp

2030 Build Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	235	0	0	1396	0	137	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			-1%			-1%			0%	
Storage Length (ft)	0		0	0		0	400		615	0		0
Storage Lanes	0		0	0		1	1		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			No			No			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		352			205			740			316	
Travel Time (s)		6.9			4.0			14.4			6.2	
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
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	8%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	247	0	0	1469	0	144	0	0	0	0	0
Turn Type						Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases						Free			Free			
Detector Phase		2			6		4					
Switch Phase												
Minimum Initial (s)		10.0			10.0		6.0					
Minimum Split (s)		16.0			16.0		12.0					
Total Split (s)	0.0	64.0	0.0	0.0	64.0	0.0	16.0	0.0	0.0	0.0	0.0	0.0
Total Split (%)	0.0%	80.0%	0.0%	0.0%	80.0%	0.0%	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)		58.0			58.0		10.0					
Yellow Time (s)		4.0			4.0		4.0					
All-Red Time (s)		2.0			2.0		2.0					
Lost Time Adjust (s)	0.0	-1.0	0.0	0.0	-1.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	4.0	4.0	5.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0		3.0					
Recall Mode		C-Max			C-Max		None					
v/c Ratio		0.09			0.55		0.37					
Control Delay		10.1			5.2		34.8					
Queue Delay		0.0			0.0		0.0					
Total Delay		10.1			5.2		34.8					
Queue Length 50th (ft)		53			127		34					
Queue Length 95th (ft)		m62			179		60					
Internal Link Dist (ft)		272			125			660			236	
Turn Bay Length (ft)							400					
Base Capacity (vph)		2658			2685		448					
Starvation Cap Reductn		0			0		0					
Spillback Cap Reductn		0			0		0					
Storage Cap Reductn		0			0		0					
Reduced v/c Ratio		0.09			0.55		0.32					

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 35 (44%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 3: Executive Park Drive & Route 24 NB On-Ramp



HCM Signalized Intersection Capacity Analysis
3: Executive Park Drive & Route 24 NB On-Ramp

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	235	0	0	1396	0	137	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			-1%			-1%			0%	
Total Lost time (s)		5.0			5.0		5.0					
Lane Util. Factor		0.95			0.95		0.97					
Frt		1.00			1.00		1.00					
Flt Protected		1.00			1.00		0.95					
Satd. Flow (prot)		3522			3557		3259					
Flt Permitted		1.00			1.00		0.95					
Satd. Flow (perm)		3522			3557		3259					
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	247	0	0	1469	0	144	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	247	0	0	1469	0	144	0	0	0	0	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	8%	2%	2%	2%	2%	2%
Turn Type						Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases						Free			Free			
Actuated Green, G (s)		59.4			59.4		8.6					
Effective Green, g (s)		60.4			60.4		9.6					
Actuated g/C Ratio		0.76			0.76		0.12					
Clearance Time (s)		6.0			6.0		6.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		2659			2686		391					
v/s Ratio Prot		0.07			c0.41		c0.04					
v/s Ratio Perm												
v/c Ratio		0.09			0.55		0.37					
Uniform Delay, d1		2.6			4.1		32.4					
Progression Factor		3.66			1.00		1.00					
Incremental Delay, d2		0.0			0.8		0.6					
Delay (s)		9.5			4.9		33.0					
Level of Service		A			A		C					
Approach Delay (s)		9.5			4.9			33.0			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
2: Narrows Rd & South Main St

2030 Build Conditions - PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	130	26	50	528	322	120
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.89	0.89	0.95	0.95
Hourly flow rate (vph)	159	32	56	593	339	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)					1086	
pX, platoon unblocked						
vC, conflicting volume	1108	402	465			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1108	402	465			
tC, single (s)	6.5	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.2			
p0 queue free %	27	95	95			
cM capacity (veh/h)	217	627	1107			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	190	649	465
Volume Left	159	56	0
Volume Right	32	0	126
cSH	243	1107	1700
Volume to Capacity	0.78	0.05	0.27
Queue Length 95th (ft)	144	4	0
Control Delay (s)	58.1	1.3	0.0
Lane LOS	F	A	
Approach Delay (s)	58.1	1.3	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	9.1		
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
11: Copicut Rd & South Main St

2030 Build Conditions - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	10	30	533	40	30	318
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	33	579	43	33	346
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1012	601			623	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1012	601			623	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	93			97	
cM capacity (veh/h)	256	500			958	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	43	623	378
Volume Left	11	0	33
Volume Right	33	43	0
cSH	404	1700	958
Volume to Capacity	0.11	0.37	0.03
Queue Length 95th (ft)	9	0	3
Control Delay (s)	15.0	0.0	1.1
Lane LOS	B		A
Approach Delay (s)	15.0	0.0	1.1
Approach LOS	B		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
21: Ridge Hill Rd & South Main St

2030 Build Conditions - PM Peak Hour

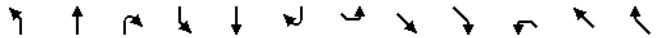
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	10	0	95	260	0	70	40	1368	105	20	680	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.92	0.92	0.92	0.87	0.87	0.87
Hourly flow rate (vph)	11	0	103	302	0	81	43	1487	114	23	782	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								440				
pX, platoon unblocked	0.56	0.56		0.56	0.56	0.56				0.56		
vC, conflicting volume	2540	2516	782	2562	2459	1544	782			1601		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3363	3320	782	3402	3217	1579	782			1681		
tC, single (s)	7.2	6.5	6.2	7.2	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	74	0	100	0	95			89		
cM capacity (veh/h)	0	4	396	1	5	76	845			215		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	114	384	1645	805
Volume Left	11	302	43	23
Volume Right	103	81	114	0
cSH	0	2	845	215
Volume to Capacity	Err	222.22	0.05	0.11
Queue Length 95th (ft)	Err	Err	4	9
Control Delay (s)	Err	Err	8.4	5.2
Lane LOS	F	F	A	A
Approach Delay (s)	Err	Err	8.4	5.2
Approach LOS	F	F		

Intersection Summary				
Average Delay			Err	
Intersection Capacity Utilization			128.1%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
30: South Main St & High St

2030 Build Conditions - PM Peak Hour



Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	0	1372	61	20	694	5	0	0	0	11	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.93	0.93	0.93	0.25	0.25	0.25	0.83	0.83	0.83
Hourly flow rate (vph)	0	1508	67	22	746	5	0	0	0	13	0	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	752			1575			2345	2367	749	2333	2336	1541
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	752			1575			2345	2367	749	2333	2336	1541
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			100	100	100	47	100	92
cM capacity (veh/h)	867			404			22	34	415	25	35	143

Direction, Lane #	NB 1	SB 1	SE 1	NW 1
Volume Total	1575	773	0	25
Volume Left	0	22	0	13
Volume Right	67	5	0	12
cSH	867	404	1700	41
Volume to Capacity	0.00	0.05	0.00	0.61
Queue Length 95th (ft)	0	4	0	56
Control Delay (s)	0.0	1.7	0.0	183.0
Lane LOS		A	A	F
Approach Delay (s)	0.0	1.7	0.0	183.0
Approach LOS			A	F

Intersection Summary				
Average Delay			2.5	
Intersection Capacity Utilization			85.9%	ICU Level of Service
Analysis Period (min)			15	

New Bedford

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	5	0	189	10	563	0	75	294	193	195	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	12	12	12	12	16	12	12	16	12
Storage Length (ft)	0		0	0		0	0		0	300		0
Storage Lanes	0		0	0		1	0		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1031			525			388			877	
Travel Time (s)		23.4			11.9			8.8			19.9	
Peak Hour Factor	0.88	0.88	0.88	0.82	0.82	0.82	0.94	0.94	0.94	0.83	0.83	0.83
Heavy Vehicles (%)	0%	20%	0%	7%	25%	5%	0%	9%	8%	5%	11%	60%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	0	242	687	0	393	0	233	241	0
Turn Type	Perm			Perm		pt+ov	Perm			pm+pt		
Protected Phases		8			4	4 1		2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4	4 1	2	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	13.0	13.0		13.0	13.0		27.0	27.0		19.0	22.0	
Total Split (s)	15.0	15.0	0.0	15.0	15.0	38.0	62.0	62.0	0.0	23.0	85.0	0.0
Total Split (%)	15.0%	15.0%	0.0%	15.0%	15.0%	38.0%	62.0%	62.0%	0.0%	23.0%	85.0%	0.0%
Maximum Green (s)	9.0	9.0		9.0	9.0		56.0	56.0		17.0	79.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		C-Max	C-Max		Min	Min		None	Min	
Walk Time (s)							5.0	5.0				
Flash Dont Walk (s)							16.0	16.0				
Pedestrian Calls (#/hr)							0	0				
v/c Ratio		0.01			0.34	0.51		0.81		0.70	0.38	
Control Delay		14.2			17.8	3.4		22.7		36.4	25.5	
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	
Total Delay		14.2			17.8	3.4		22.7		36.4	25.5	
Queue Length 50th (ft)		2			44	35		49		115	115	
Queue Length 95th (ft)		9			179	26		138		135	134	
Internal Link Dist (ft)		951			445			308			797	
Turn Bay Length (ft)										300		
Base Capacity (vph)		987			710	1351		1132		357	1511	
Starvation Cap Reductn		0			0	23		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		0.01			0.34	0.52		0.35		0.65	0.16	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 12 (12%), Referenced to phase 4:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Jones Street & Mt Pleasant St

HCM Signalized Intersection Capacity Analysis
2: Jones Street & Mt Pleasant St

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	5	0	189	10	563	0	75	294	193	195	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	16	12	12	16	12
Total Lost time (s)		6.0			6.0	6.0		6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Frt		1.00			1.00	0.85		0.89		1.00	1.00	
Flt Protected		1.00			0.95	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		1794			1681	1538		1776		1719	1912	
Flt Permitted		1.00			0.73	1.00		1.00		0.22	1.00	
Satd. Flow (perm)		1794			1290	1538		1776		402	1912	
Peak-hour factor, PHF	0.88	0.88	0.88	0.82	0.82	0.82	0.94	0.94	0.94	0.83	0.83	0.83
Adj. Flow (vph)	0	6	0	230	12	687	0	80	313	233	235	6
RTOR Reduction (vph)	0	0	0	0	0	165	0	275	0	0	3	0
Lane Group Flow (vph)	0	6	0	0	242	522	0	118	0	233	238	0
Heavy Vehicles (%)	0%	20%	0%	7%	25%	5%	0%	9%	8%	5%	11%	60%
Turn Type	Perm			Perm		pt+ov	Perm			pm+pt		
Protected Phases		8			4	4 1		2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		55.0			55.0	76.0		12.0		33.0	33.0	
Effective Green, g (s)		55.0			55.0	76.0		12.0		33.0	33.0	
Actuated g/C Ratio		0.55			0.55	0.76		0.12		0.33	0.33	
Clearance Time (s)		6.0			6.0			6.0		6.0	6.0	
Vehicle Extension (s)		2.0			2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		987			710	1169		213		330	631	
v/s Ratio Prot		0.00				c0.34		0.07		c0.11	0.12	
v/s Ratio Perm					0.19					c0.13		
v/c Ratio		0.01			0.34	0.45		0.55		0.71	0.38	
Uniform Delay, d1		10.2			12.5	4.4		41.5		27.1	25.6	
Progression Factor		1.00			1.11	3.84		1.00		1.00	1.00	
Incremental Delay, d2		0.0			1.3	0.1		1.8		5.5	0.1	
Delay (s)		10.2			15.0	16.8		43.2		32.6	25.8	
Level of Service		B			B	B		D		C	C	
Approach Delay (s)		10.2			16.4			43.2			29.1	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	25.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
14: Tarkiln Hill Road & Church Street

2030 Build Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	315	0	30	504	60	241	200	40	45	170	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	12	11	11	12	11	11	11	11	11	12
Storage Length (ft)	50		0	0		0	0		0	0		145
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		305			1116			176			552	
Travel Time (s)		6.9			25.4			4.0			12.5	
Peak Hour Factor	0.81	0.81	0.81	0.87	0.87	0.87	0.84	0.84	0.84	0.90	0.90	0.90
Heavy Vehicles (%)	5%	2%	0%	8%	2%	2%	1%	2%	0%	11%	4%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	75	389	0	34	648	0	287	286	0	0	239	102
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Detector Phase	1	1		1	1		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	30.0	30.0		30.0	30.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	35.0	35.0		35.0	35.0		12.0	12.0		12.0	12.0	12.0
Total Split (s)	54.0	54.0	0.0	54.0	54.0	0.0	46.0	46.0	0.0	46.0	46.0	46.0
Total Split (%)	54.0%	54.0%	0.0%	54.0%	54.0%	0.0%	46.0%	46.0%	0.0%	46.0%	46.0%	46.0%
Maximum Green (s)	49.0	49.0		49.0	49.0		41.0	41.0		41.0	41.0	41.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	0.2	0.2		0.2	0.2		5.0	5.0		5.0	5.0	5.0
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	C-Min
v/c Ratio	0.82	0.53		0.13	0.89		0.56	0.33			0.32	0.13
Control Delay	82.1	23.9		16.9	42.1		25.6	18.7			18.8	16.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	82.1	23.9		16.9	42.1		25.6	18.7			18.8	16.8
Queue Length 50th (ft)	40	176		13	363		129	111			92	36
Queue Length 95th (ft)	#101	201		28	437		221	179			169	76
Internal Link Dist (ft)		225			1036			96			472	
Turn Bay Length (ft)	50											145
Base Capacity (vph)	109	882		321	868		512	862			754	791
Starvation Cap Reductn	0	0		0	0		0	0			0	0
Spillback Cap Reductn	0	0		0	0		0	0			0	0
Storage Cap Reductn	0	0		0	0		0	0			0	0
Reduced v/c Ratio	0.69	0.44		0.11	0.75		0.56	0.33			0.32	0.13

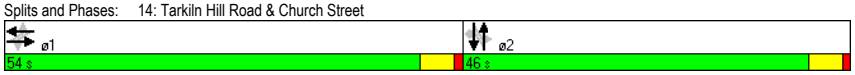
Intersection Summary	
Area Type:	Other

Lanes, Volumes, Timings
14: Tarkiln Hill Road & Church Street

2030 Build Condition - AM Peak Hour

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 14: Tarkiln Hill Road & Church Street

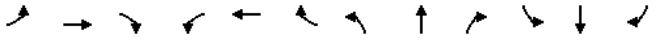


HCM Signalized Intersection Capacity Analysis
14: Tarkiln Hill Road & Church Street

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	315	0	30	504	60	241	200	40	45	170	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	12	11	11	12	11	11	11	11	11	12
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)	1604	1801		1616	1772		1728	1761			1723	1615
Flt Permitted	0.13	1.00		0.39	1.00		0.57	1.00			0.89	1.00
Satd. Flow (perm)	223	1801		657	1772		1045	1761			1542	1615
Peak-hour factor, PHF	0.81	0.81	0.81	0.87	0.87	0.87	0.84	0.84	0.84	0.90	0.90	0.90
Adj. Flow (vph)	75	389	0	34	579	69	287	238	48	50	189	102
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	75	389	0	34	648	0	287	286	0	0	239	102
Heavy Vehicles (%)	5%	2%	0%	8%	2%	2%	1%	2%	0%	11%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Actuated Green, G (s)	41.1	41.1		41.1	41.1		48.9	48.9			48.9	48.9
Effective Green, g (s)	41.1	41.1		41.1	41.1		48.9	48.9			48.9	48.9
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.49	0.49			0.49	0.49
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)	0.2	0.2		0.2	0.2		5.0	5.0			5.0	5.0
Lane Grp Cap (vph)	92	740		270	728		511	861			754	790
v/s Ratio Prot		0.22			c0.37			0.16				
v/s Ratio Perm	0.34			0.05			c0.27				0.15	0.06
v/c Ratio	0.82	0.53		0.13	0.89		0.56	0.33			0.32	0.13
Uniform Delay, d1	26.1	22.1		18.3	27.4		18.0	15.6			15.5	13.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	38.7	0.3		0.1	12.8		4.4	1.0			1.1	0.3
Delay (s)	64.8	22.4		18.4	40.1		22.4	16.6			16.6	14.3
Level of Service	E	C		B	D		C	B			B	B
Approach Delay (s)		29.3			39.0			19.5			15.9	
Approach LOS		C			D			B			B	

Intersection Summary					
HCM Average Control Delay	27.6	HCM Level of Service		C	
HCM Volume to Capacity ratio	0.71				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		10.0	
Intersection Capacity Utilization	88.0%	ICU Level of Service		E	
Analysis Period (min)	15				
c Critical Lane Group					



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	81	10	55	120	47	10	290	60	61	370	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	14	16	16	14	16	11	11	16	11	11	16
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		197			310			393			488	
Travel Time (s)		4.5			7.0			8.9			11.1	
Peak Hour Factor	0.77	0.77	0.77	0.69	0.69	0.69	0.88	0.88	0.88	0.91	0.91	0.91
Heavy Vehicles (%)	0%	8%	11%	4%	4%	3%	0%	4%	5%	0%	4%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	150	0	0	322	0	11	398	0	67	423	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	17.0	17.0		17.0	17.0		21.0	21.0		21.0	21.0	
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0
Total Split (%)	37.0%	37.0%	0.0%	37.0%	37.0%	0.0%	37.0%	37.0%	0.0%	37.0%	37.0%	0.0%
Maximum Green (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag							Lead	Lead		Lead	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.23			0.48		0.04	0.58		0.25	0.61	
Control Delay		15.5			18.3		16.2	20.9		18.8	22.1	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		15.5			18.3		16.2	20.9		18.8	22.1	
Queue Length 50th (ft)		32			75		2	100		15	111	
Queue Length 95th (ft)		85			150		15	#272		62	#333	
Internal Link Dist (ft)		117			230			313			408	
Turn Bay Length (ft)												
Base Capacity (vph)		664			673		249	686		270	696	
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		0.23			0.48		0.04	0.58		0.25	0.61	

Intersection Summary	
Area Type:	Other

Lane Group	ø2
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	15.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	26%
Maximum Green (s)	15.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	5.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	4.0
Pedestrian Calls (#/hr)	10
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

Lanes, Volumes, Timings
19: Wood Street & Route 18

2030 Build Condition - AM Peak Hour

Cycle Length: 81
Actuated Cycle Length: 64.2
Natural Cycle: 60
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 19: Wood Street & Route 18

HCM Signalized Intersection Capacity Analysis
19: Wood Street & Route 18

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	81	10	55	120	47	10	290	60	61	370	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	14	16	16	14	16	11	11	16	11	11	16
Total Lost time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.97		1.00	0.97		1.00	0.99	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1860			1874		1745	1718		1745	1759	
Flt Permitted		0.89			0.88		0.34	1.00		0.37	1.00	
Satd. Flow (perm)		1674			1678		632	1718		685	1759	
Peak-hour factor, PHF	0.77	0.77	0.77	0.69	0.69	0.69	0.88	0.88	0.88	0.91	0.91	0.91
Adj. Flow (vph)	32	105	13	80	174	68	11	330	68	67	407	16
RTOR Reduction (vph)	0	4	0	0	11	0	0	8	0	0	2	0
Lane Group Flow (vph)	0	146	0	0	311	0	11	390	0	67	421	0
Heavy Vehicles (%)	0%	8%	11%	4%	4%	3%	0%	4%	5%	0%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Actuated Green, G (s)		25.4			25.4		25.4	25.4		25.4	25.4	
Effective Green, g (s)		25.4			25.4		25.4	25.4		25.4	25.4	
Actuated g/C Ratio		0.37			0.37		0.37	0.37		0.37	0.37	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		614			616		232	631		251	646	
v/s Ratio Prot								0.23			c0.24	
v/s Ratio Perm		0.09			c0.19		0.02			0.10		
v/c Ratio		0.24			0.51		0.05	0.62		0.27	0.65	
Uniform Delay, d1		15.2			17.0		14.1	17.9		15.4	18.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.9			2.9		0.4	4.5		2.6	5.1	
Delay (s)		16.1			20.0		14.5	22.4		18.0	23.3	
Level of Service		B			B		B	C		B	C	
Approach Delay (s)		16.1			20.0			22.2			22.5	
Approach LOS		B			B			C			C	

Intersection Summary				
HCM Average Control Delay	21.1	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	69.2	Sum of lost time (s)	18.4	
Intersection Capacity Utilization	58.4%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	97	240	25	40	255	42	60	102	25	35	161	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	14	16	16	16	16
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1761			1229			1754			2421	
Travel Time (s)		40.0			27.9			39.9			55.0	
Peak Hour Factor	0.89	0.89	0.89	0.96	0.96	0.96	0.83	0.83	0.83	0.91	0.91	0.91
Heavy Vehicles (%)	15%	6%	12%	7%	2%	0%	2%	2%	8%	8%	10%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	407	0	0	352	0	0	225	0	0	375	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Minimum Split (s)	36.0	36.0		36.0	36.0		29.0	29.0		29.0	29.0	
Total Split (s)	36.0	36.0	0.0	36.0	36.0	0.0	29.0	29.0	0.0	29.0	29.0	0.0
Total Split (%)	55.4%	55.4%	0.0%	55.4%	55.4%	0.0%	44.6%	44.6%	0.0%	44.6%	44.6%	0.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
v/c Ratio		0.55			0.40			0.46			0.62	
Control Delay		16.2			13.3			20.7			23.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		16.2			13.3			20.7			23.5	
Queue Length 50th (ft)		110			87			69			122	
Queue Length 95th (ft)		184			146			114			205	
Internal Link Dist (ft)		1681			1149			1674			2341	
Turn Bay Length (ft)												
Base Capacity (vph)		740			876			485			601	
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		0.55			0.40			0.46			0.62	

Intersection Summary	
Area Type:	Other
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 18 (28%), Referenced to phase 2: and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Pretimed	

Splits and Phases: 24: Nash Road & Church Street

HCM Signalized Intersection Capacity Analysis
24: Nash Road & Church Street

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	97	240	25	40	255	42	60	102	25	35	161	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	16	14	16	16	16	16
Total Lost time (s)		6.0			6.0			7.0			7.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.98			0.98			0.94	
Flt Protected		0.99			0.99			0.98			0.99	
Satd. Flow (prot)		1934			2056			1905			1875	
Flt Permitted		0.82			0.92			0.74			0.94	
Satd. Flow (perm)		1604			1898			1432			1778	
Peak-hour factor, PHF	0.89	0.89	0.89	0.96	0.96	0.96	0.83	0.83	0.83	0.91	0.91	0.91
Adj. Flow (vph)	109	270	28	42	266	44	72	123	30	38	177	160
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	407	0	0	352	0	0	225	0	0	375	0
Heavy Vehicles (%)	15%	6%	12%	7%	2%	0%	2%	2%	8%	8%	10%	5%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Actuated Green, G (s)		30.0			30.0			22.0			22.0	
Effective Green, g (s)		30.0			30.0			22.0			22.0	
Actuated g/C Ratio		0.46			0.46			0.34			0.34	
Clearance Time (s)		6.0			6.0			7.0			7.0	
Lane Grp Cap (vph)		740			876			485			602	
v/s Ratio Prot												
v/s Ratio Perm		c0.25			0.19			0.16			c0.21	
v/c Ratio		0.55			0.40			0.46			0.62	
Uniform Delay, d1		12.6			11.6			16.9			18.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.9			1.4			3.2			4.8	
Delay (s)		15.6			12.9			20.0			22.8	
Level of Service		B			B			C			C	
Approach Delay (s)		15.6			12.9			20.0			22.8	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
28: Coggeshall Street & Route 18 SB

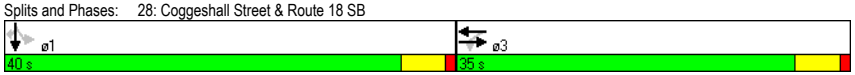
2030 Build Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	200	95	196	212	0	0	0	0	126	690	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	15	12	12	12	12	12	10	10
Storage Length (ft)	0		0	0		0	0		0	0		130
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			No			No			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		686			474			1008			501	
Travel Time (s)		15.6			10.8			22.9			11.4	
Peak Hour Factor	0.78	0.78	0.78	0.86	0.86	0.86	0.92	0.92	0.92	0.88	0.88	0.88
Heavy Vehicles (%)	0%	5%	2%	2%	8%	0%	0%	0%	0%	7%	3%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	378	0	0	475	0	0	0	0	0	927	45
Turn Type				Perm						Perm		Perm
Protected Phases		3			3						1	
Permitted Phases				3						1		1
Minimum Split (s)		35.0		35.0	35.0					40.0	40.0	40.0
Total Split (s)	0.0	35.0	0.0	35.0	35.0	0.0	0.0	0.0	0.0	40.0	40.0	40.0
Total Split (%)	0.0%	46.7%	0.0%	46.7%	46.7%	0.0%	0.0%	0.0%	0.0%	53.3%	53.3%	53.3%
Maximum Green (s)		30.0		30.0	30.0					35.0	35.0	35.0
Yellow Time (s)		4.0		4.0	4.0					4.0	4.0	4.0
All-Red Time (s)		1.0		1.0	1.0					1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	4.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
v/c Ratio		0.52			1.16						0.62	0.06
Control Delay		18.4			122.9						17.2	4.0
Queue Delay		0.0			0.0						0.0	0.0
Total Delay		18.4			122.9						17.2	4.0
Queue Length 50th (ft)		116			~267						161	0
Queue Length 95th (ft)		157			#412						213	15
Internal Link Dist (ft)		606			394			928			421	
Turn Bay Length (ft)												130
Base Capacity (vph)		721			408						1505	694
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		0.52			1.16						0.62	0.06

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2: and 6:, Start of Green	
Natural Cycle: 80	
Control Type: Pretimed	

~ 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.

Splits and Phases: 28: Coggeshall Street & Route 18 SB



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	200	95	196	212	0	0	0	0	126	690	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	15	12	12	12	12	12	10	10
Total Lost time (s)		5.0			5.0						5.0	5.0
Lane Util. Factor		1.00			1.00						0.95	1.00
Frt		0.96			1.00						1.00	0.85
Flt Protected		1.00			0.98						0.99	1.00
Satd. Flow (prot)		1747			1942						3227	1436
Flt Permitted		1.00			0.51						0.99	1.00
Satd. Flow (perm)		1747			1020						3227	1436
Peak-hour factor, PHF	0.78	0.78	0.78	0.86	0.86	0.86	0.92	0.92	0.92	0.88	0.88	0.88
Adj. Flow (vph)	0	256	122	228	247	0	0	0	0	143	784	45
RTOR Reduction (vph)	0	23	0	0	0	0	0	0	0	0	0	24
Lane Group Flow (vph)	0	355	0	0	475	0	0	0	0	0	927	21
Heavy Vehicles (%)	0%	5%	2%	2%	8%	0%	0%	0%	0%	7%	3%	5%
Turn Type				Perm						Perm		Perm
Protected Phases		3			3						1	
Permitted Phases				3						1		1
Actuated Green, G (s)		30.0			30.0						35.0	35.0
Effective Green, g (s)		30.0			30.0						35.0	35.0
Actuated g/C Ratio		0.40			0.40						0.47	0.47
Clearance Time (s)		5.0			5.0						5.0	5.0
Lane Grp Cap (vph)		699			408						1506	670
v/s Ratio Prot		0.20										
v/s Ratio Perm					c0.47						0.29	0.01
v/c Ratio		0.51			1.16						0.62	0.03
Uniform Delay, d1		16.9			22.5						15.0	10.8
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		2.6			97.6						1.9	0.1
Delay (s)		19.6			120.1						16.9	10.9
Level of Service		B			F						B	B
Approach Delay (s)		19.6			120.1			0.0			16.6	
Approach LOS		B			F			A			B	

Intersection Summary					
HCM Average Control Delay	44.1	HCM Level of Service		D	
HCM Volume to Capacity ratio	0.87				
Actuated Cycle Length (s)	75.0	Sum of lost time (s)		10.0	
Intersection Capacity Utilization	91.7%	ICU Level of Service		F	
Analysis Period (min)	15				

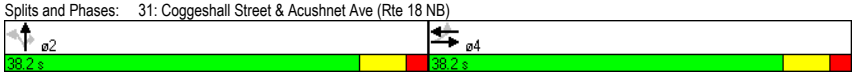
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	278	0	0	318	54	85	295	231	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	15	12	12	11	11	12	12	12
Storage Length (ft)	0		0	0		0	0		160	0		0
Storage Lanes	0		0	0		0	1		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		474			546			1002			363	
Travel Time (s)		10.8			12.4			22.8			8.3	
Peak Hour Factor	0.95	0.95	0.95	0.86	0.86	0.86	0.84	0.84	0.84	0.92	0.92	0.92
Heavy Vehicles (%)	7%	7%	0%	0%	4%	4%	12%	10%	4%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	340	0	0	433	0	101	351	275	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			4			2				
Permitted Phases	4						2		2			
Minimum Split (s)	38.2	38.2			38.2		38.2	38.2	38.2			
Total Split (s)	38.2	38.2	0.0	0.0	38.2	0.0	38.2	38.2	38.2	0.0	0.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	0.0%	50.0%	0.0%	50.0%	50.0%	50.0%	0.0%	0.0%	0.0%
Maximum Green (s)	32.0	32.0			32.0		32.0	32.0	32.0			
Yellow Time (s)	4.2	4.2			4.2		4.2	4.2	4.2			
All-Red Time (s)	2.0	2.0			2.0		2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	4.0	4.0	6.2	4.0	6.2	6.2	6.2	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
v/c Ratio		0.47			0.52		0.15	0.50	0.35			
Control Delay		18.8			18.7		14.6	19.5	3.4			
Queue Delay		0.0			0.0		0.0	0.0	0.0			
Total Delay		18.8			18.7		14.6	19.5	3.4			
Queue Length 50th (ft)		113			143		29	119	0			
Queue Length 95th (ft)		184			210		54	176	33			
Internal Link Dist (ft)		394			466			922			283	
Turn Bay Length (ft)									160			
Base Capacity (vph)		721			833		675	699	789			
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		0.47			0.52		0.15	0.50	0.35			

Intersection Summary	
Area Type:	Other
Cycle Length: 76.4	
Actuated Cycle Length: 76.4	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:, Start of Green	
Natural Cycle: 80	
Control Type: Pretimed	

Lanes, Volumes, Timings
31: Coggeshall Street & Acushnet Ave (Rte 18 NB) 2030 Build Condition - AM Peak Hour

Splits and Phases: 31: Coggeshall Street & Acushnet Ave (Rte 18 NB)



HCM Signalized Intersection Capacity Analysis
31: Coggeshall Street & Acushnet Ave (Rte 18 NB)

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	278	0	0	318	54	85	295	231	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	12	12	15	12	12	11	11	12	12	12
Total Lost time (s)		6.2			6.2		6.2	6.2	6.2			
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00			
Frt		1.00			0.98		1.00	1.00	0.85			
Flt Protected		0.99			1.00		0.95	1.00	1.00			
Satd. Flow (prot)		1940			1970		1612	1670	1501			
Flt Permitted		0.88			1.00		0.95	1.00	1.00			
Satd. Flow (perm)		1720			1970		1612	1670	1501			
Peak-hour factor, PHF	0.95	0.95	0.95	0.86	0.86	0.86	0.84	0.84	0.84	0.92	0.92	0.92
Adj. Flow (vph)	47	293	0	0	370	63	101	351	275	0	0	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	0	160	0	0	0
Lane Group Flow (vph)	0	340	0	0	425	0	101	351	115	0	0	0
Heavy Vehicles (%)	7%	7%	0%	0%	4%	4%	12%	10%	4%	0%	0%	0%
Turn Type	Perm						Perm		Perm			
Protected Phases		4			4			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		32.0			32.0		32.0	32.0	32.0			
Effective Green, g (s)		32.0			32.0		32.0	32.0	32.0			
Actuated g/C Ratio		0.42			0.42		0.42	0.42	0.42			
Clearance Time (s)		6.2			6.2		6.2	6.2	6.2			
Lane Grp Cap (vph)		720			825		675	699	629			
v/s Ratio Prot					c0.22			c0.21				
v/s Ratio Perm		0.20					0.06		0.08			
v/c Ratio		0.47			0.51		0.15	0.50	0.18			
Uniform Delay, d1		16.1			16.4		13.8	16.3	14.0			
Progression Factor		1.00			1.00		1.00	1.00	1.00			
Incremental Delay, d2		2.2			2.3		0.5	2.6	0.6			
Delay (s)		18.3			18.7		14.2	18.9	14.6			
Level of Service		B			B		B	B	B			
Approach Delay (s)		18.3			18.7			16.6			0.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	76.4	Sum of lost time (s)	12.4
Intersection Capacity Utilization	89.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
49: Kings Highway & Stop & Shop driveway

2030 Build Condition - AM Peak Hour

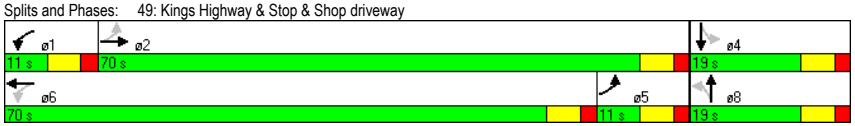
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	465	159	157	600	35	52	5	78	45	10	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		515			208			360			359	
Travel Time (s)		11.7			4.7			8.2			8.2	
Peak Hour Factor	0.81	0.81	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.72	0.72	0.72
Heavy Vehicles (%)	6%	6%	3%	1%	4%	0%	12%	29%	2%	0%	13%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	869	0	0	880	0	0	151	0	0	159	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.0	13.0		11.0	13.0		13.0	13.0		19.0	19.0	
Total Split (s)	11.0	70.0	0.0	11.0	70.0	0.0	19.0	19.0	0.0	19.0	19.0	0.0
Total Split (%)	11.0%	70.0%	0.0%	11.0%	70.0%	0.0%	19.0%	19.0%	0.0%	19.0%	19.0%	0.0%
Maximum Green (s)	5.0	64.0		5.0	64.0		13.0	13.0		13.0	13.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	
Walk Time (s)										5.0	5.0	
Flash Dont Walk (s)										8.0	8.0	
Pedestrian Calls (#/hr)										0	0	
v/c Ratio		0.45			0.51			0.53			0.54	
Control Delay		1.5			4.8			26.9			28.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		1.5			4.8			26.9			28.7	
Queue Length 50th (ft)		10			71			21			24	
Queue Length 95th (ft)		36			127			51			38	
Internal Link Dist (ft)		435			128			280			279	
Turn Bay Length (ft)												
Base Capacity (vph)		1935			1734			395			413	
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		0.45			0.51			0.38			0.38	

Intersection Summary	
Area Type:	Other

Lanes, Volumes, Timings
49: Kings Highway & Stop & Shop driveway

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green, Master Intersection
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 49: Kings Highway & Stop & Shop driveway



HCM Signalized Intersection Capacity Analysis
49: Kings Highway & Stop & Shop driveway

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	465	159	157	600	35	52	5	78	45	10	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frt		0.97			0.99			0.91			0.92	
Flt Protected		0.99			0.99			0.98			0.98	
Satd. Flow (prot)		3293			3440			3027			3227	
Flt Permitted		0.73			0.63			0.80			0.80	
Satd. Flow (perm)		2412			2173			2455			2622	
Peak-hour factor, PHF	0.81	0.81	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.72	0.72	0.72
Adj. Flow (vph)	99	574	196	174	667	39	58	6	87	62	14	83
RTOR Reduction (vph)	0	15	0	0	2	0	0	80	0	0	76	0
Lane Group Flow (vph)	0	854	0	0	878	0	0	71	0	0	83	0
Heavy Vehicles (%)	6%	6%	3%	1%	4%	0%	12%	29%	2%	0%	13%	0%
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		79.7			79.7			8.3			8.3	
Effective Green, g (s)		79.7			79.7			8.3			8.3	
Actuated g/C Ratio		0.80			0.80			0.08			0.08	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		1922			1732			204			218	
v/s Ratio Prot												
v/s Ratio Perm		0.35			c0.40			0.03			c0.03	
v/c Ratio		0.44			0.51			0.35			0.38	
Uniform Delay, d1		3.2			3.5			43.3			43.4	
Progression Factor		0.29			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.1			0.4			0.4	
Delay (s)		1.0			3.5			43.7			43.8	
Level of Service		A			A			D			D	
Approach Delay (s)		1.0			3.5			43.7			43.8	
Approach LOS		A			A			D			D	

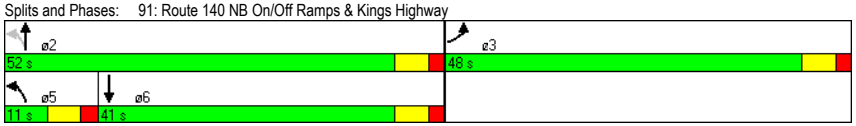
Intersection Summary				
HCM Average Control Delay	8.5	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.50			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	67.1%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	361	100	90	342	664	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	12	12	16
Storage Length (ft)	0	100	0			100
Storage Lanes	1	0	0			0
Taper Length (ft)	25	25	25			25
Right Turn on Red		No				No
Link Speed (mph)	30			30	30	
Link Distance (ft)	268			574	515	
Travel Time (s)	6.1			13.0	11.7	
Peak Hour Factor	0.83	0.83	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	3%	4%	7%	5%	5%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	555	0	0	508	837	0
Turn Type			pm+pt			
Protected Phases	3		5	2	6	
Permitted Phases			2			
Detector Phase	3		5	2	6	
Switch Phase						
Minimum Initial (s)	7.0		5.0	7.0	7.0	
Minimum Split (s)	13.0		11.0	13.0	13.0	
Total Split (s)	48.0	0.0	11.0	52.0	41.0	0.0
Total Split (%)	48.0%	0.0%	11.0%	52.0%	41.0%	0.0%
Maximum Green (s)	42.0		5.0	46.0	35.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	4.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		None	C-Min	C-Min	
v/c Ratio	0.84			0.44	0.45	
Control Delay	41.8			16.6	15.5	
Queue Delay	0.0			0.0	0.0	
Total Delay	41.8			16.6	15.5	
Queue Length 50th (ft)	320			102	177	
Queue Length 95th (ft)	355			203	249	
Internal Link Dist (ft)	188			494	435	
Turn Bay Length (ft)						
Base Capacity (vph)	819			1149	1843	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.68			0.44	0.45	

Intersection Summary	
Area Type:	Other

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 3 (3%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 91: Route 140 NB On/Off Ramps & Kings Highway



HCM Signalized Intersection Capacity Analysis
91: Route 140 NB On/Off Ramps & Kings Highway

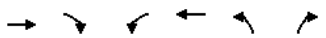
2030 Build Condition - AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	361	100	90	342	664	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	12	12	16
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			0.95	0.95	
Frt	0.97			1.00	0.99	
Flt Protected	0.96			0.99	1.00	
Satd. Flow (prot)	1949			3389	3414	
Flt Permitted	0.96			0.62	1.00	
Satd. Flow (perm)	1949			2128	3414	
Peak-hour factor, PHF	0.83	0.83	0.85	0.85	0.85	0.85
Adj. Flow (vph)	435	120	106	402	781	56
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	555	0	0	508	837	0
Heavy Vehicles (%)	3%	4%	7%	5%	5%	0%
Turn Type			pm+pt			
Protected Phases	3		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	34.0			54.0	54.0	
Effective Green, g (s)	34.0			54.0	54.0	
Actuated g/C Ratio	0.34			0.54	0.54	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	663			1149	1844	
v/s Ratio Prot	c0.28				c0.25	
v/s Ratio Perm				0.24		
v/c Ratio	0.84			0.44	0.45	
Uniform Delay, d1	30.4			13.9	14.0	
Progression Factor	1.00			0.99	0.97	
Incremental Delay, d2	9.0			0.3	0.7	
Delay (s)	39.5			14.1	14.3	
Level of Service	D			B	B	
Approach Delay (s)	39.5			14.1	14.3	
Approach LOS	D			B	B	

Intersection Summary			
HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
96: Kings Highway & Shaw's driveway

2030 Build Condition - AM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	388	105	91	673	90	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	525			574	347	
Travel Time (s)	11.9			13.0	7.9	
Peak Hour Factor	0.93	0.93	0.92	0.92	0.85	0.85
Heavy Vehicles (%)	6%	2%	5%	4%	7%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	530	0	0	831	106	53
Turn Type			pm+pt			Prot
Protected Phases	2		1	6	7	7
Permitted Phases			6			
Detector Phase	2		1	6	7	7
Switch Phase						
Minimum Initial (s)	7.0		5.0	7.0	7.0	7.0
Minimum Split (s)	13.0		11.0	13.0	13.0	13.0
Total Split (s)	60.0	0.0	11.0	71.0	29.0	29.0
Total Split (%)	60.0%	0.0%	11.0%	71.0%	29.0%	29.0%
Maximum Green (s)	54.0		5.0	65.0	23.0	23.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	2.0		2.0	2.0	2.0	2.0
Recall Mode	C-Min		None	C-Min	None	None
v/c Ratio	0.21			0.39	0.58	0.25
Control Delay	5.2			2.0	54.2	13.8
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	5.2			2.0	54.2	13.8
Queue Length 50th (ft)	50			23	65	0
Queue Length 95th (ft)	97			31	108	30
Internal Link Dist (ft)	445			494	267	
Turn Bay Length (ft)						
Base Capacity (vph)	2575			2145	388	395
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	0.21			0.39	0.27	0.13

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 38 (38%), Referenced to phase 2:EBT and 6:WBTL, Start of Green	

Lanes, Volumes, Timings
96: Kings Highway & Shaw's driveway

Natural Cycle: 40
Control Type: Actuated-Coordinated

Splits and Phases: 96: Kings Highway & Shaw's driveway

HCM Signalized Intersection Capacity Analysis
96: Kings Highway & Shaw's driveway

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	388	105	91	673	90	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12
Total Lost time (s)	6.0			6.0	6.0	6.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	0.97			1.00	1.00	0.85
Flt Protected	1.00			0.99	0.95	1.00
Satd. Flow (prot)	3323			3447	1687	1538
Flt Permitted	1.00			0.80	0.95	1.00
Satd. Flow (perm)	3323			2780	1687	1538
Peak-hour factor, PHF	0.93	0.93	0.92	0.92	0.85	0.85
Adj. Flow (vph)	417	113	99	732	106	53
RTOR Reduction (vph)	12	0	0	0	0	47
Lane Group Flow (vph)	518	0	0	831	106	6
Heavy Vehicles (%)	6%	2%	5%	4%	7%	5%
Turn Type			pm+pt			Prot
Protected Phases	2		1	6	7	7
Permitted Phases			6			
Actuated Green, G (s)	77.1			77.1	10.9	10.9
Effective Green, g (s)	77.1			77.1	10.9	10.9
Actuated g/C Ratio	0.77			0.77	0.11	0.11
Clearance Time (s)	6.0			6.0	6.0	6.0
Vehicle Extension (s)	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	2562			2143	184	168
v/s Ratio Prot	0.16				c0.06	0.00
v/s Ratio Perm				c0.30		
v/c Ratio	0.20			0.39	0.58	0.03
Uniform Delay, d1	3.1			3.7	42.4	39.8
Progression Factor	1.66			0.38	1.00	1.00
Incremental Delay, d2	0.2			0.0	2.7	0.0
Delay (s)	5.3			1.5	45.1	39.9
Level of Service	A			A	D	D
Approach Delay (s)	5.3			1.5	43.3	
Approach LOS	A			A	D	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	91	266	90	70	231	135	35	130	165	225	215	202
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	11	16	16	10	10	16	12	14	16	11	16
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		443			1111			850			178	
Travel Time (s)		10.1			25.3			19.3			4.0	
Peak Hour Factor	0.90	0.90	0.90	0.91	0.91	0.91	0.82	0.82	0.82	0.84	0.84	0.84
Heavy Vehicles (%)	1%	6%	5%	1%	6%	6%	3%	6%	11%	4%	4%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	497	0	0	331	148	0	202	201	0	764	0
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt		
Protected Phases		4			4			2		1	2	
Permitted Phases	4			4		4	2		2	2		
Detector Phase	4	4		4	4	4	2	2	2	1	2	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	
Minimum Split (s)	13.0	13.0		13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	
Total Split (s)	30.0	30.0	0.0	30.0	30.0	30.0	30.0	30.0	30.0	20.0	30.0	0.0
Total Split (%)	30.3%	30.3%	0.0%	30.3%	30.3%	30.3%	30.3%	30.3%	30.3%	20.2%	30.3%	0.0%
Maximum Green (s)	25.0	25.0		25.0	25.0	25.0	25.0	25.0	25.0	15.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0		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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0
Lead/Lag	Lag	Lag		Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Recall Mode	Max	Max		Max	Max	Max	None	None	None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.49			0.61	0.22		0.39	0.28		0.76	
Control Delay		16.7			23.5	4.4		18.3	4.1		22.4	
Queue Delay		0.0			0.0	0.0		0.0	0.0		0.0	
Total Delay		16.7			23.5	4.4		18.3	4.1		22.4	
Queue Length 50th (ft)		61			89	0		48	0		100	
Queue Length 95th (ft)		153			#279	39		126	33		#245	
Internal Link Dist (ft)		363			1031			770			98	
Turn Bay Length (ft)												
Base Capacity (vph)		1014			545	664		548	749		1055	
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		0.49			0.61	0.22		0.37	0.27		0.72	

Intersection Summary	
Area Type:	Other

Lane Group	ø3
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	6.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	19%
Maximum Green (s)	14.0
Yellow Time (s)	4.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	6.0
Flash Dont Walk (s)	8.0
Pedestrian Calls (#/hr)	8
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	

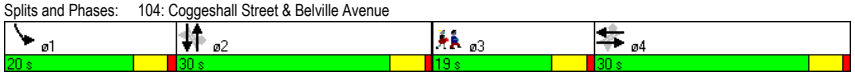
Intersection Summary

Lanes, Volumes, Timings
104: Coggeshall Street & Belville Avenue

2030 Build Condition - AM Peak Hour

Cycle Length: 99
Actuated Cycle Length: 62.7
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 104: Coggeshall Street & Belville Avenue



HCM Signalized Intersection Capacity Analysis
104: Coggeshall Street & Belville Avenue

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	91	266	90	70	231	135	35	130	165	225	215	202
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	11	16	16	10	10	16	12	14	16	11	16
Total Lost time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Lane Util. Factor		0.95			1.00	1.00		1.00	1.00		0.95	
Frt		0.97			1.00	0.85		1.00	0.85		0.95	
Flt Protected		0.99			0.99	1.00		0.99	1.00		0.98	
Satd. Flow (prot)		3197			1672	1422		1784	1552		3161	
Flt Permitted		0.76			0.80	1.00		0.75	1.00		0.77	
Satd. Flow (perm)		2459			1345	1422		1354	1552		2470	
Peak-hour factor, PHF	0.90	0.90	0.90	0.91	0.91	0.91	0.82	0.82	0.82	0.84	0.84	0.84
Adj. Flow (vph)	101	296	100	77	254	148	43	159	201	268	256	240
RTOR Reduction (vph)	0	19	0	0	0	92	0	0	128	0	57	0
Lane Group Flow (vph)	0	478	0	0	331	56	0	202	73	0	707	0
Heavy Vehicles (%)	1%	6%	5%	1%	6%	6%	3%	6%	11%	4%	4%	2%
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt		
Protected Phases		4			4			2		1	2	
Permitted Phases	4			4		4	2		2	2		
Actuated Green, G (s)		25.4			25.4	25.4		24.1	24.1		24.1	
Effective Green, g (s)		25.4			25.4	25.4		24.1	24.1		24.1	
Actuated g/C Ratio		0.38			0.38	0.38		0.36	0.36		0.36	
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Vehicle Extension (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Grp Cap (vph)		936			512	542		489	561		892	
v/s Ratio Prot												
v/s Ratio Perm		0.19			c0.25	0.04		0.15	0.05		c0.29	
v/c Ratio		0.51			0.65	0.10		0.41	0.13		0.79	
Uniform Delay, d1		15.9			17.0	13.3		16.0	14.3		19.1	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		2.0			6.2	0.4		0.8	0.1		5.1	
Delay (s)		17.9			23.2	13.7		16.8	14.4		24.2	
Level of Service		B			C	B		B	B		C	
Approach Delay (s)		17.9			20.2			15.6			24.2	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	66.7	Sum of lost time (s)	17.2
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	67	46	180	505	151	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	14	16	16	14
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		30			30
Link Distance (ft)	693		149			313
Travel Time (s)	15.8		3.4			7.1
Peak Hour Factor	0.84	0.84	0.86	0.86	0.90	0.90
Heavy Vehicles (%)	8%	18%	7%	5%	8%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	135	0	796	0	0	596
Turn Type					Perm	
Protected Phases	2		1			1
Permitted Phases					1	
Minimum Split (s)	27.0		37.0		37.0	37.0
Total Split (s)	27.0	0.0	37.0	0.0	37.0	37.0
Total Split (%)	42.2%	0.0%	57.8%	0.0%	57.8%	57.8%
Maximum Green (s)	20.0		30.0		30.0	30.0
Yellow Time (s)	5.0		5.0		5.0	5.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	4.0	7.0	4.0	7.0	7.0
Lead/Lag	Lag		Lead		Lead	Lead
Lead-Lag Optimize?	Yes		Yes		Yes	Yes
v/c Ratio	0.23		0.43			0.58
Control Delay	11.5		3.6			15.3
Queue Delay	0.0		0.0			0.0
Total Delay	11.5		3.6			15.3
Queue Length 50th (ft)	22		23			84
Queue Length 95th (ft)	53		46			131
Internal Link Dist (ft)	613		69			233
Turn Bay Length (ft)						
Base Capacity (vph)	589		1832			1021
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.23		0.43			0.58

Intersection Summary	
Area Type:	Other
Cycle Length: 64	
Actuated Cycle Length: 64	
Offset: 35 (55%), Referenced to phase 2:WBL and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Pretimed	

Splits and Phases: 137: Hillman St & Pleasant Street

HCM Signalized Intersection Capacity Analysis
137: Hillman St & Pleasant Street

2030 Build Condition - AM Peak Hour

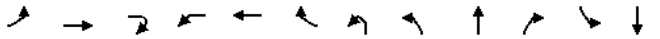
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	67	46	180	505	151	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	14	16	16	14
Total Lost time (s)	7.0		7.0			7.0
Lane Util. Factor	1.00		0.95			0.95
Frt	0.94		0.89			1.00
Flt Protected	0.97		1.00			0.99
Satd. Flow (prot)	1763		3245			3587
Flt Permitted	0.97		1.00			0.60
Satd. Flow (perm)	1763		3245			2178
Peak-hour factor, PHF	0.84	0.84	0.86	0.86	0.90	0.90
Adj. Flow (vph)	80	55	209	587	168	428
RTOR Reduction (vph)	38	0	312	0	0	0
Lane Group Flow (vph)	97	0	484	0	0	596
Heavy Vehicles (%)	8%	18%	7%	5%	8%	5%
Turn Type					Perm	
Protected Phases	2		1			1
Permitted Phases					1	
Actuated Green, G (s)	20.0		30.0			30.0
Effective Green, g (s)	20.0		30.0			30.0
Actuated g/C Ratio	0.31		0.47			0.47
Clearance Time (s)	7.0		7.0			7.0
Lane Grp Cap (vph)	551		1521			1021
v/s Ratio Prot	c0.06		0.15			
v/s Ratio Perm						c0.27
v/c Ratio	0.18		0.32			0.58
Uniform Delay, d1	16.0		10.6			12.4
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.7		0.6			2.4
Delay (s)	16.7		11.2			14.9
Level of Service	B		B			B
Approach Delay (s)	16.7		11.2			14.9
Approach LOS	B		B			B

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	64.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
140: Mill Street & Pleasant St

2030 Build Condition - AM Peak Hour

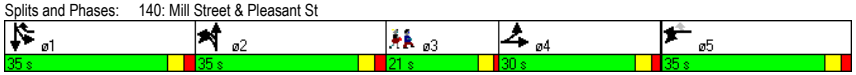


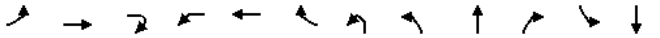
Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	225	185	5	410	180	187	20	55	219	30	57	287
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	16	16	11	12	10	16	10	12	14	16	14
Storage Length (ft)	0			0		0		100		0	0	
Storage Lanes	1			1		1		1		0	0	
Taper Length (ft)	25			25		25		25		25	25	
Right Turn on Red			Yes			No				Yes		
Link Speed (mph)		30			30				30			30
Link Distance (ft)		168			308				709			499
Travel Time (s)		3.8			7.0				16.1			11.3
Peak Hour Factor	0.88	0.88	0.88	0.82	0.82	0.82	0.88	0.88	0.88	0.88	0.84	0.84
Heavy Vehicles (%)	5%	1%	0%	3%	3%	4%	0%	9%	5%	3%	4%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	256	216	0	500	220	228	0	85	283	0	0	466
Turn Type	Split			Split		pm+ov	Split	Split			Split	
Protected Phases	4	4		5	5	1	2	2	2		1	1
Permitted Phases						5						
Detector Phase	4	4		5	5	1	2	2	2		1	1
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0
Minimum Split (s)	21.0	21.0		21.0	21.0	21.0	21.0	21.0	21.0		21.0	21.0
Total Split (s)	30.0	30.0	0.0	35.0	35.0	35.0	35.0	35.0	35.0	0.0	35.0	35.0
Total Split (%)	19.2%	19.2%	0.0%	22.4%	22.4%	22.4%	22.4%	22.4%	22.4%	0.0%	22.4%	22.4%
Maximum Green (s)	25.0	25.0		30.0	30.0	30.0	30.0	30.0	30.0		30.0	30.0
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lag	Lag				Lead	Lag	Lag	Lag		Lead	Lead
Lead-Lag Optimize?	Yes	Yes				Yes	Yes	Yes	Yes		Yes	Yes
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Recall Mode	Max	Max		Max	Max	Max	Max	Max	Max		Max	Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.82	0.58		1.40	0.57	0.35		0.26	0.39			0.60
Control Delay	79.2	62.7		239.0	59.0	28.8		52.1	50.6			56.0
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0			0.0
Total Delay	79.2	62.7		239.0	59.0	28.8		52.1	50.6			56.0
Queue Length 50th (ft)	216	173		~568	172	120		62	108			193
Queue Length 95th (ft)	#409	293		#828	271	210		127	175			274
Internal Link Dist (ft)		88			228				629			419
Turn Bay Length (ft)								100				
Base Capacity (vph)	311	373		356	388	660		332	718			781
Starvation Cap Reductn	0	0		0	0	0		0	0			0
Spillback Cap Reductn	0	0		0	0	0		0	0			0
Storage Cap Reductn	0	0		0	0	0		0	0			0
Reduced v/c Ratio	0.82	0.58		1.40	0.57	0.35		0.26	0.39			0.60

Lane Group	SBR	ø3
Lane Configurations		
Volume (vph)	47	
Ideal Flow (vphpl)	1900	
Lane Width (ft)	16	
Storage Length (ft)	0	
Storage Lanes	0	
Taper Length (ft)	25	
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor	0.84	
Heavy Vehicles (%)	4%	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Turn Type		
Protected Phases		3
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)		4.0
Minimum Split (s)		21.0
Total Split (s)	0.0	21.0
Total Split (%)	0.0%	13%
Maximum Green (s)		17.0
Yellow Time (s)		3.0
All-Red Time (s)		1.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	4.0	
Lead/Lag		Lead
Lead-Lag Optimize?		Yes
Vehicle Extension (s)		3.0
Recall Mode		None
Walk Time (s)		10.0
Flash Dont Walk (s)		7.0
Pedestrian Calls (#/hr)		11
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	
Area Type:	Other
Cycle Length: 156	
Actuated Cycle Length: 143.4	
Natural Cycle: 125	
Control Type: Semi Act-Uncoord	
~ 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.	

Splits and Phases: 140: Mill Street & Pleasant St



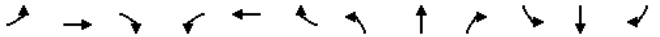


Movement	EBL	EBT	EBR2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	225	185	5	410	180	187	20	55	219	30	57	287
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	16	16	11	12	10	16	10	12	14	16	14
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0			5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	0.95			0.95
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.98			0.98
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.95	1.00			0.99
Satd. Flow (prot)	1776	2124		1694	1845	1449		1581	3384			3714
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.95	1.00			0.99
Satd. Flow (perm)	1776	2124		1694	1845	1449		1581	3384			3714
Peak-hour factor, PHF	0.88	0.88	0.88	0.82	0.82	0.82	0.88	0.88	0.88	0.88	0.84	0.84
Adj. Flow (vph)	256	210	6	500	220	228	23	62	249	34	68	342
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	6	0	0	0
Lane Group Flow (vph)	256	215	0	500	220	228	0	85	277	0	0	466
Heavy Vehicles (%)	5%	1%	0%	3%	3%	4%	0%	9%	5%	3%	4%	0%
Turn Type	Split			Split		pm+ov	Split	Split			Split	
Protected Phases	4	4		5	5	1	2	2	2		1	1
Permitted Phases						5						
Actuated Green, G (s)	25.1	25.1		30.2	30.2	60.4		30.2	30.2			30.2
Effective Green, g (s)	25.1	25.1		30.2	30.2	60.4		30.2	30.2			30.2
Actuated g/C Ratio	0.17	0.17		0.21	0.21	0.41		0.21	0.21			0.21
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0			5.0
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0			5.0
Lane Grp Cap (vph)	305	365		350	382	649		327	700			768
v/s Ratio Prot	c0.14	0.10		c0.30	0.12	0.07		0.05	c0.08			c0.13
v/s Ratio Perm						0.08						
v/c Ratio	0.84	0.59		1.43	0.58	0.35		0.26	0.40			0.61
Uniform Delay, d1	58.5	55.7		57.9	52.1	29.4		48.5	50.0			52.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00			1.00
Incremental Delay, d2	23.3	6.8		208.7	6.2	1.5		1.9	1.7			3.5
Delay (s)	81.8	62.5		266.6	58.3	30.9		50.5	51.7			56.1
Level of Service	F	E		F	E	C		D	D			E
Approach Delay (s)		73.0			161.6				51.4			56.1
Approach LOS		E			F				D			E

Intersection Summary			
HCM Average Control Delay	103.2	HCM Level of Service	F
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	146.0	Sum of lost time (s)	30.3
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	47
Ideal Flow (vphpl)	1900
Lane Width	16
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.84
Adj. Flow (vph)	56
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	4%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	54	40	39	16	10	40	890	51	91	855	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	16	16	16	16	11	11	11	10	11	11
Storage Length (ft)	0		0	0		0	150		225	150		225
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		440			82			328			2491	
Travel Time (s)		10.0			1.9			7.5			56.6	
Peak Hour Factor	0.89	0.89	0.89	0.82	0.82	0.82	0.88	0.88	0.88	0.92	0.92	0.92
Heavy Vehicles (%)	8%	6%	3%	6%	6%	10%	7%	7%	4%	7%	5%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	281	106	0	0	80	0	45	1011	58	99	929	261
Turn Type	Perm			Perm			Prot		custom	Prot		Perm
Protected Phases		4			4		1	2	5	1	2	
Permitted Phases	4			4								2
Detector Phase	4	4		4	4		1	2	5	1	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		4.0	7.0	4.0	4.0	7.0	7.0
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0	13.0	9.0	10.0	13.0	13.0
Total Split (s)	32.0	32.0	0.0	32.0	32.0	0.0	19.0	38.0	20.0	19.0	38.0	38.0
Total Split (%)	22.9%	22.9%	0.0%	22.9%	22.9%	0.0%	13.6%	27.1%	14.3%	13.6%	27.1%	27.1%
Maximum Green (s)	27.0	27.0		27.0	27.0		13.0	32.0	15.0	13.0	32.0	32.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	5.0	5.0		5.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Recall Mode	None	None		None	None		None	None	None	None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.94	0.26			0.21		0.26	1.07	0.39	0.60	0.96	0.46
Control Delay	84.3	43.4			76.9		58.0	88.6	61.8	69.5	62.9	16.8
Queue Delay	0.0	0.0			0.0		0.0	149.8	289.8	0.4	0.0	0.0
Total Delay	84.3	43.4			76.9		58.0	238.4	351.6	69.9	62.9	16.8
Queue Length 50th (ft)	182	57			49		28	~366	37	63	315	41
Queue Length 95th (ft)	#486	142			110		79	#746	95	#172	#681	155
Internal Link Dist (ft)		360			2			248			2411	
Turn Bay Length (ft)							150		225	150		225
Base Capacity (vph)	299	403			384		193	948	205	186	967	567
Starvation Cap Reductn	0	0			0		0	231	0	0	0	0
Spillback Cap Reductn	0	0			0		0	0	168	6	0	0
Storage Cap Reductn	0	0			0		0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.26			0.21		0.23	1.41	1.57	0.55	0.96	0.46

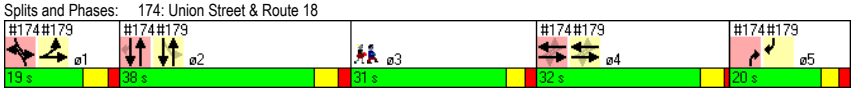
Lane Group	ø3
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	17.0
Minimum Split (s)	31.0
Total Split (s)	31.0
Total Split (%)	22%
Maximum Green (s)	26.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	17.0
Flash Dont Walk (s)	9.0
Pedestrian Calls (#/hr)	13
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	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 114.2	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	

~ 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.

Splits and Phases: 174: Union Street & Route 18



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	54	40	39	16	10	40	890	51	91	855	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	16	16	16	16	11	11	11	10	11	11
Total Lost time (s)	5.0	5.0			5.0		6.0	6.0	5.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.94			0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1616	1642			1921		1631	3261	1501	1574	3323	1516
Flt Permitted	0.72	1.00			0.79		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1221	1642			1563		1631	3261	1501	1574	3323	1516
Peak-hour factor, PHF	0.89	0.89	0.89	0.82	0.82	0.82	0.88	0.88	0.88	0.92	0.92	0.92
Adj. Flow (vph)	281	61	45	48	20	12	45	1011	58	99	929	261
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	128
Lane Group Flow (vph)	281	106	0	0	80	0	45	1011	58	99	929	133
Heavy Vehicles (%)	8%	6%	3%	6%	6%	10%	7%	7%	4%	7%	5%	3%
Turn Type	Perm			Perm			Prot		custom	Prot		Perm
Protected Phases		4			4		1	2	5	1	2	
Permitted Phases	4			4								2
Actuated Green, G (s)	28.0	28.0			28.0		12.0	33.2	9.3	12.0	33.2	33.2
Effective Green, g (s)	28.0	28.0			28.0		12.0	33.2	9.3	12.0	33.2	33.2
Actuated g/C Ratio	0.24	0.24			0.24		0.10	0.28	0.08	0.10	0.28	0.28
Clearance Time (s)	5.0	5.0			5.0		6.0	6.0	5.0	6.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0			5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	290	390			371		166	918	118	160	935	427
v/s Ratio Prot		0.06					0.03	c0.31	c0.04	c0.06	0.28	
v/s Ratio Perm	c0.23				0.05							0.09
v/c Ratio	0.97	0.27			0.22		0.27	1.10	0.49	0.62	0.99	0.31
Uniform Delay, d1	44.6	36.7			36.2		49.0	42.4	52.1	50.8	42.3	33.4
Progression Factor	1.00	1.00			1.80		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	44.5	0.8			0.6		1.2	61.4	4.3	7.9	27.7	0.6
Delay (s)	89.0	37.5			65.6		50.2	103.8	56.4	58.7	70.0	34.0
Level of Service	F	D			E		D	F	E	E	E	C
Approach Delay (s)		74.9			65.6			99.2			61.9	
Approach LOS		E			E			F			E	

Intersection Summary					
HCM Average Control Delay		78.2	HCM Level of Service		E
HCM Volume to Capacity ratio		0.92			
Actuated Cycle Length (s)		118.0	Sum of lost time (s)		35.5
Intersection Capacity Utilization		64.3%	ICU Level of Service		C
Analysis Period (min)		15			
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	81	20	95	5	10	5	0	168	20	15	183	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	15	16	16	16	16	16	12	12
Storage Length (ft)	0		0	0		0	0		0	0		50
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		82			609			920			687	
Travel Time (s)		1.9			13.8			20.9			15.6	
Peak Hour Factor	0.78	0.78	0.78	0.57	0.57	0.57	0.89	0.89	0.89	0.81	0.81	0.81
Heavy Vehicles (%)	12%	14%	5%	0%	17%	33%	0%	22%	0%	14%	13%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	252	0	0	36	0	0	211	0	0	245	69
Turn Type	pm+pt			Perm						Perm		custom
Protected Phases	1	1 4			4			2			2	5
Permitted Phases	1 4			4						2		
Detector Phase	1	1 4		4	4			2		2	2	5
Switch Phase												
Minimum Initial (s)	4.0			7.0	7.0			7.0		7.0	7.0	4.0
Minimum Split (s)	10.0			12.0	12.0			13.0		13.0	13.0	9.0
Total Split (s)	19.0	51.0	0.0	32.0	32.0	0.0	0.0	38.0	0.0	38.0	38.0	20.0
Total Split (%)	13.6%	36.4%	0.0%	22.9%	22.9%	0.0%	0.0%	27.1%	0.0%	27.1%	27.1%	14.3%
Maximum Green (s)	13.0			27.0	27.0			32.0		32.0	32.0	15.0
Yellow Time (s)	4.0			4.0	4.0			4.0		4.0	4.0	3.0
All-Red Time (s)	2.0			1.0	1.0			2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	4.0	6.0	4.0	6.0	6.0	5.0
Lead/Lag	Lead			Lag	Lag			Lag		Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes			Yes		Yes	Yes	
Vehicle Extension (s)	4.0			5.0	5.0			4.0		4.0	4.0	4.0
Recall Mode	None			None	None			None		None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.45			0.09			0.41			0.52	0.45
Control Delay		16.0			34.7			40.1			43.9	63.7
Queue Delay		0.0			0.0			0.0			0.0	335.7
Total Delay		16.0			34.7			40.1			43.9	399.4
Queue Length 50th (ft)		48			14			109			134	44
Queue Length 95th (ft)		76			30			247			266	100
Internal Link Dist (ft)		2			529			840			607	
Turn Bay Length (ft)												50
Base Capacity (vph)		586			395			519			472	212
Starvation Cap Reductn		0			0			0			0	0
Spillback Cap Reductn		0			11			0			0	171
Storage Cap Reductn		0			0			0			0	0
Reduced v/c Ratio		0.43			0.09			0.41			0.52	1.68

Lanes, Volumes, Timings
179: Union Street & McArthur Drive
2030 Build Condition - AM Peak Hour

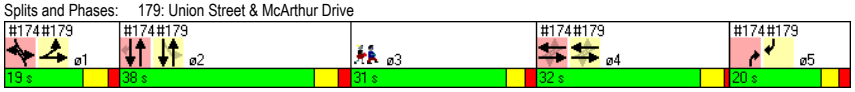
Lane Group	ø3
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	17.0
Minimum Split (s)	31.0
Total Split (s)	31.0
Total Split (%)	22%
Maximum Green (s)	26.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	17.0
Flash Dont Walk (s)	9.0
Pedestrian Calls (#/hr)	13
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	

Lanes, Volumes, Timings
179: Union Street & McArthur Drive

2030 Build Condition - AM Peak Hour

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 114.2	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 179: Union Street & McArthur Drive



HCM Signalized Intersection Capacity Analysis
179: Union Street & McArthur Drive

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	81	20	95	5	10	5	0	168	20	15	183	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	15	16	16	16	16	16	12	12
Total Lost time (s)		6.0			5.0			6.0			6.0	5.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frt		0.93			0.97			0.99			1.00	0.85
Flt Protected		0.98			0.99			1.00			1.00	1.00
Satd. Flow (prot)		1812			1708			1774			1674	1553
Flt Permitted		0.85			0.92			1.00			0.97	1.00
Satd. Flow (perm)		1573			1585			1774			1622	1553
Peak-hour factor, PHF	0.78	0.78	0.78	0.57	0.57	0.57	0.89	0.89	0.89	0.81	0.81	0.81
Adj. Flow (vph)	104	26	122	9	18	9	0	189	22	19	226	69
RTOR Reduction (vph)	0	0	0	0	7	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	252	0	0	29	0	0	208	0	0	245	69
Heavy Vehicles (%)	12%	14%	5%	0%	17%	33%	0%	22%	0%	14%	13%	4%
Turn Type	pm+pt			Perm						Perm		custom
Protected Phases	1	1 4			4			2			2	5
Permitted Phases	1 4			4						2		
Actuated Green, G (s)		40.0			28.0			33.2			33.2	9.3
Effective Green, g (s)		40.0			28.0			33.2			33.2	9.3
Actuated g/C Ratio		0.34			0.24			0.28			0.28	0.08
Clearance Time (s)					5.0			6.0			6.0	5.0
Vehicle Extension (s)					5.0			4.0			4.0	4.0
Lane Grp Cap (vph)		558			376			499			456	122
v/s Ratio Prot		c0.05						0.12				c0.04
v/s Ratio Perm		c0.11			0.02						c0.15	
v/c Ratio		0.45			0.08			0.42			0.54	0.57
Uniform Delay, d1		30.4			35.0			34.5			35.9	52.4
Progression Factor		0.64			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.8			0.2			0.8			1.6	7.1
Delay (s)		20.2			35.1			35.3			37.5	59.5
Level of Service		C			D			D			D	E
Approach Delay (s)		20.2			35.1			35.3			42.3	
Approach LOS		C			D			D			D	

Intersection Summary					
HCM Average Control Delay	33.3	HCM Level of Service	C		
HCM Volume to Capacity ratio	0.50				
Actuated Cycle Length (s)	118.0	Sum of lost time (s)	36.5		
Intersection Capacity Utilization	50.0%	ICU Level of Service	A		
Analysis Period (min)	15				
c Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis
9: Tarkiln Hill Rd & Kings Highway

2030 Build Condition - AM Peak Hour

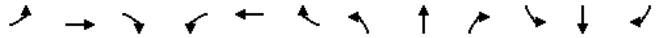
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	10	21	10	578	771	60
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.83	0.83	0.90	0.90
Hourly flow rate (vph)	12	26	12	696	857	67
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				393	611	
pX, platoon unblocked	0.91					
vC, conflicting volume	1610	890	923			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1621	890	923			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	92	98			
cM capacity (veh/h)	101	337	748			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	38	708	923
Volume Left	12	12	0
Volume Right	26	0	67
cSH	192	748	1700
Volume to Capacity	0.20	0.02	0.54
Queue Length 95th (ft)	18	1	0
Control Delay (s)	28.3	0.4	0.0
Lane LOS	D	A	
Approach Delay (s)	28.3	0.4	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: Park Avenue & Church Street

2030 Build Condition - AM Peak Hour



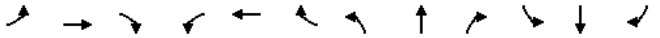
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	73	140	20	0	52	0	428	20	10	190	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.84	0.84	0.84	0.85	0.85	0.85	0.76	0.76	0.76
Hourly flow rate (vph)	0	94	179	24	0	62	0	504	24	13	250	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											176	
pX, platoon unblocked	0.94	0.94	0.94	0.94	0.94		0.94					
vC, conflicting volume	854	803	250	1018	792	515	250			527		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	809	756	165	985	743	515	165			527		
tC, single (s)	7.1	6.5	6.3	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	70	78	81	100	89	100			99		
cM capacity (veh/h)	248	312	804	127	319	564	1335			1050		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	273	86	527	263
Volume Left	0	24	0	13
Volume Right	179	62	24	0
cSH	522	288	1700	1050
Volume to Capacity	0.52	0.30	0.31	0.01
Queue Length 95th (ft)	75	30	0	1
Control Delay (s)	19.2	22.7	0.0	0.5
Lane LOS	C	C		A
Approach Delay (s)	19.2	22.7	0.0	0.5
Approach LOS	C	C		

Intersection Summary			
Average Delay	6.4		
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
17: Irvington Street & Church Street

2030 Build Condition - AM Peak Hour



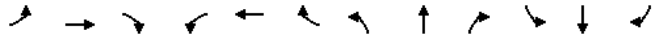
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	0	5	25	0	20	5	274	0	0	343	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.79	0.79	0.79	0.85	0.85	0.85	0.77	0.77	0.77
Hourly flow rate (vph)	7	0	7	32	0	25	6	322	0	0	445	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	811	786	452	793	793	322	458			322		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	811	786	452	793	793	322	458			322		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	99	89	100	96	99			100		
cM capacity (veh/h)	288	325	612	295	322	723	1113			1249		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	13	57	328	458
Volume Left	7	32	6	0
Volume Right	7	25	0	13
cSH	392	400	1113	1700
Volume to Capacity	0.03	0.14	0.01	0.27
Queue Length 95th (ft)	3	12	0	0
Control Delay (s)	14.5	15.5	0.2	0.0
Lane LOS	B	C	A	
Approach Delay (s)	14.5	15.5	0.2	0.0
Approach LOS	B	C		

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	28.7%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
32: Coggeshall Street & North Front St

2030 Build Condition - AM Peak Hour



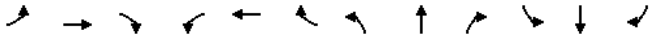
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	50	390	54	119	320	50	37	67	52	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.84	0.84	0.84	0.86	0.86	0.86	0.92	0.92	0.92
Hourly flow rate (vph)	56	438	61	142	381	60	43	78	60	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		546			443							
pX, platoon unblocked	0.93			0.91			0.95	0.95	0.91	0.95	0.95	0.93
vC, conflicting volume	440			499			1275	1305	469	1374	1305	411
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	357			398			1089	1120	365	1194	1121	325
tC, single (s)	4.1			4.1			7.2	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.5	4.0	3.3
p0 queue free %	95			87			72	51	90	100	100	100
cM capacity (veh/h)	1104			1054			153	160	604	76	161	668

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	555	582	181
Volume Left	56	142	43
Volume Right	61	60	60
cSH	1104	1054	209
Volume to Capacity	0.05	0.13	0.87
Queue Length 95th (ft)	4	12	168
Control Delay (s)	1.4	3.4	80.0
Lane LOS	A	A	F
Approach Delay (s)	1.4	3.4	80.0
Approach LOS			F

Intersection Summary				
Average Delay	13.1			
Intersection Capacity Utilization	66.0%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
55: Rt 18 SB Exit Ramp & Purchase St

2030 Build Condition - AM Peak Hour



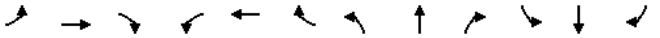
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	10	248	5	35	0	231	0	0	279	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	11	270	5	38	0	251	0	0	303	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								823				
pX, platoon unblocked												
vC, conflicting volume	595	554	303	565	554	251	303			251		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	595	554	303	565	554	251	303			251		
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 %	100	100	99	37	99	95	100			100		
cM capacity (veh/h)	392	440	736	429	440	788	1258			1314		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	11	313	251	303
Volume Left	0	270	0	0
Volume Right	11	38	0	0
cSH	736	454	1258	1700
Volume to Capacity	0.01	0.69	0.00	0.18
Queue Length 95th (ft)	1	129	0	0
Control Delay (s)	10.0	28.7	0.0	0.0
Lane LOS	A	D		
Approach Delay (s)	10.0	28.7	0.0	0.0
Approach LOS	A	D		

Intersection Summary				
Average Delay	10.4			
Intersection Capacity Utilization	44.2%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
58: Coggeshall St & Purchase Street

2030 Build Condition - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	15	155	36	35	109	98	10	202	60	97	177	15
Peak Hour Factor	0.80	0.80	0.80	0.83	0.83	0.83	0.89	0.89	0.89	0.88	0.88	0.88
Hourly flow rate (vph)	19	194	45	42	131	118	11	227	67	110	201	17

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	258	292	306	328
Volume Left (vph)	19	42	11	110
Volume Right (vph)	45	118	67	17
Hadj (s)	-0.04	-0.10	-0.04	0.20
Departure Headway (s)	6.8	6.6	6.6	6.7
Degree Utilization, x	0.48	0.54	0.56	0.61
Capacity (veh/h)	469	487	498	491
Control Delay (s)	15.9	17.0	17.5	19.8
Approach Delay (s)	15.9	17.0	17.5	19.8
Approach LOS	C	C	C	C

Intersection Summary				
Delay	17.7			
HCM Level of Service	C			
Intersection Capacity Utilization	63.0%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
72: Weld St & Purchase St

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	0	5	121	55	25	57	229	0	0	256	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.89	0.89	0.89	0.89	0.89	0.89	0.83	0.83	0.83
Hourly flow rate (vph)	6	0	6	136	62	28	64	257	0	0	308	30
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	768	709	323	715	724	257	339			257		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	768	709	323	715	724	257	339			257		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.3			2.2		
p0 queue free %	98	100	99	58	81	96	95			100		
cM capacity (veh/h)	254	342	711	326	333	765	1177			1319		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	12	167	59	321	339
Volume Left	6	136	0	64	0
Volume Right	6	0	28	0	30
cSH	375	328	455	1177	1700
Volume to Capacity	0.03	0.51	0.13	0.05	0.20
Queue Length 95th (ft)	2	69	11	4	0
Control Delay (s)	14.9	26.9	14.1	2.1	0.0
Lane LOS	B	D	B	A	
Approach Delay (s)	14.9	23.5		2.1	0.0
Approach LOS	B	C			

Intersection Summary				
Average Delay	6.9			
Intersection Capacity Utilization	52.6%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
74: Logan St & Purchase St

2030 Build Condition - AM Peak Hour

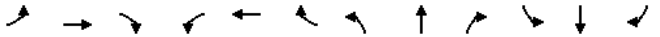
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	35	0	46	0	240	120	106	279	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.84	0.84	0.84	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	42	0	55	0	267	133	118	310	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	934	946	310	879	879	333	310			400		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	934	946	310	879	879	333	310			400		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.3	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.4	2.2			2.3		
p0 queue free %	100	100	100	83	100	92	100			90		
cM capacity (veh/h)	211	236	735	243	258	697	1262			1132		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	96	400	428
Volume Left	0	42	0	118
Volume Right	0	55	133	0
cSH	1700	385	1262	1132
Volume to Capacity	0.00	0.25	0.00	0.10
Queue Length 95th (ft)	0	24	0	9
Control Delay (s)	0.0	17.4	0.0	3.1
Lane LOS	A	C		A
Approach Delay (s)	0.0	17.4	0.0	3.1
Approach LOS	A	C		

Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	55.3%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
75: Logan St & North Front Street

2030 Build Condition - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	156	15	15	5	5	15	5	146	5	55	219	89
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.69	0.69	0.69	0.78	0.78	0.78	0.93	0.93	0.93
Hourly flow rate (vph)	184	18	18	7	7	22	6	187	6	59	235	96
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											720	
pX, platoon unblocked												
vC, conflicting volume	630	608	283	631	653	190	331			194		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	630	608	283	631	653	190	331			194		
tC, single (s)	7.2	6.5	6.4	7.1	6.5	6.4	4.3			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.5	3.5	4.0	3.5	2.4			2.2		
p0 queue free %	48	96	98	98	98	97	99			96		
cM capacity (veh/h)	352	393	719	360	371	805	1149			1380		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	219	36	200	390
Volume Left	184	7	6	59
Volume Right	18	22	6	96
cSH	371	543	1149	1380
Volume to Capacity	0.59	0.07	0.01	0.04
Queue Length 95th (ft)	91	5	0	3
Control Delay (s)	27.8	12.1	0.3	1.5
Lane LOS	D	B	A	A
Approach Delay (s)	27.8	12.1	0.3	1.5
Approach LOS	D	B		

Intersection Summary				
Average Delay	8.5			
Intersection Capacity Utilization	55.3%	ICU Level of Service		B
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
77: Route 140 On/Off Ramps & Mt. Pleasant Street

2030 Build Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	167	0	230	408	55	226
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.69	0.69	0.85	0.85	0.75	0.75
Hourly flow rate (vph)	242	0	271	480	73	301
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			877			
pX, platoon unblocked						
vC, conflicting volume	959	511			271	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	959	511			271	
tC, single (s)	6.5	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	5	100			94	
cM capacity (veh/h)	256	559			1293	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	242	751	375
Volume Left	242	0	73
Volume Right	0	480	0
cSH	256	1700	1293
Volume to Capacity	0.95	0.44	0.06
Queue Length 95th (ft)	217	0	5
Control Delay (s)	85.2	0.0	2.0
Lane LOS	F		A
Approach Delay (s)	85.2	0.0	2.0
Approach LOS	F		

Intersection Summary				
Average Delay	15.6			
Intersection Capacity Utilization	71.3%	ICU Level of Service		C
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
126: Logan St & Acushnet Ave.

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	145	61	39	55	0	26	7	51	0	6	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.90	0.90	0.90	0.88	0.88	0.88	0.67	0.67	0.67
Hourly flow rate (vph)	19	181	76	43	61	0	30	8	58	0	9	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	136	134	9	272	105	37	9			66		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	136	134	9	272	105	37	9			66		
tC, single (s)	7.2	6.5	6.3	7.2	6.6	6.2	4.3			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.6	4.1	3.3	2.3			2.2		
p0 queue free %	98	75	93	91	92	100	98			100		
cM capacity (veh/h)	752	739	1061	492	763	1041	1524			1549		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	276	104	95	9
Volume Left	19	43	30	0
Volume Right	76	0	58	0
cSH	807	621	1524	1549
Volume to Capacity	0.34	0.17	0.02	0.00
Queue Length 95th (ft)	38	15	1	0
Control Delay (s)	11.8	12.0	2.4	0.0
Lane LOS	B	B	A	
Approach Delay (s)	11.8	12.0	2.4	0.0
Approach LOS	B	B		

Intersection Summary				
Average Delay	9.7			
Intersection Capacity Utilization	35.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
129: Whale's Tooth Station driveway & Acushnet Ave.

2030 Build Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	36	35	80	151	50	75
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.86	0.86	0.76	0.76
Hourly flow rate (vph)	39	38	93	176	66	99
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	411	181			269	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	411	181			269	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	96			95	
cM capacity (veh/h)	567	862			1295	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	77	269	164
Volume Left	39	0	66
Volume Right	38	176	0
cSH	682	1700	1295
Volume to Capacity	0.11	0.16	0.05
Queue Length 95th (ft)	10	0	4
Control Delay (s)	11.0	0.0	3.4
Lane LOS	B		A
Approach Delay (s)	11.0	0.0	3.4
Approach LOS	B		

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
130: Herman Melville Boulevard & McArthur Drive

2030 Build Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	120	35	169	100	60	149
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.99	0.99	0.81	0.81
Hourly flow rate (vph)	128	37	171	101	74	184
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	553	221			272	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	553	221			272	
tC, single (s)	6.6	6.4			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.5			2.3	
p0 queue free %	71	95			94	
cM capacity (veh/h)	444	780			1247	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	165	272	258
Volume Left	128	0	74
Volume Right	37	101	0
cSH	492	1700	1247
Volume to Capacity	0.34	0.16	0.06
Queue Length 95th (ft)	36	0	5
Control Delay (s)	16.0	0.0	2.7
Lane LOS	C		A
Approach Delay (s)	16.0	0.0	2.7
Approach LOS	C		

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
136: Hillman St & Acushnet Ave.

2030 Build Condition - AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	156	165	120	84	44	47
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.91	0.91	0.82	0.82
Hourly flow rate (vph)	184	194	132	92	54	57
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	438	82	111			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	438	82	111			
tC, single (s)	6.4	6.3	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.4			
p0 queue free %	65	80	90			
cM capacity (veh/h)	521	966	1379			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	378	224	111
Volume Left	184	132	0
Volume Right	194	0	57
cSH	682	1379	1700
Volume to Capacity	0.55	0.10	0.07
Queue Length 95th (ft)	85	8	0
Control Delay (s)	16.6	5.0	0.0
Lane LOS	C	A	
Approach Delay (s)	16.6	5.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	10.4		
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
147: Wamsutta St & Acushnet Ave.

2030 Build Condition - AM Peak Hour

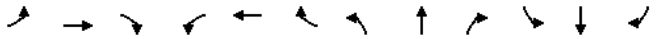
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	39	10	74	26	10	101
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.65	0.65	0.86	0.86	0.76	0.76
Hourly flow rate (vph)	60	15	86	30	13	133
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	260	101			86	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	260	101			86	
tC, single (s)	6.4	6.4			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.3	
p0 queue free %	92	98			99	
cM capacity (veh/h)	726	895			1467	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	75	116	146
Volume Left	60	0	13
Volume Right	15	30	0
cSH	755	1700	1467
Volume to Capacity	0.10	0.07	0.01
Queue Length 95th (ft)	8	0	1
Control Delay (s)	10.3	0.0	0.7
Lane LOS	B		A
Approach Delay (s)	10.3	0.0	0.7
Approach LOS	B		

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
148: Wamsutta St & North Front St

2030 Build Condition - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	26	0	10	5	0	10	5	115	15	10	160	44
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.64	0.64	0.64	0.58	0.58	0.58	0.93	0.93	0.93	0.89	0.89	0.89
Hourly flow rate (vph)	41	0	16	9	0	17	5	124	16	11	180	49
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	387	378	204	385	394	132	229			140		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	387	378	204	385	394	132	229			140		
tC, single (s)	7.1	6.5	6.2	7.3	6.5	6.3	4.1			4.5		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.7	4.0	3.4	2.2			2.5		
p0 queue free %	93	100	98	98	100	98	100			99		
cM capacity (veh/h)	559	550	841	527	538	894	1351			1259		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	56	26	145	240
Volume Left	41	9	5	11
Volume Right	16	17	16	49
cSH	616	725	1351	1259
Volume to Capacity	0.09	0.04	0.00	0.01
Queue Length 95th (ft)	7	3	0	1
Control Delay (s)	11.4	10.1	0.3	0.4
Lane LOS	B	B	A	A
Approach Delay (s)	11.4	10.1	0.3	0.4
Approach LOS	B	B		

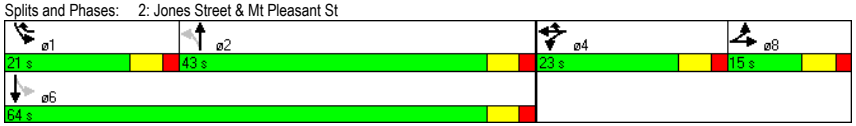
Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	25.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	0	5	328	5	502	5	160	407	424	330	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	12	12	12	12	16	12	11	11	12
Storage Length (ft)	0		0	0		0	0		0	300		0
Storage Lanes	0		0	0		1	0		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1031			525			388			877	
Travel Time (s)		23.4			11.9			8.8			19.9	
Peak Hour Factor	0.54	0.54	0.54	0.97	0.97	0.97	0.94	0.94	0.94	0.80	0.80	0.80
Heavy Vehicles (%)	0%	0%	0%	2%	0%	3%	0%	2%	2%	1%	5%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	18	0	0	343	518	0	608	0	530	412	0
Turn Type	Split			Split		pt+ov	Perm			pm+pt		
Protected Phases	8	8		4	4	4 1		2		1	6	
Permitted Phases							2			6		
Detector Phase	8	8		4	4	4 1	2	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	13.0	13.0		13.0	13.0		27.0	27.0		19.0	22.0	
Total Split (s)	15.0	15.0	0.0	23.0	23.0	44.0	43.0	43.0	0.0	21.0	64.0	0.0
Total Split (%)	14.7%	14.7%	0.0%	22.5%	22.5%	43.1%	42.2%	42.2%	0.0%	20.6%	62.7%	0.0%
Maximum Green (s)	9.0	9.0		17.0	17.0		37.0	37.0		15.0	58.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		Min	Min		None	Min	
Walk Time (s)							5.0	5.0				
Flash Dont Walk (s)							16.0	16.0				
Pedestrian Calls (#/hr)							0	0				
v/c Ratio		0.10			0.90	0.52		0.88		1.22	0.41	
Control Delay		31.2			62.8	3.5		35.5		139.4	11.4	
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	
Total Delay		31.2			62.8	3.5		35.5		139.4	11.4	
Queue Length 50th (ft)		4			153	0		204		~239	86	
Queue Length 95th (ft)		14			#430	50		408		#481	170	
Internal Link Dist (ft)		951			445			308			797	
Turn Bay Length (ft)										300		
Base Capacity (vph)		231			382	998		963		435	1283	
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		0.08			0.90	0.52		0.63		1.22	0.32	

Intersection Summary

Area Type: Other
Cycle Length: 102
Actuated Cycle Length: 81.6
Natural Cycle: 110
Control Type: Actuated-Uncoordinated
~ 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.

Splits and Phases: 2: Jones Street & Mt Pleasant St



HCM Signalized Intersection Capacity Analysis
2: Jones Street & Mt Pleasant St

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	0	5	328	5	502	5	160	407	424	330	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	16	12	11	11	12
Total Lost time (s)		6.0			6.0	6.0		6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Frt		0.93			1.00	0.85		0.90		1.00	1.00	
Flt Protected		0.98			0.95	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		1959			1776	1568		1908		1728	1749	
Flt Permitted		0.98			0.95	1.00		1.00		0.15	1.00	
Satd. Flow (perm)		1959			1776	1568		1901		274	1749	
Peak-hour factor, PHF	0.54	0.54	0.54	0.97	0.97	0.97	0.94	0.94	0.94	0.80	0.80	0.80
Adj. Flow (vph)	9	0	9	338	5	518	5	170	433	530	412	0
RTOR Reduction (vph)	0	9	0	0	0	317	0	95	0	0	0	0
Lane Group Flow (vph)	0	9	0	0	343	201	0	513	0	530	412	0
Heavy Vehicles (%)	0%	0%	0%	2%	0%	3%	0%	2%	2%	1%	5%	0%
Turn Type	Split			Split		pt+ov	Perm			pm+pt		
Protected Phases	8	8		4	4	4 1		2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		2.3			17.5	33.0		25.9		47.4	47.4	
Effective Green, g (s)		2.3			17.5	33.0		25.9		47.4	47.4	
Actuated g/C Ratio		0.03			0.21	0.39		0.30		0.56	0.56	
Clearance Time (s)		6.0			6.0			6.0		6.0	6.0	
Vehicle Extension (s)		2.0			2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		53			365	607		578		417	973	
v/s Ratio Prot		c0.00			c0.19	0.13				c0.23	0.24	
v/s Ratio Perm								0.27		c0.48		
v/c Ratio		0.17			0.94	0.33		0.89		1.27	0.42	
Uniform Delay, d1		40.5			33.3	18.3		28.3		22.9	11.0	
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2		0.6			31.2	0.1		14.8		139.6	0.1	
Delay (s)		41.1			64.6	18.5		43.1		162.5	11.1	
Level of Service		D			E	B		D		F	B	
Approach Delay (s)		41.1			36.8			43.1			96.3	
Approach LOS		D			D			D			F	

Intersection Summary				
HCM Average Control Delay	61.5	HCM Level of Service		E
HCM Volume to Capacity ratio	1.09			
Actuated Cycle Length (s)	85.2	Sum of lost time (s)		18.0
Intersection Capacity Utilization	97.3%	ICU Level of Service		F
Analysis Period (min)	15			
c Critical Lane Group				

Lanes, Volumes, Timings
14: Kings Highway & Church Street

2030 Build Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	116	554	5	35	461	70	233	210	80	70	275	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	12	11	11	12	11	11	11	11	11	12
Storage Length (ft)	50		0	0		0	0		0	0		145
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		305			1116			176			552	
Travel Time (s)		6.9			25.4			4.0			12.5	
Peak Hour Factor	0.92	0.92	0.92	0.91	0.91	0.91	0.86	0.86	0.86	0.89	0.89	0.89
Heavy Vehicles (%)	3%	1%	0%	7%	2%	0%	1%	2%	4%	1%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	126	607	0	38	584	0	271	337	0	0	388	136
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Minimum Split (s)	35.0	35.0		35.0	35.0		21.0	21.0		21.0	21.0	21.0
Total Split (s)	35.0	35.0	0.0	35.0	35.0	0.0	24.0	24.0	0.0	24.0	24.0	24.0
Total Split (%)	59.3%	59.3%	0.0%	59.3%	59.3%	0.0%	40.7%	40.7%	0.0%	40.7%	40.7%	40.7%
Maximum Green (s)	30.0	30.0		30.0	30.0		19.0	19.0		19.0	19.0	19.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
v/c Ratio	0.46	0.66		0.15	0.65		1.27	0.61			0.89	0.26
Control Delay	16.3	15.0		9.6	14.9		178.8	22.5			45.2	16.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	16.3	15.0		9.6	14.9		178.8	22.5			45.2	16.6
Queue Length 50th (ft)	26	146		7	139		~126	99			128	35
Queue Length 95th (ft)	71	245		21	237		#236	163			#269	72
Internal Link Dist (ft)		225			1036			96			472	
Turn Bay Length (ft)	50											145
Base Capacity (vph)	273	924		256	899		213	553			437	515
Starvation Cap Reductn	0	0		0	0		0	0			0	0
Spillback Cap Reductn	0	0		0	0		0	0			0	0
Storage Cap Reductn	0	0		0	0		0	0			0	0
Reduced v/c Ratio	0.46	0.66		0.15	0.65		1.27	0.61			0.89	0.26

Intersection Summary	
Area Type:	Other
Cycle Length: 59	
Actuated Cycle Length: 59	
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green	
Natural Cycle: 65	
Control Type: Pretimed	

~ 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.

Splits and Phases: 14: Kings Highway & Church Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	116	554	5	35	461	70	233	210	80	70	275	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	12	11	11	12	11	11	11	11	11	12
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)	1636	1816		1631	1770		1728	1717			1786	1599
Flt Permitted	0.31	1.00		0.29	1.00		0.36	1.00			0.75	1.00
Satd. Flow (perm)	537	1816		504	1770		663	1717			1357	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.91	0.91	0.91	0.86	0.86	0.86	0.89	0.89	0.89
Adj. Flow (vph)	126	602	5	38	507	77	271	244	93	79	309	136
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	126	607	0	38	584	0	271	337	0	0	388	136
Heavy Vehicles (%)	3%	1%	0%	7%	2%	0%	1%	2%	4%	1%	2%	1%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Actuated Green, G (s)	30.0	30.0		30.0	30.0		19.0	19.0			19.0	19.0
Effective Green, g (s)	30.0	30.0		30.0	30.0		19.0	19.0			19.0	19.0
Actuated g/C Ratio	0.51	0.51		0.51	0.51		0.32	0.32			0.32	0.32
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lane Grp Cap (vph)	273	923		256	900		214	553			437	515
v/s Ratio Prot		c0.33			0.33			0.20				
v/s Ratio Perm	0.23			0.08			c0.41				0.29	0.09
v/c Ratio	0.46	0.66		0.15	0.65		1.27	0.61			0.89	0.26
Uniform Delay, d1	9.3	10.7		7.7	10.6		20.0	16.9			19.0	14.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	5.5	3.7		1.2	3.6		151.5	4.9			22.5	1.2
Delay (s)	14.8	14.4		8.9	14.3		171.5	21.8			41.5	16.1
Level of Service	B	B		A	B		F	C			D	B
Approach Delay (s)		14.4			13.9			88.5			34.9	
Approach LOS		B			B			F			C	

Intersection Summary					
HCM Average Control Delay	36.7	HCM Level of Service		D	
HCM Volume to Capacity ratio	0.89				
Actuated Cycle Length (s)	59.0	Sum of lost time (s)		10.0	
Intersection Capacity Utilization	105.4%	ICU Level of Service		G	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	161	10	45	105	35	15	385	50	125	530	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	14	16	16	14	16	11	11	16	11	11	16
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		197			310			393			488	
Travel Time (s)		4.5			7.0			8.9			11.1	
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.83	0.83	0.83	0.86	0.86	0.86
Heavy Vehicles (%)	0%	1%	0%	0%	3%	0%	0%	3%	2%	1%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	202	0	0	210	0	18	524	0	145	633	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0
Total Split (%)	37.0%	37.0%	0.0%	37.0%	37.0%	0.0%	37.0%	37.0%	0.0%	37.0%	37.0%	0.0%
Maximum Green (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag							Lead	Lead		Lead	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.41			0.47		0.09	0.60		0.49	0.71	
Control Delay		19.8			20.2		14.4	17.8		23.1	20.9	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		19.8			20.2		14.4	17.8		23.1	20.9	
Queue Length 50th (ft)		44			44		2	83		22	111	
Queue Length 95th (ft)		134			133		21	#380		#151	#525	
Internal Link Dist (ft)		117			230			313			408	
Turn Bay Length (ft)												
Base Capacity (vph)		952			853		208	871		294	888	
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		0.21			0.25		0.09	0.60		0.49	0.71	

Intersection Summary	
Area Type:	Other

Lane Group	ø2
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	15.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	26%
Maximum Green (s)	15.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	5.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	4.0
Pedestrian Calls (#/hr)	10
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

Lanes, Volumes, Timings
19: Wood Street & Route 18

2030 Build Condition - PM Peak Hour

Cycle Length: 81
Actuated Cycle Length: 53
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 19: Wood Street & Route 18

HCM Signalized Intersection Capacity Analysis
19: Wood Street & Route 18

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	161	10	45	105	35	15	385	50	125	530	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	14	16	16	14	16	11	11	16	11	11	16
Total Lost time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.97		1.00	0.98		1.00	1.00	
Flt Protected		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1987			1918		1745	1754		1728	1794	
Flt Permitted		0.96			0.88		0.23	1.00		0.33	1.00	
Satd. Flow (perm)		1923			1712		420	1754		595	1794	
Peak-hour factor, PHF	0.92	0.92	0.92	0.88	0.88	0.88	0.83	0.83	0.83	0.86	0.86	0.86
Adj. Flow (vph)	16	175	11	51	119	40	18	464	60	145	616	17
RTOR Reduction (vph)	0	3	0	0	11	0	0	4	0	0	1	0
Lane Group Flow (vph)	0	199	0	0	199	0	18	520	0	145	632	0
Heavy Vehicles (%)	0%	1%	0%	0%	3%	0%	0%	3%	2%	1%	2%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Actuated Green, G (s)		13.5			13.5		26.2	26.2		26.2	26.2	
Effective Green, g (s)		13.5			13.5		26.2	26.2		26.2	26.2	
Actuated g/C Ratio		0.23			0.23		0.45	0.45		0.45	0.45	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		450			401		191	796		270	815	
v/s Ratio Prot								0.30			c0.35	
v/s Ratio Perm		0.10			c0.12		0.04			0.24		
v/c Ratio		0.44			0.50		0.09	0.65		0.54	0.78	
Uniform Delay, d1		18.9			19.1		9.0	12.2		11.4	13.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.9			1.3		0.3	2.1		2.6	4.9	
Delay (s)		19.8			20.5		9.3	14.4		14.0	18.2	
Level of Service		B			C		A	B		B	B	
Approach Delay (s)		19.8			20.5			14.2			17.4	
Approach LOS		B			C			B			B	

Intersection Summary					
HCM Average Control Delay	17.1	HCM Level of Service		B	
HCM Volume to Capacity ratio	0.68				
Actuated Cycle Length (s)	57.7	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	71.0%	ICU Level of Service		C	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	116	415	80	40	275	55	60	166	30	76	247	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	14	16	16	16	16
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1761			1229			1754			2421	
Travel Time (s)		40.0			27.9			39.9			55.0	
Peak Hour Factor	0.84	0.84	0.84	0.91	0.91	0.91	0.89	0.89	0.89	0.86	0.86	0.86
Heavy Vehicles (%)	1%	3%	1%	3%	3%	0%	0%	3%	3%	0%	4%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	727	0	0	406	0	0	288	0	0	551	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Minimum Split (s)	36.0	36.0		36.0	36.0		29.0	29.0		29.0	29.0	
Total Split (s)	36.0	36.0	0.0	36.0	36.0	0.0	29.0	29.0	0.0	29.0	29.0	0.0
Total Split (%)	55.4%	55.4%	0.0%	55.4%	55.4%	0.0%	44.6%	44.6%	0.0%	44.6%	44.6%	0.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
v/c Ratio		0.92			0.48			0.62			0.92	
Control Delay		37.4			14.5			24.9			46.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		37.4			14.5			24.9			46.0	
Queue Length 50th (ft)		256			105			94			206	
Queue Length 95th (ft)		#420			175			167			#359	
Internal Link Dist (ft)		1681			1149			1674			2341	
Turn Bay Length (ft)												
Base Capacity (vph)		786			845			466			596	
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		0.92			0.48			0.62			0.92	

Intersection Summary	
Area Type:	Other
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 18 (28%), Referenced to phase 2: and 6:, Start of Green	
Natural Cycle: 70	
Control Type: Pretimed	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 24: Nash Road & Church Street

HCM Signalized Intersection Capacity Analysis
24: Nash Road & Church Street

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	116	415	80	40	275	55	60	166	30	76	247	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	16	14	16	16	16	16
Total Lost time (s)		6.0			6.0			7.0			7.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			0.98			0.98			0.96	
Flt Protected		0.99			0.99			0.99			0.99	
Satd. Flow (prot)		2047			2047			1927			1984	
Flt Permitted		0.83			0.89			0.71			0.88	
Satd. Flow (perm)		1705			1830			1378			1760	
Peak-hour factor, PHF	0.84	0.84	0.84	0.91	0.91	0.91	0.89	0.89	0.89	0.86	0.86	0.86
Adj. Flow (vph)	138	494	95	44	302	60	67	187	34	88	287	176
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	727	0	0	406	0	0	288	0	0	551	0
Heavy Vehicles (%)	1%	3%	1%	3%	3%	0%	0%	3%	3%	0%	4%	3%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Actuated Green, G (s)		30.0			30.0			22.0			22.0	
Effective Green, g (s)		30.0			30.0			22.0			22.0	
Actuated g/C Ratio		0.46			0.46			0.34			0.34	
Clearance Time (s)		6.0			6.0			7.0			7.0	
Lane Grp Cap (vph)		787			845			466			596	
v/s Ratio Prot												
v/s Ratio Perm		c0.43			0.22			0.21			c0.31	
v/c Ratio		0.92			0.48			0.62			0.92	
Uniform Delay, d1		16.4			12.1			18.0			20.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		18.1			2.0			6.0			22.3	
Delay (s)		34.6			14.1			24.0			43.0	
Level of Service		C			B			C			D	
Approach Delay (s)		34.6			14.1			24.0			43.0	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM Average Control Delay	31.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
28: Coggeshall Street & Route 18 SB

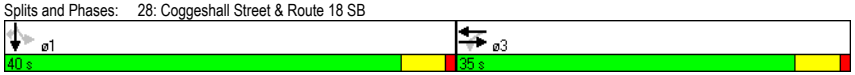
2030 Build Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	217	95	170	257	0	0	0	0	106	630	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	15	12	12	12	12	12	10	10
Storage Length (ft)	0		0	0		0	0		0	0		130
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			No			No			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		686			474			1008			501	
Travel Time (s)		15.6			10.8			22.9			11.4	
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.92	0.92	0.92	0.96	0.96	0.96
Heavy Vehicles (%)	0%	3%	4%	1%	1%	0%	0%	0%	0%	6%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	339	0	0	497	0	0	0	0	0	766	47
Turn Type				Perm						Perm		Perm
Protected Phases		3			3						1	
Permitted Phases				3						1		1
Minimum Split (s)		35.0		35.0	35.0					40.0	40.0	40.0
Total Split (s)	0.0	35.0	0.0	35.0	35.0	0.0	0.0	0.0	0.0	40.0	40.0	40.0
Total Split (%)	0.0%	46.7%	0.0%	46.7%	46.7%	0.0%	0.0%	0.0%	0.0%	53.3%	53.3%	53.3%
Maximum Green (s)		30.0		30.0	30.0					35.0	35.0	35.0
Yellow Time (s)		4.0		4.0	4.0					4.0	4.0	4.0
All-Red Time (s)		1.0		1.0	1.0					1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	4.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
v/c Ratio		0.47			1.01						0.50	0.06
Control Delay		17.3			69.5						15.4	4.0
Queue Delay		0.0			0.0						0.0	0.0
Total Delay		17.3			69.5						15.4	4.0
Queue Length 50th (ft)		100			~231						124	0
Queue Length 95th (ft)		171			#395						172	16
Internal Link Dist (ft)		606			394			928			421	
Turn Bay Length (ft)												130
Base Capacity (vph)		727			491						1522	728
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		0.47			1.01						0.50	0.06

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2: and 6:, Start of Green	
Natural Cycle: 80	
Control Type: Pretimed	

~ 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.

Splits and Phases: 28: Coggeshall Street & Route 18 SB



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	217	95	170	257	0	0	0	0	106	630	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	15	12	12	12	12	12	10	10
Total Lost time (s)		5.0			5.0						5.0	5.0
Lane Util. Factor		1.00			1.00						0.95	1.00
Frt		0.96			1.00						1.00	0.85
Flt Protected		1.00			0.98						0.99	1.00
Satd. Flow (prot)		1764			2029						3261	1507
Flt Permitted		1.00			0.59						0.99	1.00
Satd. Flow (perm)		1764			1226						3261	1507
Peak-hour factor, PHF	0.92	0.92	0.92	0.86	0.86	0.86	0.92	0.92	0.92	0.96	0.96	0.96
Adj. Flow (vph)	0	236	103	198	299	0	0	0	0	110	656	47
RTOR Reduction (vph)	0	21	0	0	0	0	0	0	0	0	0	25
Lane Group Flow (vph)	0	318	0	0	497	0	0	0	0	0	766	22
Heavy Vehicles (%)	0%	3%	4%	1%	1%	0%	0%	0%	0%	6%	2%	0%
Turn Type				Perm						Perm		Perm
Protected Phases		3			3						1	
Permitted Phases				3						1		1
Actuated Green, G (s)		30.0			30.0						35.0	35.0
Effective Green, g (s)		30.0			30.0						35.0	35.0
Actuated g/C Ratio		0.40			0.40						0.47	0.47
Clearance Time (s)		5.0			5.0						5.0	5.0
Lane Grp Cap (vph)		706			490						1522	703
v/s Ratio Prot		0.18										
v/s Ratio Perm					c0.41						0.23	0.01
v/c Ratio		0.45			1.01						0.50	0.03
Uniform Delay, d1		16.5			22.5						13.9	10.8
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		2.1			44.3						1.2	0.1
Delay (s)		18.5			66.8						15.1	10.9
Level of Service		B			E						B	B
Approach Delay (s)		18.5			66.8			0.0			14.9	
Approach LOS		B			E			A			B	

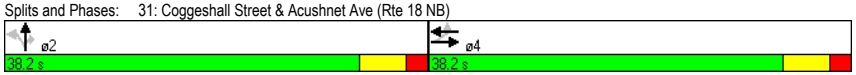
Intersection Summary			
HCM Average Control Delay	31.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	273	0	0	307	103	120	465	292	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	15	12	12	11	11	12	12	12
Storage Length (ft)	0		0	0		0	0		160	0		0
Storage Lanes	0		0	0		0	1		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		474			546			1002			363	
Travel Time (s)		10.8			12.4			22.8			8.3	
Peak Hour Factor	0.93	0.93	0.93	0.94	0.94	0.94	0.93	0.93	0.93	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	0%	0%	1%	1%	0%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	342	0	0	437	0	129	500	314	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			4			2				
Permitted Phases	4						2		2			
Minimum Split (s)	38.2	38.2			38.2		38.2	38.2	38.2			
Total Split (s)	38.2	38.2	0.0	0.0	38.2	0.0	38.2	38.2	38.2	0.0	0.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	0.0%	50.0%	0.0%	50.0%	50.0%	50.0%	0.0%	0.0%	0.0%
Maximum Green (s)	32.0	32.0			32.0		32.0	32.0	32.0			
Yellow Time (s)	4.2	4.2			4.2		4.2	4.2	4.2			
All-Red Time (s)	2.0	2.0			2.0		2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	4.0	4.0	6.2	4.0	6.2	6.2	6.2	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
v/c Ratio		0.46			0.51		0.17	0.66	0.38			
Control Delay		18.6			17.9		14.7	23.1	3.4			
Queue Delay		0.0			0.0		0.0	0.0	0.0			
Total Delay		18.6			17.9		14.7	23.1	3.4			
Queue Length 50th (ft)		113			139		37	185	0			
Queue Length 95th (ft)		184			220		71	289	44			
Internal Link Dist (ft)		394			466			922			283	
Turn Bay Length (ft)									160			
Base Capacity (vph)		738			853		756	754	824			
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		0.46			0.51		0.17	0.66	0.38			

Intersection Summary	
Area Type:	Other
Cycle Length: 76.4	
Actuated Cycle Length: 76.4	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:, Start of Green	
Natural Cycle: 80	
Control Type: Pretimed	

Splits and Phases: 31: Coggeshall Street & Acushnet Ave (Rte 18 NB)



HCM Signalized Intersection Capacity Analysis
31: Coggeshall Street & Acushnet Ave (Rte 18 NB)

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	273	0	0	307	103	120	465	292	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	12	12	15	12	12	11	11	12	12	12
Total Lost time (s)		6.2			6.2		6.2	6.2	6.2			
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00			
Frt		1.00			0.97		1.00	1.00	0.85			
Flt Protected		0.99			1.00		0.95	1.00	1.00			
Satd. Flow (prot)		2012			1999		1805	1801	1531			
Flt Permitted		0.87			1.00		0.95	1.00	1.00			
Satd. Flow (perm)		1761			1999		1805	1801	1531			
Peak-hour factor, PHF	0.93	0.93	0.93	0.94	0.94	0.94	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	48	294	0	0	327	110	129	500	314	0	0	0
RTOR Reduction (vph)	0	0	0	0	16	0	0	0	182	0	0	0
Lane Group Flow (vph)	0	342	0	0	421	0	129	500	132	0	0	0
Heavy Vehicles (%)	4%	3%	0%	0%	1%	1%	0%	2%	2%	0%	0%	0%
Turn Type	Perm						Perm		Perm			
Protected Phases		4			4			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)		32.0			32.0		32.0	32.0	32.0			
Effective Green, g (s)		32.0			32.0		32.0	32.0	32.0			
Actuated g/C Ratio		0.42			0.42		0.42	0.42	0.42			
Clearance Time (s)		6.2			6.2		6.2	6.2	6.2			
Lane Grp Cap (vph)		738			837		756	754	641			
v/s Ratio Prot					c0.21			c0.28				
v/s Ratio Perm		0.19					0.07		0.09			
v/c Ratio		0.46			0.50		0.17	0.66	0.21			
Uniform Delay, d1		16.0			16.3		13.9	17.9	14.1			
Progression Factor		1.00			1.00		1.00	1.00	1.00			
Incremental Delay, d2		2.1			2.2		0.5	4.6	0.7			
Delay (s)		18.1			18.5		14.4	22.4	14.8			
Level of Service		B			B		B	C	B			
Approach Delay (s)		18.1			18.5			18.8			0.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	76.4	Sum of lost time (s)	12.4
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
49: Kings Highway & Stop & Shop driveway

2030 Build Condition - PM Peak Hour

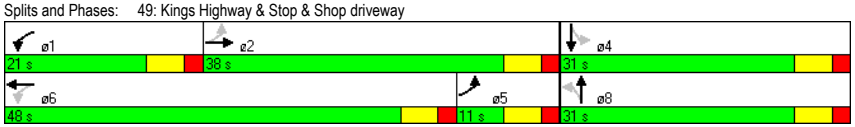
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	730	134	175	440	50	166	45	289	160	25	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		515			196			360			359	
Travel Time (s)		11.7			4.5			8.2			8.2	
Peak Hour Factor	0.93	0.93	0.93	0.95	0.95	0.95	0.85	0.85	0.85	0.89	0.89	0.89
Heavy Vehicles (%)	1%	1%	0%	1%	1%	0%	2%	0%	0%	1%	0%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1112	0	0	700	0	0	588	0	0	399	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.0	13.0		11.0	13.0		13.0	13.0		19.0	19.0	
Total Split (s)	11.0	38.0	0.0	21.0	48.0	0.0	31.0	31.0	0.0	31.0	31.0	0.0
Total Split (%)	12.2%	42.2%	0.0%	23.3%	53.3%	0.0%	34.4%	34.4%	0.0%	34.4%	34.4%	0.0%
Maximum Green (s)	5.0	32.0		15.0	42.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)										5.0	5.0	
Flash Dont Walk (s)										8.0	8.0	
Pedestrian Calls (#/hr)										0	0	
v/c Ratio		0.78			0.64			0.74			0.66	
Control Delay		16.2			12.9			14.9			16.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		16.2			12.9			14.9			16.0	
Queue Length 50th (ft)		133			73			38			32	
Queue Length 95th (ft)		#321			177			84			77	
Internal Link Dist (ft)		435			116			280			279	
Turn Bay Length (ft)												
Base Capacity (vph)		1421			1389			1218			998	
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		0.78			0.50			0.48			0.40	

Intersection Summary	
Area Type:	Other

Lanes, Volumes, Timings
49: Kings Highway & Stop & Shop driveway

Cycle Length: 90
Actuated Cycle Length: 59.1
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 49: Kings Highway & Stop & Shop driveway



HCM Signalized Intersection Capacity Analysis
49: Kings Highway & Stop & Shop driveway

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	730	134	175	440	50	166	45	289	160	25	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frt		0.98			0.99			0.91			0.93	
Flt Protected		0.99			0.99			0.98			0.98	
Satd. Flow (prot)		3481			3490			3222			3247	
Flt Permitted		0.70			0.54			0.73			0.62	
Satd. Flow (perm)		2470			1915			2377			2067	
Peak-hour factor, PHF	0.93	0.93	0.93	0.95	0.95	0.95	0.85	0.85	0.85	0.89	0.89	0.89
Adj. Flow (vph)	183	785	144	184	463	53	195	53	340	180	28	191
RTOR Reduction (vph)	0	9	0	0	6	0	0	264	0	0	148	0
Lane Group Flow (vph)	0	1103	0	0	694	0	0	324	0	0	251	0
Heavy Vehicles (%)	1%	1%	0%	1%	1%	0%	2%	0%	0%	1%	0%	1%
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		33.7			33.7			13.1			13.1	
Effective Green, g (s)		33.7			33.7			13.1			13.1	
Actuated g/C Ratio		0.57			0.57			0.22			0.22	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		1416			1098			530			461	
v/s Ratio Prot												
v/s Ratio Perm		c0.45			0.36			c0.14			0.12	
v/c Ratio		0.78			0.63			0.61			0.54	
Uniform Delay, d1		9.7			8.4			20.6			20.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.5			0.9			1.5			0.7	
Delay (s)		12.2			9.3			22.0			20.9	
Level of Service		B			A			C			C	
Approach Delay (s)		12.2			9.3			22.0			20.9	
Approach LOS		B			A			C			C	

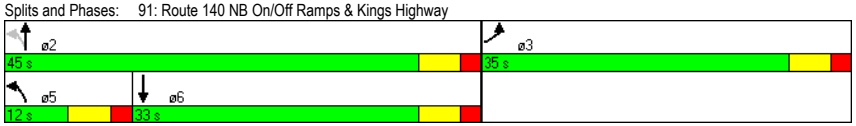
Intersection Summary				
HCM Average Control Delay	14.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.73			
Actuated Cycle Length (s)	58.8	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	94.4%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	493	160	150	541	666	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	12	12	16
Storage Length (ft)	0	100	0			100
Storage Lanes	1	0	0			0
Taper Length (ft)	25	25	25			25
Right Turn on Red		No				No
Link Speed (mph)	30			30	30	
Link Distance (ft)	268			574	515	
Travel Time (s)	6.1			13.0	11.7	
Peak Hour Factor	0.92	0.92	0.83	0.83	0.79	0.79
Heavy Vehicles (%)	2%	0%	3%	1%	2%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	710	0	0	833	984	0
Turn Type			pm+pt			
Protected Phases	3		5	2	6	
Permitted Phases			2			
Detector Phase	3		5	2	6	
Switch Phase						
Minimum Initial (s)	7.0		5.0	7.0	7.0	
Minimum Split (s)	13.0		11.0	13.0	13.0	
Total Split (s)	35.0	0.0	12.0	45.0	33.0	0.0
Total Split (%)	43.8%	0.0%	15.0%	56.3%	41.3%	0.0%
Maximum Green (s)	29.0		6.0	39.0	27.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	4.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	2.0		2.0	2.0	2.0	
Recall Mode	None		None	Min	Min	
v/c Ratio	0.95			1.04dl	0.62	
Control Delay	48.4			36.0	17.2	
Queue Delay	0.0			0.0	0.0	
Total Delay	48.4			36.0	17.2	
Queue Length 50th (ft)	346			185	176	
Queue Length 95th (ft)	#576			#239	193	
Internal Link Dist (ft)	188			494	435	
Turn Bay Length (ft)						
Base Capacity (vph)	754			1004	1605	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.94			0.83	0.61	

Intersection Summary	
Area Type:	Other

Cycle Length: 80
Actuated Cycle Length: 76.4
Natural Cycle: 90
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.

Splits and Phases: 91: Route 140 NB On/Off Ramps & Kings Highway



HCM Signalized Intersection Capacity Analysis
91: Route 140 NB On/Off Ramps & Kings Highway

2030 Build Condition - PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	493	160	150	541	666	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	12	12	16
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			0.95	0.95	
Frt	0.97			1.00	0.98	
Flt Protected	0.96			0.99	1.00	
Satd. Flow (prot)	1977			3521	3449	
Flt Permitted	0.96			0.55	1.00	
Satd. Flow (perm)	1977			1958	3449	
Peak-hour factor, PHF	0.92	0.92	0.83	0.83	0.79	0.79
Adj. Flow (vph)	536	174	181	652	843	141
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	710	0	0	833	984	0
Heavy Vehicles (%)	2%	0%	3%	1%	2%	5%
Turn Type			pm+pt			
Protected Phases	3		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	29.0			35.4	35.4	
Effective Green, g (s)	29.0			35.4	35.4	
Actuated g/C Ratio	0.38			0.46	0.46	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	2.0			2.0	2.0	
Lane Grp Cap (vph)	750			907	1598	
v/s Ratio Prot	c0.36				0.29	
v/s Ratio Perm				c0.43		
v/c Ratio	0.95			1.04dl	0.62	
Uniform Delay, d1	23.0			19.2	15.4	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	20.5			13.6	0.5	
Delay (s)	43.4			32.8	15.9	
Level of Service	D			C	B	
Approach Delay (s)	43.4			32.8	15.9	
Approach LOS	D			C	B	

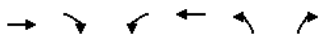
Intersection Summary			
HCM Average Control Delay	29.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	76.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

Lanes, Volumes, Timings
96: Kings Highway & Shaw's driveway

2030 Build Condition - PM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	596	235	145	681	155	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	525			574	347	
Travel Time (s)	11.9			13.0	7.9	
Peak Hour Factor	0.91	0.91	0.96	0.96	0.89	0.89
Heavy Vehicles (%)	2%	0%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	913	0	0	860	174	107
Turn Type			pm+pt			Prot
Protected Phases	2		1	6	7	7
Permitted Phases			6			
Detector Phase	2		1	6	7	7
Switch Phase						
Minimum Initial (s)	7.0		5.0	7.0	7.0	7.0
Minimum Split (s)	13.0		11.0	13.0	13.0	13.0
Total Split (s)	58.0	0.0	11.0	69.0	22.0	22.0
Total Split (%)	63.7%	0.0%	12.1%	75.8%	24.2%	24.2%
Maximum Green (s)	52.0		5.0	63.0	16.0	16.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	2.0		2.0	2.0	2.0	2.0
Recall Mode	Min		None	Min	None	None
v/c Ratio	0.47			0.66	0.51	0.28
Control Delay	6.5			10.7	25.0	7.3
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	6.5			10.7	25.0	7.3
Queue Length 50th (ft)	56			73	41	0
Queue Length 95th (ft)	112			152	111	34
Internal Link Dist (ft)	445			494	267	
Turn Bay Length (ft)						
Base Capacity (vph)	3275			2298	596	605
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	0.28			0.37	0.29	0.18

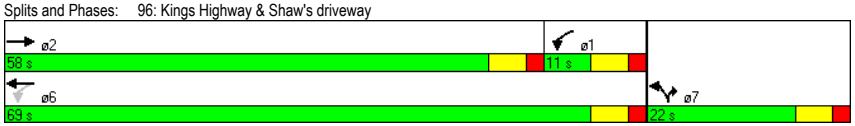
Intersection Summary	
Area Type:	Other
Cycle Length: 91	
Actuated Cycle Length: 49.4	
Natural Cycle: 50	

Lanes, Volumes, Timings
96: Kings Highway & Shaw's driveway

2030 Build Condition - PM Peak Hour

Control Type: Actuated-Uncoordinated

Splits and Phases: 96: Kings Highway & Shaw's driveway

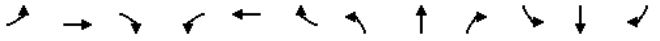


HCM Signalized Intersection Capacity Analysis
96: Kings Highway & Shaw's driveway

2030 Build Condition - PM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	596	235	145	681	155	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12
Total Lost time (s)	6.0			6.0	6.0	6.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	0.96			1.00	1.00	0.85
Flt Protected	1.00			0.99	0.95	1.00
Satd. Flow (prot)	3408			3543	1787	1599
Flt Permitted	1.00			0.65	0.95	1.00
Satd. Flow (perm)	3408			2309	1787	1599
Peak-hour factor, PHF	0.91	0.91	0.96	0.96	0.89	0.89
Adj. Flow (vph)	655	258	151	709	174	107
RTOR Reduction (vph)	47	0	0	0	0	87
Lane Group Flow (vph)	866	0	0	860	174	20
Heavy Vehicles (%)	2%	0%	1%	1%	1%	1%
Turn Type			pm+pt			Prot
Protected Phases	2		1	6	7	7
Permitted Phases			6			
Actuated Green, G (s)	27.7			27.7	9.3	9.3
Effective Green, g (s)	27.7			27.7	9.3	9.3
Actuated g/C Ratio	0.57			0.57	0.19	0.19
Clearance Time (s)	6.0			6.0	6.0	6.0
Vehicle Extension (s)	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	1927			1305	339	303
v/s Ratio Prot	0.25				c0.10	0.01
v/s Ratio Perm				c0.37		
v/c Ratio	0.45			0.66	0.51	0.07
Uniform Delay, d1	6.2			7.4	17.8	16.3
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.1			0.9	0.5	0.0
Delay (s)	6.3			8.3	18.4	16.3
Level of Service	A			A	B	B
Approach Delay (s)	6.3			8.3	17.6	
Approach LOS	A			A	B	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	49.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	284	75	75	239	265	30	235	330	290	180	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	11	16	16	10	10	16	12	14	16	11	16
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		443			1111			850			178	
Travel Time (s)		10.1			25.3			19.3			4.0	
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.90	0.90	0.90	0.92	0.92	0.92
Heavy Vehicles (%)	1%	3%	6%	1%	1%	4%	3%	4%	1%	3%	3%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	516	0	0	334	282	0	294	367	0	673	0
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt		
Protected Phases		4			4			2		1	2	
Permitted Phases	4			4		4	2		2	2		
Detector Phase	4	4		4	4	4	2	2	2	1	2	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	
Minimum Split (s)	13.0	13.0		13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	
Total Split (s)	30.0	30.0	0.0	30.0	30.0	30.0	30.0	30.0	30.0	20.0	30.0	0.0
Total Split (%)	30.3%	30.3%	0.0%	30.3%	30.3%	30.3%	30.3%	30.3%	30.3%	20.2%	30.3%	0.0%
Maximum Green (s)	25.0	25.0		25.0	25.0	25.0	25.0	25.0	25.0	15.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0		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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0
Lead/Lag	Lag	Lag		Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Recall Mode	Max	Max		Max	Max	Max	None	None	None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.54			0.61	0.38		0.46	0.41		0.76	
Control Delay		18.0			23.4	4.2		18.9	3.8		24.1	
Queue Delay		0.0			0.0	0.0		0.0	0.0		0.0	
Total Delay		18.0			23.4	4.2		18.9	3.8		24.1	
Queue Length 50th (ft)		66			89	0		72	0		93	
Queue Length 95th (ft)		165			#277	51		199	57		#266	
Internal Link Dist (ft)		363			1031			770			98	
Turn Bay Length (ft)												
Base Capacity (vph)		952			550	750		649	904		909	
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		0.54			0.61	0.38		0.45	0.41		0.74	

Intersection Summary	
Area Type:	Other

Lane Group	ø3
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	6.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	19%
Maximum Green (s)	14.0
Yellow Time (s)	4.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	0.2
Recall Mode	None
Walk Time (s)	6.0
Flash Dont Walk (s)	8.0
Pedestrian Calls (#/hr)	9
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	

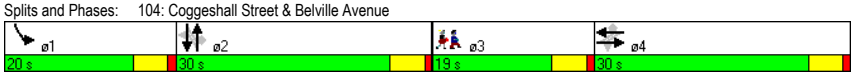
Intersection Summary

Lanes, Volumes, Timings
104: Coggeshall Street & Belville Avenue

2030 Build Condition - PM Peak Hour

Cycle Length: 99
Actuated Cycle Length: 63.2
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 104: Coggeshall Street & Belville Avenue



HCM Signalized Intersection Capacity Analysis
104: Coggeshall Street & Belville Avenue

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	284	75	75	239	265	30	235	330	290	180	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	11	16	16	10	10	16	12	14	16	11	16
Total Lost time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Lane Util. Factor		0.95			1.00	1.00		1.00	1.00		0.95	
Frt		0.98			1.00	0.85		1.00	0.85		0.96	
Flt Protected		0.99			0.99	1.00		0.99	1.00		0.98	
Satd. Flow (prot)		3268			1735	1449		1819	1706		3214	
Flt Permitted		0.71			0.78	1.00		0.89	1.00		0.67	
Satd. Flow (perm)		2343			1374	1449		1620	1706		2192	
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.90	0.90	0.90	0.92	0.92	0.92
Adj. Flow (vph)	125	309	82	80	254	282	33	261	367	315	196	162
RTOR Reduction (vph)	0	13	0	0	0	176	0	0	232	0	32	0
Lane Group Flow (vph)	0	503	0	0	334	106	0	294	135	0	641	0
Heavy Vehicles (%)	1%	3%	6%	1%	1%	4%	3%	4%	1%	3%	3%	0%
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt		
Protected Phases		4			4			2		1	2	
Permitted Phases	4			4		4	2		2	2		
Actuated Green, G (s)		25.3			25.3	25.3		24.7	24.7		24.7	
Effective Green, g (s)		25.3			25.3	25.3		24.7	24.7		24.7	
Actuated g/C Ratio		0.38			0.38	0.38		0.37	0.37		0.37	
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Vehicle Extension (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Grp Cap (vph)		882			517	546		595	627		806	
v/s Ratio Prot												
v/s Ratio Perm		0.21			c0.24	0.07		0.18	0.08		c0.29	
v/c Ratio		0.57			0.65	0.19		0.49	0.22		0.79	
Uniform Delay, d1		16.6			17.3	14.1		16.4	14.6		19.0	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2		2.7			6.1	0.8		0.9	0.2		5.8	
Delay (s)		19.3			23.4	14.9		17.3	14.8		24.7	
Level of Service		B			C	B		B	B		C	
Approach Delay (s)		19.3			19.5			15.9			24.7	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM Average Control Delay	19.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	17.2
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	161	98	370	595	114	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	14	16	16	14
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		30			30
Link Distance (ft)	693		149			313
Travel Time (s)	15.8		3.4			7.1
Peak Hour Factor	0.77	0.77	0.94	0.94	0.73	0.73
Heavy Vehicles (%)	3%	6%	3%	3%	3%	3%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	336	0	1027	0	0	635
Turn Type					Perm	
Protected Phases	2		1			1
Permitted Phases					1	
Minimum Split (s)	27.0		37.0		37.0	37.0
Total Split (s)	27.0	0.0	37.0	0.0	37.0	37.0
Total Split (%)	42.2%	0.0%	57.8%	0.0%	57.8%	57.8%
Maximum Green (s)	20.0		30.0		30.0	30.0
Yellow Time (s)	5.0		5.0		5.0	5.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	4.0	7.0	4.0	7.0	7.0
Lead/Lag	Lag		Lead		Lead	Lead
Lead-Lag Optimize?	Yes		Yes		Yes	Yes
v/c Ratio	0.53		0.53			0.66
Control Delay	19.0		5.3			17.2
Queue Delay	0.0		0.0			0.0
Total Delay	19.0		5.3			17.2
Queue Length 50th (ft)	89		45			94
Queue Length 95th (ft)	128		84			106
Internal Link Dist (ft)	613		69			233
Turn Bay Length (ft)						
Base Capacity (vph)	629		1928			960
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.53		0.53			0.66

Intersection Summary	
Area Type:	Other
Cycle Length: 64	
Actuated Cycle Length: 64	
Offset: 35 (55%), Referenced to phase 2:WBL and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Pretimed	

Splits and Phases: 137: Hillman St & Pleasant Street

HCM Signalized Intersection Capacity Analysis
137: Hillman St & Pleasant Street

2030 Build Condition - PM Peak Hour

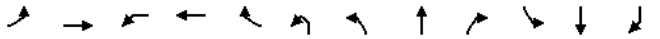
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	161	98	370	595	114	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	14	16	16	14
Total Lost time (s)	7.0		7.0			7.0
Lane Util. Factor	1.00		0.95			0.95
Frt	0.95		0.91			1.00
Flt Protected	0.97		1.00			0.99
Satd. Flow (prot)	1903		3393			3693
Flt Permitted	0.97		1.00			0.55
Satd. Flow (perm)	1903		3393			2048
Peak-hour factor, PHF	0.77	0.77	0.94	0.94	0.73	0.73
Adj. Flow (vph)	209	127	394	633	156	479
RTOR Reduction (vph)	34	0	336	0	0	0
Lane Group Flow (vph)	302	0	691	0	0	635
Heavy Vehicles (%)	3%	6%	3%	3%	3%	3%
Turn Type					Perm	
Protected Phases	2		1			1
Permitted Phases					1	
Actuated Green, G (s)	20.0		30.0			30.0
Effective Green, g (s)	20.0		30.0			30.0
Actuated g/C Ratio	0.31		0.47			0.47
Clearance Time (s)	7.0		7.0			7.0
Lane Grp Cap (vph)	595		1590			960
v/s Ratio Prot	c0.16		0.20			
v/s Ratio Perm						c0.31
v/c Ratio	0.51		0.43			0.66
Uniform Delay, d1	18.0		11.3			13.1
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	3.1		0.9			3.6
Delay (s)	21.0		12.2			16.7
Level of Service	C		B			B
Approach Delay (s)	21.0		12.2			16.7
Approach LOS	C		B			B

Intersection Summary			
HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	64.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
140: Mill Street & Pleasant St

2030 Build Condition - PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	260	203	360	205	248	25	135	455	105	117	345	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	16	11	12	10	16	10	12	14	16	14	16
Storage Length (ft)	0		0		0		100		0	0		0
Storage Lanes	1		1		1		1		0	0		0
Taper Length (ft)	25		25		25		25		25	25		25
Right Turn on Red					No				Yes			
Link Speed (mph)		30		30				30			30	
Link Distance (ft)		168		308				709			499	
Travel Time (s)		3.8		7.0				16.1			11.3	
Peak Hour Factor	0.96	0.96	0.93	0.93	0.93	0.87	0.87	0.87	0.87	0.83	0.83	0.83
Heavy Vehicles (%)	1%	1%	4%	1%	3%	0%	5%	3%	3%	0%	0%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	271	211	387	220	267	0	184	644	0	0	628	0
Turn Type	Split		Split		pt+ov	Split	Split			Split		
Protected Phases	4	4	5	5	1 5	2	2	2		1	1	
Permitted Phases												
Detector Phase	4	4	5	5	1 5	2	2	2		1	1	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0		7.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	12.0	12.0	12.0	12.0		12.0	12.0	12.0		12.0	12.0	
Total Split (s)	30.0	30.0	35.0	35.0	70.0	35.0	35.0	35.0	0.0	35.0	35.0	0.0
Total Split (%)	19.2%	19.2%	22.4%	22.4%	44.9%	22.4%	22.4%	22.4%	0.0%	22.4%	22.4%	0.0%
Maximum Green (s)	25.0	25.0	30.0	30.0		30.0	30.0	30.0		30.0	30.0	
Yellow Time (s)	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lag	Lag				Lag	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes				Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0		5.0	5.0	
Recall Mode	Max	Max	Max	Max		Max	Max	Max		Max	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.86	0.58	1.13	0.57	0.41		0.56	0.91			0.82	
Control Delay	85.9	65.3	139.7	61.3	32.2		62.0	74.1			67.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	85.9	65.3	139.7	61.3	32.2		62.0	74.1			67.2	
Queue Length 50th (ft)	276	203	~477	208	193		173	339			331	
Queue Length 95th (ft)	#450	295	#690	301	278		250	#439			368	
Internal Link Dist (ft)		88		228				629			419	
Turn Bay Length (ft)							100					
Base Capacity (vph)	314	363	343	384	648		330	709			762	
Starvation Cap Reductn	0	0	0	0	0		0	0			0	
Spillback Cap Reductn	0	0	0	0	0		0	0			0	
Storage Cap Reductn	0	0	0	0	0		0	0			0	
Reduced v/c Ratio	0.86	0.58	1.13	0.57	0.41		0.56	0.91			0.82	

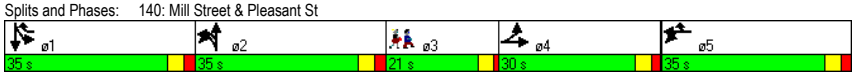
Lane Group	ø3
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	13%
Maximum Green (s)	17.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	0.2
Recall Mode	None
Walk Time (s)	10.0
Flash Dont Walk (s)	7.0
Pedestrian Calls (#/hr)	18
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	
Area Type:	Other
Cycle Length: 156	
Actuated Cycle Length: 147.6	
Natural Cycle: 140	
Control Type: Semi Act-Uncoord	

~ 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.

Splits and Phases: 140: Mill Street & Pleasant St



HCM Signalized Intersection Capacity Analysis
140: Mill Street & Pleasant St

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	260	203	360	205	248	25	135	455	105	117	345	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	16	11	12	10	16	10	12	14	16	14	16
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0			5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95			0.95	
Frt	1.00	1.00	1.00	1.00	0.85		1.00	0.97			0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1847	2132	1678	1881	1463		1617	3406			3731	
Flt Permitted	0.95	1.00	0.95	1.00	1.00		0.95	1.00			0.99	
Satd. Flow (perm)	1847	2132	1678	1881	1463		1617	3406			3731	
Peak-hour factor, PHF	0.96	0.96	0.93	0.93	0.93	0.87	0.87	0.87	0.87	0.83	0.83	0.83
Adj. Flow (vph)	271	211	387	220	267	29	155	523	121	141	416	71
RTOR Reduction (vph)	0	0	0	0	0	0	0	13	0	0	0	0
Lane Group Flow (vph)	271	211	387	220	267	0	184	631	0	0	628	0
Heavy Vehicles (%)	1%	1%	4%	1%	3%	0%	5%	3%	3%	0%	0%	3%
Turn Type	Split		Split		pt+ov	Split	Split			Split		
Protected Phases	4	4	5	5	1 5	2	2	2		1	1	
Permitted Phases												
Actuated Green, G (s)	25.1	25.1	30.2	30.2	65.4		30.2	30.2			30.2	
Effective Green, g (s)	25.1	25.1	30.2	30.2	65.4		30.2	30.2			30.2	
Actuated g/C Ratio	0.17	0.17	0.20	0.20	0.44		0.20	0.20			0.20	
Clearance Time (s)	5.0	5.0	5.0	5.0			5.0	5.0			5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0			5.0	5.0			5.0	
Lane Grp Cap (vph)	310	358	339	380	640		327	688			754	
v/s Ratio Prot	c0.15	0.10	c0.23	0.12	0.18		0.11	c0.19			c0.17	
v/s Ratio Perm												
v/c Ratio	0.87	0.59	1.14	0.58	0.42		0.56	0.92			0.83	
Uniform Delay, d1	60.6	57.4	59.6	53.9	28.9		53.7	58.4			57.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	27.2	7.0	93.0	6.3	2.0		6.8	19.2			10.4	
Delay (s)	87.9	64.3	152.6	60.2	30.9		60.5	77.6			67.6	
Level of Service	F	E	F	E	C		E	E			E	
Approach Delay (s)		77.6		92.2				73.8			67.6	
Approach LOS		E		F				E			E	

Intersection Summary				
HCM Average Control Delay	78.8	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.94			
Actuated Cycle Length (s)	149.4	Sum of lost time (s)	33.7	
Intersection Capacity Utilization	78.0%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Lanes, Volumes, Timings
174: Union Street & Route 18

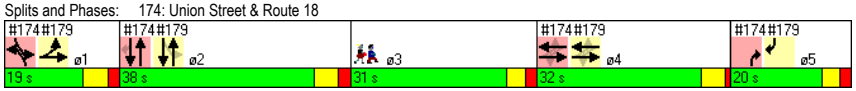
2030 Build Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	340	31	60	85	38	15	90	980	24	36	1150	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	11	11	11	10	11	11
Storage Length (ft)	0		0	0		0	150		225	150		225
Storage Lanes	0		0	0		0	1		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		432			82			365			2491	
Travel Time (s)		9.8			1.9			8.3			56.6	
Peak Hour Factor	0.93	0.93	0.93	0.85	0.85	0.85	0.91	0.91	0.91	0.99	0.99	0.99
Heavy Vehicles (%)	1%	3%	0%	2%	0%	0%	1%	4%	0%	17%	4%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	464	0	0	163	0	99	1077	26	36	1162	146
Turn Type	Perm			Perm			Prot		custom	Prot		Perm
Protected Phases		4			4		1	2	5	1	2	
Permitted Phases	4			4								2
Detector Phase	4	4		4	4		1	2	5	1	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		4.0	7.0	4.0	4.0	7.0	7.0
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0	13.0	9.0	10.0	13.0	13.0
Total Split (s)	32.0	32.0	0.0	32.0	32.0	0.0	19.0	38.0	20.0	19.0	38.0	38.0
Total Split (%)	22.9%	22.9%	0.0%	22.9%	22.9%	0.0%	13.6%	27.1%	14.3%	13.6%	27.1%	27.1%
Maximum Green (s)	27.0	27.0		27.0	27.0		13.0	32.0	15.0	13.0	32.0	32.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	5.0	5.0		5.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Recall Mode	None	None		None	None		None	None	None	None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		1.44			0.40		0.59	1.18	0.13	0.26	1.27	0.30
Control Delay		248.8			85.3		70.0	129.7	54.6	59.7	166.5	20.9
Queue Delay		0.0			0.0		0.0	110.0	0.3	0.0	0.0	0.0
Total Delay		248.8			85.3		70.0	239.7	54.9	59.7	166.5	20.9
Queue Length 50th (ft)		~421			119		66	~445	16	23	~510	34
Queue Length 95th (ft)		#841			m212		#158	#827	53	68	#912	114
Internal Link Dist (ft)		352			2			285			2411	
Turn Bay Length (ft)							150		225	150		225
Base Capacity (vph)		323			406		191	915	200	160	915	480
Starvation Cap Reductn		0			0		0	159	0	0	0	0
Spillback Cap Reductn		0			0		0	0	46	0	0	0
Storage Cap Reductn		0			0		0	0	0	0	0	0
Reduced v/c Ratio		1.44			0.40		0.52	1.42	0.17	0.23	1.27	0.30

Lane Group	ø3
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	17.0
Minimum Split (s)	31.0
Total Split (s)	31.0
Total Split (%)	22%
Maximum Green (s)	26.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	0.2
Recall Mode	None
Walk Time (s)	17.0
Flash Dont Walk (s)	9.0
Pedestrian Calls (#/hr)	19
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	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 119.5	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
~	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.
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 174: Union Street & Route 18



HCM Signalized Intersection Capacity Analysis
174: Union Street & Route 18

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	340	31	60	85	38	15	90	980	24	36	1150	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	11	11	11	10	11	11
Total Lost time (s)		5.0			5.0		6.0	6.0	5.0	6.0	6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.98			0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		2012			2033		1728	3355	1561	1440	3355	1546
Flt Permitted		0.67			0.84		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1401			1764		1728	3355	1561	1440	3355	1546
Peak-hour factor, PHF	0.93	0.93	0.93	0.85	0.85	0.85	0.91	0.91	0.91	0.99	0.99	0.99
Adj. Flow (vph)	366	33	65	100	45	18	99	1077	26	36	1162	146
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	59
Lane Group Flow (vph)	0	464	0	0	163	0	99	1077	26	36	1162	87
Heavy Vehicles (%)	1%	3%	0%	2%	0%	0%	1%	4%	0%	17%	4%	1%
Turn Type	Perm			Perm			Prot		custom	Prot		Perm
Protected Phases		4			4		1	2	5	1	2	
Permitted Phases	4			4								2
Actuated Green, G (s)		27.5			27.5		11.6	32.6	14.8	11.6	32.6	32.6
Effective Green, g (s)		27.5			27.5		11.6	32.6	14.8	11.6	32.6	32.6
Actuated g/C Ratio		0.22			0.22		0.09	0.27	0.12	0.09	0.27	0.27
Clearance Time (s)		5.0			5.0		6.0	6.0	5.0	6.0	6.0	6.0
Vehicle Extension (s)		5.0			5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)		315			396		164	894	189	136	894	412
v/s Ratio Prot							c0.06	0.32	c0.02	0.03	c0.35	
v/s Ratio Perm		c0.33			0.09							0.06
v/c Ratio		1.47			0.41		0.60	1.20	0.14	0.26	1.30	0.21
Uniform Delay, d1		47.5			40.5		53.2	44.9	48.1	51.4	44.9	34.9
Progression Factor		1.00			1.92		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		229.4			1.1		7.1	102.7	0.5	1.4	143.1	0.4
Delay (s)		276.8			78.7		60.3	147.6	48.5	52.9	188.0	35.3
Level of Service		F			E		E	F	D	D	F	D
Approach Delay (s)		276.8			78.7			138.3			167.8	
Approach LOS		F			E			F			F	

Intersection Summary			
HCM Average Control Delay	168.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	122.4	Sum of lost time (s)	35.9
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
179: Union Street & McArthur Drive

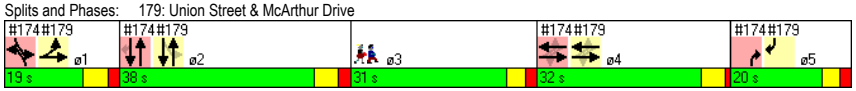
2030 Build Condition - PM Peak Hour

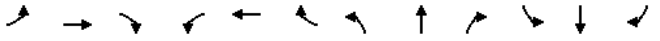
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	5	35	0	15	5	0	206	5	5	252	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	15	16	16	16	16	16	12	12
Storage Length (ft)	0		0	0		0	0		0	0		50
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		82			609			920			687	
Travel Time (s)		1.9			13.8			20.9			15.6	
Peak Hour Factor	0.90	0.90	0.90	0.75	0.75	0.75	0.69	0.69	0.69	0.83	0.83	0.83
Heavy Vehicles (%)	0%	25%	16%	0%	0%	25%	0%	6%	20%	0%	6%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	101	0	0	27	0	0	306	0	0	310	149
Turn Type	pm+pt			Perm						Perm		custom
Protected Phases	1	1 4			4			2			2	5
Permitted Phases	1 4			4						2		
Detector Phase	1	1 4		4	4			2		2	2	5
Switch Phase												
Minimum Initial (s)	4.0			7.0	7.0			7.0		7.0	7.0	4.0
Minimum Split (s)	10.0			12.0	12.0			13.0		13.0	13.0	9.0
Total Split (s)	19.0	51.0	0.0	32.0	32.0	0.0	0.0	38.0	0.0	38.0	38.0	20.0
Total Split (%)	13.6%	36.4%	0.0%	22.9%	22.9%	0.0%	0.0%	27.1%	0.0%	27.1%	27.1%	14.3%
Maximum Green (s)	13.0			27.0	27.0			32.0		32.0	32.0	15.0
Yellow Time (s)	4.0			4.0	4.0			4.0		4.0	4.0	3.0
All-Red Time (s)	2.0			1.0	1.0			2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	4.0	6.0	4.0	6.0	6.0	5.0
Lead/Lag	Lead			Lag	Lag			Lag		Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes			Yes		Yes	Yes	
Vehicle Extension (s)	4.0			5.0	5.0			4.0		4.0	4.0	4.0
Recall Mode	None			None	None			None		None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.19			0.06			0.55			0.64	0.76
Control Delay		7.6			34.9			44.9			48.5	77.0
Queue Delay		0.0			0.0			0.0			0.0	668.2
Total Delay		7.6			34.9			44.9			48.5	745.2
Queue Length 50th (ft)		23			11			176			184	100
Queue Length 95th (ft)		m40			35			261			341	#231
Internal Link Dist (ft)		2			529			840			607	
Turn Bay Length (ft)												50
Base Capacity (vph)		560			442			552			486	204
Starvation Cap Reductn		0			0			0			0	0
Spillback Cap Reductn		0			7			0			0	175
Storage Cap Reductn		0			0			0			0	0
Reduced v/c Ratio		0.18			0.06			0.55			0.64	5.14

Lane Group	ø3
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	17.0
Minimum Split (s)	31.0
Total Split (s)	31.0
Total Split (%)	22%
Maximum Green (s)	26.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	0.2
Recall Mode	None
Walk Time (s)	17.0
Flash Dont Walk (s)	9.0
Pedestrian Calls (#/hr)	19
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	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 119.5	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
#	95th percentile volume exceeds capacity, queue may be longer.
	Queue shown is maximum after two cycles.
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 179: Union Street & McArthur Drive





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	5	35	0	15	5	0	206	5	5	252	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	15	16	16	16	16	16	12	12
Total Lost time (s)		6.0			5.0			6.0			6.0	5.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frt		0.95			0.96			1.00			1.00	0.85
Flt Protected		0.97			1.00			1.00			1.00	1.00
Satd. Flow (prot)		1845			1894			2019			1793	1599
Flt Permitted		0.85			1.00			1.00			0.99	1.00
Satd. Flow (perm)		1602			1894			2019			1781	1599
Peak-hour factor, PHF	0.90	0.90	0.90	0.75	0.75	0.75	0.69	0.69	0.69	0.83	0.83	0.83
Adj. Flow (vph)	56	6	39	0	20	7	0	299	7	6	304	149
RTOR Reduction (vph)	0	0	0	0	5	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	101	0	0	22	0	0	305	0	0	310	149
Heavy Vehicles (%)	0%	25%	16%	0%	0%	25%	0%	6%	20%	0%	6%	1%
Turn Type	pm+pt			Perm						Perm		custom
Protected Phases	1	1 4			4			2			2	5
Permitted Phases	1 4			4						2		
Actuated Green, G (s)		39.1			27.5			32.6			32.6	14.8
Effective Green, g (s)		39.1			27.5			32.6			32.6	14.8
Actuated g/C Ratio		0.32			0.22			0.27			0.27	0.12
Clearance Time (s)					5.0			6.0			6.0	5.0
Vehicle Extension (s)					5.0			4.0			4.0	4.0
Lane Grp Cap (vph)		535			426			538			474	193
v/s Ratio Prot		c0.02			0.01			0.15				c0.09
v/s Ratio Perm		c0.04									c0.17	
v/c Ratio		0.19			0.05			0.57			0.65	0.77
Uniform Delay, d1		30.2			37.2			38.8			39.9	52.2
Progression Factor		0.35			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.2			0.1			1.7			3.6	18.2
Delay (s)		10.7			37.3			40.5			43.5	70.4
Level of Service		B			D			D			D	E
Approach Delay (s)		10.7			37.3			40.5			52.2	
Approach LOS		B			D			D			D	

Intersection Summary			
HCM Average Control Delay	43.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	122.4	Sum of lost time (s)	36.9
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
9: Tarkiln Hill Rd & Kings Highway

2030 Build Condition - PM Peak Hour

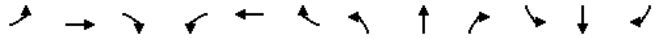
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	50	15	30	1149	650	160
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.91	0.91	0.90	0.90
Hourly flow rate (vph)	62	19	33	1263	722	178
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				393	611	
pX, platoon unblocked	0.71					
vC, conflicting volume	2140	811	900			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2401	811	900			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	95	96			
cM capacity (veh/h)	25	381	755			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	81	1296	900
Volume Left	62	33	0
Volume Right	19	0	178
cSH	32	755	1700
Volume to Capacity	2.56	0.04	0.53
Queue Length 95th (ft)	236	3	0
Control Delay (s)	972.6	1.9	0.0
Lane LOS	F	A	
Approach Delay (s)	972.6	1.9	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	35.8		
Intersection Capacity Utilization	95.0%	ICU Level of Service	F
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: Park Avenue & Church Street

2030 Build Condition - PM Peak Hour



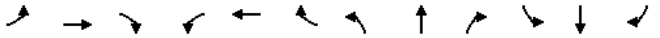
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	177	341	15	0	31	0	488	20	5	310	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.80	0.80	0.80	0.85	0.85	0.85	0.79	0.79	0.79
Hourly flow rate (vph)	5	188	363	19	0	39	0	574	24	6	392	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											176	
pX, platoon unblocked	0.84	0.84	0.84	0.84	0.84		0.84					
vC, conflicting volume	1030	1003	392	1448	991	586	392			598		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	937	905	174	1438	891	586	174			598		
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 %	97	19	50	0	100	92	100			99		
cM capacity (veh/h)	190	231	726	15	236	508	1182			989		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	556	58	598	399
Volume Left	5	19	0	6
Volume Right	363	39	24	0
cSH	415	43	1700	989
Volume to Capacity	1.34	1.33	0.35	0.01
Queue Length 95th (ft)	645	140	0	0
Control Delay (s)	196.3	396.5	0.0	0.2
Lane LOS	F	F		A
Approach Delay (s)	196.3	396.5	0.0	0.2
Approach LOS	F	F		

Intersection Summary			
Average Delay	82.0		
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
17: Irvington Street & Church Street

2030 Build Condition - PM Peak Hour



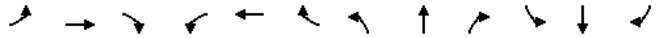
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	0	0	25	5	15	10	382	0	0	479	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.66	0.66	0.66	0.92	0.92	0.92	0.91	0.91	0.91
Hourly flow rate (vph)	7	0	0	38	8	23	11	415	0	0	526	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	993	966	529	966	969	415	532			415		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	993	966	529	966	969	415	532			415		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.3			2.2		
p0 queue free %	97	100	100	84	97	96	99			100		
cM capacity (veh/h)	211	254	553	230	253	627	992			1155		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	7	68	426	532
Volume Left	7	38	11	0
Volume Right	0	23	0	5
cSH	211	295	992	1700
Volume to Capacity	0.03	0.23	0.01	0.31
Queue Length 95th (ft)	3	22	1	0
Control Delay (s)	22.6	20.8	0.3	0.0
Lane LOS	C	C	A	
Approach Delay (s)	22.6	20.8	0.3	0.0
Approach LOS	C	C		

Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	38.2%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
32: Coggeshall Street & North Front St

2030 Build Condition - PM Peak Hour



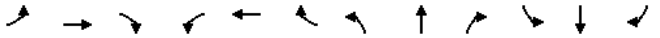
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	100	405	45	58	330	45	70	139	65	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.79	0.79	0.79	0.92	0.92	0.92
Hourly flow rate (vph)	108	435	48	62	355	48	89	176	82	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		546			443							
pX, platoon unblocked	0.92			0.91			0.95	0.95	0.91	0.95	0.95	0.92
vC, conflicting volume	403			484			1178	1203	460	1349	1203	379
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	313			382			979	1005	356	1159	1005	286
tC, single (s)	4.1			4.1			7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	91			94			54	10	87	100	100	100
cM capacity (veh/h)	1153			1059			194	195	614	29	197	700

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	591	466	347
Volume Left	108	62	89
Volume Right	48	48	82
cSH	1153	1059	233
Volume to Capacity	0.09	0.06	1.49
Queue Length 95th (ft)	8	5	515
Control Delay (s)	2.4	1.7	281.3
Lane LOS	A	A	F
Approach Delay (s)	2.4	1.7	281.3
Approach LOS			F

Intersection Summary				
Average Delay	71.1			
Intersection Capacity Utilization	65.7%	ICU Level of Service		C
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
55: Rt 18 SB Exit Ramp & Purchase St

2030 Build Condition - PM Peak Hour



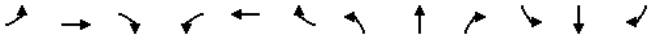
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	195	5	50	5	463	0	0	269	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	212	5	54	5	503	0	0	292	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								828				
pX, platoon unblocked	0.92	0.92		0.92	0.92	0.92				0.92		
vC, conflicting volume	864	807	292	807	807	503	292			503		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	812	750	292	750	750	422	292			422		
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 %	100	100	100	30	98	91	100			100		
cM capacity (veh/h)	246	313	747	302	313	584	1269			1051		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	272	509	292
Volume Left	0	212	5	0
Volume Right	0	54	0	0
cSH	1700	334	1269	1700
Volume to Capacity	0.00	0.81	0.00	0.17
Queue Length 95th (ft)	0	173	0	0
Control Delay (s)	0.0	49.2	0.1	0.0
Lane LOS	A	E	A	
Approach Delay (s)	0.0	49.2	0.1	0.0
Approach LOS	A	E		

Intersection Summary				
Average Delay	12.5			
Intersection Capacity Utilization	49.1%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
58: Coggeshall St & Purchase Street

2030 Build Condition - PM Peak Hour



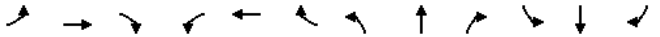
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	136	10	20	158	118	20	333	75	111	234	10
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.83	0.83	0.83	0.94	0.94	0.94
Hourly flow rate (vph)	6	155	11	23	180	134	24	401	90	118	249	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	172	336	516	378
Volume Left (vph)	6	23	24	118
Volume Right (vph)	11	134	90	11
Hadj (s)	0.01	-0.21	-0.03	0.12
Departure Headway (s)	8.3	7.4	7.1	7.4
Degree Utilization, x	0.40	0.69	1.01	0.78
Capacity (veh/h)	388	468	516	473
Control Delay (s)	16.7	25.6	69.2	31.9
Approach Delay (s)	16.7	25.6	69.2	31.9
Approach LOS	C	D	F	D

Intersection Summary				
Delay	42.3			
HCM Level of Service	E			
Intersection Capacity Utilization	76.8%	ICU Level of Service	D	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
72: Weld St & Purchase St

2030 Build Condition - PM Peak Hour



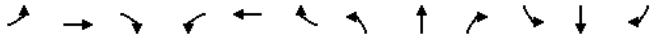
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	0	46	92	120	30	97	367	0	0	246	30
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.86	0.86	0.86	0.94	0.94	0.94	0.90	0.90	0.90
Hourly flow rate (vph)	28	0	52	107	140	35	103	390	0	0	273	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	991	887	290	939	903	390	307			390		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	991	887	290	939	903	390	307			390		
tC, single (s)	7.1	6.5	6.3	7.1	6.5	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.0	3.4	2.2			2.2		
p0 queue free %	75	100	93	50	45	95	92			100		
cM capacity (veh/h)	113	262	737	213	255	639	1260			1179		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	81	177	105	494	307
Volume Left	28	107	0	103	0
Volume Right	52	0	35	0	33
cSH	250	228	319	1260	1700
Volume to Capacity	0.32	0.78	0.33	0.08	0.18
Queue Length 95th (ft)	34	139	35	7	0
Control Delay (s)	26.1	60.3	21.7	2.4	0.0
Lane LOS	D	F	C	A	
Approach Delay (s)	26.1	45.9		2.4	0.0
Approach LOS	D	E			

Intersection Summary				
Average Delay	13.9			
Intersection Capacity Utilization	63.9%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
74: Logan St & Purchase St

2030 Build Condition - PM Peak Hour



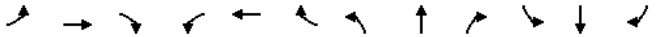
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	60	0	76	0	389	115	66	314	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.85	0.85	0.85	0.96	0.96	0.96	0.94	0.94	0.94
Hourly flow rate (vph)	0	0	0	71	0	89	0	405	120	70	334	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1029	999	334	940	940	465	334			525		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1029	999	334	940	940	465	334			525		
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 %	100	100	100	69	100	85	100			93		
cM capacity (veh/h)	172	228	712	231	247	597	1237			1017		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	160	525	404
Volume Left	0	71	0	70
Volume Right	0	89	120	0
cSH	1700	351	1237	1017
Volume to Capacity	0.00	0.46	0.00	0.07
Queue Length 95th (ft)	0	57	0	6
Control Delay (s)	0.0	23.5	0.0	2.2
Lane LOS	A	C		A
Approach Delay (s)	0.0	23.5	0.0	2.2
Approach LOS	A	C		

Intersection Summary				
Average Delay	4.3			
Intersection Capacity Utilization	65.6%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
75: Logan St & North Front Street

2030 Build Condition - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	170	15	10	10	20	45	5	234	5	10	141	52
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.61	0.61	0.61	0.92	0.92	0.92	0.88	0.88	0.88
Hourly flow rate (vph)	195	17	11	16	33	74	5	254	5	11	160	59
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											720	
pX, platoon unblocked												
vC, conflicting volume	571	483	190	501	510	257	219			260		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	571	483	190	501	510	257	219			260		
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 %	47	96	99	96	93	91	100			99		
cM capacity (veh/h)	365	480	857	460	464	786	1362			1316		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	224	123	265	231
Volume Left	195	16	5	11
Volume Right	11	74	5	59
cSH	384	614	1362	1316
Volume to Capacity	0.58	0.20	0.00	0.01
Queue Length 95th (ft)	89	19	0	1
Control Delay (s)	26.7	12.3	0.2	0.5
Lane LOS	D	B	A	A
Approach Delay (s)	26.7	12.3	0.2	0.5
Approach LOS	D	B		

Intersection Summary				
Average Delay	9.1			
Intersection Capacity Utilization	40.1%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
77: Route 140 On/Off Ramps & Mt. Pleasant Street

2030 Build Condition - PM Peak Hour

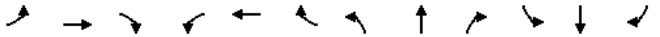
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	257	0	255	412	70	497
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.95	0.95	0.68	0.68
Hourly flow rate (vph)	292	0	268	434	103	731
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			877			
pX, platoon unblocked						
vC, conflicting volume	1422	485			268	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1422	485			268	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	0	100			92	
cM capacity (veh/h)	137	580			1272	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	292	702	834
Volume Left	292	0	103
Volume Right	0	434	0
cSH	137	1700	1272
Volume to Capacity	2.13	0.41	0.08
Queue Length 95th (ft)	598	0	7
Control Delay (s)	585.0	0.0	2.0
Lane LOS	F		A
Approach Delay (s)	585.0	0.0	2.0
Approach LOS	F		

Intersection Summary			
Average Delay	94.4		
Intersection Capacity Utilization	93.0%	ICU Level of Service	F
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
126: Logan St & Acushnet Ave.

2030 Build Condition - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	135	31	32	85	0	46	17	55	0	6	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.61	0.61	0.61	0.93	0.93	0.93	0.75	0.75	0.75
Hourly flow rate (vph)	16	145	33	52	139	0	49	18	59	0	8	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	228	188	11	264	161	48	15			77		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	228	188	11	264	161	48	15			77		
tC, single (s)	7.1	6.5	6.3	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	79	97	90	80	100	97			100		
cM capacity (veh/h)	607	685	1052	542	706	1027	1597			1534		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	195	192	127	15
Volume Left	16	52	49	0
Volume Right	33	0	59	7
cSH	720	652	1597	1534
Volume to Capacity	0.27	0.29	0.03	0.00
Queue Length 95th (ft)	27	31	2	0
Control Delay (s)	11.8	12.8	3.0	0.0
Lane LOS	B	B	A	
Approach Delay (s)	11.8	12.8	3.0	0.0
Approach LOS	B	B		

Intersection Summary				
Average Delay	9.7			
Intersection Capacity Utilization	34.2%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
129: Whale's Tooth Station driveway & Acushnet Ave.

2030 Build Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	99	67	80	36	20	90
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.72	0.72	0.63	0.63
Hourly flow rate (vph)	108	73	111	50	32	143
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	342	136			161	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	342	136			161	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	83	92			98	
cM capacity (veh/h)	639	913			1418	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	180	161	175
Volume Left	108	0	32
Volume Right	73	50	0
cSH	727	1700	1418
Volume to Capacity	0.25	0.09	0.02
Queue Length 95th (ft)	24	0	2
Control Delay (s)	11.6	0.0	1.5
Lane LOS	B		A
Approach Delay (s)	11.6	0.0	1.5
Approach LOS	B		

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
130: Herman Melville Boulevard & McArthur Drive

2030 Build Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	140	70	166	95	30	201
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.76	0.76	0.95	0.95	0.73	0.73
Hourly flow rate (vph)	184	92	175	100	41	275
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	582	225			275	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	582	225			275	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	60	88			97	
cM capacity (veh/h)	456	795			1244	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	276	275	316
Volume Left	184	0	41
Volume Right	92	100	0
cSH	532	1700	1244
Volume to Capacity	0.52	0.16	0.03
Queue Length 95th (ft)	74	0	3
Control Delay (s)	18.9	0.0	1.3
Lane LOS	C		A
Approach Delay (s)	18.9	0.0	1.3
Approach LOS	C		

Intersection Summary			
Average Delay		6.5	
Intersection Capacity Utilization		48.8%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
136: Hillman St & Acushnet Ave.

2030 Build Condition - PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	70	150	190	41	81	133
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.87	0.87	0.77	0.77
Hourly flow rate (vph)	84	181	218	47	105	173
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	675	192	278			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	675	192	278			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	76	78	83			
cM capacity (veh/h)	349	840	1268			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	265	266	278
Volume Left	84	218	0
Volume Right	181	0	173
cSH	581	1268	1700
Volume to Capacity	0.46	0.17	0.16
Queue Length 95th (ft)	59	16	0
Control Delay (s)	16.3	7.2	0.0
Lane LOS	C	A	
Approach Delay (s)	16.3	7.2	0.0
Approach LOS	C		

Intersection Summary			
Average Delay		7.7	
Intersection Capacity Utilization		48.2%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
147: Wamsutta St & Acushnet Ave.

2030 Build Condition - PM Peak Hour

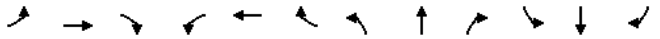
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	21	15	108	44	5	64
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.81	0.81	0.72	0.72	0.63	0.63
Hourly flow rate (vph)	26	19	150	61	8	102
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	298	181			150	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	298	181			150	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	98			99	
cM capacity (veh/h)	694	867			1444	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	44	211	110
Volume Left	26	0	8
Volume Right	19	61	0
cSH	757	1700	1444
Volume to Capacity	0.06	0.12	0.01
Queue Length 95th (ft)	5	0	0
Control Delay (s)	10.1	0.0	0.6
Lane LOS	B		A
Approach Delay (s)	10.1	0.0	0.6
Approach LOS	B		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	18.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
148: Wamsutta St & North Front St

2030 Build Condition - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	44	0	5	10	0	20	10	175	10	5	155	26
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.68	0.68	0.63	0.63	0.63	0.90	0.90	0.90	0.82	0.82	0.82
Hourly flow rate (vph)	65	0	7	16	0	32	11	194	11	6	189	32
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	471	445	205	447	455	200	221			206		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	471	445	205	447	455	200	221			206		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.4	4.1			4.1		
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 %	87	100	99	97	100	96	99			100		
cM capacity (veh/h)	482	504	841	516	498	807	1360			1378		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	72	48	217	227
Volume Left	65	16	11	6
Volume Right	7	32	11	32
cSH	504	679	1360	1378
Volume to Capacity	0.14	0.07	0.01	0.00
Queue Length 95th (ft)	12	6	1	0
Control Delay (s)	13.3	10.7	0.5	0.2
Lane LOS	B	B	A	A
Approach Delay (s)	13.3	10.7	0.5	0.2
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	27.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
182: McArthur Blvd & McArthur Dr-Leonard's Wharf

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	155	10	0	0	20	10	15	20	0	15	10	265
Peak Hour Factor	0.81	0.81	0.81	0.83	0.83	0.83	0.51	0.51	0.51	0.85	0.85	0.85
Hourly flow rate (vph)	191	12	0	0	24	12	29	39	0	18	12	312

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	204	36	69	341
Volume Left (vph)	191	0	29	18
Volume Right (vph)	0	12	0	312
Hadj (s)	0.30	-0.13	0.69	-0.41
Departure Headway (s)	5.2	5.0	5.6	4.2
Degree Utilization, x	0.29	0.05	0.11	0.40
Capacity (veh/h)	646	637	595	806
Control Delay (s)	10.4	8.3	9.3	10.1
Approach Delay (s)	10.4	8.3	9.3	10.1
Approach LOS	B	A	A	B

Intersection Summary				
Delay			10.0	
HCM Level of Service			A	
Intersection Capacity Utilization			40.3%	ICU Level of Service
Analysis Period (min)			15	A

HCM Unsignalized Intersection Capacity Analysis
184: McArthur Blvd & McArthur Dr

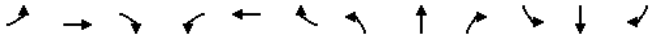
2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	270	30	0	40	0	165	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.83	0.83	0.83	0.82	0.82	0.82	0.25	0.25	0.25
Hourly flow rate (vph)	0	0	0	325	36	0	49	0	201	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	216	299	0	198	198	101	0			201		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	216	299	0	198	198	101	0			201		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	100	100	100	56	95	100	97			100		
cM capacity (veh/h)	698	598	1091	736	680	960	1591			1383		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	361	250	0
Volume Left	325	49	0
Volume Right	0	201	0
cSH	730	1591	1700
Volume to Capacity	0.49	0.03	0.00
Queue Length 95th (ft)	69	2	0
Control Delay (s)	14.7	1.6	0.0
Lane LOS	B	A	
Approach Delay (s)	14.7	1.6	0.0
Approach LOS	B		

Intersection Summary				
Average Delay			9.3	
Intersection Capacity Utilization			35.6%	ICU Level of Service
Analysis Period (min)			15	A

Taunton

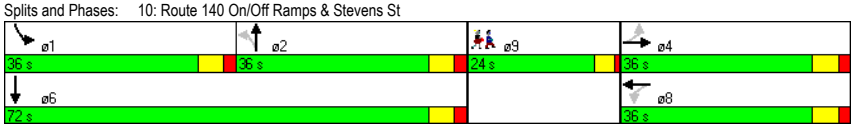


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	5	0	10	5	140	5	565	81	165	65	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	13	16	12	12	16	12	12	16	12	12	12
Storage Length (ft)	0		0	0		0	0		0	200		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		819			376			787			471	
Travel Time (s)		18.6			8.5			17.9			10.7	
Peak Hour Factor	0.45	0.45	0.45	0.84	0.84	0.84	0.85	0.85	0.85	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	33%	0%	3%	0%	7%	13%	11%	4%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	22	0	0	185	0	0	766	0	196	89	0
Turn Type	Perm			Perm			Perm			Prot		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2					
Detector Phase	4	4		8	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Total Split (s)	36.0	36.0	0.0	36.0	36.0	0.0	36.0	36.0	0.0	36.0	72.0	0.0
Total Split (%)	27.3%	27.3%	0.0%	27.3%	27.3%	0.0%	27.3%	27.3%	0.0%	27.3%	54.5%	0.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	66.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.07			0.41			0.55		0.44	0.07	
Control Delay		24.2			9.3			14.0		26.0	3.0	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		24.2			9.3			14.0		26.0	3.0	
Queue Length 50th (ft)		3			3			95		31	7	
Queue Length 95th (ft)		6			24			145		55	17	
Internal Link Dist (ft)		739			296			707			391	
Turn Bay Length (ft)										200		
Base Capacity (vph)		1461			1506			1612		1617	1800	
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		0.02			0.12			0.48		0.12	0.05	

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	24.0
Total Split (s)	24.0
Total Split (%)	18%
Maximum Green (s)	20.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	13.0
Pedestrian Calls (#/hr)	0
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	
Area Type:	Other
Cycle Length: 132	
Actuated Cycle Length: 58.6	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 10: Route 140 On/Off Ramps & Stevens St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	5	0	10	5	140	5	565	81	165	65	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	13	16	12	12	16	12	12	16	12	12	12
Total Lost time (s)		6.0			6.0			6.0		6.0	6.0	
Lane Util. Factor		0.95			0.95			0.95		0.97	1.00	
Frt		1.00			0.86			0.98		1.00	0.98	
Flt Protected		0.98			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		3639			2967			3289		3155	1799	
Flt Permitted		0.76			0.93			0.95		0.95	1.00	
Satd. Flow (perm)		2851			2778			3137		3155	1799	
Peak-hour factor, PHF	0.45	0.45	0.45	0.84	0.84	0.84	0.85	0.85	0.85	0.84	0.84	0.84
Adj. Flow (vph)	11	11	0	12	6	167	6	665	95	196	77	12
RTOR Reduction (vph)	0	0	0	0	149	0	0	6	0	0	3	0
Lane Group Flow (vph)	0	22	0	0	36	0	0	760	0	196	86	0
Heavy Vehicles (%)	0%	0%	0%	33%	0%	3%	0%	7%	13%	11%	4%	0%
Turn Type	Perm			Perm			Perm			Prot		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		6.3			6.3			26.0		8.3	40.3	
Effective Green, g (s)		6.3			6.3			26.0		8.3	40.3	
Actuated g/C Ratio		0.11			0.11			0.44		0.14	0.69	
Clearance Time (s)		6.0			6.0			6.0		6.0	6.0	
Vehicle Extension (s)		2.0			2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		307			299			1392		447	1237	
v/s Ratio Prot										c0.06	0.05	
v/s Ratio Perm		0.01			c0.01			c0.24				
v/c Ratio		0.07			0.12			0.55		0.44	0.07	
Uniform Delay, d1		23.5			23.6			12.0		23.0	3.0	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.0			0.1			0.2		0.3	0.0	
Delay (s)		23.6			23.7			12.2		23.3	3.0	
Level of Service		C			C			B		C	A	
Approach Delay (s)		23.6			23.7			12.2			16.9	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	15.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	58.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	10	10	0	0	0	5	116	0	60	56	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	14	12	12	12	12	12	16	12	12	16
Storage Length (ft)	0		0	0		0	200		0	0		0
Storage Lanes	0		0	0		0	1		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		396			269			674			311	
Travel Time (s)		9.0			6.1			15.3			7.1	
Peak Hour Factor	0.83	0.83	0.83	0.77	0.77	0.77	0.85	0.85	0.85	0.87	0.87	0.87
Heavy Vehicles (%)	41%	25%	38%	0%	0%	0%	36%	4%	0%	13%	8%	9%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	42	0	0	0	0	0	142	0	0	133	92
Turn Type	Perm						Perm			Perm		Perm
Protected Phases		2						1			1	
Permitted Phases	2						1			1		1
Detector Phase	2	2					1	1		1	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0					8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	13.0	13.0					13.0	13.0		13.0	13.0	13.0
Total Split (s)	31.0	31.0	0.0	0.0	0.0	0.0	51.0	51.0	0.0	51.0	51.0	51.0
Total Split (%)	37.8%	37.8%	0.0%	0.0%	0.0%	0.0%	62.2%	62.2%	0.0%	62.2%	62.2%	62.2%
Maximum Green (s)	26.0	26.0					46.0	46.0		46.0	46.0	46.0
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag					Lead	Lead		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes					Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0					2.0	2.0		2.0	2.0	2.0
Recall Mode	None	None					Min	Min		Min	Min	Min
v/c Ratio		0.06						0.05			0.06	0.06
Control Delay		7.9						2.0			2.1	1.2
Queue Delay		0.0						0.0			0.0	0.0
Total Delay		7.9						2.0			2.1	1.2
Queue Length 50th (ft)		1						0			0	0
Queue Length 95th (ft)		8						13			13	11
Internal Link Dist (ft)		316			189			594			231	
Turn Bay Length (ft)												
Base Capacity (vph)		2433						3245			2664	1679
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		0.02						0.04			0.05	0.05

Intersection Summary	
Area Type:	Other

Cycle Length: 82
Actuated Cycle Length: 29.7
Natural Cycle: 40
Control Type: Actuated-Uncoordinated

Splits and Phases: 18: Galleria Mall Entrance & County St

HCM Signalized Intersection Capacity Analysis
18: Galleria Mall Entrance & County St

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	10	10	0	0	0	5	116	0	60	56	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	14	12	12	12	12	12	16	12	12	16
Total Lost time (s)		5.0						5.0			5.0	5.0
Lane Util. Factor		0.95						0.95			0.95	1.00
Frt		0.96						1.00			1.00	0.85
Flt Protected		0.98						1.00			0.97	1.00
Satd. Flow (prot)		2745						3419			3182	1679
Flt Permitted		0.98						0.95			0.82	1.00
Satd. Flow (perm)		2745						3246			2664	1679
Peak-hour factor, PHF	0.83	0.83	0.83	0.77	0.77	0.77	0.85	0.85	0.85	0.87	0.87	0.87
Adj. Flow (vph)	18	12	12	0	0	0	6	136	0	69	64	92
RTOR Reduction (vph)	0	12	0	0	0	0	0	0	0	0	0	31
Lane Group Flow (vph)	0	30	0	0	0	0	0	142	0	0	133	61
Heavy Vehicles (%)	41%	25%	38%	0%	0%	0%	36%	4%	0%	13%	8%	9%
Turn Type	Perm						Perm			Perm		Perm
Protected Phases		2						1			1	
Permitted Phases	2						1			1		1
Actuated Green, G (s)		1.3						22.5			22.5	22.5
Effective Green, g (s)		1.3						22.5			22.5	22.5
Actuated g/C Ratio		0.04						0.67			0.67	0.67
Clearance Time (s)		5.0						5.0			5.0	5.0
Vehicle Extension (s)		2.0						2.0			2.0	2.0
Lane Grp Cap (vph)		106						2161			1773	1118
v/s Ratio Prot												
v/s Ratio Perm		0.01						0.04			c0.05	0.04
v/c Ratio		0.29						0.07			0.08	0.05
Uniform Delay, d1		15.8						2.0			2.0	2.0
Progression Factor		1.00						1.00			1.00	1.00
Incremental Delay, d2		0.5						0.0			0.0	0.0
Delay (s)		16.3						2.0			2.0	2.0
Level of Service		B						A			A	A
Approach Delay (s)		16.3			0.0			2.0			2.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	3.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.09		
Actuated Cycle Length (s)	33.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

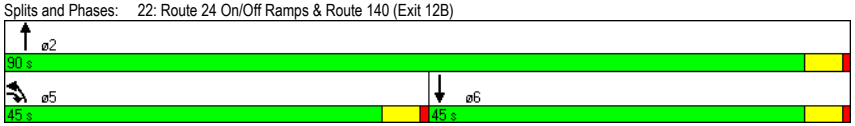
Lanes, Volumes, Timings
22: Route 24 On/Off Ramps & Route 140 (Exit 12B)

2030 Build Condition - AM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	765	95	891	764	242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	12	12	12	12	12
Storage Length (ft)	0	0	250			0
Storage Lanes	0	2	1			0
Taper Length (ft)	25	25	25			25
Right Turn on Red		No				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	741			870	631	
Travel Time (s)	16.8			19.8	14.3	
Peak Hour Factor	0.85	0.85	0.90	0.90	0.84	0.84
Heavy Vehicles (%)	5%	9%	16%	4%	6%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	900	106	990	1198	0
Turn Type		Over	Prot			
Protected Phases		5	5	2	6	
Permitted Phases						
Detector Phase		5	5	2	6	
Switch Phase						
Minimum Initial (s)		4.0	4.0	4.0	4.0	
Minimum Split (s)		10.0	10.0	22.0	22.0	
Total Split (s)	0.0	45.0	45.0	90.0	45.0	0.0
Total Split (%)	0.0%	50.0%	50.0%	100.0%	50.0%	0.0%
Maximum Green (s)		40.0	40.0	85.0	40.0	
Yellow Time (s)		4.0	4.0	4.0	4.0	
All-Red Time (s)		1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	4.0
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0	3.0	3.0	
Recall Mode		None	None	C-Min	C-Min	
Walk Time (s)				5.0	5.0	
Flash Dont Walk (s)				11.0	11.0	
Pedestrian Calls (#/hr)				0	0	
v/c Ratio		0.86	0.17	0.29	0.73	
Control Delay		33.6	24.6	0.2	20.3	
Queue Delay		0.0	0.0	0.0	0.0	
Total Delay		33.6	24.6	0.2	20.3	
Queue Length 50th (ft)		251	52	0	269	
Queue Length 95th (ft)		295	92	0	331	
Internal Link Dist (ft)	661			790	551	
Turn Bay Length (ft)			250			
Base Capacity (vph)		1159	692	3471	1645	
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		0.78	0.15	0.29	0.73	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Splits and Phases: 22: Route 24 On/Off Ramps & Route 140 (Exit 12B)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	765	95	891	764	242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	15	12	12	12	12	12
Total Lost time (s)		5.0	5.0	5.0	5.0	
Lane Util. Factor		0.88	1.00	0.95	0.95	
Frt		0.85	1.00	1.00	0.96	
Flt Protected		1.00	0.95	1.00	1.00	
Satd. Flow (prot)		2608	1556	3471	3313	
Flt Permitted		1.00	0.95	1.00	1.00	
Satd. Flow (perm)		2608	1556	3471	3313	
Peak-hour factor, PHF	0.85	0.85	0.90	0.90	0.84	0.84
Adj. Flow (vph)	0	900	106	990	910	288
RTOR Reduction (vph)	0	0	0	0	31	0
Lane Group Flow (vph)	0	900	106	990	1167	0
Heavy Vehicles (%)	5%	9%	16%	4%	6%	2%
Turn Type		Over	Prot			
Protected Phases		5	5	2	6	
Permitted Phases						
Actuated Green, G (s)		36.1	36.1	90.0	43.9	
Effective Green, g (s)		36.1	36.1	90.0	43.9	
Actuated g/C Ratio		0.40	0.40	1.00	0.49	
Clearance Time (s)		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1046	624	3471	1616	
v/s Ratio Prot		c0.35	0.07	0.29	c0.35	
v/s Ratio Perm						
v/c Ratio		0.86	0.17	0.29	0.72	
Uniform Delay, d1		24.6	17.3	0.0	18.2	
Progression Factor		1.00	1.47	1.00	0.95	
Incremental Delay, d2		7.4	0.1	0.2	2.7	
Delay (s)		32.0	25.7	0.2	20.0	
Level of Service		C	C	A	C	
Approach Delay (s)	32.0			2.7	20.0	
Approach LOS	C			A	C	

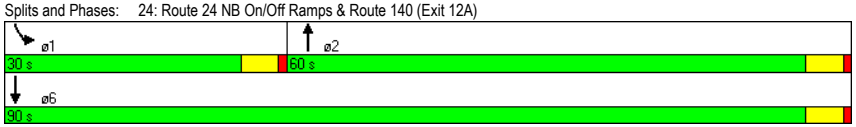
Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	330	681	1175	286	1237
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	12	12
Storage Length (ft)	0	0		300	250	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Right Turn on Red		Yes		No		
Link Speed (mph)	30		30			30
Link Distance (ft)	736		624			870
Travel Time (s)	16.7		14.2			19.8
Peak Hour Factor	0.92	0.92	0.86	0.86	0.92	0.92
Heavy Vehicles (%)	0%	1%	7%	6%	6%	8%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	359	792	1366	311	1345
Turn Type		Free		Free	Prot	
Protected Phases			2		1	6
Permitted Phases		Free		Free		
Detector Phase			2		1	6
Switch Phase						
Minimum Initial (s)			8.0		8.0	8.0
Minimum Split (s)			13.0		13.0	13.0
Total Split (s)	0.0	0.0	60.0	0.0	30.0	90.0
Total Split (%)	0.0%	0.0%	66.7%	0.0%	33.3%	100.0%
Maximum Green (s)			55.0		25.0	85.0
Yellow Time (s)			4.0		4.0	4.0
All-Red Time (s)			1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	5.0	4.0	5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)			2.0		2.0	2.0
Recall Mode			C-Min		None	C-Min
v/c Ratio		0.20	0.36	0.90	0.80	0.40
Control Delay		0.3	8.1	9.9	46.8	0.2
Queue Delay		0.0	0.0	0.0	0.0	0.0
Total Delay		0.3	8.1	9.9	46.8	0.2
Queue Length 50th (ft)		0	94	0	182	0
Queue Length 95th (ft)		0	148	0	m228	0
Internal Link Dist (ft)	656		544			790
Turn Bay Length (ft)				300	250	
Base Capacity (vph)		1790	2246	1524	482	3343
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		0.20	0.35	0.90	0.65	0.40

Intersection Summary	
Area Type:	Other

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 16 (18%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 24: Route 24 NB On/Off Ramps & Route 140 (Exit 12A)



HCM Signalized Intersection Capacity Analysis
24: Route 24 NB On/Off Ramps & Route 140 (Exit 12A)

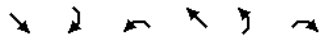
2030 Build Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	330	681	1175	286	1237
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	15	12	12	12	12
Total Lost time (s)		4.0	5.0	4.0	5.0	5.0
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95
Frt		0.86	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1790	3374	1524	1703	3343
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1790	3374	1524	1703	3343
Peak-hour factor, PHF	0.92	0.92	0.86	0.86	0.92	0.92
Adj. Flow (vph)	0	359	792	1366	311	1345
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	359	792	1366	311	1345
Heavy Vehicles (%)	0%	1%	7%	6%	6%	8%
Turn Type		Free		Free	Prot	
Protected Phases			2		1	6
Permitted Phases		Free		Free		
Actuated Green, G (s)		90.0	59.4	90.0	20.6	90.0
Effective Green, g (s)		90.0	59.4	90.0	20.6	90.0
Actuated g/C Ratio		1.00	0.66	1.00	0.23	1.00
Clearance Time (s)			5.0		5.0	5.0
Vehicle Extension (s)			2.0		2.0	2.0
Lane Grp Cap (vph)		1790	2227	1524	390	3343
v/s Ratio Prot			0.23		0.18	0.40
v/s Ratio Perm		0.20		c0.90		
v/c Ratio		0.20	0.36	0.90	0.80	0.40
Uniform Delay, d1		0.0	6.8	0.0	32.7	0.0
Progression Factor		1.00	1.00	1.00	1.14	1.00
Incremental Delay, d2		0.3	0.4	8.6	6.7	0.2
Delay (s)		0.3	7.2	8.6	43.9	0.2
Level of Service		A	A	A	D	A
Approach Delay (s)	0.3		8.1			8.4
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
26: Route 140 (Exit 12B) & Mozzone Blvd

2030 Build Condition - AM Peak Hour

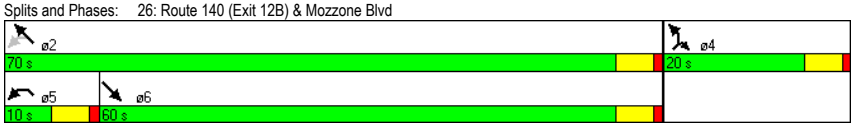


Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (vph)	990	20	35	1079	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		150	0		0	0
Storage Lanes		0	1		1	1
Taper Length (ft)		25	25		25	25
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	1723			724	1178	
Travel Time (s)	39.2			16.5	26.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1098	0	0	1211	5	16
Turn Type			pm+pt			Prot
Protected Phases	6		5	2	4	4
Permitted Phases			2			
Detector Phase	6		5	2	4	4
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	15.0		10.0	15.0	15.0	15.0
Total Split (s)	60.0	0.0	10.0	70.0	20.0	20.0
Total Split (%)	66.7%	0.0%	11.1%	77.8%	22.2%	22.2%
Maximum Green (s)	55.0		5.0	65.0	15.0	15.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	4.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	C-Min		None	C-Min	None	None
v/c Ratio	0.34			0.42	0.04	0.13
Control Delay	1.4			3.9	39.6	20.5
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	1.4			3.9	39.6	20.5
Queue Length 50th (ft)	0			1	3	0
Queue Length 95th (ft)	84			263	14	20
Internal Link Dist (ft)	1643			644	1098	
Turn Bay Length (ft)						
Base Capacity (vph)	3267			2897	295	277
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	0.34			0.42	0.02	0.06

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	

Offset: 16 (18%), Referenced to phase 2:NWTL and 6:SET, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 26: Route 140 (Exit 12B) & Mozzone Blvd



Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (vph)	990	20	35	1079	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3529			3534	1770	1583
Flt Permitted	1.00			0.88	0.95	1.00
Satd. Flow (perm)	3529			3127	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1076	22	38	1173	5	16
RTOR Reduction (vph)	1	0	0	0	0	16
Lane Group Flow (vph)	1097	0	0	1211	5	0
Turn Type			pm+pt			Prot
Protected Phases	6		5	2	4	4
Permitted Phases			2			
Actuated Green, G (s)	77.3			77.3	2.7	2.7
Effective Green, g (s)	77.3			77.3	2.7	2.7
Actuated g/C Ratio	0.86			0.86	0.03	0.03
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	3031			2686	53	47
v/s Ratio Prot	0.31				c0.00	0.00
v/s Ratio Perm				c0.39		
v/c Ratio	0.36			0.45	0.09	0.01
Uniform Delay, d1	1.3			1.5	42.5	42.4
Progression Factor	1.00			2.62	1.00	1.00
Incremental Delay, d2	0.3			0.1	0.8	0.1
Delay (s)	1.6			3.9	43.2	42.4
Level of Service	A			A	D	D
Approach Delay (s)	1.6			3.9	42.6	
Approach LOS	A			A	D	

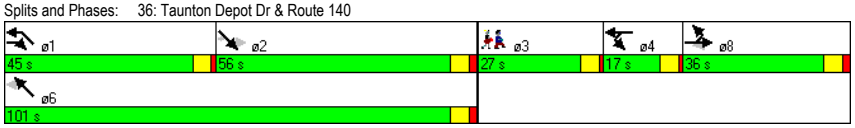
Intersection Summary			
HCM Average Control Delay	3.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	78	0	85	5	0	0	5	895	204	184	730	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	12	12
Storage Length (ft)	0		100	0		0	180		130	320		350
Storage Lanes	1		1	0		0	1		1	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		846			205			2224			1723	
Travel Time (s)		19.2			4.7			50.5			39.2	
Peak Hour Factor	0.85	0.85	0.85	0.50	0.50	0.50	0.90	0.90	0.90	0.93	0.93	0.93
Heavy Vehicles (%)	9%	0%	4%	0%	0%	0%	0%	4%	5%	0%	6%	0%
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	46	46	100	0	10	0	0	1000	227	198	785	0
Turn Type	Split		pm+ov	Split			Perm		Perm	pm+pt		
Protected Phases	8	8	1	4	4			2		1	6	
Permitted Phases			8				2		2	6		
Detector Phase	8	8	1	4	4		2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	4.0	4.0		6.0	6.0	6.0	6.0	20.0	
Minimum Split (s)	12.0	12.0	11.0	9.0	9.0		12.0	12.0	12.0	11.0	26.0	
Total Split (s)	36.0	36.0	45.0	17.0	17.0	0.0	56.0	56.0	56.0	45.0	101.0	0.0
Total Split (%)	19.9%	19.9%	24.9%	9.4%	9.4%	0.0%	30.9%	30.9%	30.9%	24.9%	55.8%	0.0%
Maximum Green (s)	30.0	30.0	40.0	12.0	12.0		50.0	50.0	50.0	40.0	95.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0		2.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.0	5.0	5.0	4.0	6.0	6.0	6.0	5.0	6.0	4.0
Lead/Lag			Lead	Lag	Lag		Lag	Lag	Lag	Lead		
Lead-Lag Optimize?				Yes	Yes							
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		4.0	4.0	4.0	2.0	4.0	
Recall Mode	None	None	None	None	None		Min	Min	Min	None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.34	0.34	0.22		0.08			0.52	0.25	0.44	0.30	
Control Delay	52.8	52.8	7.9		52.8			18.6	12.0	9.5	7.0	
Queue Delay	0.0	0.0	0.0		0.0			0.0	0.0	0.0	0.0	
Total Delay	52.8	52.8	7.9		52.8			18.6	12.0	9.5	7.0	
Queue Length 50th (ft)	24	24	0		5			142	32	19	48	
Queue Length 95th (ft)	82	82	38		17			525	173	130	259	
Internal Link Dist (ft)		766			125			2144			1643	
Turn Bay Length (ft)			100						130	320		
Base Capacity (vph)	547	547	949		285			1912	923	949	3191	
Starvation Cap Reductn	0	0	0		0			0	0	0	0	
Spillback Cap Reductn	0	0	0		0			0	0	0	0	
Storage Cap Reductn	0	0	0		0			0	0	0	0	
Reduced v/c Ratio	0.08	0.08	0.11		0.04			0.52	0.25	0.21	0.25	

Lane Group	ø3
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	15%
Maximum Green (s)	22.0
Yellow Time (s)	4.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	15.0
Pedestrian Calls (#/hr)	2
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	
Area Type:	Other
Cycle Length: 181	
Actuated Cycle Length: 91.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 36: Taunton Depot Dr & Route 140



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	78	0	85	5	0	0	5	895	204	184	730	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)	6.0	6.0	5.0		5.0			6.0	6.0	5.0	6.0	
Lane Util. Factor	0.95	0.95	1.00		1.00			0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85		1.00			1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00		0.95			1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1573	1573	1553		2046			3471	1538	1805	3406	
Flt Permitted	0.95	0.95	1.00		0.95			0.95	1.00	0.19	1.00	
Satd. Flow (perm)	1573	1573	1553		2046			3300	1538	370	3406	
Peak-hour factor, PHF	0.85	0.85	0.85	0.50	0.50	0.50	0.90	0.90	0.90	0.93	0.93	0.93
Adj. Flow (vph)	92	0	100	10	0	0	6	994	227	198	785	0
RTOR Reduction (vph)	0	0	83	0	0	0	0	0	35	0	0	0
Lane Group Flow (vph)	46	46	17	0	10	0	0	1000	192	198	785	0
Heavy Vehicles (%)	9%	0%	4%	0%	0%	0%	0%	4%	5%	0%	6%	0%
Turn Type	Split		pm+ov	Split			Perm		Perm	pm+pt		
Protected Phases	8	8	1	4	4			2		1	6	
Permitted Phases			8				2		2	6		
Actuated Green, G (s)	6.3	6.3	17.0		0.8			53.3	53.3	69.0	69.0	
Effective Green, g (s)	6.3	6.3	17.0		0.8			53.3	53.3	69.0	69.0	
Actuated g/C Ratio	0.06	0.06	0.17		0.01			0.53	0.53	0.68	0.68	
Clearance Time (s)	6.0	6.0	5.0		5.0			6.0	6.0	5.0	6.0	
Vehicle Extension (s)	2.0	2.0	2.0		2.0			4.0	4.0	2.0	4.0	
Lane Grp Cap (vph)	98	98	261		16			1741	812	405	2327	
v/s Ratio Prot	c0.03	0.03	0.01		c0.00					c0.05	0.23	
v/s Ratio Perm			0.00					c0.30	0.12	0.28		
v/c Ratio	0.47	0.47	0.06		0.62			0.57	0.24	0.49	0.34	
Uniform Delay, d1	45.7	45.7	35.3		50.0			16.2	12.9	8.4	6.6	
Progression Factor	1.00	1.00	1.00		1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.3	1.3	0.0		44.0			0.6	0.2	0.3	0.1	
Delay (s)	47.0	47.0	35.4		94.0			16.7	13.1	8.8	6.7	
Level of Service	D	D	D		F			B	B	A	A	
Approach Delay (s)		40.9			94.0			16.0			7.1	
Approach LOS		D			F			B			A	

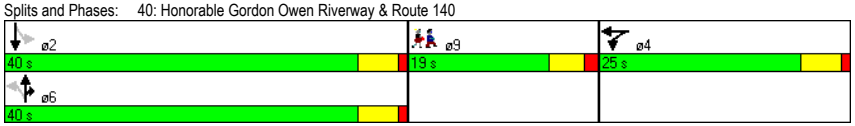
Intersection Summary			
HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	101.0	Sum of lost time (s)	29.9
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	231	0	5	0	650	302	10	400	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12	12	11	12	12	13	12
Storage Length (ft)	0		0	0		0	0		175	0		0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		220			991			547			1888	
Travel Time (s)		5.0			22.5			12.4			42.9	
Peak Hour Factor	0.92	0.92	0.92	0.84	0.84	0.84	0.93	0.93	0.93	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	8%	0%	0%	0%	6%	4%	8%	5%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	281	0	0	699	325	0	460	0
Turn Type				Split			Perm		Prot	Perm		
Protected Phases				4	4			6	6		2	
Permitted Phases							6			2		
Detector Phase				4	4		6	6	6	2	2	
Switch Phase												
Minimum Initial (s)				6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)				11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Total Split (s)	0.0	0.0	0.0	25.0	25.0	0.0	40.0	40.0	40.0	40.0	40.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	29.8%	29.8%	0.0%	47.6%	47.6%	47.6%	47.6%	47.6%	0.0%
Maximum Green (s)				20.0	20.0		35.0	35.0	35.0	35.0	35.0	
Yellow Time (s)				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	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Recall Mode				None	None		None	None	None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio					0.66			0.74	0.34		0.46	
Control Delay					31.0			20.5	3.9		12.9	
Queue Delay					0.0			0.0	0.0		0.0	
Total Delay					31.0			20.5	3.9		12.9	
Queue Length 50th (ft)					91			161	7		85	
Queue Length 95th (ft)					201			#584	67		276	
Internal Link Dist (ft)		140			911			467			1808	
Turn Bay Length (ft)									175			
Base Capacity (vph)					568			994	1008		1054	
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					0.49			0.70	0.32		0.44	

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	23%
Maximum Green (s)	14.0
Yellow Time (s)	3.5
All-Red Time (s)	1.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	4.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	7.0
Pedestrian Calls (#/hr)	3
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	

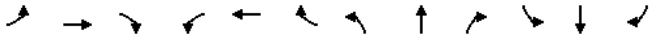
Intersection Summary	
Area Type:	Other
Cycle Length: 84	
Actuated Cycle Length: 63	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 40: Honorable Gordon Owen Riverway & Route 140



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	231	0	5	0	650	302	10	400	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	13	12	12	11	12	12	13	12
Total Lost time (s)					5.0			5.0	5.0		5.0	
Lane Util. Factor					1.00			1.00	1.00		1.00	
Frt					1.00			1.00	0.85		1.00	
Flt Protected					0.95			1.00	1.00		1.00	
Satd. Flow (prot)					1731			1733	1553		1866	
Flt Permitted					0.95			1.00	1.00		0.98	
Satd. Flow (perm)					1731			1733	1553		1836	
Peak-hour factor, PHF	0.92	0.92	0.92	0.84	0.84	0.84	0.93	0.93	0.93	0.89	0.89	0.89
Adj. Flow (vph)	0	0	0	275	0	6	0	699	325	11	449	0
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	133	0	0	0
Lane Group Flow (vph)	0	0	0	0	280	0	0	699	192	0	460	0
Heavy Vehicles (%)	0%	0%	0%	8%	0%	0%	0%	6%	4%	8%	5%	0%
Turn Type				Split			Perm		Prot	Perm		
Protected Phases				4	4			6	6		2	
Permitted Phases							6			2		
Actuated Green, G (s)					15.6			34.2	34.2		34.2	
Effective Green, g (s)					15.6			34.2	34.2		34.2	
Actuated g/C Ratio					0.23			0.51	0.51		0.51	
Clearance Time (s)					5.0			5.0	5.0		5.0	
Vehicle Extension (s)					4.0			4.0	4.0		4.0	
Lane Grp Cap (vph)					404			886	794		939	
v/s Ratio Prot					c0.16			c0.40	0.12			
v/s Ratio Perm											0.25	
v/c Ratio					0.69			0.79	0.24		0.49	
Uniform Delay, d1					23.5			13.4	9.1		10.7	
Progression Factor					1.00			1.00	1.00		1.00	
Incremental Delay, d2					5.5			5.0	0.2		0.6	
Delay (s)					29.0			18.4	9.3		11.2	
Level of Service					C			B	A		B	
Approach Delay (s)		0.0			29.0			15.5			11.2	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM Average Control Delay	16.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	66.9	Sum of lost time (s)	17.1
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

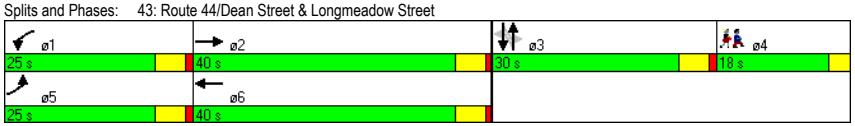


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	819	296	185	655	95	127	350	270	125	220	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	16	10	12	13	12	11	16	12	11	12
Storage Length (ft)	100		70	100		70	0		50	0		100
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1663			1440			2994			1249	
Travel Time (s)		37.8			32.7			68.0			28.4	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.86	0.86	0.86	0.68	0.68	0.68
Heavy Vehicles (%)	18%	3%	3%	5%	4%	2%	8%	6%	3%	3%	8%	20%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1186	0	197	798	0	0	869	0	0	530	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			3			3	
Permitted Phases							3			3		
Detector Phase	5	2		1	6		3	3		3	3	
Switch Phase												
Minimum Initial (s)	9.0	12.0		9.0	12.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	14.0	17.0		14.0	17.0		13.0	13.0		13.0	13.0	
Total Split (s)	25.0	40.0	0.0	25.0	40.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0
Total Split (%)	22.1%	35.4%	0.0%	22.1%	35.4%	0.0%	26.5%	26.5%	0.0%	26.5%	26.5%	0.0%
Maximum Green (s)	20.0	35.0		20.0	35.0		25.0	25.0		25.0	25.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	5.0		4.0	5.0		4.0	4.0		4.0	4.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.08	0.93		0.70	0.41			1.47			2.36dl	
Control Delay	45.3	42.8		52.0	13.9			248.5			97.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	45.3	42.8		52.0	13.9			248.5			97.1	
Queue Length 50th (ft)	6	330		108	107			~350			~179	
Queue Length 95th (ft)	27	#642		#230	290			#558			#238	
Internal Link Dist (ft)		1583			1360			2914			1169	
Turn Bay Length (ft)	100			100								
Base Capacity (vph)	302	1274		339	1964			590			494	
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	0.04	0.93		0.58	0.41			1.47			1.07	

Lane Group	ø4
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	4
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	8.0
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	16%
Maximum Green (s)	15.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	0.2
Recall Mode	None
Walk Time (s)	8.0
Flash Dont Walk (s)	7.0
Pedestrian Calls (#/hr)	12
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	

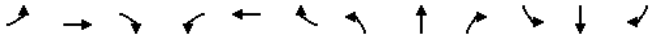
Intersection Summary	
Area Type:	Other
Cycle Length: 113	
Actuated Cycle Length: 95.4	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
dl Defacto Left Lane. Recode with 1 though lane as a left lane.	

Splits and Phases: 43: Route 44/Dean Street & Longmeadow Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	819	296	185	655	95	127	350	270	125	220	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	16	10	12	13	12	11	16	12	11	12
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frt	1.00	0.96		1.00	0.98			0.95			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1428	3365		1604	3414			3109			3193	
Flt Permitted	0.95	1.00		0.95	1.00			0.63			0.57	
Satd. Flow (perm)	1428	3365		1604	3414			1981			1860	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.86	0.86	0.86	0.68	0.68	0.68
Adj. Flow (vph)	11	871	315	197	697	101	148	407	314	184	324	22
RTOR Reduction (vph)	0	29	0	0	7	0	0	68	0	0	3	0
Lane Group Flow (vph)	11	1157	0	197	791	0	0	801	0	0	527	0
Heavy Vehicles (%)	18%	3%	3%	5%	4%	2%	8%	6%	3%	3%	8%	20%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			3			3	
Permitted Phases							3			3		
Actuated Green, G (s)	1.5	39.4		16.8	54.7			25.2			25.2	
Effective Green, g (s)	1.5	39.4		16.8	54.7			25.2			25.2	
Actuated g/C Ratio	0.01	0.39		0.16	0.54			0.25			0.25	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	4.0	5.0		4.0	5.0			4.0			4.0	
Lane Grp Cap (vph)	21	1301		264	1833			490			460	
v/s Ratio Prot	0.01	c0.34		c0.12	0.23							
v/s Ratio Perm								c0.40			0.28	
v/c Ratio	0.52	0.89		0.75	0.43			1.64			2.36dl	
Uniform Delay, d1	49.8	29.2		40.5	14.2			38.4			38.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	27.4	8.3		11.6	0.3			295.0			88.4	
Delay (s)	77.3	37.6		52.1	14.6			333.4			126.7	
Level of Service	E	D		D	B			F			F	
Approach Delay (s)		37.9			22.0			333.4			126.7	
Approach LOS		D			C			F			F	

Intersection Summary					
HCM Average Control Delay	118.1	HCM Level of Service	F		
HCM Volume to Capacity ratio	1.09				
Actuated Cycle Length (s)	101.9	Sum of lost time (s)	20.5		
Intersection Capacity Utilization	91.2%	ICU Level of Service	F		
Analysis Period (min)	15				
dl Defacto Left Lane. Recode with 1 though lane as a left lane.					
c Critical Lane Group					



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	165	307	134	110	245	141	636	62	160	558	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	12	12	11	11	11	12	12	12
Storage Length (ft)	0		50	0		50	50		0	50		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1373			971			2224			3692	
Travel Time (s)		31.2			22.1			43.3			71.9	
Peak Hour Factor	0.80	0.80	0.80	0.95	0.95	0.95	0.95	0.95	0.95	0.73	0.73	0.73
Heavy Vehicles (%)	0%	6%	3%	1%	4%	3%	4%	5%	2%	10%	6%	13%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	237	384	0	257	258	0	882	0	0	997	0
Turn Type	Perm		Prot	Perm		Prot	pm+pt			pm+pt		
Protected Phases		4	4		4	4	3	2 3		1	1 2	
Permitted Phases	4			4			2 3			1 2		
Detector Phase	4	4	4	4	4	4	3	2 3		1	1 2	
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	6.0			6.0		
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	11.0			11.0		
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	17.0	57.0	0.0	15.0	55.0	0.0
Total Split (%)	20.5%	20.5%	20.5%	20.5%	20.5%	20.5%	13.9%	46.7%	0.0%	12.3%	45.1%	0.0%
Maximum Green (s)	20.0	20.0	20.0	20.0	20.0	20.0	12.0			10.0		
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead			Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0		
Recall Mode	Max	Max	Max	Max	Max	Max	None			None		
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.97	0.88		1.60	0.65		0.81			1.04	
Control Delay		92.9	44.5		325.6	31.8		30.3			64.8	
Queue Delay		0.0	0.0		0.0	0.0		0.0			0.0	
Total Delay		92.9	44.5		325.6	31.8		30.3			64.8	
Queue Length 50th (ft)		145	131		~224	84		170			213	
Queue Length 95th (ft)		#326	#291		#481	#236		#433			#398	
Internal Link Dist (ft)		1293			891			2144			3612	
Turn Bay Length (ft)			50			50						
Base Capacity (vph)		245	438		161	395		1088			960	
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		0.97	0.88		1.60	0.65		0.81			1.04	

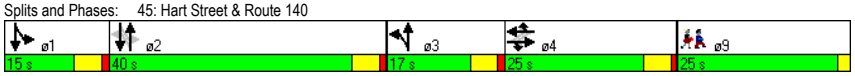
Lane Group	ø2	ø9
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	2	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	8.0	1.0
Minimum Split (s)	13.0	25.0
Total Split (s)	40.0	25.0
Total Split (%)	33%	20%
Maximum Green (s)	35.0	23.0
Yellow Time (s)	4.0	2.0
All-Red Time (s)	1.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		7.0
Flash Dont Walk (s)		16.0
Pedestrian Calls (#/hr)		4
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	
Area Type:	Other
Cycle Length: 122	
Actuated Cycle Length: 102	
Natural Cycle: 150	
Control Type: Semi Act-Uncoord	

~ 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.

Splits and Phases: 45: Hart Street & Route 140



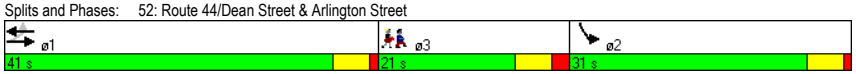
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	165	307	134	110	245	141	636	62	160	558	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12	11	11	11	12	12	12
Total Lost time (s)		5.0	5.0		5.0	5.0		5.0			5.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.95			0.95	
Frt		1.00	0.85		1.00	0.85		0.99			1.00	
Flt Protected		0.99	1.00		0.97	1.00		0.99			0.99	
Satd. Flow (prot)		1734	1516		1807	1568		3272			3331	
Flt Permitted		0.71	1.00		0.44	1.00		0.61			0.54	
Satd. Flow (perm)		1238	1516		814	1568		2010			1821	
Peak-hour factor, PHF	0.80	0.80	0.80	0.95	0.95	0.95	0.95	0.95	0.95	0.73	0.73	0.73
Adj. Flow (vph)	31	206	384	141	116	258	148	669	65	219	764	14
RTOR Reduction (vph)	0	0	138	0	0	85	0	4	0	0	1	0
Lane Group Flow (vph)	0	237	246	0	257	173	0	878	0	0	996	0
Heavy Vehicles (%)	0%	6%	3%	1%	4%	3%	4%	5%	2%	10%	6%	13%
Turn Type	Perm		Prot	Perm		Prot	pm+pt			pm+pt		
Protected Phases		4	4		4	4	3	2 3		1	1 2	
Permitted Phases	4			4			2 3			1 2		
Actuated Green, G (s)		20.2	20.2		20.2	20.2		47.4			45.4	
Effective Green, g (s)		20.2	20.2		20.2	20.2		47.4			45.4	
Actuated g/C Ratio		0.20	0.20		0.20	0.20		0.46			0.44	
Clearance Time (s)		5.0	5.0		5.0	5.0						
Vehicle Extension (s)		3.0	3.0		3.0	3.0						
Lane Grp Cap (vph)		242	296		159	306		1068			946	
v/s Ratio Prot			0.16			0.11		c0.10			c0.10	
v/s Ratio Perm		0.19			c0.32			0.28			c0.36	
v/c Ratio		0.98	0.83		1.62	0.56		0.82			1.05	
Uniform Delay, d1		41.4	40.0		41.6	37.7		24.4			29.1	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		52.8	22.8		304.4	7.3		5.2			44.3	
Delay (s)		94.2	62.8		346.1	45.0		29.6			73.4	
Level of Service		F	E		F	D		C			E	
Approach Delay (s)		74.8			195.2			29.6			73.4	
Approach LOS		E			F			C			E	

Intersection Summary					
HCM Average Control Delay	81.7	HCM Level of Service		F	
HCM Volume to Capacity ratio	1.16				
Actuated Cycle Length (s)	103.5	Sum of lost time (s)		25.8	
Intersection Capacity Utilization	84.0%	ICU Level of Service		E	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	ø3
Lane Configurations							
Volume (vph)	48	800	655	142	296	57	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	16	12	14	12	
Storage Length (ft)	150			0	0	0	
Storage Lanes	1			0	1	0	
Taper Length (ft)	25			25	25	25	
Right Turn on Red				Yes		No	
Link Speed (mph)		30	30		30		
Link Distance (ft)		1036	1663		418		
Travel Time (s)		23.5	37.8		9.5		
Peak Hour Factor	0.87	0.87	0.86	0.86	0.81	0.81	
Heavy Vehicles (%)	3%	5%	5%	3%	4%	12%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	55	920	927	0	435	0	
Turn Type	Perm						
Protected Phases		1	1		2		3
Permitted Phases	1						
Detector Phase	1	1	1		2		
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		5.0		5.0
Minimum Split (s)	15.0	15.0	15.0		10.0		21.0
Total Split (s)	41.0	41.0	41.0	0.0	31.0	0.0	21.0
Total Split (%)	44.1%	44.1%	44.1%	0.0%	33.3%	0.0%	23%
Maximum Green (s)	36.0	36.0	36.0		26.0		15.0
Yellow Time (s)	4.0	4.0	4.0		4.0		4.0
All-Red Time (s)	1.0	1.0	1.0		1.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	4.0	5.0	4.0	
Lead/Lag	Lead	Lead	Lead				Lag
Lead-Lag Optimize?	Yes	Yes	Yes				Yes
Vehicle Extension (s)	3.0	3.0	3.0		3.0		1.0
Recall Mode	None	None	None		None		None
Walk Time (s)							5.0
Flash Dont Walk (s)							10.0
Pedestrian Calls (#/hr)							8
v/c Ratio	0.57	1.00	0.90		0.79		
Control Delay	46.9	52.2	32.7		35.9		
Queue Delay	0.0	0.0	0.0		0.0		
Total Delay	46.9	52.2	32.7		35.9		
Queue Length 50th (ft)	15	352	317		159		
Queue Length 95th (ft)	#96	#890	#835		#337		
Internal Link Dist (ft)		956	1583		338		
Turn Bay Length (ft)	150						
Base Capacity (vph)	96	919	1027		663		
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	0.57	1.00	0.90		0.66		

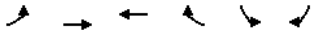
Intersection Summary	
Area Type:	Other
Cycle Length: 93	
Actuated Cycle Length: 72.3	
Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 52: Route 44/Dean Street & Arlington Street



HCM Signalized Intersection Capacity Analysis
52: Route 44/Dean Street & Arlington Street

2030 Build Condition - AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	48	800	655	142	296	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	16	12	14	12
Total Lost time (s)	5.0	5.0	5.0		5.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.98		0.98	
Flt Protected	0.95	1.00	1.00		0.96	
Satd. Flow (prot)	1636	1810	2008		1807	
Flt Permitted	0.11	1.00	1.00		0.96	
Satd. Flow (perm)	188	1810	2008		1807	
Peak-hour factor, PHF	0.87	0.87	0.86	0.86	0.81	0.81
Adj. Flow (vph)	55	920	762	165	365	70
RTOR Reduction (vph)	0	0	7	0	0	0
Lane Group Flow (vph)	55	920	920	0	435	0
Heavy Vehicles (%)	3%	5%	5%	3%	4%	12%
Turn Type	Perm					
Protected Phases		1	1		2	
Permitted Phases	1					
Actuated Green, G (s)	36.7	36.7	36.7		22.1	
Effective Green, g (s)	36.7	36.7	36.7		22.1	
Actuated g/C Ratio	0.48	0.48	0.48		0.29	
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	89	862	956		518	
v/s Ratio Prot		c0.51	0.46		c0.24	
v/s Ratio Perm	0.29					
v/c Ratio	0.62	1.07	0.96		0.84	
Uniform Delay, d1	15.0	20.2	19.5		25.8	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	12.1	50.2	20.4		11.4	
Delay (s)	27.1	70.4	39.9		37.3	
Level of Service	C	E	D		D	
Approach Delay (s)		68.0	39.9		37.3	
Approach LOS		E	D		D	

Intersection Summary				
HCM Average Control Delay	51.1	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.98			
Actuated Cycle Length (s)	77.1	Sum of lost time (s)	18.3	
Intersection Capacity Utilization	71.3%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Lanes, Volumes, Timings
53: Route 44 & Route 104/Dean Street

2030 Build Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Volume (vph)	182	1008	0	0	736	20	0	0	30	5	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	16	12	12	12	12	16
Storage Length (ft)	50		0	0		50	0	0		0	50
Storage Lanes	1		0	0		0	0	1		1	1
Taper Length (ft)	25		25	25		25	25	25		25	25
Right Turn on Red			Yes			Yes					Yes
Link Speed (mph)		30			30		30			30	
Link Distance (ft)		825			1426		127			959	
Travel Time (s)		18.8			32.4		2.9			21.8	
Peak Hour Factor	0.85	0.85	0.85	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89
Heavy Vehicles (%)	3%	3%	0%	0%	4%	0%	0%	0%	7%	0%	4%
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	1400	0	0	822	0	0	0	0	40	207
Turn Type	pm+pt							custom	Perm		custom
Protected Phases	5	2			6			8		4	4
Permitted Phases	2								4		5
Detector Phase	5	2			6			8	4	4	4
Switch Phase											
Minimum Initial (s)	6.0	12.0			12.0			6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	17.0			17.0			11.0	11.0	11.0	11.0
Total Split (s)	17.0	62.0	0.0	0.0	45.0	0.0	0.0	25.0	25.0	25.0	25.0
Total Split (%)	19.5%	71.3%	0.0%	0.0%	51.7%	0.0%	0.0%	28.7%	28.7%	28.7%	28.7%
Maximum Green (s)	12.0	57.0			40.0			20.0	20.0	20.0	20.0
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	4.0	4.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead				Lag						
Lead-Lag Optimize?	Yes				Yes						
Vehicle Extension (s)	1.5	1.5			1.5			2.0	2.0	2.0	2.0
Recall Mode	None	Min			Min			None	None	None	None
v/c Ratio		0.82			0.33					0.18	0.63
Control Delay		12.8			4.1					30.8	24.7
Queue Delay		0.0			0.0					0.0	0.0
Total Delay		12.8			4.1					30.8	24.7
Queue Length 50th (ft)		162			50					17	44
Queue Length 95th (ft)		308			100					44	106
Internal Link Dist (ft)		745			1346		47			879	
Turn Bay Length (ft)											50
Base Capacity (vph)		1945			2504					495	588
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		0.72			0.33					0.08	0.35

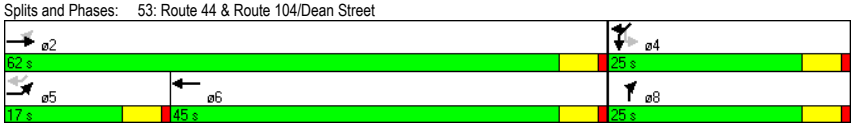
Intersection Summary	
Area Type:	Other

Lanes, Volumes, Timings
53: Route 44 & Route 104/Dean Street

2030 Build Condition - AM Peak Hour

Cycle Length: 87
Actuated Cycle Length: 70.5
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 53: Route 44 & Route 104/Dean Street

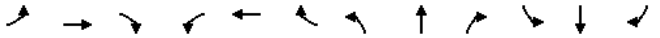


HCM Signalized Intersection Capacity Analysis
53: Route 44 & Route 104/Dean Street

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL2	SWL	SWR
Lane Configurations											
Volume (vph)	182	1008	0	0	736	20	0	0	30	5	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	12	12	12	16
Total Lost time (s)		5.0			5.0					5.0	5.0
Lane Util. Factor		0.95			0.95					1.00	1.00
Frt		1.00			1.00					1.00	0.85
Flt Protected		0.99			1.00					0.95	1.00
Satd. Flow (prot)		3478			3461					1704	1760
Flt Permitted		0.67			1.00					0.95	1.00
Satd. Flow (perm)		2352			3461					1704	1760
Peak-hour factor, PHF	0.85	0.85	0.85	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89
Adj. Flow (vph)	214	1186	0	0	800	22	0	0	34	6	207
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	95
Lane Group Flow (vph)	0	1400	0	0	821	0	0	0	0	40	112
Heavy Vehicles (%)	3%	3%	0%	0%	4%	0%	0%	0%	7%	0%	4%
Turn Type	pm+pt							custom	Perm		custom
Protected Phases	5	2			6			8		4	4
Permitted Phases	2								4		5
Actuated Green, G (s)		51.0			51.0					9.3	9.3
Effective Green, g (s)		51.0			51.0					9.3	9.3
Actuated g/C Ratio		0.73			0.73					0.13	0.13
Clearance Time (s)		5.0			5.0					5.0	5.0
Vehicle Extension (s)		1.5			1.5					2.0	2.0
Lane Grp Cap (vph)		1706			2511					225	233
v/s Ratio Prot					0.24						c0.06
v/s Ratio Perm		c0.60								0.02	
v/c Ratio		0.82			0.33					0.18	0.48
Uniform Delay, d1		6.5			3.5					27.1	28.3
Progression Factor		1.00			1.00					1.00	1.00
Incremental Delay, d2		3.1			0.0					0.1	0.6
Delay (s)		9.7			3.5					27.2	28.8
Level of Service		A			A					C	C
Approach Delay (s)		9.7			3.5		0.0			28.6	
Approach LOS		A			A		A			C	

Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	70.3	Sum of lost time (s)	10.0
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	228	60	35	144	10	45	445	20	10	260	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	16	12
Right Turn on Red			Yes			No			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		376			382			1581			384	
Travel Time (s)		8.5			8.7			35.9			8.7	
Peak Hour Factor	0.87	0.87	0.87	0.82	0.82	0.82	0.93	0.93	0.93	0.76	0.76	0.76
Heavy Vehicles (%)	5%	4%	4%	3%	5%	13%	2%	5%	0%	0%	2%	5%
Parking (#/hr)											0	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	354	0	0	231	0	0	548	0	0	381	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0
Total Split (%)	29.7%	29.7%	0.0%	29.7%	29.7%	0.0%	29.7%	29.7%	0.0%	29.7%	29.7%	0.0%
Maximum Green (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag							Lead	Lead		Lead	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.51			0.32			0.81			0.52	
Control Delay		19.2			16.8			31.2			19.6	
Queue Delay		0.0			0.0			0.0			0.1	
Total Delay		19.2			16.8			31.2			19.7	
Queue Length 50th (ft)		86			53			162			96	
Queue Length 95th (ft)		230			138			#498			207	
Internal Link Dist (ft)		296			302			1501			304	
Turn Bay Length (ft)												
Base Capacity (vph)		690			722			675			729	
Starvation Cap Reductn		0			0			0			32	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.51			0.32			0.81			0.55	

Intersection Summary

Lanes, Volumes, Timings
57: Spring Street & Summer Street
2030 Build Condition - AM Peak Hour

Lane Group	ø2
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Parking (#/hr)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	15.0
Minimum Split (s)	21.0
Total Split (s)	41.0
Total Split (%)	41%
Maximum Green (s)	35.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	5.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	8.0
Pedestrian Calls (#/hr)	11
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

Lanes, Volumes, Timings
57: Spring Street & Summer Street

2030 Build Condition - AM Peak Hour

Area Type: Other
Cycle Length: 101
Actuated Cycle Length: 64.2
Natural Cycle: 75
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 57: Spring Street & Summer Street

HCM Signalized Intersection Capacity Analysis
57: Spring Street & Summer Street

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	228	60	35	144	10	45	445	20	10	260	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	12	12	12	12	12	16	12
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			0.99			0.99			0.99	
Flt Protected		1.00			0.99			1.00			1.00	
Satd. Flow (prot)		1772			2017			1800			1877	
Flt Permitted		0.97			0.90			0.94			0.98	
Satd. Flow (perm)		1728			1828			1704			1840	
Peak-hour factor, PHF	0.87	0.87	0.87	0.82	0.82	0.82	0.93	0.93	0.93	0.76	0.76	0.76
Adj. Flow (vph)	23	262	69	43	176	12	48	478	22	13	342	26
RTOR Reduction (vph)	0	7	0	0	0	0	0	1	0	0	2	0
Lane Group Flow (vph)	0	347	0	0	231	0	0	547	0	0	379	0
Heavy Vehicles (%)	5%	4%	4%	3%	5%	13%	2%	5%	0%	0%	2%	5%
Parking (#/hr)											0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Actuated Green, G (s)		25.4			25.4			25.4			25.4	
Effective Green, g (s)		25.4			25.4			25.4			25.4	
Actuated g/C Ratio		0.37			0.37			0.37			0.37	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		634			671			625			675	
v/s Ratio Prot												
v/s Ratio Perm		c0.20			0.13			c0.32			0.21	
v/c Ratio		0.55			0.34			0.87			0.56	
Uniform Delay, d1		17.3			15.9			20.4			17.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		3.4			1.4			15.7			3.4	
Delay (s)		20.7			17.3			36.1			20.8	
Level of Service		C			B			D			C	
Approach Delay (s)		20.7			17.3			36.1			20.8	
Approach LOS		C			B			D			C	

Intersection Summary				
HCM Average Control Delay	25.8	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.71			
Actuated Cycle Length (s)	69.2	Sum of lost time (s)	18.4	
Intersection Capacity Utilization	72.0%	ICU Level of Service	C	
Analysis Period (min)	15			

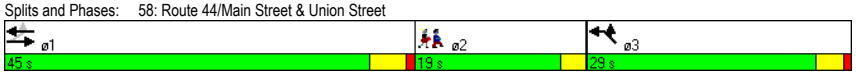
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2	ø2
Lane Configurations												
Volume (vph)	10	535	305	0	488	10	0	0	450	10	20	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	16	12	16	12	12	12	12	16	15	
Right Turn on Red			Yes			Yes		Yes			Yes	
Link Speed (mph)		30			30		30		30			
Link Distance (ft)		913			784		606		384			
Travel Time (s)		20.8			17.8		13.8		8.7			
Peak Hour Factor	0.90	0.90	0.90	0.89	0.89	0.89	0.92	0.92	0.97	0.97	0.97	
Heavy Vehicles (%)	0%	5%	5%	0%	6%	14%	0%	0%	7%	0%	0%	
Parking (#/hr)			0			0						
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	944	0	0	559	0	0	0	464	31	0	
Turn Type	Perm									Prot		
Protected Phases		1			1				3	3		2
Permitted Phases	1											
Detector Phase	1	1			1				3	3		
Switch Phase												
Minimum Initial (s)	15.0	15.0			15.0				5.0	5.0		1.0
Minimum Split (s)	20.0	20.0			20.0				9.0	9.0		19.0
Total Split (s)	45.0	45.0	0.0	0.0	45.0	0.0	0.0	0.0	29.0	29.0	0.0	19.0
Total Split (%)	48.4%	48.4%	0.0%	0.0%	48.4%	0.0%	0.0%	0.0%	31.2%	31.2%	0.0%	20%
Maximum Green (s)	40.0	40.0			40.0				25.0	25.0		16.0
Yellow Time (s)	4.0	4.0			4.0				3.0	3.0		3.0
All-Red Time (s)	1.0	1.0			1.0				1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lead			Lead							Lag
Lead-Lag Optimize?	Yes	Yes			Yes							Yes
Vehicle Extension (s)	3.0	3.0			3.0				3.0	3.0		3.0
Recall Mode	Max	Max			Max				Max	Max		None
Walk Time (s)												7.0
Flash Dont Walk (s)												9.0
Pedestrian Calls (#/hr)												18
v/c Ratio		0.96			0.56				0.89	0.05		
Control Delay		43.4			18.8				50.2	13.7		
Queue Delay		0.0			0.0				0.0	0.0		
Total Delay		43.4			18.8				50.2	13.7		
Queue Length 50th (ft)		341			150				191	3		
Queue Length 95th (ft)		#864			359				#481	26		
Internal Link Dist (ft)		833			704		526		304			
Turn Bay Length (ft)												
Base Capacity (vph)		982			1004				523	582		
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		0.96			0.56				0.89	0.05		

Intersection Summary

Area Type: Other
Cycle Length: 93
Actuated Cycle Length: 81.6
Natural Cycle: 110
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 58: Route 44/Main Street & Union Street



HCM Signalized Intersection Capacity Analysis
58: Route 44/Main Street & Union Street

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2
Lane Configurations											
Volume (vph)	10	535	305	0	488	10	0	0	450	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	16	12	16	12	12	12	12	16	15
Total Lost time (s)		5.0			5.0				4.0	4.0	
Lane Util. Factor		1.00			1.00				1.00	1.00	
Frt		0.95			1.00				1.00	0.85	
Flt Protected		1.00			1.00				0.95	1.00	
Satd. Flow (prot)		1951			2023				1687	1830	
Flt Permitted		0.99			1.00				0.95	1.00	
Satd. Flow (perm)		1939			2023				1687	1830	
Peak-hour factor, PHF	0.90	0.90	0.90	0.89	0.89	0.89	0.92	0.92	0.97	0.97	0.97
Adj. Flow (vph)	11	594	339	0	548	11	0	0	464	10	21
RTOR Reduction (vph)	0	20	0	0	1	0	0	0	0	15	0
Lane Group Flow (vph)	0	924	0	0	558	0	0	0	464	16	0
Heavy Vehicles (%)	0%	5%	5%	0%	6%	14%	0%	0%	7%	0%	0%
Parking (#/hr)			0			0					
Turn Type	Perm									Prot	
Protected Phases		1			1				3	3	
Permitted Phases	1										
Actuated Green, G (s)		40.5			40.5				25.3	25.3	
Effective Green, g (s)		40.5			40.5				25.3	25.3	
Actuated g/C Ratio		0.49			0.49				0.30	0.30	
Clearance Time (s)		5.0			5.0				4.0	4.0	
Vehicle Extension (s)		3.0			3.0				3.0	3.0	
Lane Grp Cap (vph)		942			982				512	555	
v/s Ratio Prot					0.28				c0.28	0.01	
v/s Ratio Perm		c0.48									
v/c Ratio		0.98			0.57				0.91	0.03	
Uniform Delay, d1		21.1			15.2				27.9	20.4	
Progression Factor		1.00			1.00				1.00	1.00	
Incremental Delay, d2		25.2			2.4				22.2	0.1	
Delay (s)		46.2			17.6				50.2	20.5	
Level of Service		D			B				D	C	
Approach Delay (s)		46.2			17.6		0.0		48.3		
Approach LOS		D			B		A		D		

Intersection Summary			
HCM Average Control Delay	38.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	83.4	Sum of lost time (s)	17.6
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
61: Taunton Green & Broadway

2030 Build Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	179	794	193	0	0	1051	0	306	89	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	10	10	12	12	12
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		304			913			579			302	
Travel Time (s)		6.9			20.8			13.2			6.9	
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	11%	0%	0%	6%	2%	6%	8%	0%	0%	0%
Parking (#/hr)			0			0			0			
Shared Lane Traffic (%)												
Lane Group Flow (vph)	197	873	212	0	0	1142	0	340	99	0	0	0
Turn Type	Perm		Perm			Free			Perm			
Protected Phases		1						3				
Permitted Phases	1		1			Free			3			
Detector Phase	1	1	1					3	3			
Switch Phase												
Minimum Initial (s)	30.0	30.0	30.0					25.0	25.0			
Minimum Split (s)	35.0	35.0	35.0					30.0	30.0			
Total Split (s)	35.0	35.0	35.0	0.0	0.0	0.0	0.0	30.0	30.0	0.0	0.0	0.0
Total Split (%)	40.7%	40.7%	40.7%	0.0%	0.0%	0.0%	0.0%	34.9%	34.9%	0.0%	0.0%	0.0%
Maximum Green (s)	30.0	30.0	30.0					25.0	25.0			
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0			
All-Red Time (s)	1.0	1.0	1.0					1.0	1.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lead									
Lead-Lag Optimize?	Yes	Yes	Yes									
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0			
Recall Mode	Max	Max	Max					Max	Max			
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.29	0.73	0.32			0.45		0.70	0.23			
Control Delay	8.2	28.1	4.0			0.6		36.2	6.7			
Queue Delay	0.0	0.0	0.0			0.0		0.0	0.0			
Total Delay	8.2	28.1	4.0			0.6		36.2	6.7			
Queue Length 50th (ft)	21	215	0			0		163	0			
Queue Length 95th (ft)	m66	283	m39			0		259	35			
Internal Link Dist (ft)		224			833			499			222	
Turn Bay Length (ft)												
Base Capacity (vph)	678	1188	656			2547		486	435			
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	0.29	0.73	0.32			0.45		0.70	0.23			

Intersection Summary

Lane Group	ø2
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Parking (#/hr)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	24%
Maximum Green (s)	17.0
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	2.0
Recall Mode	Ped
Walk Time (s)	10.0
Flash Dont Walk (s)	7.0
Pedestrian Calls (#/hr)	26
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

Area Type: Other
Cycle Length: 86
Actuated Cycle Length: 86
Natural Cycle: 90
Control Type: Semi Act-Uncoord
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 61: Taunton Green & Broadway

HCM Signalized Intersection Capacity Analysis
61: Taunton Green & Broadway

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	179	794	193	0	0	1051	0	306	89	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	16	12	12	12	12	10	10	12	12	12
Total Lost time (s)	5.0	5.0	5.0			4.0		5.0	5.0			
Lane Util. Factor	1.00	0.95	1.00			0.88		1.00	1.00			
Frt	1.00	1.00	0.85			0.85		1.00	0.85			
Flt Protected	0.95	1.00	1.00			1.00		1.00	1.00			
Satd. Flow (prot)	1703	3406	1484			2547		1673	1256			
Flt Permitted	0.95	1.00	1.00			1.00		1.00	1.00			
Satd. Flow (perm)	1703	3406	1484			2547		1673	1256			
Peak-hour factor, PHF	0.91	0.91	0.91	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.92	0.92
Adj. Flow (vph)	197	873	212	0	0	1142	0	340	99	0	0	0
RTOR Reduction (vph)	84	0	138	0	0	0	0	0	70	0	0	0
Lane Group Flow (vph)	113	873	74	0	0	1142	0	340	29	0	0	0
Heavy Vehicles (%)	6%	6%	11%	0%	0%	6%	2%	6%	8%	0%	0%	0%
Parking (#/hr)			0			0			0			
Turn Type	Perm		Perm			Free			Perm			
Protected Phases		1						3				
Permitted Phases	1		1			Free			3			
Actuated Green, G (s)	30.0	30.0	30.0			86.0		25.0	25.0			
Effective Green, g (s)	30.0	30.0	30.0			86.0		25.0	25.0			
Actuated g/C Ratio	0.35	0.35	0.35			1.00		0.29	0.29			
Clearance Time (s)	5.0	5.0	5.0					5.0	5.0			
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0			
Lane Grp Cap (vph)	594	1188	518			2547		486	365			
v/s Ratio Prot		c0.26						c0.20				
v/s Ratio Perm	0.07		0.05			c0.45			0.02			
v/c Ratio	0.19	0.73	0.14			0.45		0.70	0.08			
Uniform Delay, d1	19.5	24.5	19.2			0.0		27.2	22.1			
Progression Factor	0.90	0.96	0.85			1.00		1.00	1.00			
Incremental Delay, d2	0.7	4.1	0.6			0.6		8.1	0.4			
Delay (s)	18.3	27.7	16.8			0.6		35.3	22.6			
Level of Service	B	C	B			A		D	C			
Approach Delay (s)		24.5			0.6			32.4			0.0	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
71: Court Street & Washington Street

2030 Build Condition - AM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2
Lane Configurations							
Volume (vph)	438	21	638	295	37	421	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	14	10	9	12	12	
Storage Length (ft)	0	50		0	0		
Storage Lanes	1	1		1	1		
Taper Length (ft)	25	25		25	25		
Right Turn on Red		Yes		Yes			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1051		260			584	
Travel Time (s)	23.9		5.9			13.3	
Peak Hour Factor	0.88	0.88	0.87	0.87	0.85	0.85	
Heavy Vehicles (%)	9%	0%	3%	4%	0%	3%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	498	24	733	339	44	495	
Turn Type		Perm		Perm	Perm		
Protected Phases	3		1			1	2
Permitted Phases		3		1	1		
Detector Phase	3	3	1	1	1	1	
Switch Phase							
Minimum Initial (s)	5.0	5.0	10.0	10.0	10.0	10.0	3.0
Minimum Split (s)	10.0	10.0	15.0	15.0	15.0	15.0	18.0
Total Split (s)	25.0	25.0	55.0	55.0	55.0	55.0	18.0
Total Split (%)	25.5%	25.5%	56.1%	56.1%	56.1%	56.1%	18%
Maximum Green (s)	20.0	20.0	50.0	50.0	50.0	50.0	16.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag			Lead	Lead	Lead	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	4.0	4.0	4.0	4.0	0.7
Recall Mode	Max	Max	Max	Max	Max	Max	None
Walk Time (s)							7.0
Flash Dont Walk (s)							8.0
Pedestrian Calls (#/hr)							19
v/c Ratio	1.25	0.06	0.73	0.35	0.18	0.46	
Control Delay	163.8	24.0	20.9	2.6	13.4	13.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	163.8	24.0	20.9	2.6	13.4	13.7	
Queue Length 50th (ft)	~300	6	213	0	8	113	
Queue Length 95th (ft)	#593	29	504	36	34	260	
Internal Link Dist (ft)	971		180			504	
Turn Bay Length (ft)		50					
Base Capacity (vph)	398	406	1001	955	250	1072	
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	1.25	0.06	0.73	0.35	0.18	0.46	

Intersection Summary	
Area Type:	Other
Cycle Length: 98	
Actuated Cycle Length: 86.8	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	

~ 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.

Splits and Phases: 71: Court Street & Washington Street

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	438	21	638	295	37	421
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	14	10	9	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1723	1722	1398	1805	1845
Flt Permitted	0.95	1.00	1.00	1.00	0.23	1.00
Satd. Flow (perm)	1711	1723	1722	1398	431	1845
Peak-hour factor, PHF	0.88	0.88	0.87	0.87	0.85	0.85
Adj. Flow (vph)	498	24	733	339	44	495
RTOR Reduction (vph)	0	5	0	145	0	0
Lane Group Flow (vph)	498	19	733	194	44	495
Heavy Vehicles (%)	9%	0%	3%	4%	0%	3%
Turn Type		Perm		Perm	Perm	
Protected Phases	3		1			1
Permitted Phases		3		1	1	
Actuated Green, G (s)	20.2	20.2	50.4	50.4	50.4	50.4
Effective Green, g (s)	20.2	20.2	50.4	50.4	50.4	50.4
Actuated g/C Ratio	0.23	0.23	0.57	0.57	0.57	0.57
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	393	396	986	801	247	1057
v/s Ratio Prot	c0.29		c0.43			0.27
v/s Ratio Perm		0.01		0.14	0.10	
v/c Ratio	1.27	0.05	0.74	0.24	0.18	0.47
Uniform Delay, d1	33.9	26.4	14.0	9.3	8.9	11.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	139.0	0.2	5.1	0.7	1.6	1.5
Delay (s)	172.9	26.6	19.1	10.0	10.5	12.5
Level of Service	F	C	B	B	B	B
Approach Delay (s)	166.2		16.2			12.3
Approach LOS	F		B			B

Intersection Summary			
HCM Average Control Delay	51.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	88.0	Sum of lost time (s)	17.4
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	450	157	108	39	126	52	112	431	63	31	341	366
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	12	16	12	12	12	13	12	12	12	11	12
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		698			192			448			574	
Travel Time (s)		15.9			4.4			10.2			13.0	
Peak Hour Factor	0.97	0.97	0.97	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	10%	8%	1%	10%	8%	4%	6%	3%	6%	8%
Shared Lane Traffic (%)	20%											
Lane Group Flow (vph)	371	366	0	0	233	0	0	681	0	0	803	0
Turn Type	Split			Split			pm+pt			Perm		
Protected Phases	1	1		2	2		3	8			4	
Permitted Phases							8			4		
Detector Phase	1	1		2	2		3	8		4	4	
Switch Phase												
Minimum Initial (s)	18.0	18.0		7.0	7.0		6.0	18.0		18.0	18.0	
Minimum Split (s)	24.0	24.0		12.0	12.0		11.0	24.0		24.0	24.0	
Total Split (s)	41.0	41.0	0.0	17.0	17.0	0.0	20.0	61.0	0.0	41.0	41.0	0.0
Total Split (%)	29.1%	29.1%	0.0%	12.1%	12.1%	0.0%	14.2%	43.3%	0.0%	29.1%	29.1%	0.0%
Maximum Green (s)	35.0	35.0		12.0	12.0		15.0	55.0		35.0	35.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	1.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	5.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lead	Lead		Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.83	0.87			1.23			0.87			0.68	
Control Delay	62.1	66.0			182.6			48.4			28.2	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	62.1	66.0			182.6			48.4			28.2	
Queue Length 50th (ft)	344	331			~288			302			260	
Queue Length 95th (ft)	#520	#526			#464			#417			338	
Internal Link Dist (ft)		618			112			368			494	
Turn Bay Length (ft)												
Base Capacity (vph)	536	500			190			930			1178	
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	0.69	0.73			1.23			0.73			0.68	

Intersection Summary	
Area Type:	Other

Lane Group	ø5
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	5
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	3.0
Minimum Split (s)	22.0
Total Split (s)	22.0
Total Split (%)	16%
Maximum Green (s)	17.0
Yellow Time (s)	4.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	10.0
Pedestrian Calls (#/hr)	21
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	

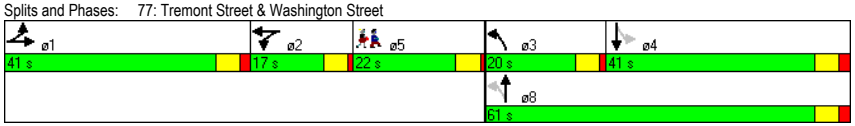
Intersection Summary

Lanes, Volumes, Timings
77: Tremont Street & Washington Street

2030 Build Condition - AM Peak Hour

Cycle Length: 141
Actuated Cycle Length: 120.9
Natural Cycle: 115
Control Type: Actuated-Uncoordinated
~ 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.

Splits and Phases: 77: Tremont Street & Washington Street



HCM Signalized Intersection Capacity Analysis
77: Tremont Street & Washington Street

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	450	157	108	39	126	52	112	431	63	31	341	366
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	12	16	12	12	12	13	12	12	12	11	12
Total Lost time (s)	6.0	6.0			5.0			6.0			6.0	
Lane Util. Factor	0.95	0.95			1.00			0.95			0.95	
Frt	1.00	0.95			0.97			0.98			0.93	
Flt Protected	0.95	0.99			0.99			0.99			1.00	
Satd. Flow (prot)	1759	1608			1745			3355			3016	
Flt Permitted	0.95	0.99			0.99			0.57			0.89	
Satd. Flow (perm)	1759	1608			1745			1934			2688	
Peak-hour factor, PHF	0.97	0.97	0.97	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92
Adj. Flow (vph)	464	162	111	42	135	56	126	484	71	34	371	398
RTOR Reduction (vph)	0	11	0	0	8	0	0	6	0	0	101	0
Lane Group Flow (vph)	371	355	0	0	225	0	0	675	0	0	702	0
Heavy Vehicles (%)	4%	4%	10%	8%	1%	10%	8%	4%	6%	3%	6%	8%
Turn Type	Split			Split			pm+pt			Perm		
Protected Phases	1	1		2	2		3	8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	30.6	30.6			12.6			48.4			48.4	
Effective Green, g (s)	30.6	30.6			12.6			48.4			48.4	
Actuated g/C Ratio	0.25	0.25			0.10			0.40			0.40	
Clearance Time (s)	6.0	6.0			5.0			6.0			6.0	
Vehicle Extension (s)	2.0	2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)	440	402			180			765			1064	
v/s Ratio Prot	0.21	c0.22			c0.13							
v/s Ratio Perm								c0.35			0.26	
v/c Ratio	0.84	0.88			1.25			0.88			0.66	
Uniform Delay, d1	43.6	44.1			54.9			34.3			30.2	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	13.2	19.3			149.8			11.4			1.1	
Delay (s)	56.8	63.4			204.7			45.7			31.4	
Level of Service	E	E			F			D			C	
Approach Delay (s)		60.1			204.7			45.7			31.4	
Approach LOS		E			F			D			C	

Intersection Summary					
HCM Average Control Delay	60.4	HCM Level of Service		E	
HCM Volume to Capacity ratio	0.93				
Actuated Cycle Length (s)	122.3	Sum of lost time (s)		30.7	
Intersection Capacity Utilization	90.3%	ICU Level of Service		E	
Analysis Period (min)	15				
c Critical Lane Group					

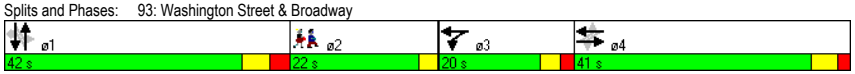
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	275	92	5	20	96	5	5	520	15	10	370	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		0	0		0	0		50
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			No			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1068			1376			92			2042	
Travel Time (s)		24.3			31.3			2.1			46.4	
Peak Hour Factor	0.88	0.88	0.88	0.72	0.72	0.72	0.87	0.87	0.87	0.89	0.89	0.89
Heavy Vehicles (%)	5%	2%	25%	6%	1%	0%	6%	0%	0%	13%	7%	4%
Parking (#/hr)									2			
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	423	0	0	168	0	0	621	0	0	427	253
Turn Type	Perm			pm+pt			Perm			Perm		Perm
Protected Phases		4		3	3 4			1			1	
Permitted Phases	4			3 4			1			1		1
Detector Phase	4	4		3	3 4		1	1		1	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0		4.0			18.0	18.0		18.0	18.0	18.0
Minimum Split (s)	14.0	14.0		9.0			25.0	25.0		25.0	25.0	25.0
Total Split (s)	41.0	41.0	0.0	20.0	61.0	0.0	42.0	42.0	0.0	42.0	42.0	42.0
Total Split (%)	32.8%	32.8%	0.0%	16.0%	48.8%	0.0%	33.6%	33.6%	0.0%	33.6%	33.6%	33.6%
Maximum Green (s)	35.0	35.0		15.0			35.0	35.0		35.0	35.0	35.0
Yellow Time (s)	4.0	4.0		3.0			4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0			3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	7.0	7.0	4.0	7.0	7.0	7.0
Lead/Lag	Lag	Lag		Lead			Lead	Lead		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0		2.0			3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None			Min	Min		Min	Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.88			0.22			0.59			0.80	0.53
Control Delay		55.6			18.0			34.5			47.4	36.8
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay		55.6			18.0			34.5			47.4	36.8
Queue Length 50th (ft)		237			53			155			221	118
Queue Length 95th (ft)		#569			100			285			#504	264
Internal Link Dist (ft)		988			1296			12			1962	
Turn Bay Length (ft)												50
Base Capacity (vph)		483			849			1183			599	538
Starvation Cap Reductn		0			0			0			0	0
Spillback Cap Reductn		0			0			0			0	0
Storage Cap Reductn		0			0			0			0	0

Lane Group	ø2
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Parking (#/hr)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	22.0
Total Split (s)	22.0
Total Split (%)	18%
Maximum Green (s)	19.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	19
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.88			0.20			0.52			0.71	0.47

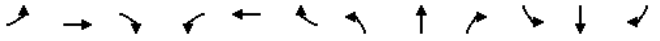
Intersection Summary	
Area Type:	Other
Cycle Length: 125	
Actuated Cycle Length: 103.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 93: Washington Street & Broadway



Lane Group	ø2
Reduced v/c Ratio	

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	275	92	5	20	96	5	5	520	15	10	370	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		6.0			5.0			7.0			7.0	7.0
Lane Util. Factor		1.00			1.00			0.95			1.00	1.00
Frt		1.00			0.99			1.00			1.00	0.85
Flt Protected		0.96			0.99			1.00			1.00	1.00
Satd. Flow (prot)		1983			1841			3591			1771	1553
Flt Permitted		0.68			0.91			0.95			0.98	1.00
Satd. Flow (perm)		1395			1697			3413			1732	1553
Peak-hour factor, PHF	0.88	0.88	0.88	0.72	0.72	0.72	0.87	0.87	0.87	0.89	0.89	0.89
Adj. Flow (vph)	312	105	6	28	133	7	6	598	17	11	416	253
RTOR Reduction (vph)	0	1	0	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	422	0	0	168	0	0	620	0	0	427	253
Heavy Vehicles (%)	5%	2%	25%	6%	1%	0%	6%	0%	0%	13%	7%	4%
Parking (#/hr)									2			
Turn Type	Perm			pm+pt			Perm			Perm		Perm
Protected Phases		4		3	3 4			1			1	
Permitted Phases	4			3 4			1			1		1
Actuated Green, G (s)		36.0			46.0			32.1			32.1	32.1
Effective Green, g (s)		36.0			46.0			32.1			32.1	32.1
Actuated g/C Ratio		0.34			0.44			0.30			0.30	0.30
Clearance Time (s)		6.0						7.0			7.0	7.0
Vehicle Extension (s)		4.0						3.0			3.0	3.0
Lane Grp Cap (vph)		476			754			1038			527	473
v/s Ratio Prot					c0.02							
v/s Ratio Perm		c0.30			0.08			0.18			c0.25	0.16
v/c Ratio		0.89			0.22			0.60			0.81	0.53
Uniform Delay, d1		32.8			18.6			31.2			33.9	30.5
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		18.2			0.1			0.9			9.2	1.2
Delay (s)		51.1			18.6			32.1			43.1	31.7
Level of Service		D			B			C			D	C
Approach Delay (s)		51.1			18.6			32.1			38.8	
Approach LOS		D			B			C			D	

Intersection Summary			
HCM Average Control Delay	37.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	105.5	Sum of lost time (s)	27.4
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
46: Taunton Station driveway & Arlington Street

2030 Build Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	26	11	144	46	15	327
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	12	157	50	16	355
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			729			
pX, platoon unblocked						
vC, conflicting volume	570	182			207	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	570	182			207	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	99			99	
cM capacity (veh/h)	477	861			1365	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	28	12	207	372
Volume Left	28	0	0	16
Volume Right	0	12	50	0
cSH	477	861	1700	1365
Volume to Capacity	0.06	0.01	0.12	0.01
Queue Length 95th (ft)	5	1	0	1
Control Delay (s)	13.0	9.2	0.0	0.4
Lane LOS	B	A		A
Approach Delay (s)	11.9		0.0	0.4
Approach LOS	B			

Intersection Summary			
Average Delay		1.0	
Intersection Capacity Utilization		39.4%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
66: Cohannet Street & Taunton Green

2030 Build Condition - AM Peak Hour

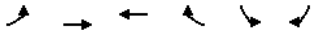
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL	NER
Lane Configurations											
Volume (veh/h)	0	151	10	0	0	0	613	232	131	0	429
Sign Control		Stop			Stop		Free			Free	
Grade		0%			0%		0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93	0.83	0.83
Hourly flow rate (vph)	0	162	11	0	0	0	659	249	141	0	517
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type							Raised			None	
Median storage veh)							1				
Upstream signal (ft)											
pX, platoon unblocked											
vC, conflicting volume	1897	2155	320	1660	1709	0	517				
vC1, stage 1 conf vol	1638	1638		0	0						
vC2, stage 2 conf vol	258	517		1660	1709						
vCu, unblocked vol	1897	2155	320	1660	1709	0	517				
tC, single (s)	7.1	6.6	6.2	7.1	6.5	6.2	4.2				
tC, 2 stage (s)	6.1	5.6		6.1	5.5						
tF (s)	3.5	4.1	3.3	3.5	4.0	3.3	2.3				
p0 queue free %	100	0	99	0	100	100	36				
cM capacity (veh/h)	38	16	726	0	48	1091	1029				

Direction, Lane #	EB 1	EB 2	SB 1	SB 2	SB 3	NE 1
Volume Total	162	11	330	330	390	517
Volume Left	0	0	330	330	0	0
Volume Right	0	11	0	0	141	517
cSH	16	726	1029	1029	1700	1700
Volume to Capacity	9.89	0.01	0.64	0.64	0.23	0.30
Queue Length 95th (ft)	Err	1	121	121	0	0
Control Delay (s)	Err	10.0	14.5	14.5	0.0	0.0
Lane LOS	F	B	B	B		
Approach Delay (s)	9378.6		9.1			0.0
Approach LOS	F					

Intersection Summary			
Average Delay		938.9	
Intersection Capacity Utilization		41.2%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
67: Post Office Square & Broadway

2030 Build Condition - AM Peak Hour



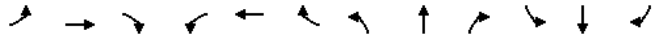
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	0	817	729	0	400
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.91	0.91	0.96	0.96
Hourly flow rate (vph)	0	0	898	801	0	417
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			302			
pX, platoon unblocked						
vC, conflicting volume	1699				898	449
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1699				898	449
tC, single (s)	4.1				6.8	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	24
cM capacity (veh/h)	380				283	549

Direction, Lane #	WB 1	WB 2	WB 3	SB 1
Volume Total	449	449	801	417
Volume Left	0	0	0	0
Volume Right	0	0	801	417
cSH	1700	1700	1700	549
Volume to Capacity	0.26	0.26	0.47	0.76
Queue Length 95th (ft)	0	0	0	168
Control Delay (s)	0.0	0.0	0.0	29.3
Lane LOS				D
Approach Delay (s)	0.0			29.3
Approach LOS				D

Intersection Summary			
Average Delay		5.8	
Intersection Capacity Utilization		54.0%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
70: Post Office Square & Court Street

2030 Build Condition - AM Peak Hour



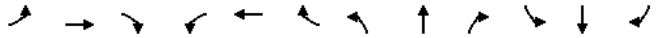
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	10	670	58	475	0	0	0	0	300	0
Sign Control		Free			Free			Yield			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.46	0.46	0.46	0.94	0.94	0.94	0.92	0.92	0.92	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	22	713	62	505	0	0	0	0	337	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					565							
pX, platoon unblocked												
vC, conflicting volume	62			22			1656	1487	0	1498	1509	62
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	62			22			1656	1487	0	1498	1509	62
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.1	3.3
p0 queue free %	100			54			0	100	100	100	0	100
cM capacity (veh/h)	1554			1562			0	68	1091	65	64	1009

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1
Volume Total	22	475	299	505	337
Volume Left	0	475	238	0	0
Volume Right	22	0	0	505	0
cSH	1700	1562	1562	1700	64
Volume to Capacity	0.01	0.46	0.46	0.30	5.25
Queue Length 95th (ft)	0	62	62	0	Err
Control Delay (s)	0.0	9.2	8.2	0.0	Err
Lane LOS		A	A		F
Approach Delay (s)	0.0	5.3			Err
Approach LOS					F

Intersection Summary			
Average Delay		2061.1	
Intersection Capacity Utilization		49.2%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
75: Frederick Martin Parkway & Washington Street

2030 Build Condition - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	0	0	104	0	136	0	776	164	105	745	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.42	0.42	0.42	0.87	0.87	0.87	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	12	0	0	120	0	156	0	882	186	119	847	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								574			260	
pX, platoon unblocked	0.90	0.90	0.85	0.90	0.90	0.91	0.85			0.91		
vC, conflicting volume	1685	2156	849	2060	2066	534	852			1068		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1331	1856	736	1749	1755	290	739			877		
tC, single (s)	7.5	6.5	6.9	7.7	6.5	7.0	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	82	100	100	0	100	76	100			82		
cM capacity (veh/h)	67	55	312	39	64	640	746			680		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	12	120	156	441	627	119	852
Volume Left	12	120	0	0	0	119	0
Volume Right	0	0	156	0	186	0	6
cSH	67	39	640	746	1700	680	1700
Volume to Capacity	0.18	3.03	0.24	0.00	0.37	0.18	0.50
Queue Length 95th (ft)	15	Err	24	0	0	16	0
Control Delay (s)	69.8	Err	12.4	0.0	0.0	11.4	0.0
Lane LOS	F	F	B			B	
Approach Delay (s)	69.8	4339.9		0.0		1.4	
Approach LOS	F	F					

Intersection Summary				
Average Delay	515.3			
Intersection Capacity Utilization	81.6%	ICU Level of Service	D	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
78: Kilmer Street & Oak Street

2030 Build Condition - AM Peak Hour

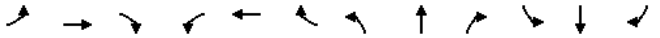
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	109	10	21	387	193	107
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.80	0.80	0.79	0.79
Hourly flow rate (vph)	130	12	26	484	244	135
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	848	312	380			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	848	312	380			
tC, single (s)	6.5	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.2			
p0 queue free %	59	98	98			
cM capacity (veh/h)	319	719	1184			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	142	510	380
Volume Left	130	26	0
Volume Right	12	0	135
cSH	335	1184	1700
Volume to Capacity	0.42	0.02	0.22
Queue Length 95th (ft)	51	2	0
Control Delay (s)	23.4	0.7	0.0
Lane LOS	C	A	
Approach Delay (s)	23.4	0.7	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
87: Purchase Street & School Street

2030 Build Condition - AM Peak Hour



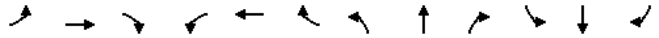
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	35	243	10	16	133	5	25	70	21	11	70	60
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.69	0.69	0.69	0.90	0.90	0.90
Hourly flow rate (vph)	41	286	12	18	151	6	36	101	30	12	78	67
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	157			298			670	567	292	646	570	154
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	157			298			670	567	292	646	570	154
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			99			87	75	96	96	81	93
cM capacity (veh/h)	1399			1275			286	413	740	292	411	897

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	339	175	168	157
Volume Left	41	18	36	12
Volume Right	12	6	30	67
cSH	1399	1275	406	513
Volume to Capacity	0.03	0.01	0.41	0.31
Queue Length 95th (ft)	2	1	50	32
Control Delay (s)	1.2	0.9	20.0	15.1
Lane LOS	A	A	C	C
Approach Delay (s)	1.2	0.9	20.0	15.1
Approach LOS			C	C

Intersection Summary				
Average Delay	7.5			
Intersection Capacity Utilization	40.5%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
88: Purchase Street & Washington Street

2030 Build Condition - AM Peak Hour



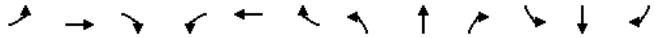
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	112	5	21	137	36	5	65	42	109	45	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.68	0.68	0.68	0.68	0.68	0.68	0.70	0.70	0.70
Hourly flow rate (vph)	0	162	7	31	201	53	7	96	62	156	64	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	254			170			502	482	166	565	459	228
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	254			170			502	482	166	565	459	228
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			98			98	80	93	54	87	98
cM capacity (veh/h)	1322			1420			417	473	884	339	491	816

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	170	285	165	234
Volume Left	0	31	7	156
Volume Right	7	53	62	14
cSH	1322	1420	569	385
Volume to Capacity	0.00	0.02	0.29	0.61
Queue Length 95th (ft)	0	2	30	97
Control Delay (s)	0.0	1.0	13.9	27.8
Lane LOS		A	B	D
Approach Delay (s)	0.0	1.0	13.9	27.8
Approach LOS			B	D

Intersection Summary				
Average Delay	10.6			
Intersection Capacity Utilization	39.6%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
89: Winter Street & School Street

2030 Build Condition - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	220	10	75	370	20	25	35	65	20	41	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.63	0.63	0.63	0.84	0.84	0.84	0.56	0.56	0.56
Hourly flow rate (vph)	11	237	11	119	587	32	30	42	77	36	73	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	619			247			1159	1121	242	1203	1110	603
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	619			247			1159	1121	242	1203	1110	603
tC, single (s)	4.2			4.1			7.1	6.6	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.1	3.3	3.6	4.0	3.3
p0 queue free %	99			91			72	77	90	66	61	96
cM capacity (veh/h)	933			1324			107	182	790	105	190	503

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	258	738	149	127
Volume Left	11	119	30	36
Volume Right	11	32	77	18
cSH	933	1324	246	167
Volume to Capacity	0.01	0.09	0.60	0.76
Queue Length 95th (ft)	1	7	89	121
Control Delay (s)	0.5	2.2	39.6	74.4
Lane LOS	A	A	E	F
Approach Delay (s)	0.5	2.2	39.6	74.4
Approach LOS			E	F

Intersection Summary				
Average Delay	13.4			
Intersection Capacity Utilization	56.2%	ICU Level of Service		B
Analysis Period (min)	15			

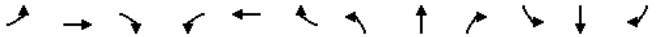
HCM Unsignalized Intersection Capacity Analysis
100: Downtown Taunton Station driveway & Oak Street

2030 Build Condition - AM Peak Hour

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Volume (veh/h)	27	82	524	54	159	330
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	89	570	59	173	359
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						807
pX, platoon unblocked	0.83					
vC, conflicting volume	1303	599			628	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1262	599			628	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	77	82			82	
cM capacity (veh/h)	127	502			954	

Direction, Lane #	NW 1	NE 1	SW 1
Volume Total	118	628	532
Volume Left	29	0	173
Volume Right	89	59	0
cSH	290	1700	954
Volume to Capacity	0.41	0.37	0.18
Queue Length 95th (ft)	48	0	16
Control Delay (s)	25.7	0.0	4.6
Lane LOS	D		A
Approach Delay (s)	25.7	0.0	4.6
Approach LOS	D		

Intersection Summary				
Average Delay	4.3			
Intersection Capacity Utilization	73.6%	ICU Level of Service		D
Analysis Period (min)	15			



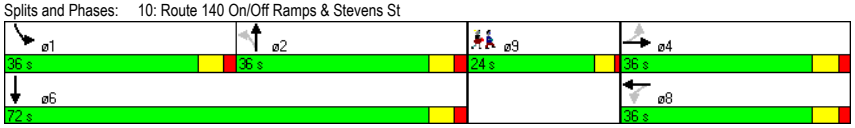
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	85	5	30	40	55	5	265	320	530	210	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	13	16	12	12	16	12	12	16	12	12	12
Storage Length (ft)	0		0	0		0	0		0	200		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		819			376			787			471	
Travel Time (s)		18.6			8.5			17.9			10.7	
Peak Hour Factor	0.76	0.76	0.76	0.84	0.84	0.84	0.89	0.89	0.89	0.80	0.80	0.80
Heavy Vehicles (%)	0%	0%	0%	10%	0%	2%	0%	8%	0%	1%	1%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	172	0	0	149	0	0	664	0	662	306	0
Turn Type	Perm			Perm			Perm			Prot		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2					
Detector Phase	4	4		8	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Total Split (s)	36.0	36.0	0.0	36.0	36.0	0.0	36.0	36.0	0.0	36.0	72.0	0.0
Total Split (%)	27.3%	27.3%	0.0%	27.3%	27.3%	0.0%	27.3%	27.3%	0.0%	27.3%	54.5%	0.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	66.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.39			0.33			0.69		0.65	0.25	
Control Delay		29.2			18.9			18.2		23.6	4.7	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		29.2			18.9			18.2		23.6	4.7	
Queue Length 50th (ft)		31			15			77		111	37	
Queue Length 95th (ft)		58			42			150		169	62	
Internal Link Dist (ft)		739			296			707			391	
Turn Bay Length (ft)										200		
Base Capacity (vph)		1510			1390			1618		1720	1754	
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		0.11			0.11			0.41		0.38	0.17	

Lanes, Volumes, Timings
10: Route 140 On/Off Ramps & Stevens St
2030 Build Condition - PM Peak Hour

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	24.0
Total Split (s)	24.0
Total Split (%)	18%
Maximum Green (s)	20.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	13.0
Pedestrian Calls (#/hr)	0
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	
Area Type:	Other
Cycle Length: 132	
Actuated Cycle Length: 62.6	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 10: Route 140 On/Off Ramps & Stevens St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	85	5	30	40	55	5	265	320	530	210	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	13	16	12	12	16	12	12	16	12	12	12
Total Lost time (s)		6.0			6.0			6.0		6.0	6.0	
Lane Util. Factor		0.95			0.95			0.95		0.97	1.00	
Frt		0.99			0.93			0.92		1.00	0.98	
Flt Protected		0.98			0.99			1.00		0.95	1.00	
Satd. Flow (prot)		3651			3227			3200		3467	1835	
Flt Permitted		0.82			0.84			0.95		0.95	1.00	
Satd. Flow (perm)		3042			2733			3044		3467	1835	
Peak-hour factor, PHF	0.76	0.76	0.76	0.84	0.84	0.84	0.89	0.89	0.89	0.80	0.80	0.80
Adj. Flow (vph)	53	112	7	36	48	65	6	298	360	662	262	44
RTOR Reduction (vph)	0	3	0	0	56	0	0	154	0	0	3	0
Lane Group Flow (vph)	0	169	0	0	93	0	0	510	0	662	303	0
Heavy Vehicles (%)	0%	0%	0%	10%	0%	2%	0%	8%	0%	1%	1%	3%
Turn Type	Perm			Perm			Perm			Prot		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		8.9			8.9			17.0		18.3	41.3	
Effective Green, g (s)		8.9			8.9			17.0		18.3	41.3	
Actuated g/C Ratio		0.14			0.14			0.27		0.29	0.66	
Clearance Time (s)		6.0			6.0			6.0		6.0	6.0	
Vehicle Extension (s)		2.0			2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		435			391			832		1020	1218	
v/s Ratio Prot										c0.19	0.17	
v/s Ratio Perm		c0.06			0.03			c0.17				
v/c Ratio		0.39			0.24			0.61		0.65	0.25	
Uniform Delay, d1		24.2			23.6			19.7		19.1	4.2	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.1			0.9		1.1	0.0	
Delay (s)		24.4			23.8			20.7		20.2	4.2	
Level of Service		C			C			C		C	A	
Approach Delay (s)		24.4			23.8			20.7			15.2	
Approach LOS		C			C			C			B	

Intersection Summary					
HCM Average Control Delay	18.5	HCM Level of Service	B		
HCM Volume to Capacity ratio	0.58				
Actuated Cycle Length (s)	62.2	Sum of lost time (s)	18.0		
Intersection Capacity Utilization	56.8%	ICU Level of Service	B		
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	315	155	45	0	0	0	25	65	0	165	153	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	14	12	12	12	12	12	16	12	12	16
Storage Length (ft)	0		0	0		0	200		0	0		0
Storage Lanes	0		0	0		0	1		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		396			269			674			311	
Travel Time (s)		9.0			6.1			15.3			7.1	
Peak Hour Factor	0.94	0.94	0.94	0.79	0.79	0.79	0.76	0.76	0.76	0.90	0.90	0.90
Heavy Vehicles (%)	1%	4%	0%	0%	0%	11%	0%	0%	0%	3%	1%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	548	0	0	0	0	0	119	0	0	353	506
Turn Type	Perm						Perm			Perm		Perm
Protected Phases		2						1			1	
Permitted Phases	2						1			1		1
Detector Phase	2	2					1	1		1	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0					8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	13.0	13.0					13.0	13.0		13.0	13.0	13.0
Total Split (s)	31.0	31.0	0.0	0.0	0.0	0.0	51.0	51.0	0.0	51.0	51.0	51.0
Total Split (%)	37.8%	37.8%	0.0%	0.0%	0.0%	0.0%	62.2%	62.2%	0.0%	62.2%	62.2%	62.2%
Maximum Green (s)	26.0	26.0					46.0	46.0		46.0	46.0	46.0
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag					Lead	Lead		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes					Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0					2.0	2.0		2.0	2.0	2.0
Recall Mode	None	None					Min	Min		Min	Min	Min
v/c Ratio		0.48						0.11			0.35	0.51
Control Delay		11.0						6.9			8.3	3.1
Queue Delay		0.0						0.0			0.0	0.0
Total Delay		11.0						6.9			8.3	3.1
Queue Length 50th (ft)		35						5			18	0
Queue Length 95th (ft)		82						14			46	37
Internal Link Dist (ft)		316			189			594			231	
Turn Bay Length (ft)												
Base Capacity (vph)		3115						2975			2717	1794
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		0.18						0.04			0.13	0.28

Intersection Summary	
Area Type:	Other

Cycle Length: 82
Actuated Cycle Length: 32.1
Natural Cycle: 40
Control Type: Actuated-Uncoordinated

Splits and Phases: 18: Galleria Mall Entrance & County St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	315	155	45	0	0	0	25	65	0	165	153	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	14	12	12	12	12	12	16	12	12	16
Total Lost time (s)		5.0						5.0			5.0	5.0
Lane Util. Factor		0.95						0.95			0.95	1.00
Frt		0.99						1.00			1.00	0.85
Flt Protected		0.97						0.99			0.97	1.00
Satd. Flow (prot)		3735						3561			3449	1794
Flt Permitted		0.97						0.82			0.77	1.00
Satd. Flow (perm)		3735						2974			2719	1794
Peak-hour factor, PHF	0.94	0.94	0.94	0.79	0.79	0.79	0.76	0.76	0.76	0.90	0.90	0.90
Adj. Flow (vph)	335	165	48	0	0	0	33	86	0	183	170	506
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	0	315
Lane Group Flow (vph)	0	539	0	0	0	0	0	119	0	0	353	191
Heavy Vehicles (%)	1%	4%	0%	0%	0%	11%	0%	0%	0%	3%	1%	2%
Turn Type	Perm						Perm			Perm		Perm
Protected Phases		2						1			1	
Permitted Phases	2						1			1		1
Actuated Green, G (s)		9.8						12.0			12.0	12.0
Effective Green, g (s)		9.8						12.0			12.0	12.0
Actuated g/C Ratio		0.31						0.38			0.38	0.38
Clearance Time (s)		5.0						5.0			5.0	5.0
Vehicle Extension (s)		2.0						2.0			2.0	2.0
Lane Grp Cap (vph)		1151						1122			1026	677
v/s Ratio Prot												
v/s Ratio Perm		0.14						0.04			c0.13	0.11
v/c Ratio		0.47						0.11			0.34	0.28
Uniform Delay, d1		8.9						6.4			7.1	6.9
Progression Factor		1.00						1.00			1.00	1.00
Incremental Delay, d2		0.1						0.0			0.1	0.1
Delay (s)		9.0						6.4			7.2	7.0
Level of Service		A						A			A	A
Approach Delay (s)		9.0			0.0			6.4			7.1	
Approach LOS		A			A			A			A	

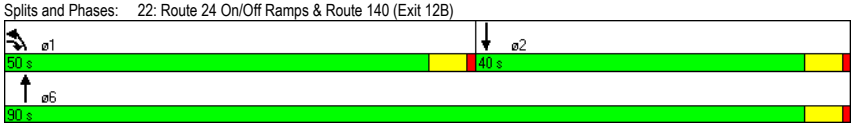
Intersection Summary				
HCM Average Control Delay	7.7	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.40			
Actuated Cycle Length (s)	31.8	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	45.8%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	1440	285	976	1129	362
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	12	12	12	12	12
Storage Length (ft)	0	0	250			200
Storage Lanes	0	2	1			0
Taper Length (ft)	25	25	25			25
Right Turn on Red		No				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	729			870	625	
Travel Time (s)	16.6			19.8	14.2	
Peak Hour Factor	0.96	0.96	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	0%	3%	2%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1500	310	1061	1620	0
Turn Type		Over	Prot			
Protected Phases		1	1	6	2	
Permitted Phases						
Detector Phase		1	1	6	2	
Switch Phase						
Minimum Initial (s)		4.0	4.0	4.0	4.0	
Minimum Split (s)		9.0	9.0	9.0	21.0	
Total Split (s)	0.0	50.0	50.0	90.0	40.0	0.0
Total Split (%)	0.0%	55.6%	55.6%	100.0%	44.4%	0.0%
Maximum Green (s)		45.0	45.0	85.0	35.0	
Yellow Time (s)		4.0	4.0	4.0	4.0	
All-Red Time (s)		1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	4.0
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0	3.0	3.0	
Recall Mode		None	None	C-Min	C-Min	
Walk Time (s)					5.0	
Flash Dont Walk (s)					11.0	
Pedestrian Calls (#/hr)					0	
v/c Ratio		1.10	0.34	0.30	1.19	
Control Delay		79.5	14.4	0.2	116.4	
Queue Delay		0.0	0.0	0.0	0.0	
Total Delay		79.5	14.4	0.2	116.4	
Queue Length 50th (ft)		~554	134	0	~584	
Queue Length 95th (ft)		#699	91	0	#724	
Internal Link Dist (ft)	649			790	545	
Turn Bay Length (ft)			250			
Base Capacity (vph)		1367	903	3505	1361	
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		1.10	0.34	0.30	1.19	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Green, Master Intersection	
Natural Cycle: 140	
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.

Splits and Phases: 22: Route 24 On/Off Ramps & Route 140 (Exit 12B)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	1440	285	976	1129	362
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	15	12	12	12	12	12
Total Lost time (s)		5.0	5.0	5.0	5.0	
Lane Util. Factor		0.88	1.00	0.95	0.95	
Frt		0.85	1.00	1.00	0.96	
Flt Protected		1.00	0.95	1.00	1.00	
Satd. Flow (prot)		2733	1805	3505	3410	
Flt Permitted		1.00	0.95	1.00	1.00	
Satd. Flow (perm)		2733	1805	3505	3410	
Peak-hour factor, PHF	0.96	0.96	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1500	310	1061	1227	393
RTOR Reduction (vph)	0	0	0	0	34	0
Lane Group Flow (vph)	0	1500	310	1061	1586	0
Heavy Vehicles (%)	2%	4%	0%	3%	2%	2%
Turn Type		Over	Prot			
Protected Phases		1	1	6	2	
Permitted Phases						
Actuated Green, G (s)		45.0	45.0	90.0	35.0	
Effective Green, g (s)		45.0	45.0	90.0	35.0	
Actuated g/C Ratio		0.50	0.50	1.00	0.39	
Clearance Time (s)		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1367	903	3505	1326	
v/s Ratio Prot		c0.55	0.17	0.30	c0.46	
v/s Ratio Perm						
v/c Ratio		1.10	0.34	0.30	1.20	
Uniform Delay, d1		22.5	13.6	0.0	27.5	
Progression Factor		1.00	0.96	1.00	0.89	
Incremental Delay, d2		55.5	0.2	0.2	94.2	
Delay (s)		78.0	13.3	0.2	118.6	
Level of Service		E	B	A	F	
Approach Delay (s)	78.0			3.2	118.6	
Approach LOS	E			A	F	

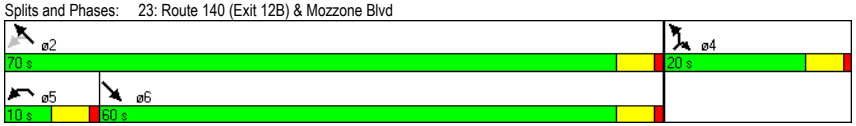
Intersection Summary			
HCM Average Control Delay	69.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	101.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (vph)	1271	191	225	1008	176	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		150	0		0	0
Storage Lanes		0	1		1	1
Taper Length (ft)		25	25		25	25
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	1713			740	1061	
Travel Time (s)	38.9			16.8	24.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1590	0	0	1341	191	239
Turn Type			pm+pt			Prot
Protected Phases	6		5	2	4	4
Permitted Phases			2			
Detector Phase	6		5	2	4	4
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	10.0		10.0	10.0	10.0	10.0
Total Split (s)	60.0	0.0	10.0	70.0	20.0	20.0
Total Split (%)	66.7%	0.0%	11.1%	77.8%	22.2%	22.2%
Maximum Green (s)	55.0		5.0	65.0	15.0	15.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	4.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	C-Min		None	C-Min	None	None
v/c Ratio	0.62			1.46dl	0.72	0.67
Control Delay	7.0			46.1	52.5	25.4
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	7.0			46.1	52.5	25.4
Queue Length 50th (ft)	198			~442	103	51
Queue Length 95th (ft)	255			#576	#180	130
Internal Link Dist (ft)	1633			660	981	
Turn Bay Length (ft)						
Base Capacity (vph)	2574			1309	295	380
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	0.62			1.02	0.65	0.63

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	

Offset: 40 (44%), Referenced to phase 2:NWTL and 6:SET, Start of Green
Natural Cycle: 90
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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 23: Route 140 (Exit 12B) & Mozzone Blvd



HCM Signalized Intersection Capacity Analysis
23: Route 140 (Exit 12B) & Mozzone Blvd

2030 Build Condition - PM Peak Hour

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (vph)	1271	191	225	1008	176	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	0.98			1.00	1.00	0.85
Flt Protected	1.00			0.99	0.95	1.00
Satd. Flow (prot)	3470			3507	1770	1583
Flt Permitted	1.00			0.50	0.95	1.00
Satd. Flow (perm)	3470			1770	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1382	208	245	1096	191	239
RTOR Reduction (vph)	9	0	0	0	0	118
Lane Group Flow (vph)	1581	0	0	1341	191	121
Turn Type			pm+pt			Prot
Protected Phases	6		5	2	4	4
Permitted Phases			2			
Actuated Green, G (s)	66.6			66.6	13.4	13.4
Effective Green, g (s)	66.6			66.6	13.4	13.4
Actuated g/C Ratio	0.74			0.74	0.15	0.15
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2568			1310	264	236
v/s Ratio Prot	0.46				c0.11	0.08
v/s Ratio Perm				c0.76		
v/c Ratio	0.62			1.46dl	0.72	0.51
Uniform Delay, d1	5.6			11.7	36.5	35.3
Progression Factor	1.00			1.04	1.00	1.00
Incremental Delay, d2	1.1			30.8	9.4	1.9
Delay (s)	6.7			43.0	46.0	37.2
Level of Service	A			D	D	D
Approach Delay (s)	6.7			43.0	41.1	
Approach LOS	A			D	D	

Intersection Summary			
HCM Average Control Delay	25.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	97.9%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Lanes, Volumes, Timings
24: Route 24 NB On/Off Ramps & Route 140 (Exit 12A)

2030 Build Condition - PM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	249	991	880	170	2434
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	12	12
Storage Length (ft)	0	0		300	250	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		30			30
Link Distance (ft)	736		624			870
Travel Time (s)	16.7		14.2			19.8
Peak Hour Factor	0.94	0.94	0.98	0.98	0.97	0.97
Heavy Vehicles (%)	0%	2%	3%	6%	6%	3%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	265	1011	898	175	2509
Turn Type		Free		Free	Prot	
Protected Phases			2		1	6
Permitted Phases		Free		Free		
Detector Phase			2		1	6
Switch Phase						
Minimum Initial (s)			8.0		8.0	8.0
Minimum Split (s)			13.0		13.0	13.0
Total Split (s)	0.0	0.0	66.0	0.0	24.0	90.0
Total Split (%)	0.0%	0.0%	73.3%	0.0%	26.7%	100.0%
Maximum Green (s)			61.0		19.0	85.0
Yellow Time (s)			4.0		4.0	4.0
All-Red Time (s)			1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	5.0	4.0	5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)			2.0		2.0	2.0
Recall Mode			C-Min		None	C-Min
v/c Ratio		0.15	0.39	0.59	0.68	0.72
Control Delay		0.2	5.3	1.7	36.0	0.1
Queue Delay		0.0	0.0	0.0	0.0	0.0
Total Delay		0.2	5.3	1.7	36.0	0.1
Queue Length 50th (ft)		0	91	0	100	0
Queue Length 95th (ft)		0	155	0	m74	m0
Internal Link Dist (ft)	656		544			790
Turn Bay Length (ft)				300	250	
Base Capacity (vph)		1772	2588	1524	360	3505
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		0.15	0.39	0.59	0.49	0.72

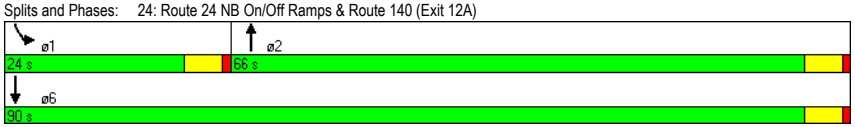
Intersection Summary	
Area Type:	Other

Lanes, Volumes, Timings
24: Route 24 NB On/Off Ramps & Route 140 (Exit 12A)

2030 Build Condition - PM Peak Hour

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 18 (20%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 24: Route 24 NB On/Off Ramps & Route 140 (Exit 12A)



HCM Signalized Intersection Capacity Analysis
24: Route 24 NB On/Off Ramps & Route 140 (Exit 12A)

2030 Build Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	249	991	880	170	2434
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	15	12	12	12	12
Total Lost time (s)		4.0	5.0	4.0	5.0	5.0
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95
Frt		0.86	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1772	3505	1524	1703	3505
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1772	3505	1524	1703	3505
Peak-hour factor, PHF	0.94	0.94	0.98	0.98	0.97	0.97
Adj. Flow (vph)	0	265	1011	898	175	2509
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	265	1011	898	175	2509
Heavy Vehicles (%)	0%	2%	3%	6%	6%	3%
Turn Type		Free		Free	Prot	
Protected Phases			2		1	6
Permitted Phases		Free		Free		
Actuated Green, G (s)		90.0	66.5	90.0	13.5	90.0
Effective Green, g (s)		90.0	66.5	90.0	13.5	90.0
Actuated g/C Ratio		1.00	0.74	1.00	0.15	1.00
Clearance Time (s)			5.0		5.0	5.0
Vehicle Extension (s)			2.0		2.0	2.0
Lane Grp Cap (vph)		1772	2590	1524	255	3505
v/s Ratio Prot			0.29		0.10	c0.72
v/s Ratio Perm		0.15		0.59		
v/c Ratio		0.15	0.39	0.59	0.69	0.72
Uniform Delay, d1		0.0	4.3	0.0	36.2	0.0
Progression Factor		1.00	1.00	1.00	0.98	1.00
Incremental Delay, d2		0.2	0.4	1.7	0.6	0.1
Delay (s)		0.2	4.8	1.7	36.1	0.1
Level of Service		A	A	A	D	A
Approach Delay (s)	0.2		3.3			2.5
Approach LOS	A		A			A

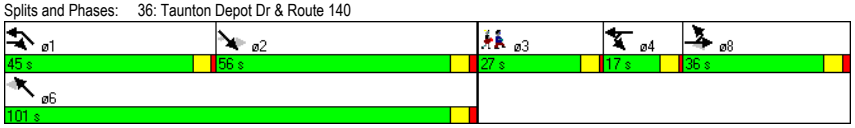
Intersection Summary				
HCM Average Control Delay	2.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	305	5	302	5	0	0	0	885	272	209	930	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	12	12
Storage Length (ft)	0		100	0		0	180		130	320		350
Storage Lanes	1		1	0		0	1		1	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		846			205			2224			1713	
Travel Time (s)		19.2			4.7			50.5			38.9	
Peak Hour Factor	0.93	0.93	0.93	0.63	0.63	0.63	0.98	0.98	0.98	0.94	0.94	0.94
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	0%	2%	2%	0%	1%	0%
Shared Lane Traffic (%)	49%											
Lane Group Flow (vph)	167	166	325	0	8	0	0	903	278	222	989	0
Turn Type	Split		pm+ov	Split			Perm		Perm	pm+pt		
Protected Phases	8	8	1	4	4			2		1	6	
Permitted Phases			8				2		2	6		
Detector Phase	8	8	1	4	4		2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	4.0	4.0		6.0	6.0	6.0	6.0	20.0	
Minimum Split (s)	12.0	12.0	11.0	9.0	9.0		12.0	12.0	12.0	11.0	26.0	
Total Split (s)	36.0	36.0	45.0	17.0	17.0	0.0	56.0	56.0	56.0	45.0	101.0	0.0
Total Split (%)	19.9%	19.9%	24.9%	9.4%	9.4%	0.0%	30.9%	30.9%	30.9%	24.9%	55.8%	0.0%
Maximum Green (s)	30.0	30.0	40.0	12.0	12.0		50.0	50.0	50.0	40.0	95.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	1.0	1.0		2.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.0	5.0	5.0	4.0	6.0	6.0	6.0	5.0	6.0	4.0
Lead/Lag			Lead	Lag	Lag		Lag	Lag	Lag	Lead		
Lead-Lag Optimize?				Yes	Yes		Yes	Yes	Yes			
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		4.0	4.0	4.0	2.0	4.0	
Recall Mode	None	None	None	None	None		Min	Min	Min	None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.59	0.58	0.40		0.07			0.58	0.37	0.51	0.43	
Control Delay	51.4	51.0	4.6		60.0			26.4	16.8	14.0	11.8	
Queue Delay	0.0	0.0	0.0		0.0			0.0	0.0	0.0	0.0	
Total Delay	51.4	51.0	4.6		60.0			26.4	16.8	14.0	11.8	
Queue Length 50th (ft)	84	84	0		4			165	52	34	101	
Queue Length 95th (ft)	260	258	65		20			547	245	179	422	
Internal Link Dist (ft)		766			125			2144			1633	
Turn Bay Length (ft)			100						130	320		
Base Capacity (vph)	598	600	1235		291			2097	979	918	3237	
Starvation Cap Reductn	0	0	0		0			0	0	0	0	
Spillback Cap Reductn	0	0	0		0			0	0	0	0	
Storage Cap Reductn	0	0	0		0			0	0	0	0	
Reduced v/c Ratio	0.28	0.28	0.26		0.03			0.43	0.28	0.24	0.31	

Lane Group	ø3
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	15%
Maximum Green (s)	22.0
Yellow Time (s)	4.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	15.0
Pedestrian Calls (#/hr)	6
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	
Area Type:	Other
Cycle Length: 181	
Actuated Cycle Length: 94.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 36: Taunton Depot Dr & Route 140



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	305	5	302	5	0	0	0	885	272	209	930	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)	6.0	6.0	5.0		5.0			6.0	6.0	5.0	6.0	
Lane Util. Factor	0.95	0.95	1.00		1.00			0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85		1.00			1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00		0.95			1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1689	1599		2046			3539	1583	1805	3574	
Flt Permitted	0.95	0.95	1.00		0.95			1.00	1.00	0.18	1.00	
Satd. Flow (perm)	1681	1689	1599		2046			3539	1583	338	3574	
Peak-hour factor, PHF	0.93	0.93	0.93	0.63	0.63	0.63	0.98	0.98	0.98	0.94	0.94	0.94
Adj. Flow (vph)	328	5	325	8	0	0	0	903	278	222	989	0
RTOR Reduction (vph)	0	0	230	0	0	0	0	0	59	0	0	0
Lane Group Flow (vph)	167	166	95	0	8	0	0	903	219	222	989	0
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	0%	2%	2%	0%	1%	0%
Turn Type	Split		pm+ov	Split			Perm		Perm	pm+pt		
Protected Phases	8	8	1	4	4			2		1	6	
Permitted Phases			8				2		2	6		
Actuated Green, G (s)	16.0	16.0	29.7		0.7			42.1	42.1	60.8	60.8	
Effective Green, g (s)	16.0	16.0	29.7		0.7			42.1	42.1	60.8	60.8	
Actuated g/C Ratio	0.16	0.16	0.29		0.01			0.41	0.41	0.60	0.60	
Clearance Time (s)	6.0	6.0	5.0		5.0			6.0	6.0	5.0	6.0	
Vehicle Extension (s)	2.0	2.0	2.0		2.0			4.0	4.0	2.0	4.0	
Lane Grp Cap (vph)	263	265	465		14			1459	653	398	2128	
v/s Ratio Prot	c0.10	0.10	0.03		c0.00			c0.26		c0.07	0.28	
v/s Ratio Perm			0.03						0.14	0.26		
v/c Ratio	0.63	0.63	0.20		0.57			0.62	0.34	0.56	0.46	
Uniform Delay, d1	40.3	40.3	27.3		50.6			23.7	20.5	12.8	11.5	
Progression Factor	1.00	1.00	1.00		1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.7	3.3	0.1		30.5			0.9	0.4	1.0	0.2	
Delay (s)	44.0	43.6	27.4		81.0			24.6	20.9	13.8	11.8	
Level of Service	D	D	C		F			C	C	B	B	
Approach Delay (s)		35.7			81.0			23.7			12.1	
Approach LOS		D			F			C			B	

Intersection Summary			
HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	102.1	Sum of lost time (s)	29.6
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	476	0	0	0	525	343	15	675	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12	12	11	12	12	13	12
Storage Length (ft)	0		0	0		0	0		175	0		0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		220			991			547			1888	
Travel Time (s)		5.0			22.5			12.4			42.9	
Peak Hour Factor	0.92	0.92	0.92	0.82	0.82	0.82	0.96	0.96	0.96	0.89	0.89	0.89
Heavy Vehicles (%)	2%	2%	2%	1%	0%	100%	0%	3%	1%	0%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	580	0	0	547	357	0	775	0
Turn Type				Split			Perm		Prot	Perm		
Protected Phases				4	4			6	6		2	
Permitted Phases							6			2		
Detector Phase				4	4		6	6	6	2	2	
Switch Phase												
Minimum Initial (s)				6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)				11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Total Split (s)	0.0	0.0	0.0	25.0	25.0	0.0	40.0	40.0	40.0	40.0	40.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	29.8%	29.8%	0.0%	47.6%	47.6%	47.6%	47.6%	47.6%	0.0%
Maximum Green (s)				20.0	20.0		35.0	35.0	35.0	35.0	35.0	
Yellow Time (s)				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	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Recall Mode				None	None		None	None	None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio					1.06			0.60	0.36		0.80	
Control Delay					82.6			16.8	2.8		23.9	
Queue Delay					0.0			0.0	0.0		0.0	
Total Delay					82.6			16.8	2.8		23.9	
Queue Length 50th (ft)					~236			132	0		219	
Queue Length 95th (ft)					#521			360	48		#625	
Internal Link Dist (ft)		140			911			467			1808	
Turn Bay Length (ft)									175			
Base Capacity (vph)					548			925	1002		984	
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					1.06			0.59	0.36		0.79	

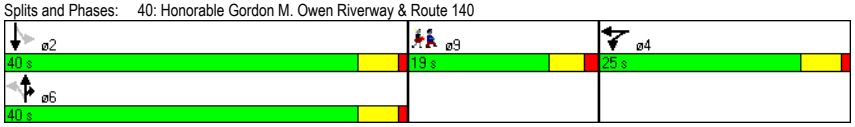
Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	23%
Maximum Green (s)	14.0
Yellow Time (s)	3.5
All-Red Time (s)	1.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	4.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	7.0
Pedestrian Calls (#/hr)	3
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	
Area Type:	Other
Cycle Length: 84	
Actuated Cycle Length: 68.2	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	

~ 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.

Splits and Phases: 40: Honorable Gordon M. Owen Riverway & Route 140



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	476	0	0	0	525	343	15	675	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	13	12	12	11	12	12	13	12
Total Lost time (s)					5.0			5.0	5.0		5.0	
Lane Util. Factor					1.00			1.00	1.00		1.00	
Frt					1.00			1.00	0.85		1.00	
Flt Protected					0.95			1.00	1.00		1.00	
Satd. Flow (prot)					1847			1783	1599		1924	
Flt Permitted					0.95			1.00	1.00		0.99	
Satd. Flow (perm)					1847			1783	1599		1897	
Peak-hour factor, PHF	0.92	0.92	0.92	0.82	0.82	0.82	0.96	0.96	0.96	0.89	0.89	0.89
Adj. Flow (vph)	0	0	0	580	0	0	0	547	357	17	758	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	185	0	0	0
Lane Group Flow (vph)	0	0	0	0	580	0	0	547	172	0	775	0
Heavy Vehicles (%)	2%	2%	2%	1%	0%	100%	0%	3%	1%	0%	2%	0%
Turn Type				Split			Perm		Prot	Perm		
Protected Phases				4	4			6	6		2	
Permitted Phases							6			2		
Actuated Green, G (s)					20.2			34.8	34.8		34.8	
Effective Green, g (s)					20.2			34.8	34.8		34.8	
Actuated g/C Ratio					0.28			0.48	0.48		0.48	
Clearance Time (s)					5.0			5.0	5.0		5.0	
Vehicle Extension (s)					4.0			4.0	4.0		4.0	
Lane Grp Cap (vph)					516			858	770		913	
v/s Ratio Prot					c0.31			0.31	0.11			
v/s Ratio Perm											c0.41	
v/c Ratio					1.12			0.64	0.22		0.85	
Uniform Delay, d1					26.0			14.0	10.9		16.4	
Progression Factor					1.00			1.00	1.00		1.00	
Incremental Delay, d2					78.3			1.8	0.2		7.7	
Delay (s)					104.4			15.8	11.1		24.2	
Level of Service					F			B	B		C	
Approach Delay (s)		0.0			104.4			13.9			24.2	
Approach LOS		A			F			B			C	

Intersection Summary					
HCM Average Control Delay		40.7	HCM Level of Service		D
HCM Volume to Capacity ratio		0.95			
Actuated Cycle Length (s)		72.3	Sum of lost time (s)		17.3
Intersection Capacity Utilization		82.3%	ICU Level of Service		E
Analysis Period (min)		15			

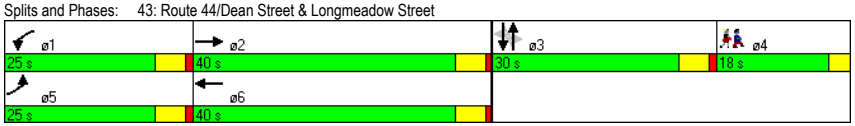
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	829	356	405	769	220	78	330	220	150	235	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	16	10	12	13	12	11	16	12	11	12
Storage Length (ft)	100		70	100		70	0		50	0		100
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1663			1440			2994			1249	
Travel Time (s)		37.8			32.7			68.0			28.4	
Peak Hour Factor	0.93	0.93	0.93	0.96	0.96	0.96	0.92	0.92	0.92	0.84	0.84	0.84
Heavy Vehicles (%)	0%	3%	3%	2%	3%	3%	1%	2%	1%	1%	1%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1274	0	422	1030	0	0	683	0	0	471	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			3			3	
Permitted Phases							3			3		
Detector Phase	5	2		1	6		3	3		3	3	
Switch Phase												
Minimum Initial (s)	9.0	12.0		9.0	12.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	14.0	17.0		14.0	17.0		13.0	13.0		13.0	13.0	
Total Split (s)	25.0	40.0	0.0	25.0	40.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0
Total Split (%)	22.1%	35.4%	0.0%	22.1%	35.4%	0.0%	26.5%	26.5%	0.0%	26.5%	26.5%	0.0%
Maximum Green (s)	20.0	35.0		20.0	35.0		25.0	25.0		25.0	25.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	5.0		4.0	5.0		4.0	4.0		4.0	4.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.07	1.03		1.25	0.51			1.09			2.39dl	
Control Delay	45.1	65.4		171.0	15.0			93.6			69.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	45.1	65.4		171.0	15.0			93.6			69.1	
Queue Length 50th (ft)	6	~385		~314	150			~218			145	
Queue Length 95th (ft)	27	#710		#615	398			#420			#281	
Internal Link Dist (ft)		1583			1360			2914			1169	
Turn Bay Length (ft)	100			100								
Base Capacity (vph)	344	1233		337	2002			629			492	
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	0.03	1.03		1.25	0.51			1.09			0.96	

Lane Group	ø4
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	4
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	8.0
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	16%
Maximum Green (s)	15.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	8.0
Flash Dont Walk (s)	7.0
Pedestrian Calls (#/hr)	7
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	

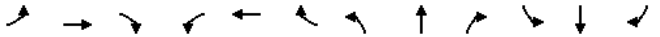
Intersection Summary	
Area Type:	Other
Cycle Length: 113	
Actuated Cycle Length: 98.6	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
dl Defacto Left Lane. Recode with 1 though lane as a left lane.	

Splits and Phases: 43: Route 44/Dean Street & Longmeadow Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	829	356	405	769	220	78	330	220	150	235	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	16	10	12	13	12	11	16	12	11	12
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frt	1.00	0.95		1.00	0.97			0.95			1.00	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1685	3347		1652	3388			3237			3379	
Flt Permitted	0.95	1.00		0.95	1.00			0.68			0.56	
Satd. Flow (perm)	1685	3347		1652	3388			2230			1924	
Peak-hour factor, PHF	0.93	0.93	0.93	0.96	0.96	0.96	0.92	0.92	0.92	0.84	0.84	0.84
Adj. Flow (vph)	11	891	383	422	801	229	85	359	239	179	280	12
RTOR Reduction (vph)	0	38	0	0	15	0	0	62	0	0	2	0
Lane Group Flow (vph)	11	1236	0	422	1015	0	0	621	0	0	469	0
Heavy Vehicles (%)	0%	3%	3%	2%	3%	3%	1%	2%	1%	1%	1%	0%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			3			3	
Permitted Phases							3			3		
Actuated Green, G (s)	1.6	39.3		20.1	57.8			25.1			25.1	
Effective Green, g (s)	1.6	39.3		20.1	57.8			25.1			25.1	
Actuated g/C Ratio	0.02	0.37		0.19	0.55			0.24			0.24	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	4.0	5.0		4.0	5.0			4.0			4.0	
Lane Grp Cap (vph)	26	1252		316	1863			533			459	
v/s Ratio Prot	0.01	c0.37		c0.26	0.30							
v/s Ratio Perm								c0.28			0.24	
v/c Ratio	0.42	0.99		1.34	0.54			1.17			2.39dl	
Uniform Delay, d1	51.3	32.6		42.5	15.2			40.0			40.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	14.4	22.3		171.0	0.6			93.5			47.9	
Delay (s)	65.7	54.9		213.5	15.8			133.5			87.9	
Level of Service	E	D		F	B			F			F	
Approach Delay (s)		55.0			73.2			133.5			87.9	
Approach LOS		E			E			F			F	

Intersection Summary			
HCM Average Control Delay	79.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	105.1	Sum of lost time (s)	20.6
Intersection Capacity Utilization	103.0%	ICU Level of Service	G
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	105	173	106	170	240	290	803	122	120	882	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	12	12	11	11	11	12	12	12
Storage Length (ft)	0		50	0		50	50		0	50		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1373			971			2224			3692	
Travel Time (s)		31.2			22.1			43.3			71.9	
Peak Hour Factor	0.68	0.68	0.68	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96	0.96
Heavy Vehicles (%)	0%	1%	2%	2%	1%	1%	1%	1%	1%	2%	3%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	205	254	0	291	253	0	1278	0	0	1054	0
Turn Type	Perm		Prot	Perm		Prot	pm+pt			pm+pt		
Protected Phases		4	4		4	4	3	2 3		1	1 2	
Permitted Phases	4			4			2 3			1 2		
Detector Phase	4	4	4	4	4	4	3	2 3		1	1 2	
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	4.0			4.0		
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	9.0			9.0		
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	17.0	57.0	0.0	15.0	55.0	0.0
Total Split (%)	20.5%	20.5%	20.5%	20.5%	20.5%	20.5%	13.9%	46.7%	0.0%	12.3%	45.1%	0.0%
Maximum Green (s)	20.0	20.0	20.0	20.0	20.0	20.0	12.0			10.0		
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	5.0	5.0	4.0
Lead/Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead			Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0		
Recall Mode	Max	Max	Max	Max	Max	Max	None			None		
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		1.05	0.60		1.27	0.63		1.08			1.06	
Control Delay		118.3	23.4		186.0	29.8		77.4			68.0	
Queue Delay		0.0	0.0		0.0	0.0		0.0			0.0	
Total Delay		118.3	23.4		186.0	29.8		77.4			68.0	
Queue Length 50th (ft)		~139	66		~228	90		~340			~255	
Queue Length 95th (ft)		#181	85		#389	174		#423			#423	
Internal Link Dist (ft)		1293			891			2144			3612	
Turn Bay Length (ft)			50			50						
Base Capacity (vph)		195	420		229	403		1179			996	
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		1.05	0.60		1.27	0.63		1.08			1.06	

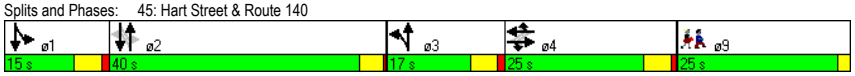
Lane Group	ø2	ø9
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	2	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	1.0
Minimum Split (s)	20.0	25.0
Total Split (s)	40.0	25.0
Total Split (%)	33%	20%
Maximum Green (s)	36.0	23.0
Yellow Time (s)	3.5	2.0
All-Red Time (s)	0.5	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		7.0
Flash Dont Walk (s)		16.0
Pedestrian Calls (#/hr)		0
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	
Area Type:	Other
Cycle Length: 122	
Actuated Cycle Length: 97	
Natural Cycle: 150	
Control Type: Semi Act-Uncoord	

~ 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.

Splits and Phases: 45: Hart Street & Route 140



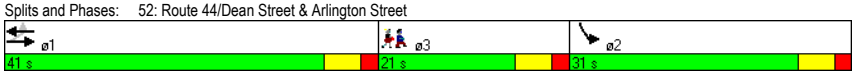
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	105	173	106	170	240	290	803	122	120	882	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12	11	11	11	12	12	12
Total Lost time (s)		5.0	5.0		5.0	5.0		4.0			5.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.95			0.95	
Frt		1.00	0.85		1.00	0.85		0.98			1.00	
Flt Protected		0.99	1.00		0.98	1.00		0.99			0.99	
Satd. Flow (prot)		1801	1531		1839	1599		3363			3484	
Flt Permitted		0.52	1.00		0.59	1.00		0.57			0.50	
Satd. Flow (perm)		943	1531		1112	1599		1947			1764	
Peak-hour factor, PHF	0.68	0.68	0.68	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96	0.96
Adj. Flow (vph)	51	154	254	112	179	253	305	845	128	125	919	10
RTOR Reduction (vph)	0	0	104	0	0	73	0	6	0	0	1	0
Lane Group Flow (vph)	0	205	150	0	291	180	0	1272	0	0	1053	0
Heavy Vehicles (%)	0%	1%	2%	2%	1%	1%	1%	1%	1%	2%	3%	0%
Turn Type	Perm		Prot	Perm		Prot	pm+pt			pm+pt		
Protected Phases		4	4		4	4	3	2 3		1	1 2	
Permitted Phases	4			4			2 3			1 2		
Actuated Green, G (s)		20.0	20.0		20.0	20.0		48.0			46.0	
Effective Green, g (s)		20.0	20.0		20.0	20.0		48.0			46.0	
Actuated g/C Ratio		0.21	0.21		0.21	0.21		0.49			0.47	
Clearance Time (s)		5.0	5.0		5.0	5.0						
Vehicle Extension (s)		3.0	3.0		3.0	3.0						
Lane Grp Cap (vph)		194	316		229	330		1139			1014	
v/s Ratio Prot			0.10			0.11		c0.14			c0.11	
v/s Ratio Perm		0.22			c0.26			c0.41			0.39	
v/c Ratio		1.06	0.47		1.27	0.55		1.12			1.04	
Uniform Delay, d1		38.5	33.9		38.5	34.4		24.5			25.5	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		80.4	5.0		151.5	6.3		64.8			38.9	
Delay (s)		118.9	38.9		190.0	40.8		89.3			64.4	
Level of Service		F	D		F	D		F			E	
Approach Delay (s)		74.6			120.6			89.3			64.4	
Approach LOS		E			F			F			E	

Intersection Summary					
HCM Average Control Delay		84.5	HCM Level of Service		F
HCM Volume to Capacity ratio		1.13			
Actuated Cycle Length (s)		97.0	Sum of lost time (s)		18.0
Intersection Capacity Utilization		100.8%	ICU Level of Service		G
Analysis Period (min)		15			
c Critical Lane Group					

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	ø3
Lane Configurations							
Volume (vph)	25	795	750	93	406	79	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	16	12	14	12	
Storage Length (ft)	150			0	0	0	
Storage Lanes	1			0	1	0	
Taper Length (ft)	25			25	25	25	
Right Turn on Red				Yes		No	
Link Speed (mph)		30	30		30		
Link Distance (ft)		1036	1663		418		
Travel Time (s)		23.5	37.8		9.5		
Peak Hour Factor	0.89	0.89	0.98	0.98	0.97	0.97	
Heavy Vehicles (%)	0%	3%	3%	0%	1%	5%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	28	893	860	0	500	0	
Turn Type	Perm						
Protected Phases		1	1		2		3
Permitted Phases	1						
Detector Phase	1	1	1		2		
Switch Phase							
Minimum Initial (s)	9.0	9.0	9.0		4.0		5.0
Minimum Split (s)	15.0	15.0	15.0		10.0		21.0
Total Split (s)	41.0	41.0	41.0	0.0	31.0	0.0	21.0
Total Split (%)	44.1%	44.1%	44.1%	0.0%	33.3%	0.0%	23%
Maximum Green (s)	35.0	35.0	35.0		25.0		15.0
Yellow Time (s)	4.0	4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0	2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0	4.0	
Lead/Lag	Lead	Lead	Lead				Lag
Lead-Lag Optimize?	Yes	Yes	Yes				Yes
Vehicle Extension (s)	3.0	3.0	3.0		3.0		1.0
Recall Mode	None	None	None		None		None
Walk Time (s)							5.0
Flash Dont Walk (s)							10.0
Pedestrian Calls (#/hr)							4
v/c Ratio	0.30	1.04	0.89		0.81		
Control Delay	27.3	65.7	33.7		36.8		
Queue Delay	0.0	0.0	0.0		0.0		
Total Delay	27.3	65.7	33.7		36.8		
Queue Length 50th (ft)	7	373	314		194		
Queue Length 95th (ft)	42	#890	#811		#500		
Internal Link Dist (ft)		956	1583		338		
Turn Bay Length (ft)	150						
Base Capacity (vph)	93	856	963		621		
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	0.30	1.04	0.89		0.81		

Intersection Summary	
Area Type:	Other
Cycle Length: 93	
Actuated Cycle Length: 76.2	
Natural Cycle: 130	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 52: Route 44/Dean Street & Arlington Street



HCM Signalized Intersection Capacity Analysis
52: Route 44/Dean Street & Arlington Street

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	25	795	750	93	406	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	16	12	14	12
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.99		0.98	
Flt Protected	0.95	1.00	1.00		0.96	
Satd. Flow (prot)	1685	1845	2066		1872	
Flt Permitted	0.11	1.00	1.00		0.96	
Satd. Flow (perm)	200	1845	2066		1872	
Peak-hour factor, PHF	0.89	0.89	0.98	0.98	0.97	0.97
Adj. Flow (vph)	28	893	765	95	419	81
RTOR Reduction (vph)	0	0	5	0	0	0
Lane Group Flow (vph)	28	893	855	0	500	0
Heavy Vehicles (%)	0%	3%	3%	0%	1%	5%
Turn Type	Perm					
Protected Phases		1	1		2	
Permitted Phases	1					
Actuated Green, G (s)	35.4	35.4	35.4		25.3	
Effective Green, g (s)	35.4	35.4	35.4		25.3	
Actuated g/C Ratio	0.44	0.44	0.44		0.31	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	87	804	901		583	
v/s Ratio Prot		c0.48	0.41		c0.27	
v/s Ratio Perm	0.14					
v/c Ratio	0.32	1.11	0.95		0.86	
Uniform Delay, d1	15.0	22.9	22.0		26.3	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	2.1	66.6	18.6		11.9	
Delay (s)	17.2	89.5	40.7		38.2	
Level of Service	B	F	D		D	
Approach Delay (s)		87.3	40.7		38.2	
Approach LOS		F	D		D	

Intersection Summary			
HCM Average Control Delay	59.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	81.2	Sum of lost time (s)	20.5
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
53: Route 44 & Route 104/Dean Street

2030 Build Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	142	1022	0	0	1038	15	15	10	5	65	15	286
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	16	12	12	12	12	12	16
Storage Length (ft)	50		0	0		50	0		0	0		50
Storage Lanes	1		0	0		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		825			1426			127			959	
Travel Time (s)		18.8			32.4			2.9			21.8	
Peak Hour Factor	0.97	0.97	0.97	0.84	0.84	0.84	0.75	0.75	0.75	0.93	0.93	0.93
Heavy Vehicles (%)	2%	2%	0%	0%	2%	6%	0%	0%	0%	0%	0%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1200	0	0	1254	0	0	40	0	0	86	308
Turn Type	pm+pt						Perm			Perm		pm+ov
Protected Phases	5	2			6			8			4	5
Permitted Phases	2						8			4		4
Detector Phase	5	2			6		8	8		4	4	5
Switch Phase												
Minimum Initial (s)	6.0	12.0			12.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	11.0	17.0			17.0		11.0	11.0		11.0	11.0	11.0
Total Split (s)	17.0	62.0	0.0	0.0	45.0	0.0	25.0	25.0	0.0	25.0	25.0	17.0
Total Split (%)	19.5%	71.3%	0.0%	0.0%	51.7%	0.0%	28.7%	28.7%	0.0%	28.7%	28.7%	19.5%
Maximum Green (s)	12.0	57.0			40.0		20.0	20.0		20.0	20.0	12.0
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lead				Lag							Lead
Lead-Lag Optimize?	Yes				Yes							Yes
Vehicle Extension (s)	1.5	1.5			1.5		2.0	2.0		2.0	2.0	1.5
Recall Mode	None	Min			Min		None	None		None	None	None
v/c Ratio		0.70			0.71			0.18			0.40	0.53
Control Delay		6.9			14.6			26.7			34.8	20.9
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay		6.9			14.6			26.7			34.8	20.9
Queue Length 50th (ft)		86			176			12			33	93
Queue Length 95th (ft)		151			273			34			81	176
Internal Link Dist (ft)		745			1346			47			879	
Turn Bay Length (ft)												50
Base Capacity (vph)		1971			2427			552			518	727
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		0.61			0.52			0.07			0.17	0.42

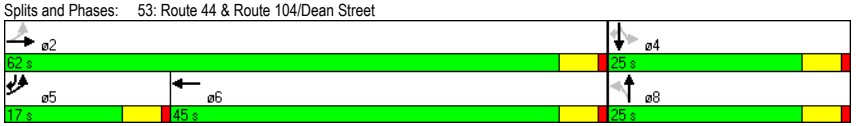
Intersection Summary	
Area Type:	Other

Lanes, Volumes, Timings
53: Route 44 & Route 104/Dean Street

2030 Build Condition - PM Peak Hour

Cycle Length: 87
Actuated Cycle Length: 61.5
Natural Cycle: 55
Control Type: Actuated-Uncoordinated

Splits and Phases: 53: Route 44 & Route 104/Dean Street

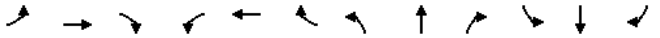


HCM Signalized Intersection Capacity Analysis
53: Route 44 & Route 104/Dean Street

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	142	1022	0	0	1038	15	15	10	5	65	15	286
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	12	12	12	12	16
Total Lost time (s)		5.0			5.0			5.0			5.0	5.0
Lane Util. Factor		0.95			0.95			1.00			1.00	1.00
Frt		1.00			1.00			0.98			1.00	0.85
Flt Protected		0.99			1.00			0.98			0.96	1.00
Satd. Flow (prot)		3518			3530			1810			1826	1794
Flt Permitted		0.58			1.00			0.80			0.74	1.00
Satd. Flow (perm)		2056			3530			1480			1403	1794
Peak-hour factor, PHF	0.97	0.97	0.97	0.84	0.84	0.84	0.75	0.75	0.75	0.93	0.93	0.93
Adj. Flow (vph)	146	1054	0	0	1236	18	20	13	7	70	16	308
RTOR Reduction (vph)	0	0	0	0	1	0	0	6	0	0	0	22
Lane Group Flow (vph)	0	1200	0	0	1253	0	0	34	0	0	86	286
Heavy Vehicles (%)	2%	2%	0%	0%	2%	6%	0%	0%	0%	0%	0%	2%
Turn Type	pm+pt						Perm			Perm		pm+ov
Protected Phases	5	2			6			8			4	5
Permitted Phases	2						8			4		4
Actuated Green, G (s)		45.1			31.5			7.0			7.0	15.6
Effective Green, g (s)		45.1			31.5			7.0			7.0	15.6
Actuated g/C Ratio		0.73			0.51			0.11			0.11	0.25
Clearance Time (s)		5.0			5.0			5.0			5.0	5.0
Vehicle Extension (s)		1.5			1.5			2.0			2.0	1.5
Lane Grp Cap (vph)		1696			1791			167			158	595
v/s Ratio Prot		c0.10			0.36							c0.07
v/s Ratio Perm		c0.42						0.02			0.06	0.09
v/c Ratio		0.71			0.70			0.20			0.54	0.48
Uniform Delay, d1		4.8			11.7			25.0			26.0	19.8
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		1.1			1.0			0.2			2.0	0.2
Delay (s)		5.9			12.7			25.2			28.1	20.0
Level of Service		A			B			C			C	C
Approach Delay (s)		5.9			12.7			25.2			21.8	
Approach LOS		A			B			C			C	

Intersection Summary					
HCM Average Control Delay	11.3	HCM Level of Service	B		
HCM Volume to Capacity ratio	0.69				
Actuated Cycle Length (s)	62.1	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	82.4%	ICU Level of Service	E		
Analysis Period (min)	15				
c Critical Lane Group					



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	219	110	15	251	10	60	370	10	10	350	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	16	12
Right Turn on Red			Yes			No			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		376			382			1581			384	
Travel Time (s)		8.5			8.7			35.9			8.7	
Peak Hour Factor	0.80	0.80	0.80	0.76	0.76	0.76	0.85	0.85	0.85	0.93	0.93	0.93
Heavy Vehicles (%)	2%	2%	1%	0%	1%	0%	0%	2%	0%	0%	1%	3%
Parking (#/hr)											0	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	462	0	0	363	0	0	518	0	0	419	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0
Total Split (%)	29.7%	29.7%	0.0%	29.7%	29.7%	0.0%	29.7%	29.7%	0.0%	29.7%	29.7%	0.0%
Maximum Green (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag							Lead	Lead		Lead	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.69			0.45			0.81			0.57	
Control Delay		24.3			18.1			31.6			20.5	
Queue Delay		0.0			0.0			0.0			0.2	
Total Delay		24.3			18.1			31.6			20.7	
Queue Length 50th (ft)		122			89			153			108	
Queue Length 95th (ft)		#307			192			#435			289	
Internal Link Dist (ft)		296			302			1501			304	
Turn Bay Length (ft)												
Base Capacity (vph)		672			810			641			740	
Starvation Cap Reductn		0			0			0			40	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.69			0.45			0.81			0.60	

Intersection Summary

Lanes, Volumes, Timings
57: Spring Street & Summer Street
2030 Build Condition - PM Peak Hour

Lane Group	ø2
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Parking (#/hr)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	15.0
Minimum Split (s)	21.0
Total Split (s)	41.0
Total Split (%)	41%
Maximum Green (s)	35.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	8.0
Pedestrian Calls (#/hr)	12
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

Lanes, Volumes, Timings
57: Spring Street & Summer Street

2030 Build Condition - PM Peak Hour

Area Type: Other
Cycle Length: 101
Actuated Cycle Length: 64.2
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 57: Spring Street & Summer Street

HCM Signalized Intersection Capacity Analysis
57: Spring Street & Summer Street

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	219	110	15	251	10	60	370	10	10	350	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	12	12	12	12	12	16	12
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.96			1.00			1.00			0.99	
Flt Protected		0.99			1.00			0.99			1.00	
Satd. Flow (prot)		1783			2118			1850			1894	
Flt Permitted		0.93			0.97			0.87			0.98	
Satd. Flow (perm)		1672			2049			1620			1866	
Peak-hour factor, PHF	0.80	0.80	0.80	0.76	0.76	0.76	0.85	0.85	0.85	0.93	0.93	0.93
Adj. Flow (vph)	50	274	138	20	330	13	71	435	12	11	376	32
RTOR Reduction (vph)	0	13	0	0	0	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	449	0	0	363	0	0	517	0	0	416	0
Heavy Vehicles (%)	2%	2%	1%	0%	1%	0%	0%	2%	0%	0%	1%	3%
Parking (#/hr)											0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Actuated Green, G (s)		25.4			25.4			25.4			25.4	
Effective Green, g (s)		25.4			25.4			25.4			25.4	
Actuated g/C Ratio		0.37			0.37			0.37			0.37	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		614			752			595			685	
v/s Ratio Prot												
v/s Ratio Perm		c0.27			0.18			c0.32			0.22	
v/c Ratio		0.73			0.48			0.87			0.61	
Uniform Delay, d1		19.0			16.8			20.4			17.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		7.5			2.2			15.9			4.0	
Delay (s)		26.5			19.1			36.2			21.8	
Level of Service		C			B			D			C	
Approach Delay (s)		26.5			19.1			36.2			21.8	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	69.2	Sum of lost time (s)	18.4
Intersection Capacity Utilization	89.1%	ICU Level of Service	E
Analysis Period (min)	15		

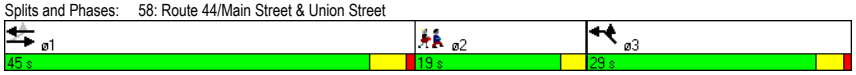
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2	ø2
Lane Configurations												
Volume (vph)	15	482	395	0	512	20	0	0	395	25	15	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	16	12	16	12	12	12	12	16	15	
Right Turn on Red			Yes			Yes		Yes			Yes	
Link Speed (mph)		30			30		30		30			
Link Distance (ft)		913			784		606		384			
Travel Time (s)		20.8			17.8		13.8		8.7			
Peak Hour Factor	0.93	0.93	0.93	0.86	0.86	0.86	0.92	0.92	0.91	0.91	0.91	
Heavy Vehicles (%)	7%	3%	1%	0%	4%	0%	0%	0%	2%	4%	0%	
Parking (#/hr)			0			0						
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	959	0	0	618	0	0	0	434	43	0	
Turn Type	Perm									Prot		
Protected Phases		1			1				3	3		2
Permitted Phases	1											
Detector Phase	1	1			1				3	3		
Switch Phase												
Minimum Initial (s)	15.0	15.0			15.0				5.0	5.0		1.0
Minimum Split (s)	20.0	20.0			20.0				9.0	9.0		19.0
Total Split (s)	45.0	45.0	0.0	0.0	45.0	0.0	0.0	0.0	29.0	29.0	0.0	19.0
Total Split (%)	48.4%	48.4%	0.0%	0.0%	48.4%	0.0%	0.0%	0.0%	31.2%	31.2%	0.0%	20%
Maximum Green (s)	40.0	40.0			40.0				25.0	25.0		16.0
Yellow Time (s)	4.0	4.0			4.0				3.0	3.0		3.0
All-Red Time (s)	1.0	1.0			1.0				1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lead			Lead							Lag
Lead-Lag Optimize?	Yes	Yes			Yes							Yes
Vehicle Extension (s)	3.0	3.0			3.0				3.0	3.0		3.0
Recall Mode	Max	Max			Max				Max	Max		None
Walk Time (s)												7.0
Flash Dont Walk (s)												9.0
Pedestrian Calls (#/hr)												19
v/c Ratio		0.96			0.60				0.79	0.08		
Control Delay		42.8			19.7				40.3	17.3		
Queue Delay		0.0			0.0				0.3	0.0		
Total Delay		42.8			19.7				40.6	17.3		
Queue Length 50th (ft)		341			171				172	8		
Queue Length 95th (ft)		#869			383				#426	38		
Internal Link Dist (ft)		833			704		526		304			
Turn Bay Length (ft)												
Base Capacity (vph)		998			1026				549	565		
Starvation Cap Reductn		0			0				9	0		
Spillback Cap Reductn		0			0				0	0		
Storage Cap Reductn		0			0				0	0		
Reduced v/c Ratio		0.96			0.60				0.80	0.08		

Intersection Summary

Area Type: Other
Cycle Length: 93
Actuated Cycle Length: 81.6
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 58: Route 44/Main Street & Union Street



HCM Signalized Intersection Capacity Analysis
58: Route 44/Main Street & Union Street

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2
Lane Configurations											
Volume (vph)	15	482	395	0	512	20	0	0	395	25	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	16	12	16	12	12	12	12	16	15
Total Lost time (s)		5.0			5.0				4.0	4.0	
Lane Util. Factor		1.00			1.00				1.00	1.00	
Frt		0.94			0.99				1.00	0.85	
Flt Protected		1.00			1.00				0.95	1.00	
Satd. Flow (prot)		1980			2063				1770	1785	
Flt Permitted		0.99			1.00				0.95	1.00	
Satd. Flow (perm)		1956			2063				1770	1785	
Peak-hour factor, PHF	0.93	0.93	0.93	0.86	0.86	0.86	0.92	0.92	0.91	0.91	0.91
Adj. Flow (vph)	16	518	425	0	595	23	0	0	434	27	16
RTOR Reduction (vph)	0	28	0	0	2	0	0	0	0	11	0
Lane Group Flow (vph)	0	931	0	0	616	0	0	0	434	32	0
Heavy Vehicles (%)	7%	3%	1%	0%	4%	0%	0%	0%	2%	4%	0%
Parking (#/hr)			0			0					
Turn Type	Perm									Prot	
Protected Phases		1			1				3	3	
Permitted Phases	1										
Actuated Green, G (s)		40.5			40.5				25.3	25.3	
Effective Green, g (s)		40.5			40.5				25.3	25.3	
Actuated g/C Ratio		0.49			0.49				0.30	0.30	
Clearance Time (s)		5.0			5.0				4.0	4.0	
Vehicle Extension (s)		3.0			3.0				3.0	3.0	
Lane Grp Cap (vph)		950			1002				537	541	
v/s Ratio Prot					0.30				c0.25	0.02	
v/s Ratio Perm		c0.48									
v/c Ratio		0.98			0.62				0.81	0.06	
Uniform Delay, d1		21.1			15.7				26.8	20.6	
Progression Factor		1.00			1.00				1.00	1.00	
Incremental Delay, d2		24.8			2.8				12.4	0.2	
Delay (s)		45.9			18.6				39.2	20.8	
Level of Service		D			B				D	C	
Approach Delay (s)		45.9			18.6		0.0		37.5		
Approach LOS		D			B		A		D		

Intersection Summary			
HCM Average Control Delay	35.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	83.4	Sum of lost time (s)	17.6
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
61: Taunton Green & Broadway

2030 Build Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	168	961	347	0	0	1155	0	202	131	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	10	10	12	12	12
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		304			913			579			302	
Travel Time (s)		6.9			20.8			13.2			6.9	
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.88	0.88	0.88	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	2%	0%	0%	2%	0%	2%	2%	0%	0%	0%
Parking (#/hr)			0			0			0			
Shared Lane Traffic (%)												
Lane Group Flow (vph)	181	1033	373	0	0	1255	0	230	149	0	0	0
Turn Type	Perm		Perm			Free			Perm			
Protected Phases		1						3				
Permitted Phases	1		1			Free			3			
Detector Phase	1	1	1					3	3			
Switch Phase												
Minimum Initial (s)	30.0	30.0	30.0					25.0	25.0			
Minimum Split (s)	35.0	35.0	35.0					30.0	30.0			
Total Split (s)	35.0	35.0	35.0	0.0	0.0	0.0	0.0	30.0	30.0	0.0	0.0	0.0
Total Split (%)	40.7%	40.7%	40.7%	0.0%	0.0%	0.0%	0.0%	34.9%	34.9%	0.0%	0.0%	0.0%
Maximum Green (s)	30.0	30.0	30.0					25.0	25.0			
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0			
All-Red Time (s)	1.0	1.0	1.0					1.0	1.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lead									
Lead-Lag Optimize?	Yes	Yes	Yes									
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0			
Recall Mode	Max	Max	Max					Max	Max			
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.26	0.84	0.46			0.47		0.45	0.30			
Control Delay	7.4	33.2	4.1			0.6		28.5	6.0			
Queue Delay	0.0	0.0	0.0			0.0		0.0	0.0			
Total Delay	7.4	33.2	4.1			0.6		28.5	6.0			
Queue Length 50th (ft)	17	267	0			0		101	0			
Queue Length 95th (ft)	59	#354	51			0		164	40			
Internal Link Dist (ft)		224			833			499			222	
Turn Bay Length (ft)												
Base Capacity (vph)	701	1223	806			2647		506	492			
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	0.26	0.84	0.46			0.47		0.45	0.30			

Intersection Summary

Lane Group	ø2
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Parking (#/hr)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	24%
Maximum Green (s)	17.0
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	2.0
Recall Mode	Ped
Walk Time (s)	10.0
Flash Dont Walk (s)	7.0
Pedestrian Calls (#/hr)	22
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

Area Type: Other
Cycle Length: 86
Actuated Cycle Length: 86
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 61: Taunton Green & Broadway

HCM Signalized Intersection Capacity Analysis
61: Taunton Green & Broadway

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	168	961	347	0	0	1155	0	202	131	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	16	12	12	12	12	10	10	12	12	12
Total Lost time (s)	5.0	5.0	5.0			4.0		5.0	5.0			
Lane Util. Factor	1.00	0.95	1.00			0.88		1.00	1.00			
Frt	1.00	1.00	0.85			0.85		1.00	0.85			
Flt Protected	0.95	1.00	1.00			1.00		1.00	1.00			
Satd. Flow (prot)	1770	3505	1615			2647		1739	1330			
Flt Permitted	0.95	1.00	1.00			1.00		1.00	1.00			
Satd. Flow (perm)	1770	3505	1615			2647		1739	1330			
Peak-hour factor, PHF	0.93	0.93	0.93	0.92	0.92	0.92	0.88	0.88	0.88	0.92	0.92	0.92
Adj. Flow (vph)	181	1033	373	0	0	1255	0	230	149	0	0	0
RTOR Reduction (vph)	83	0	243	0	0	0	0	0	106	0	0	0
Lane Group Flow (vph)	98	1033	130	0	0	1255	0	230	43	0	0	0
Heavy Vehicles (%)	2%	3%	2%	0%	0%	2%	0%	2%	2%	0%	0%	0%
Parking (#/hr)			0			0			0			
Turn Type	Perm		Perm			Free			Perm			
Protected Phases		1						3				
Permitted Phases	1		1			Free			3			
Actuated Green, G (s)	30.0	30.0	30.0			86.0		25.0	25.0			
Effective Green, g (s)	30.0	30.0	30.0			86.0		25.0	25.0			
Actuated g/C Ratio	0.35	0.35	0.35			1.00		0.29	0.29			
Clearance Time (s)	5.0	5.0	5.0					5.0	5.0			
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0			
Lane Grp Cap (vph)	617	1223	563			2647		506	387			
v/s Ratio Prot		c0.29						0.13				
v/s Ratio Perm	0.06		0.08			c0.47			0.03			
v/c Ratio	0.16	0.84	0.23			0.47		0.45	0.11			
Uniform Delay, d1	19.3	25.8	19.8			0.0		24.9	22.4			
Progression Factor	0.92	0.98	0.87			1.00		1.00	1.00			
Incremental Delay, d2	0.5	7.2	1.0			0.6		2.9	0.6			
Delay (s)	18.3	32.5	18.3			0.6		27.9	22.9			
Level of Service	B	C	B			A		C	C			
Approach Delay (s)		27.5			0.6			25.9			0.0	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
71: Court Street & Washington Street

2030 Build Condition - PM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2
Lane Configurations							
Volume (vph)	457	21	578	289	52	694	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	14	10	9	12	12	
Storage Length (ft)	0	50		0	0		
Storage Lanes	1	1		1	1		
Taper Length (ft)	25	25		25	25		
Right Turn on Red		Yes		Yes			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1051		260			584	
Travel Time (s)	23.9		5.9			13.3	
Peak Hour Factor	0.94	0.94	0.92	0.92	0.95	0.95	
Heavy Vehicles (%)	3%	0%	1%	2%	8%	1%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	486	22	628	314	55	731	
Turn Type		Perm		Perm	Perm		
Protected Phases	3		1			1	2
Permitted Phases		3		1	1		
Minimum Split (s)	10.0	10.0	15.0	15.0	15.0	15.0	17.0
Total Split (s)	25.0	25.0	55.0	55.0	55.0	55.0	17.0
Total Split (%)	25.8%	25.8%	56.7%	56.7%	56.7%	56.7%	18%
Maximum Green (s)	20.0	20.0	50.0	50.0	50.0	50.0	15.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag			Lead	Lead	Lead	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes	Yes
Walk Time (s)							7.0
Flash Dont Walk (s)							8.0
Pedestrian Calls (#/hr)							21
v/c Ratio	1.30	0.06	0.69	0.35	0.24	0.75	
Control Delay	188.2	25.6	22.8	2.7	16.5	24.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	188.2	25.6	22.8	2.7	16.5	24.8	
Queue Length 50th (ft)	~387	8	279	0	18	340	
Queue Length 95th (ft)	#581	29	410	40	45	495	
Internal Link Dist (ft)	971		180			504	
Turn Bay Length (ft)		50					
Base Capacity (vph)	373	360	905	887	230	970	
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	1.30	0.06	0.69	0.35	0.24	0.75	

Intersection Summary	
Area Type:	Other
Cycle Length: 97	
Actuated Cycle Length: 97	

Offset: 0 (0%), Referenced to phase 2:Ped and 6:, Start of Green
Natural Cycle: 90
Control Type: Pretimed
~ 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.

Splits and Phases: 71: Court Street & Washington Street

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	457	21	578	289	52	694
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	14	10	9	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1811	1723	1756	1425	1671	1881
Flt Permitted	0.95	1.00	1.00	1.00	0.25	1.00
Satd. Flow (perm)	1811	1723	1756	1425	447	1881
Peak-hour factor, PHF	0.94	0.94	0.92	0.92	0.95	0.95
Adj. Flow (vph)	486	22	628	314	55	731
RTOR Reduction (vph)	0	5	0	152	0	0
Lane Group Flow (vph)	486	17	628	162	55	731
Heavy Vehicles (%)	3%	0%	1%	2%	8%	1%
Turn Type		Perm		Perm	Perm	
Protected Phases	3		1			1
Permitted Phases		3		1	1	
Actuated Green, G (s)	20.0	20.0	50.0	50.0	50.0	50.0
Effective Green, g (s)	20.0	20.0	50.0	50.0	50.0	50.0
Actuated g/C Ratio	0.21	0.21	0.52	0.52	0.52	0.52
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	373	355	905	735	230	970
v/s Ratio Prot	c0.27		0.36			c0.39
v/s Ratio Perm		0.01		0.11	0.12	
v/c Ratio	1.30	0.05	0.69	0.22	0.24	0.75
Uniform Delay, d1	38.5	30.9	17.7	12.8	13.0	18.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	154.6	0.3	4.4	0.7	2.4	5.4
Delay (s)	193.1	31.1	22.1	13.5	15.4	24.0
Level of Service	F	C	C	B	B	C
Approach Delay (s)	186.1		19.2			23.4
Approach LOS	F		B			C

Intersection Summary				
HCM Average Control Delay	58.6	HCM Level of Service	E
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	97.0	Sum of lost time (s)	27.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	503	173	118	27	131	37	160	384	61	37	395	513
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	12	16	12	12	12	13	12	12	12	11	12
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		698			192			454			574	
Travel Time (s)		15.9			4.4			10.3			13.0	
Peak Hour Factor	0.97	0.97	0.97	0.81	0.81	0.81	0.94	0.94	0.94	0.88	0.88	0.88
Heavy Vehicles (%)	1%	2%	2%	0%	2%	3%	3%	6%	0%	0%	4%	2%
Shared Lane Traffic (%)	20%											
Lane Group Flow (vph)	415	404	0	0	241	0	0	644	0	0	1074	0
Turn Type	Split			Split			pm+pt			Perm		
Protected Phases	1	1		2	2		3	8			4	
Permitted Phases							8			4		
Detector Phase	1	1		2	2		3	8		4	4	
Switch Phase												
Minimum Initial (s)	18.0	18.0		7.0	7.0		6.0	18.0		18.0	18.0	
Minimum Split (s)	24.0	24.0		12.0	12.0		11.0	24.0		24.0	24.0	
Total Split (s)	41.0	41.0	0.0	17.0	17.0	0.0	20.0	61.0	0.0	41.0	41.0	0.0
Total Split (%)	29.1%	29.1%	0.0%	12.1%	12.1%	0.0%	14.2%	43.3%	0.0%	29.1%	29.1%	0.0%
Maximum Green (s)	35.0	35.0		12.0	12.0		15.0	55.0		35.0	35.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	1.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	5.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lead	Lead		Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.86	0.88			1.24			2.15dl			0.92	
Control Delay	62.5	64.7			186.2			61.0			42.9	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	62.5	64.7			186.2			61.0			42.9	
Queue Length 50th (ft)	378	361			~291			293			415	
Queue Length 95th (ft)	#603	#593			#417			#425			#507	
Internal Link Dist (ft)		618			112			374			494	
Turn Bay Length (ft)												
Base Capacity (vph)	552	520			195			842			1167	
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	0.75	0.78			1.24			0.76			0.92	

Intersection Summary	
Area Type:	Other

Lane Group	ø5
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	5
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	3.0
Minimum Split (s)	22.0
Total Split (s)	22.0
Total Split (%)	16%
Maximum Green (s)	17.0
Yellow Time (s)	4.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	10.0
Pedestrian Calls (#/hr)	22
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	

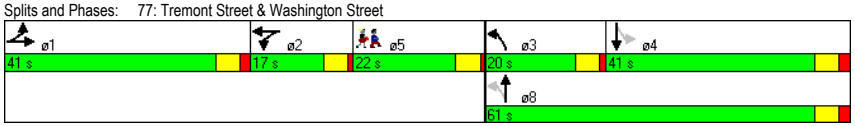
Intersection Summary

Lanes, Volumes, Timings
77: Tremont Street & Washington Street

2030 Build Condition - PM Peak Hour

Cycle Length: 141
Actuated Cycle Length: 120.2
Natural Cycle: 135
Control Type: Actuated-Uncoordinated
~ 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 77: Tremont Street & Washington Street



HCM Signalized Intersection Capacity Analysis
77: Tremont Street & Washington Street

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	503	173	118	27	131	37	160	384	61	37	395	513
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	12	16	12	12	12	13	12	12	12	11	12
Total Lost time (s)	6.0	6.0			5.0			6.0			6.0	
Lane Util. Factor	0.95	0.95			1.00			0.95			0.95	
Frt	1.00	0.95			0.97			0.98			0.92	
Flt Protected	0.95	0.99			0.99			0.99			1.00	
Satd. Flow (prot)	1811	1672			1804			3355			3113	
Flt Permitted	0.95	0.99			0.99			0.51			0.87	
Satd. Flow (perm)	1811	1672			1804			1746			2704	
Peak-hour factor, PHF	0.97	0.97	0.97	0.81	0.81	0.81	0.94	0.94	0.94	0.88	0.88	0.88
Adj. Flow (vph)	519	178	122	33	162	46	170	409	65	42	449	583
RTOR Reduction (vph)	0	11	0	0	6	0	0	6	0	0	125	0
Lane Group Flow (vph)	415	393	0	0	235	0	0	638	0	0	949	0
Heavy Vehicles (%)	1%	2%	2%	0%	2%	3%	3%	6%	0%	0%	4%	2%
Turn Type	Split			Split			pm+pt			Perm		
Protected Phases	1	1		2	2		3	8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	32.1	32.1			12.6			46.3			46.3	
Effective Green, g (s)	32.1	32.1			12.6			46.3			46.3	
Actuated g/C Ratio	0.26	0.26			0.10			0.38			0.38	
Clearance Time (s)	6.0	6.0			5.0			6.0			6.0	
Vehicle Extension (s)	2.0	2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)	477	441			187			664			1028	
v/s Ratio Prot	0.23	c0.23			c0.13							
v/s Ratio Perm								c0.37			0.35	
v/c Ratio	0.87	0.89			1.26			2.15dl			0.92	
Uniform Delay, d1	42.9	43.2			54.6			36.9			36.0	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	15.3	19.2			150.9			25.3			13.0	
Delay (s)	58.2	62.4			205.5			62.1			49.1	
Level of Service	E	E			F			E			D	
Approach Delay (s)		60.3			205.5			62.1			49.1	
Approach LOS		E			F			E			D	

Intersection Summary				
HCM Average Control Delay	69.0	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.98			
Actuated Cycle Length (s)	121.8	Sum of lost time (s)	30.8	
Intersection Capacity Utilization	97.6%	ICU Level of Service	F	
Analysis Period (min)	15			

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

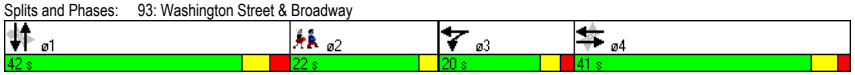
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	285	147	5	35	146	5	5	505	61	20	505	395
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		0	0		0	0		50
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			No			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1068			1376			92			2042	
Travel Time (s)		24.3			31.3			2.1			46.4	
Confl. Peds. (#/hr)										5		
Peak Hour Factor	0.92	0.92	0.92	0.84	0.84	0.84	0.98	0.98	0.98	0.95	0.95	0.95
Heavy Vehicles (%)	3%	2%	0%	3%	3%	50%	29%	4%	15%	9%	4%	3%
Parking (#/hr)									2			
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	475	0	0	222	0	0	582	0	0	553	416
Turn Type	Perm			pm+pt			Perm			Perm		Perm
Protected Phases		4		3	3 4			1			1	
Permitted Phases	4			3 4			1			1		1
Detector Phase	4	4		3	3 4		1	1		1	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0		4.0			18.0	18.0		18.0	18.0	18.0
Minimum Split (s)	14.0	14.0		9.0			25.0	25.0		25.0	25.0	25.0
Total Split (s)	41.0	41.0	0.0	20.0	61.0	0.0	42.0	42.0	0.0	42.0	42.0	42.0
Total Split (%)	32.8%	32.8%	0.0%	16.0%	48.8%	0.0%	33.6%	33.6%	0.0%	33.6%	33.6%	33.6%
Maximum Green (s)	35.0	35.0		15.0			35.0	35.0		35.0	35.0	35.0
Yellow Time (s)	4.0	4.0		3.0			4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0			3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	7.0	7.0	4.0	7.0	7.0	7.0
Lead/Lag	Lag	Lag		Lead			Lead	Lead		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0		2.0			3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None			Max	Max		Max	Max	Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		1.03			0.30			0.59			0.96	0.81
Control Delay		86.5			19.3			35.1			67.7	49.7
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay		86.5			19.3			35.1			67.7	49.7
Queue Length 50th (ft)		288			72			151			326	229
Queue Length 95th (ft)		#676			156			285			#739	#532
Internal Link Dist (ft)		988			1296			12			1962	
Turn Bay Length (ft)												50
Base Capacity (vph)		463			791			980			574	513
Starvation Cap Reductn		0			0			0			0	0
Spillback Cap Reductn		0			0			0			0	0

Lane Group	ø2
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Parking (#/hr)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	22.0
Total Split (s)	22.0
Total Split (%)	18%
Maximum Green (s)	19.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	17
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0			0	0
Reduced v/c Ratio		1.03			0.28			0.59			0.96	0.81

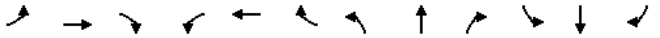
Intersection Summary
Area Type: Other
Cycle Length: 125
Actuated Cycle Length: 108.5
Natural Cycle: 110
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 93: Washington Street & Broadway



Lane Group	ø2
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	285	147	5	35	146	5	5	505	61	20	505	395
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		6.0			5.0			7.0			7.0	7.0
Lane Util. Factor		1.00			1.00			0.95			1.00	1.00
Frpb, ped/bikes		1.00			1.00			1.00			1.00	1.00
Flpb, ped/bikes		1.00			1.00			1.00			1.00	1.00
Frt		1.00			1.00			0.98			1.00	0.85
Flt Protected		0.97			0.99			1.00			1.00	1.00
Satd. Flow (prot)		2029			1799			3369			1820	1568
Flt Permitted		0.68			0.90			0.88			0.96	1.00
Satd. Flow (perm)		1415			1626			2974			1754	1568
Peak-hour factor, PHF	0.92	0.92	0.92	0.84	0.84	0.84	0.98	0.98	0.98	0.95	0.95	0.95
Adj. Flow (vph)	310	160	5	42	174	6	5	515	62	21	532	416
RTOR Reduction (vph)	0	0	0	0	0	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	475	0	0	222	0	0	575	0	0	553	416
Confl. Peds. (#/hr)										5		
Heavy Vehicles (%)	3%	2%	0%	3%	3%	50%	29%	4%	15%	9%	4%	3%
Parking (#/hr)									2			
Turn Type	Perm			pm+pt			Perm			Perm		Perm
Protected Phases		4		3	3 4			1			1	
Permitted Phases	4			3 4			1			1		1
Actuated Green, G (s)		35.5			47.1			35.5			35.5	35.5
Effective Green, g (s)		35.5			47.1			35.5			35.5	35.5
Actuated g/C Ratio		0.32			0.43			0.32			0.32	0.32
Clearance Time (s)		6.0						7.0			7.0	7.0
Vehicle Extension (s)		4.0						3.0			3.0	3.0
Lane Grp Cap (vph)		456			713			958			565	505
v/s Ratio Prot					c0.03							
v/s Ratio Perm		c0.34			0.10			0.19			c0.32	0.27
v/c Ratio		1.04			0.31			0.60			0.98	0.82
Uniform Delay, d1		37.4			20.8			31.4			37.0	34.5
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		53.4			0.1			2.8			33.0	14.1
Delay (s)		90.8			20.9			34.2			70.0	48.6
Level of Service		F			C			C			E	D
Approach Delay (s)		90.8			20.9			34.2			60.8	
Approach LOS		F			C			C			E	

Intersection Summary			
HCM Average Control Delay	56.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	110.2	Sum of lost time (s)	27.6
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
65: Taunton Station driveway & Arlington Street

2030 Build Condition - PM Peak Hour

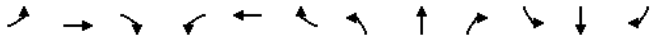
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	29	7	105	13	10	456
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	8	114	14	11	496
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			728			
pX, platoon unblocked						
vC, conflicting volume	639	121			128	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	639	121			128	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	99			99	
cM capacity (veh/h)	437	930			1458	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	32	8	128	507
Volume Left	32	0	0	11
Volume Right	0	8	14	0
cSH	437	930	1700	1458
Volume to Capacity	0.07	0.01	0.08	0.01
Queue Length 95th (ft)	6	1	0	1
Control Delay (s)	13.9	8.9	0.0	0.2
Lane LOS	B	A		A
Approach Delay (s)	12.9		0.0	0.2
Approach LOS	B			

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		41.2%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
66: Cohannet Street & Taunton Green

2030 Build Condition - PM Peak Hour



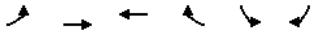
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	288	31	0	0	0	0	0	420	822	451	112
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.99	0.99	0.99	0.94	0.94	0.94
Hourly flow rate (vph)	0	310	33	0	0	0	0	0	424	874	480	119
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			Raised	
Median storage veh)											1	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2500	2713	539	2417	2348	0	599			424		
vC1, stage 1 conf vol	2288	2288		0	0							
vC2, stage 2 conf vol	212	424		2417	2348							
vCu, unblocked vol	2500	2713	539	2417	2348	0	599			424		
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 %	100	0	94	0	100	100	100			23		
cM capacity (veh/h)	7	5	540	0	14	1085	988			1135		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2	SB 3
Volume Total	310	33	424	437	437	599
Volume Left	0	0	0	437	437	0
Volume Right	0	33	424	0	0	119
cSH	5	540	1700	1135	1135	1700
Volume to Capacity	65.39	0.06	0.25	0.77	0.77	0.35
Queue Length 95th (ft)	Err	5	0	202	202	0
Control Delay (s)	Err	12.1	0.0	17.9	17.9	0.0
Lane LOS	F	B		C	C	
Approach Delay (s)	9028.5		0.0	10.6		
Approach LOS	F					

Intersection Summary			
Average Delay		1389.1	
Intersection Capacity Utilization		74.6%	ICU Level of Service D
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
67: Post Office Square & Broadway

2030 Build Condition - PM Peak Hour



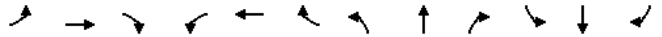
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	0	959	555	0	547
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.95	0.95	0.89	0.89
Hourly flow rate (vph)	0	0	1009	584	0	615
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			302			
pX, platoon unblocked						
vC, conflicting volume	1009				1009	505
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1009				1009	505
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	0
cM capacity (veh/h)	682				240	513

Direction, Lane #	WB 1	WB 2	WB 3	SB 1
Volume Total	505	505	584	615
Volume Left	0	0	0	0
Volume Right	0	0	584	615
cSH	1700	1700	1700	513
Volume to Capacity	0.30	0.30	0.34	1.20
Queue Length 95th (ft)	0	0	0	571
Control Delay (s)	0.0	0.0	0.0	132.9
Lane LOS				F
Approach Delay (s)	0.0			132.9
Approach LOS				F

Intersection Summary			
Average Delay		37.0	
Intersection Capacity Utilization		67.0%	ICU Level of Service C
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
70: Post Office Square & Court Street

2030 Build Condition - PM Peak Hour



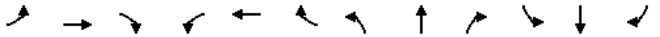
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	26	955	126	388	0	0	0	0	388	21
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.92	0.92	0.92	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	30	1027	135	417	0	0	0	0	431	23
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					565							
pX, platoon unblocked												
vC, conflicting volume	135			30			2428	2189	0	2204	2219	135
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	135			30			2428	2189	0	2204	2219	135
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			35			0	100	100	100	0	97
cM capacity (veh/h)	1461			1583			0	16	1091	15	15	919

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1
Volume Total	30	685	478	417	454
Volume Left	0	685	342	0	0
Volume Right	30	0	0	417	23
cSH	1700	1583	1583	1700	16
Volume to Capacity	0.02	0.65	0.65	0.25	28.24
Queue Length 95th (ft)	0	129	129	0	Err
Control Delay (s)	0.0	11.4	10.4	0.0	Err
Lane LOS		B	B		F
Approach Delay (s)	0.0	8.1			9999.0
Approach LOS					F

Intersection Summary			
Average Delay		2207.5	
Intersection Capacity Utilization		64.8%	ICU Level of Service C
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
75: Frederick Martin Parkway & Washington Street

2030 Build Condition - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	5	98	0	173	5	705	323	241	878	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Hourly flow rate (vph)	0	0	10	108	0	190	5	758	347	256	934	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								574			260	
pX, platoon unblocked	0.71	0.71	0.70	0.71	0.71	0.99	0.70			0.99		
vC, conflicting volume	2027	2563	934	2399	2389	553	934			1105		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2191	2947	696	2716	2702	528	696			1087		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	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 %	100	100	96	0	100	62	99			60		
cM capacity (veh/h)	8	6	274	5	9	495	640			637		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	10	108	190	384	726	256	934
Volume Left	0	108	0	5	0	256	0
Volume Right	10	0	190	0	347	0	0
cSH	274	5	495	640	1700	637	1700
Volume to Capacity	0.04	23.02	0.38	0.01	0.43	0.40	0.55
Queue Length 95th (ft)	3	Err	45	1	0	48	0
Control Delay (s)	18.7	Err	16.7	0.3	0.0	14.4	0.0
Lane LOS	C	F	C	A		B	
Approach Delay (s)	18.7	3626.6		0.1		3.1	
Approach LOS	C	F					

Intersection Summary				
Average Delay	415.5			
Intersection Capacity Utilization	98.3%	ICU Level of Service	F	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
78: Kilmer Street & Oak Street

2030 Build Condition - PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	90	21	26	225	387	89
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.72	0.72	0.91	0.91
Hourly flow rate (vph)	114	27	36	312	425	98
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	859	474	523			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	859	474	523			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	64	95	97			
cM capacity (veh/h)	314	588	1043			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	141	349	523
Volume Left	114	36	0
Volume Right	27	0	98
cSH	345	1043	1700
Volume to Capacity	0.41	0.03	0.31
Queue Length 95th (ft)	48	3	0
Control Delay (s)	22.4	1.2	0.0
Lane LOS	C	A	
Approach Delay (s)	22.4	1.2	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
87: Purchase Street & School Street

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	65	333	20	5	97	5	30	90	41	21	135	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.72	0.72	0.72	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	69	354	21	7	135	7	37	110	50	26	165	79
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	142			376			817	659	365	760	666	138
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	142			376			817	659	365	760	666	138
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 %	95			99			78	70	93	88	54	91
cM capacity (veh/h)	1441			1194			166	363	685	222	360	910

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	445	149	196	270
Volume Left	69	7	37	26
Volume Right	21	7	50	79
cSH	1441	1194	330	408
Volume to Capacity	0.05	0.01	0.60	0.66
Queue Length 95th (ft)	4	0	91	115
Control Delay (s)	1.6	0.4	30.8	29.4
Lane LOS	A	A	D	D
Approach Delay (s)	1.6	0.4	30.8	29.4
Approach LOS			D	D

Intersection Summary					
Average Delay			13.9		
Intersection Capacity Utilization			50.8%	ICU Level of Service	A
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis
88: Purchase Street & Washington Street

2030 Build Condition - PM Peak Hour

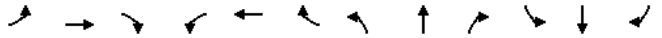
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	76	50	241	110	5	40	90	37	5	90	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.81	0.81	0.81	0.88	0.88	0.88	0.77	0.77	0.77
Hourly flow rate (vph)	11	81	53	298	136	6	45	102	42	6	117	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	142			134			928	866	107	956	889	139
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	142			134			928	866	107	956	889	139
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			79			64	56	96	95	48	99
cM capacity (veh/h)	1453			1444			125	230	944	127	224	915

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	145	440	190	130
Volume Left	11	298	45	6
Volume Right	53	6	42	6
cSH	1453	1444	223	224
Volume to Capacity	0.01	0.21	0.85	0.58
Queue Length 95th (ft)	1	19	166	81
Control Delay (s)	0.6	6.1	73.4	41.1
Lane LOS	A	A	F	E
Approach Delay (s)	0.6	6.1	73.4	41.1
Approach LOS			F	E

Intersection Summary					
Average Delay			24.4		
Intersection Capacity Utilization			52.9%	ICU Level of Service	A
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis
89: Winter Street & School Street

2030 Build Condition - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	250	15	180	400	25	25	45	85	25	66	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.72	0.72	0.72	0.85	0.85	0.85	0.78	0.78	0.78	0.88	0.88	0.88
Hourly flow rate (vph)	7	347	21	212	471	29	32	58	109	28	75	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	500			368			1335	1295	358	1418	1291	485
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	500			368			1335	1295	358	1418	1291	485
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			82			47	57	84	48	44	97
cM capacity (veh/h)	1075			1196			61	134	682	55	134	586

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	375	712	199	120
Volume Left	7	212	32	28
Volume Right	21	29	109	17
cSH	1075	1196	178	109
Volume to Capacity	0.01	0.18	1.12	1.11
Queue Length 95th (ft)	0	16	250	187
Control Delay (s)	0.2	4.1	155.4	193.0
Lane LOS	A	A	F	F
Approach Delay (s)	0.2	4.1	155.4	193.0
Approach LOS			F	F

Intersection Summary				
Average Delay	40.6			
Intersection Capacity Utilization	67.7%	ICU Level of Service		C
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
100: Downtown Taunton Station driveway & Oak Street

2030 Build Condition - PM Peak Hour

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Volume (veh/h)	35	127	478	22	60	481
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	138	520	24	65	523
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						801
pX, platoon unblocked	0.77					
vC, conflicting volume	1185	532			543	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1090	532			543	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	78	75			94	
cM capacity (veh/h)	171	548			1025	

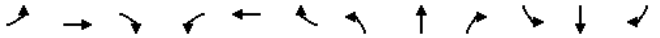
Direction, Lane #	NW 1	NE 1	SW 1
Volume Total	176	543	588
Volume Left	38	0	65
Volume Right	138	24	0
cSH	372	1700	1025
Volume to Capacity	0.47	0.32	0.06
Queue Length 95th (ft)	61	0	5
Control Delay (s)	23.1	0.0	1.7
Lane LOS	C		A
Approach Delay (s)	23.1	0.0	1.7
Approach LOS	C		

Intersection Summary				
Average Delay	3.9			
Intersection Capacity Utilization	74.9%	ICU Level of Service		D
Analysis Period (min)	15			

Norton

HCM Unsignalized Intersection Capacity Analysis
1: Route 123 & N. Worcester Street

2030 Build Condition - AM Peak Hour



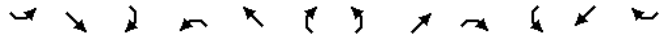
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	355	180	52	310	50	198	128	132	70	65	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.81	0.81	0.81	0.79	0.79	0.79	0.67	0.67	0.67
Hourly flow rate (vph)	16	390	198	64	383	62	251	162	167	104	97	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	444			588			1127	1095	489	1312	1163	414
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	444			588			1127	1095	489	1312	1163	414
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.6	4.1	3.4
p0 queue free %	98			94			0	17	71	0	44	98
cM capacity (veh/h)	1060			997			94	194	573	26	174	624

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	604	509	580	216
Volume Left	16	64	251	104
Volume Right	198	62	167	15
cSH	1060	997	153	47
Volume to Capacity	0.02	0.06	3.79	4.60
Queue Length 95th (ft)	1	5	Err	Err
Control Delay (s)	0.4	1.8	Err	Err
Lane LOS	A	A	F	F
Approach Delay (s)	0.4	1.8	Err	Err
Approach LOS			F	F

Intersection Summary				
Average Delay	4170.3			
Intersection Capacity Utilization	83.1%	ICU Level of Service	E	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
2: S Worcester St & S. Worcerster Street

2030 Build Condition - AM Peak Hour



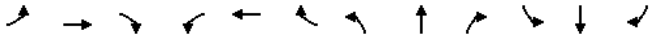
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	130	225	0	0	360	75	0	0	5	10	0	109
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.56	0.56	0.56	0.69	0.69	0.69
Hourly flow rate (vph)	144	250	0	0	400	83	0	0	9	14	0	158
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	483			250			1139	1022	250	989	981	442
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	483			250			1139	1022	250	989	981	442
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.3	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.7	4.0	3.3
p0 queue free %	87			100			100	100	99	92	100	74
cM capacity (veh/h)	1074			1327			120	206	794	184	218	616

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	394	483	9	172
Volume Left	144	0	0	14
Volume Right	0	83	9	158
cSH	1074	1327	794	514
Volume to Capacity	0.13	0.00	0.01	0.34
Queue Length 95th (ft)	12	0	1	37
Control Delay (s)	4.1	0.0	9.6	15.5
Lane LOS	A		A	C
Approach Delay (s)	4.1	0.0	9.6	15.5
Approach LOS			A	C

Intersection Summary				
Average Delay	4.1			
Intersection Capacity Utilization	66.5%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
9: John B. Scott Blvd & Harvey Street

2030 Build Condition - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	185	5	5	220	0	15	0	10	5	0	5
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.75	0.75	0.75	0.69	0.69	0.69
Hourly flow rate (vph)	0	201	5	5	232	0	20	0	13	7	0	7

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	207	237	33	14
Volume Left (vph)	0	5	20	7
Volume Right (vph)	5	0	13	7
Hadj (s)	0.11	0.06	0.32	0.23
Departure Headway (s)	4.4	4.3	5.2	5.2
Degree Utilization, x	0.25	0.28	0.05	0.02
Capacity (veh/h)	803	811	629	628
Control Delay (s)	8.9	9.0	8.5	8.3
Approach Delay (s)	8.9	9.0	8.5	8.3
Approach LOS	A	A	A	A

Intersection Summary				
Delay			8.9	
HCM Level of Service			A	
Intersection Capacity Utilization			25.6%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
14: Barrows St & S. Worcester St

2030 Build Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	65	85	254	76	35	140
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.72	0.72	0.72	0.72	0.70	0.70
Hourly flow rate (vph)	90	118	353	106	50	200
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	706	406			458	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	706	406			458	
tC, single (s)	6.5	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	76	82			96	
cM capacity (veh/h)	376	641			1113	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	208	458	250
Volume Left	90	0	50
Volume Right	118	106	0
cSH	491	1700	1113
Volume to Capacity	0.42	0.27	0.04
Queue Length 95th (ft)	52	0	4
Control Delay (s)	17.6	0.0	2.0
Lane LOS	C		A
Approach Delay (s)	17.6	0.0	2.0
Approach LOS	C		

Intersection Summary				
Average Delay			4.6	
Intersection Capacity Utilization			46.1%	ICU Level of Service A
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
15: Barrowsville Station driveway & S. Worcester St

2030 Build Condition - AM Peak Hour

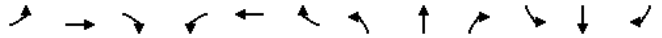
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	74	17	83	172	86	119
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	80	18	90	187	93	129
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	526	158	223			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	526	158	223			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	83	98	93			
cM capacity (veh/h)	478	887	1346			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	99	277	223
Volume Left	80	90	0
Volume Right	18	0	129
cSH	523	1346	1700
Volume to Capacity	0.19	0.07	0.13
Queue Length 95th (ft)	17	5	0
Control Delay (s)	13.5	3.0	0.0
Lane LOS	B	A	
Approach Delay (s)	13.5	3.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	40.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: John B. Scott Blvd & Dean Stret

2030 Build Condition - AM Peak Hour



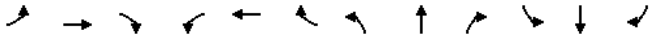
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	170	20	5	165	36	60	212	5	17	50	0
Peak Hour Factor	0.86	0.86	0.86	0.75	0.75	0.75	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	198	23	7	220	48	67	236	6	19	56	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	227	275	308	74
Volume Left (vph)	6	7	67	19
Volume Right (vph)	23	48	6	0
Hadj (s)	-0.03	0.13	0.13	0.27
Departure Headway (s)	5.5	5.6	5.6	6.2
Degree Utilization, x	0.35	0.42	0.48	0.13
Capacity (veh/h)	605	607	600	505
Control Delay (s)	11.4	12.6	13.6	10.1
Approach Delay (s)	11.4	12.6	13.6	10.1
Approach LOS	B	B	B	B

Intersection Summary			
Delay	12.4		
HCM Level of Service	B		
Intersection Capacity Utilization	38.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: Route 123 & N. Worcester Street

2030 Build Condition - PM Peak Hour



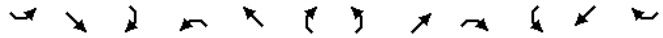
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	295	255	154	425	75	179	74	119	65	159	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.89	0.89	0.89	0.93	0.93	0.93	0.88	0.88	0.88
Hourly flow rate (vph)	15	304	263	173	478	84	192	80	128	74	181	23
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	562			567			1445	1374	436	1500	1464	520
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	562			567			1445	1374	436	1500	1464	520
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			83			0	33	79	0	0	96
cM capacity (veh/h)	1020			1010			0	119	623	33	106	549

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	582	735	400	277
Volume Left	15	173	192	74
Volume Right	263	84	128	23
cSH	1020	1010	0	69
Volume to Capacity	0.02	0.17	Err	4.02
Queue Length 95th (ft)	1	15	Err	Err
Control Delay (s)	0.4	4.0	Err	Err
Lane LOS	A	A	F	F
Approach Delay (s)	0.4	4.0	Err	Err
Approach LOS			F	F

Intersection Summary				
Average Delay			Err	
Intersection Capacity Utilization			114.5%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
2: S Worcester St & S. Worcerster Street

2030 Build Condition - PM Peak Hour



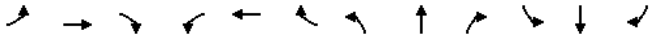
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	96	475	5	5	250	35	0	0	5	40	0	152
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.88	0.88	0.88	0.44	0.44	0.44	0.80	0.80	0.80
Hourly flow rate (vph)	105	522	5	6	284	40	0	0	11	50	0	190
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	324			527			1241	1071	525	1062	1054	304
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	324			527			1241	1071	525	1062	1054	304
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 %	92			99			100	100	98	73	100	74
cM capacity (veh/h)	1247			1050			106	203	557	183	207	738

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	633	330	11	240
Volume Left	105	6	0	50
Volume Right	5	40	11	190
cSH	1247	1050	557	452
Volume to Capacity	0.08	0.01	0.02	0.53
Queue Length 95th (ft)	7	0	2	76
Control Delay (s)	2.2	0.2	11.6	21.6
Lane LOS	A	A	B	C
Approach Delay (s)	2.2	0.2	11.6	21.6
Approach LOS			B	C

Intersection Summary				
Average Delay			5.6	
Intersection Capacity Utilization			74.4%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
9: John B. Scott Blvd & Harvey Street

2030 Build Condition - PM Peak Hour



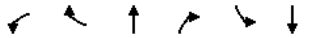
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	310	15	10	190	0	5	5	5	0	0	5
Peak Hour Factor	0.87	0.87	0.87	0.88	0.88	0.88	0.75	0.75	0.75	0.42	0.42	0.42
Hourly flow rate (vph)	6	356	17	11	216	0	7	7	7	0	0	12

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	379	227	20	12
Volume Left (vph)	6	11	7	0
Volume Right (vph)	17	0	7	12
Hadj (s)	0.00	0.04	-0.02	-0.60
Departure Headway (s)	4.2	4.4	5.2	4.6
Degree Utilization, x	0.44	0.28	0.03	0.02
Capacity (veh/h)	841	794	613	674
Control Delay (s)	10.5	9.1	8.4	7.7
Approach Delay (s)	10.5	9.1	8.4	7.7
Approach LOS	B	A	A	A

Intersection Summary				
Delay			9.9	
HCM Level of Service			A	
Intersection Capacity Utilization			30.7%	ICU Level of Service
Analysis Period (min)			15	A

HCM Unsignalized Intersection Capacity Analysis
14: Barrows St & S. Worcester St

2030 Build Condition - PM Peak Hour



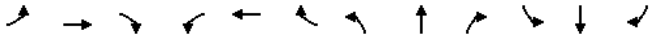
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	121	55	172	78	45	161
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.86	0.86	0.79	0.79
Hourly flow rate (vph)	142	65	200	91	57	204
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	563	245			291	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	563	245			291	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	70	92			96	
cM capacity (veh/h)	467	789			1283	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	207	291	261
Volume Left	142	0	57
Volume Right	65	91	0
cSH	536	1700	1283
Volume to Capacity	0.39	0.17	0.04
Queue Length 95th (ft)	45	0	3
Control Delay (s)	15.9	0.0	2.0
Lane LOS	C		A
Approach Delay (s)	15.9	0.0	2.0
Approach LOS	C		

Intersection Summary				
Average Delay			5.0	
Intersection Capacity Utilization			44.8%	ICU Level of Service
Analysis Period (min)			15	A

HCM Unsignalized Intersection Capacity Analysis
16: John B. Scott Blvd & Dean Stret

2030 Build Condition - PM Peak Hour



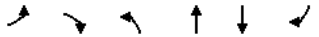
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	200	95	15	165	19	35	75	10	23	155	5
Peak Hour Factor	0.86	0.86	0.86	0.88	0.88	0.88	0.86	0.86	0.86	0.96	0.96	0.96
Hourly flow rate (vph)	6	233	110	17	188	22	41	87	12	24	161	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	349	226	140	191
Volume Left (vph)	6	17	41	24
Volume Right (vph)	110	22	12	5
Hadj (s)	-0.16	-0.02	0.04	0.02
Departure Headway (s)	5.1	5.4	5.8	5.7
Degree Utilization, x	0.49	0.34	0.23	0.30
Capacity (veh/h)	667	616	539	565
Control Delay (s)	12.9	11.2	10.5	11.2
Approach Delay (s)	12.9	11.2	10.5	11.2
Approach LOS	B	B	B	B

Intersection Summary				
Delay			11.7	
HCM Level of Service			B	
Intersection Capacity Utilization			37.6%	ICU Level of Service
Analysis Period (min)			15	A

HCM Unsignalized Intersection Capacity Analysis
24: Barrowsville Station driveway & S. Worcester St

2030 Build Condition - PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	90	38	14	146	250	33
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	41	15	159	272	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	479	290	308			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	479	290	308			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	82	94	99			
cM capacity (veh/h)	539	749	1253			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	139	174	308
Volume Left	98	15	0
Volume Right	41	0	36
cSH	588	1253	1700
Volume to Capacity	0.24	0.01	0.18
Queue Length 95th (ft)	23	1	0
Control Delay (s)	13.0	0.8	0.0
Lane LOS	B	A	
Approach Delay (s)	13.0	0.8	0.0
Approach LOS	B		

Intersection Summary				
Average Delay			3.1	
Intersection Capacity Utilization			33.3%	ICU Level of Service
Analysis Period (min)			15	A

Raynham

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	237	25	40	15	45	177	45	1328	5	50	521	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12	12	11	12	12	11	12
Storage Length (ft)	250		70	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			737			2001			1020	
Travel Time (s)		5.7			16.8			45.5			23.2	
Peak Hour Factor	0.84	0.84	0.84	0.92	0.92	0.92	0.95	0.95	0.95	0.88	0.88	0.88
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	7%	7%	7%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	282	78	0	0	257	0	0	1450	0	0	707	0
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	16.0		16.0	16.0	
Total Split (s)	32.0	32.0	0.0	32.0	32.0	0.0	11.0	43.0	0.0	32.0	32.0	0.0
Total Split (%)	42.7%	42.7%	0.0%	42.7%	42.7%	0.0%	14.7%	57.3%	0.0%	42.7%	42.7%	0.0%
Maximum Green (s)	26.0	26.0		26.0	26.0		5.0	37.0		26.0	26.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	C-Min		C-Min	C-Min	
v/c Ratio	0.93	0.14			0.48			0.88			0.61	
Control Delay	62.4	9.2			21.7			25.1			15.4	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	62.4	9.2			21.7			25.1			15.4	
Queue Length 50th (ft)	119	9			82			314			117	
Queue Length 95th (ft)	#220	32			144			#491			173	
Internal Link Dist (ft)		171			657			1921			940	
Turn Bay Length (ft)	250											
Base Capacity (vph)	348	623			610			1643			1167	
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	0.81	0.13			0.42			0.88			0.61	

Intersection Summary	
Area Type:	Other

Cycle Length: 75
Actuated Cycle Length: 75
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 12: Carver Street & Route 138

HCM Signalized Intersection Capacity Analysis
12: Carver Street & Route 138

2030 Build Condition- AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	237	25	40	15	45	177	45	1328	5	50	521	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	13	12	12	11	12	12	11	12
Total Lost time (s)	6.0	6.0			6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.91			0.90			1.00			0.99	
Flt Protected	0.95	1.00			1.00			1.00			1.00	
Satd. Flow (prot)	1787	1708			1742			3381			3208	
Flt Permitted	0.53	1.00			0.98			0.90			0.67	
Satd. Flow (perm)	1002	1708			1716			3062			2161	
Peak-hour factor, PHF	0.84	0.84	0.84	0.92	0.92	0.92	0.95	0.95	0.95	0.88	0.88	0.88
Adj. Flow (vph)	282	30	48	16	49	192	47	1398	5	57	592	58
RTOR Reduction (vph)	0	33	0	0	16	0	0	0	0	0	6	0
Lane Group Flow (vph)	282	45	0	0	241	0	0	1450	0	0	701	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	7%	7%	7%
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.7	22.7			22.7			40.3			40.3	
Effective Green, g (s)	22.7	22.7			22.7			40.3			40.3	
Actuated g/C Ratio	0.30	0.30			0.30			0.54			0.54	
Clearance Time (s)	6.0	6.0			6.0			6.0			6.0	
Vehicle Extension (s)	2.0	2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)	303	517			519			1645			1161	
v/s Ratio Prot		0.03										
v/s Ratio Perm	c0.28				0.14			c0.47			0.32	
v/c Ratio	0.93	0.09			0.46			0.88			0.60	
Uniform Delay, d1	25.4	18.7			21.2			15.2			11.9	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	33.6	0.0			0.2			5.7			2.3	
Delay (s)	59.0	18.7			21.5			21.0			14.2	
Level of Service	E	B			C			C			B	
Approach Delay (s)		50.2			21.5			21.0			14.2	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	23.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	102.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
14: I-495 SB Off-Ramp & Route 138

2030 Build Condition- AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	273	0	175	0	0	0	0	1526	230	70	442	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	16	14	16	16	16	12	12	16	10	12	12
Storage Length (ft)	0		500	0		0	0		0	200		0
Storage Lanes	1		1	0		0	0		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1388			1423			507			722	
Travel Time (s)		31.5			32.3			11.5			16.4	
Peak Hour Factor	0.77	0.77	0.77	0.92	0.92	0.92	0.25	0.96	0.96	0.79	0.79	0.25
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	0%	3%	3%	8%	8%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	355	0	227	0	0	0	0	1830	0	89	559	0
Turn Type	Prot		Free							Prot		
Protected Phases	4							2		1	6	
Permitted Phases			Free									
Detector Phase	4							2		1	6	
Switch Phase												
Minimum Initial (s)	10.0							10.0		5.0	10.0	
Minimum Split (s)	22.0							22.0		12.0	23.0	
Total Split (s)	25.0	0.0	0.0	0.0	0.0	0.0	0.0	57.0	0.0	13.0	70.0	0.0
Total Split (%)	26.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	60.0%	0.0%	13.7%	73.7%	0.0%
Maximum Green (s)	19.0							51.0		6.0	63.0	
Yellow Time (s)	4.0							4.0		5.0	5.0	
All-Red Time (s)	2.0							2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0	4.0	7.0	7.0	4.0
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Recall Mode	None							C-Max		None	C-Max	
v/c Ratio	0.99		0.14					0.99		0.90	0.25	
Control Delay	83.8		0.2					42.0		117.1	1.2	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay	83.8		0.2					42.0		117.1	1.2	
Queue Length 50th (ft)	215		0					544		53	3	
Queue Length 95th (ft)	#304		0					#742		m#113	4	
Internal Link Dist (ft)		1308			1343			427			642	
Turn Bay Length (ft)			500							200		
Base Capacity (vph)	360		1610					1844		99	2217	
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	0.99		0.14					0.99		0.90	0.25	

Intersection Summary	
Area Type:	Other

Cycle Length: 95
Actuated Cycle Length: 95
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: I-495 SB Off-Ramp & Route 138

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	273	0	175	0	0	0	0	1526	230	70	442	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	16	14	16	16	16	12	12	16	10	12	12
Total Lost time (s)	6.0		4.0					6.0		7.0	7.0	
Lane Util. Factor	1.00		1.00					0.95		1.00	0.95	
Frt	1.00		0.85					0.98		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1799		1610					3436		1560	3343	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1799		1610					3436		1560	3343	
Peak-hour factor, PHF	0.77	0.77	0.77	0.92	0.92	0.92	0.25	0.96	0.96	0.79	0.79	0.25
Adj. Flow (vph)	355	0	227	0	0	0	0	1590	240	89	559	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	355	0	227	0	0	0	0	1830	0	89	559	0
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	0%	3%	3%	8%	8%	0%
Turn Type	Prot		Free							Prot		
Protected Phases	4							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	19.0		95.0					51.0		6.0	63.0	
Effective Green, g (s)	19.0		95.0					51.0		6.0	63.0	
Actuated g/C Ratio	0.20		1.00					0.54		0.06	0.66	
Clearance Time (s)	6.0							6.0		7.0	7.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	360		1610					1845		99	2217	
v/s Ratio Prot	c0.20							c0.53		c0.06	0.17	
v/s Ratio Perm			0.14									
v/c Ratio	0.99		0.14					0.99		0.90	0.25	
Uniform Delay, d1	37.9		0.0					21.8		44.2	6.5	
Progression Factor	1.00		1.00					1.00		1.30	0.16	
Incremental Delay, d2	43.3		0.2					19.1		52.3	0.2	
Delay (s)	81.2		0.2					40.9		109.7	1.2	
Level of Service	F		A					D		F	A	
Approach Delay (s)		49.6			0.0			40.9			16.1	
Approach LOS		D			A			D			B	

Intersection Summary			
HCM Average Control Delay	37.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	110	0	212	335	1449	0	0	387	271
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	10	12	12	12	12	16
Storage Length (ft)	0		0	0		300	225		0	0		0
Storage Lanes	0		0	1		1	1		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1384			1299			722			1195	
Travel Time (s)		31.5			29.5			16.4			27.2	
Peak Hour Factor	0.25	0.25	0.25	0.91	0.91	0.91	0.91	0.91	0.25	0.25	0.80	0.80
Heavy Vehicles (%)	0%	0%	0%	4%	4%	4%	3%	3%	0%	0%	9%	9%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	121	0	233	368	1592	0	0	823	0
Turn Type				Prot		Free	Prot					
Protected Phases				3			5	2			6	
Permitted Phases						Free						
Detector Phase				3			5	2			6	
Switch Phase												
Minimum Initial (s)				5.0			5.0	10.0			10.0	
Minimum Split (s)				22.0			12.0	23.0			22.0	
Total Split (s)	0.0	0.0	0.0	24.0	0.0	0.0	41.0	71.0	0.0	0.0	30.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	25.3%	0.0%	0.0%	43.2%	74.7%	0.0%	0.0%	31.6%	0.0%
Maximum Green (s)				18.0			34.0	64.0			24.0	
Yellow Time (s)				4.0			5.0	5.0			4.0	
All-Red Time (s)				2.0			2.0	2.0			2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	6.0	4.0	4.0	7.0	7.0	4.0	4.0	6.0	4.0
Lead/Lag							Lag				Lead	
Lead-Lag Optimize?							Yes				Yes	
Vehicle Extension (s)				3.0			3.0	3.0			3.0	
Recall Mode				None			None	C-Min			C-Min	
v/c Ratio				0.53		0.13	0.81	0.61			0.65	
Control Delay				47.1		0.2	27.9	5.5			35.9	
Queue Delay				0.0		0.0	0.0	0.1			0.0	
Total Delay				47.1		0.2	27.9	5.6			35.9	
Queue Length 50th (ft)				70		0	175	183			247	
Queue Length 95th (ft)				120		0	m136	m150			m#296	
Internal Link Dist (ft)		1304			1219			642			1115	
Turn Bay Length (ft)						300	225					
Base Capacity (vph)				373		1760	586	2616			1257	
Starvation Cap Reductn				0		0	0	202			0	
Spillback Cap Reductn				0		0	0	0			0	
Storage Cap Reductn				0		0	0	0			0	
Reduced v/c Ratio				0.32		0.13	0.63	0.66			0.65	

Intersection Summary	
Area Type:	Other

Cycle Length: 95
Actuated Cycle Length: 95
Offset: 93 (98%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: I-495 NB On-Ramp & Route 138

HCM Signalized Intersection Capacity Analysis
15: I-495 NB On-Ramp & Route 138

2030 Build Condition- AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	110	0	212	335	1449	0	0	387	271
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	10	12	12	12	12	16
Total Lost time (s)				6.0		4.0	7.0	7.0			6.0	
Lane Util. Factor				1.00		1.00	1.00	0.95			0.95	
Frt				1.00		0.85	1.00	1.00			0.94	
Flt Protected				0.95		1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1967		1760	1636	3505			3107	
Flt Permitted				0.95		1.00	0.95	1.00			1.00	
Satd. Flow (perm)				1967		1760	1636	3505			3107	
Peak-hour factor, PHF	0.25	0.25	0.25	0.91	0.91	0.91	0.91	0.91	0.25	0.25	0.80	0.80
Adj. Flow (vph)	0	0	0	121	0	233	368	1592	0	0	484	339
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	121	0	233	368	1592	0	0	823	0
Heavy Vehicles (%)	0%	0%	0%	4%	4%	4%	3%	3%	0%	0%	9%	9%
Turn Type				Prot		Free	Prot					
Protected Phases				3			5	2			6	
Permitted Phases						Free						
Actuated Green, G (s)				11.1		95.0	26.5	70.9			38.4	
Effective Green, g (s)				11.1		95.0	26.5	70.9			38.4	
Actuated g/C Ratio				0.12		1.00	0.28	0.75			0.40	
Clearance Time (s)				6.0			7.0	7.0			6.0	
Vehicle Extension (s)				3.0			3.0	3.0			3.0	
Lane Grp Cap (vph)				230		1760	456	2616			1256	
v/s Ratio Prot				c0.06			c0.22	c0.45			0.26	
v/s Ratio Perm						0.13						
v/c Ratio				0.53		0.13	0.81	0.61			0.66	
Uniform Delay, d1				39.5		0.0	31.9	5.6			22.9	
Progression Factor				1.00		1.00	0.77	0.84			1.34	
Incremental Delay, d2				2.2		0.2	2.8	0.3			2.2	
Delay (s)				41.6		0.2	27.2	5.0			32.8	
Level of Service				D		A	C	A			C	
Approach Delay (s)		0.0			14.3			9.2			32.8	
Approach LOS		A			B			A			C	

Intersection Summary				
HCM Average Control Delay	15.9	HCM Level of Service		B
HCM Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	95.0	Sum of lost time (s)		20.0
Intersection Capacity Utilization	84.6%	ICU Level of Service		E
Analysis Period (min)	15			
c Critical Lane Group				

Lanes, Volumes, Timings
23: Center Street & Route 138

2030 Build Condition- AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	0	171	0	1203	40	90	481	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	14	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		60	0		200	200		0
Storage Lanes	0		0	0		1	0		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			No			No			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		129			915			1524			2001	
Travel Time (s)		2.9			20.8			34.6			45.5	
Peak Hour Factor	0.92	0.92	0.92	0.90	0.92	0.90	0.92	0.93	0.93	0.86	0.86	0.92
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	4%	4%	8%	8%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	22	190	0	1337	0	0	664	0
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0	20.0	20.0	20.0		9.0	20.0	
Total Split (s)	20.0	20.0	0.0	20.0	20.0	20.0	31.0	31.0	0.0	9.0	40.0	0.0
Total Split (%)	33.3%	33.3%	0.0%	33.3%	33.3%	33.3%	51.7%	51.7%	0.0%	15.0%	66.7%	0.0%
Maximum Green (s)	15.0	15.0		15.0	15.0	15.0	26.0	26.0		4.0	35.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max		None	Max	
v/c Ratio					0.08	0.60		0.62			0.50	
Control Delay					18.3	29.0		8.8			8.2	
Queue Delay					0.0	0.0		0.0			0.0	
Total Delay					18.3	29.0		8.8			8.2	
Queue Length 50th (ft)					6	59		127			56	
Queue Length 95th (ft)					21	113		212			99	
Internal Link Dist (ft)		49			835			1444			1921	
Turn Bay Length (ft)						60						
Base Capacity (vph)					361	406		2162			1323	
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					0.06	0.47		0.62			0.50	

Intersection Summary	
Area Type:	Other

Lanes, Volumes, Timings
23: Center Street & Route 138

2030 Build Condition- AM Peak Hour

Cycle Length: 60
Actuated Cycle Length: 58
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 23: Center Street & Route 138

HCM Signalized Intersection Capacity Analysis
23: Center Street & Route 138

2030 Build Condition- AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	0	171	0	1203	40	90	481	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	14	12	12	12	12	12	12	12	12
Total Lost time (s)					5.0	5.0		5.0			5.0	
Lane Util. Factor					1.00	1.00		0.95			0.95	
Frt					1.00	0.85		1.00			1.00	
Flt Protected					0.95	1.00		1.00			0.99	
Satd. Flow (prot)					1752	1568		3454			3316	
Flt Permitted					0.76	1.00		1.00			0.63	
Satd. Flow (perm)					1397	1568		3454			2111	
Peak-hour factor, PHF	0.92	0.92	0.92	0.90	0.92	0.90	0.92	0.93	0.93	0.86	0.86	0.92
Adj. Flow (vph)	0	0	0	22	0	190	0	1294	43	105	559	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	22	190	0	1337	0	0	664	0
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	4%	4%	8%	8%	2%
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)					11.7	11.7		36.3			36.3	
Effective Green, g (s)					11.7	11.7		36.3			36.3	
Actuated g/C Ratio					0.20	0.20		0.63			0.63	
Clearance Time (s)					5.0	5.0		5.0			5.0	
Vehicle Extension (s)					3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)					282	316		2162			1321	
v/s Ratio Prot								c0.39				
v/s Ratio Perm					0.02	c0.12					0.31	
v/c Ratio					0.08	0.60		0.62			0.50	
Uniform Delay, d1					18.8	21.0		6.6			5.9	
Progression Factor					1.00	1.00		1.00			1.00	
Incremental Delay, d2					0.1	3.2		1.3			0.3	
Delay (s)					18.9	24.2		8.0			6.2	
Level of Service					B	C		A			A	
Approach Delay (s)		0.0			23.7			8.0			6.2	
Approach LOS		A			C			A			A	

Intersection Summary				
HCM Average Control Delay	8.9	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	58.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	66.3%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	20	25	225	5	87	5	1276	205	44	358	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	160		0	0		0	0		205
Storage Lanes	0		0	1		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		820			1216			1195			808	
Travel Time (s)		18.6			27.6			27.2			18.4	
Confl. Peds. (#/hr)			1	1								
Peak Hour Factor	0.83	0.83	0.83	0.69	0.69	0.69	0.94	0.94	0.94	0.82	0.82	0.82
Heavy Vehicles (%)	2%	2%	2%	7%	7%	7%	3%	3%	3%	13%	13%	13%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	103	0	326	133	0	0	1580	0	0	521	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		30.0	30.0		30.0	30.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		35.0	35.0		35.0	35.0	
Total Split (s)	14.0	14.0	0.0	12.0	26.0	0.0	69.0	69.0	0.0	69.0	69.0	0.0
Total Split (%)	14.7%	14.7%	0.0%	12.6%	27.4%	0.0%	72.6%	72.6%	0.0%	72.6%	72.6%	0.0%
Maximum Green (s)	9.0	9.0		7.0	21.0		64.0	64.0		64.0	64.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lead	Lead		Lag								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	
v/c Ratio		0.76		0.95	0.35			0.75			0.38	
Control Delay		77.4		76.8	34.0			8.8			8.5	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		77.4		76.8	34.0			8.8			8.5	
Queue Length 50th (ft)		62		~209	69			213			63	
Queue Length 95th (ft)		#136		#255	92			178			79	
Internal Link Dist (ft)		740			1136			1115			728	
Turn Bay Length (ft)				160								
Base Capacity (vph)		135		344	380			2205			1429	
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		0.76		0.95	0.35			0.72			0.36	

Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 28 (29%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
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.

Splits and Phases: 36: Elm Street & Route 138

HCM Signalized Intersection Capacity Analysis
36: Elm Street & Route 138

2030 Build Condition- AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	20	25	225	5	87	5	1276	205	44	358	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.96		1.00	0.86			0.98			0.99	
Flt Protected		0.98		0.95	1.00			1.00			0.99	
Satd. Flow (prot)		1798		1686	1523			3432			3151	
Flt Permitted		0.73		0.67	1.00			0.95			0.67	
Satd. Flow (perm)		1338		1189	1523			3274			2122	
Peak-hour factor, PHF	0.83	0.83	0.83	0.69	0.69	0.69	0.94	0.94	0.94	0.82	0.82	0.82
Adj. Flow (vph)	49	24	30	326	7	126	5	1357	218	54	437	30
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	103	0	326	133	0	0	1580	0	0	521	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	2%	2%	2%	7%	7%	7%	3%	3%	3%	13%	13%	13%
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.6		23.7	23.7			61.3			61.3	
Effective Green, g (s)		9.6		23.7	23.7			61.3			61.3	
Actuated g/C Ratio		0.10		0.25	0.25			0.65			0.65	
Clearance Time (s)		5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0			4.0			4.0	
Lane Grp Cap (vph)		135		344	380			2113			1369	
v/s Ratio Prot				c0.09	0.09							
v/s Ratio Perm		0.08		c0.15				c0.48			0.25	
v/c Ratio		0.76		0.95	0.35			0.75			0.38	
Uniform Delay, d1		41.6		35.6	29.3			11.6			7.9	
Progression Factor		1.00		1.00	1.00			0.59			1.00	
Incremental Delay, d2		22.2		34.7	0.6			2.1			0.8	
Delay (s)		63.8		70.3	29.9			8.9			8.7	
Level of Service		E		E	C			A			A	
Approach Delay (s)		63.8			58.6			8.9			8.7	
Approach LOS		E			E			A			A	

Intersection Summary			
HCM Average Control Delay	19.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
44: Route 106 & Route 138

2030 Build Condition- AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	365	40	202	355	165	64	772	384	85	182	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1742			2236			4525			923	
Travel Time (s)		39.6			50.8			102.8			21.0	
Confl. Peds. (#/hr)			3									
Peak Hour Factor	0.88	0.88	0.88	0.89	0.89	0.89	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	3%	3%	3%	9%	9%	9%	3%	3%	3%	10%	10%	10%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	562	0	0	811	0	0	1326	0	0	405	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Detector Phase	2	2		2	2		1	1		1	1	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0		13.0	13.0	
Total Split (s)	35.0	35.0	0.0	35.0	35.0	0.0	35.0	35.0	0.0	35.0	35.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lead		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
v/c Ratio		0.59			0.88			0.96			0.51	
Control Delay		17.9			29.8			35.6			13.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		17.9			29.8			35.6			13.0	
Queue Length 50th (ft)		90			148			260			44	
Queue Length 95th (ft)		134			#257			#416			84	
Internal Link Dist (ft)		1662			2156			4445			843	
Turn Bay Length (ft)												
Base Capacity (vph)		982			945			1381			793	
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		0.57			0.86			0.96			0.51	

Intersection Summary	
Area Type:	Other
Cycle Length: 70	
Actuated Cycle Length: 69.3	
Natural Cycle: 55	

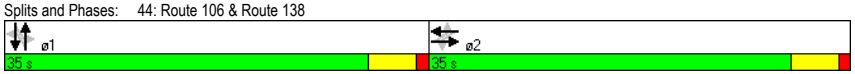
Lanes, Volumes, Timings
44: Route 106 & Route 138

2030 Build Condition- AM Peak Hour

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 44: Route 106 & Route 138



HCM Signalized Intersection Capacity Analysis
44: Route 106 & Route 138

2030 Build Condition- AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	365	40	202	355	165	64	772	384	85	182	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.97			0.95			0.96	
Flt Protected		0.99			0.99			1.00			0.99	
Satd. Flow (prot)		3425			3154			3331			3104	
Flt Permitted		0.65			0.65			0.90			0.54	
Satd. Flow (perm)		2245			2092			3013			1687	
Peak-hour factor, PHF	0.88	0.88	0.88	0.89	0.89	0.89	0.92	0.92	0.92	0.93	0.93	0.93
Adj. Flow (vph)	102	415	45	227	399	185	70	839	417	91	196	118
RTOR Reduction (vph)	0	9	0	0	40	0	0	76	0	0	64	0
Lane Group Flow (vph)	0	553	0	0	771	0	0	1250	0	0	341	0
Confl. Peds. (#/hr)			3									
Heavy Vehicles (%)	3%	3%	3%	9%	9%	9%	3%	3%	3%	10%	10%	10%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		29.3			29.3			30.0			30.0	
Effective Green, g (s)		29.3			29.3			30.0			30.0	
Actuated g/C Ratio		0.42			0.42			0.43			0.43	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		949			884			1304			730	
v/s Ratio Prot												
v/s Ratio Perm		0.25			c0.37			c0.41			0.20	
v/c Ratio		0.58			0.87			0.96			0.47	
Uniform Delay, d1		15.3			18.3			19.0			14.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.1			9.7			16.0			0.6	
Delay (s)		16.4			28.0			35.0			14.6	
Level of Service		B			C			D			B	
Approach Delay (s)		16.4			28.0			35.0			14.6	
Approach LOS		B			C			D			B	

Intersection Summary				
HCM Average Control Delay	27.2	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	69.3	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	98.1%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
11: Robinson St & Route 138

2030 Build Condition- AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	20	1431	0	5	355
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.56	0.56	0.91	0.91	0.79	0.79
Hourly flow rate (vph)	0	36	1573	0	6	449
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2035	1573			1573	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2035	1573			1573	
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	74			99	
cM capacity (veh/h)	62	137			425	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	36	1573	456
Volume Left	0	0	6
Volume Right	36	0	0
cSH	137	1700	425
Volume to Capacity	0.26	0.93	0.01
Queue Length 95th (ft)	24	0	1
Control Delay (s)	40.2	0.0	0.5
Lane LOS	E		A
Approach Delay (s)	40.2	0.0	0.5
Approach LOS	E		

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization		85.3%	ICU Level of Service E
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
17: Dog Track driveway & Route 138

2030 Build Condition- AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	35	40	211	1240	360	49
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.68	0.68	0.91	0.91	0.79	0.79
Hourly flow rate (vph)	51	59	232	1363	456	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2313	487	518			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2313	487	518			
tC, single (s)	7.1	6.7	4.2			
tC, 2 stage (s)						
tF (s)	4.2	3.8	2.3			
p0 queue free %	0	88	77			
cM capacity (veh/h)	19	495	1004			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	110	1595	518
Volume Left	51	232	0
Volume Right	59	0	62
cSH	40	1004	1700
Volume to Capacity	2.78	0.23	0.30
Queue Length 95th (ft)	306	22	0
Control Delay (s)	1022.0	9.7	0.0
Lane LOS	F	A	
Approach Delay (s)	1022.0	9.7	0.0
Approach LOS	F		

Intersection Summary			
Average Delay		57.6	
Intersection Capacity Utilization		113.2%	ICU Level of Service H
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
24: Britton Street & Route 138

2030 Build Condition- AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	30	25	1218	20	5	491
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.57	0.57	0.88	0.88	0.96	0.96
Hourly flow rate (vph)	53	44	1384	23	5	511
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1917	1395			1407	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1917	1395			1407	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	29	75			99	
cM capacity (veh/h)	74	175			470	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	96	1407	517
Volume Left	53	0	5
Volume Right	44	23	0
cSH	101	1700	470
Volume to Capacity	0.96	0.83	0.01
Queue Length 95th (ft)	144	0	1
Control Delay (s)	156.4	0.0	0.3
Lane LOS	F		A
Approach Delay (s)	156.4	0.0	0.3
Approach LOS	F		

Intersection Summary			
Average Delay		7.6	
Intersection Capacity Utilization		75.3%	ICU Level of Service D
Analysis Period (min)		15	

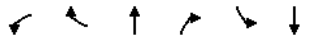
HCM Unsignalized Intersection Capacity Analysis
27: Britton Street & Route 138

2030 Build Condition- AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	34	5	5	1197	500	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	0.89	0.89
Hourly flow rate (vph)	34	5	5	1197	562	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1772	565	569			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1772	565	569			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	63	99	99			
cM capacity (veh/h)	91	524	994			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	39	1202	569
Volume Left	34	5	0
Volume Right	5	0	7
cSH	102	994	1700
Volume to Capacity	0.38	0.01	0.33
Queue Length 95th (ft)	39	0	0
Control Delay (s)	61.0	0.2	0.0
Lane LOS	F	A	
Approach Delay (s)	61.0	0.2	0.0
Approach LOS	F		

Intersection Summary			
Average Delay		1.4	
Intersection Capacity Utilization		77.0%	ICU Level of Service D
Analysis Period (min)		15	



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	7	1424	5	1	402
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.63	0.94	0.94	0.85	0.85
Hourly flow rate (vph)	8	11	1515	5	1	473
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1993	1518			1520	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1993	1518			1520	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	88	92			100	
cM capacity (veh/h)	67	148			411	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	19	1520	474
Volume Left	8	0	1
Volume Right	11	5	0
cSH	99	1700	411
Volume to Capacity	0.19	0.89	0.00
Queue Length 95th (ft)	17	0	0
Control Delay (s)	50.1	0.0	0.1
Lane LOS	F		A
Approach Delay (s)	50.1	0.0	0.1
Approach LOS	F		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	157	85	100	60	70	40	70	787	45	111	1431	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12	12	11	12	12	11	12
Storage Length (ft)	250		70	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		251			737			2001			1020	
Travel Time (s)		5.7			16.8			45.5			23.2	
Confl. Peds. (#/hr)						5	2					
Peak Hour Factor	0.92	0.92	0.92	0.79	0.79	0.79	0.88	0.88	0.88	0.98	0.98	0.98
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	4%	4%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	171	201	0	0	216	0	0	1025	0	0	1803	0
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	16.0		16.0	16.0	
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	11.0	90.0	0.0	79.0	79.0	0.0
Total Split (%)	25.0%	25.0%	0.0%	25.0%	25.0%	0.0%	9.2%	75.0%	0.0%	65.8%	65.8%	0.0%
Maximum Green (s)	24.0	24.0		24.0	24.0		5.0	84.0		73.0	73.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	Min		Min	Min	
v/c Ratio	0.83	0.51			0.85			0.90dl			1.09	
Control Delay	74.8	35.4			69.9			17.3			70.5	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	74.8	35.4			69.9			17.3			70.5	
Queue Length 50th (ft)	114	95			137			239			~760	
Queue Length 95th (ft)	#261	188			#240			315			#949	
Internal Link Dist (ft)		171			657			1921			940	
Turn Bay Length (ft)	250											
Base Capacity (vph)	214	412			264			1466			1654	
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	0.80	0.49			0.82			0.70			1.09	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 110.2
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
~ 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 12: Carver Street & Route 138

HCM Signalized Intersection Capacity Analysis
12: Carver Street & Route 138

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	157	85	100	60	70	40	70	787	45	111	1431	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	13	12	12	11	12	12	11	12
Total Lost time (s)	6.0	6.0			6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	
Frt	1.00	0.92			0.97			0.99			0.98	
Flt Protected	0.95	1.00			0.98			1.00			1.00	
Satd. Flow (prot)	1787	1728			1823			3317			3345	
Flt Permitted	0.52	1.00			0.63			0.57			0.72	
Satd. Flow (perm)	980	1728			1167			1914			2412	
Peak-hour factor, PHF	0.92	0.92	0.92	0.79	0.79	0.79	0.88	0.88	0.88	0.98	0.98	0.98
Adj. Flow (vph)	171	92	109	76	89	51	80	894	51	113	1460	230
RTOR Reduction (vph)	0	35	0	0	9	0	0	3	0	0	8	0
Lane Group Flow (vph)	171	166	0	0	207	0	0	1022	0	0	1795	0
Confl. Peds. (#/hr)						5	2					
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	4%	4%	4%	2%	2%	2%
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.0	23.0			23.0			75.2			75.2	
Effective Green, g (s)	23.0	23.0			23.0			75.2			75.2	
Actuated g/C Ratio	0.21	0.21			0.21			0.68			0.68	
Clearance Time (s)	6.0	6.0			6.0			6.0			6.0	
Vehicle Extension (s)	2.0	2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)	205	361			244			1306			1646	
v/s Ratio Prot		0.10										
v/s Ratio Perm	0.17				c0.18			0.53			c0.74	
v/c Ratio	0.83	0.46			0.85			0.90dl			1.09	
Uniform Delay, d1	41.8	38.2			41.9			11.9			17.5	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	23.3	0.3			22.0			2.9			51.2	
Delay (s)	65.1	38.5			63.9			14.8			68.7	
Level of Service	E	D			E			B			E	
Approach Delay (s)		50.7			63.9			14.8			68.7	
Approach LOS		D			E			B			E	

Intersection Summary			
HCM Average Control Delay	50.3	HCM Level of Service	D
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	110.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	115.9%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

Lanes, Volumes, Timings
14: I-495 SB Off-Ramp & Route 138

2030 Build Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	223	0	515	0	0	0	0	864	140	139	1272	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	12	12	16	10	12	12
Storage Length (ft)	0		500	0		0	0		0	300		0
Storage Lanes	1		1	0		0	0		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1388			1423			507			722	
Travel Time (s)		31.5			32.3			11.5			16.4	
Peak Hour Factor	0.81	0.81	0.81	0.25	0.25	0.25	0.25	0.95	0.95	0.98	0.98	0.25
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	0%	3%	3%	2%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	275	0	636	0	0	0	0	1056	0	142	1298	0
Turn Type	Prot		Free							Prot		
Protected Phases	4							2		1	6	
Permitted Phases			Free									
Detector Phase	4							2		1	6	
Switch Phase												
Minimum Initial (s)	10.0							10.0		5.0	10.0	
Minimum Split (s)	22.0							22.0		12.0	23.0	
Total Split (s)	23.0	0.0	0.0	0.0	0.0	0.0	0.0	39.0	0.0	18.0	57.0	0.0
Total Split (%)	28.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	48.8%	0.0%	22.5%	71.3%	0.0%
Maximum Green (s)	17.0							33.0		11.0	50.0	
Yellow Time (s)	4.0							4.0		5.0	5.0	
All-Red Time (s)	2.0							2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0	4.0	7.0	7.0	4.0
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Recall Mode	None							C-Min		None	C-Min	
v/c Ratio	0.75		0.36					0.69		0.66	0.56	
Control Delay	43.6		0.6					21.5		42.9	12.3	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay	43.6		0.6					21.5		42.9	12.3	
Queue Length 50th (ft)	128		0					230		79	162	
Queue Length 95th (ft)	181		0					303		m91	m208	
Internal Link Dist (ft)		1308			1343			427			642	
Turn Bay Length (ft)			500							300		
Base Capacity (vph)	418		1760					1531		232	2301	
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	0.66		0.36					0.69		0.61	0.56	

Intersection Summary	
Area Type:	Other

Lanes, Volumes, Timings
14: I-495 SB Off-Ramp & Route 138

2030 Build Condition - PM Peak Hour

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: I-495 SB Off-Ramp & Route 138

HCM Signalized Intersection Capacity Analysis
14: I-495 SB Off-Ramp & Route 138

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	223	0	515	0	0	0	0	864	140	139	1272	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	12	12	16	10	12	12
Total Lost time (s)	6.0		4.0					6.0		7.0	7.0	
Lane Util. Factor	1.00		1.00					0.95		1.00	0.95	
Frt	1.00		0.85					0.98		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1967		1760					3432		1652	3539	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1967		1760					3432		1652	3539	
Peak-hour factor, PHF	0.81	0.81	0.81	0.25	0.25	0.25	0.25	0.95	0.95	0.98	0.98	0.25
Adj. Flow (vph)	275	0	636	0	0	0	0	909	147	142	1298	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	275	0	636	0	0	0	0	1056	0	142	1298	0
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	0%	3%	3%	2%	2%	0%
Turn Type	Prot		Free							Prot		
Protected Phases	4							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	15.0		80.0					35.6		10.4	52.0	
Effective Green, g (s)	15.0		80.0					35.6		10.4	52.0	
Actuated g/C Ratio	0.19		1.00					0.45		0.13	0.65	
Clearance Time (s)	6.0							6.0		7.0	7.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	369		1760					1527		215	2300	
v/s Ratio Prot	c0.14							c0.31		0.09	c0.37	
v/s Ratio Perm			0.36									
v/c Ratio	0.75		0.36					0.69		0.66	0.56	
Uniform Delay, d1	30.7		0.0					17.8		33.1	7.7	
Progression Factor	1.00		1.00					1.00		1.05	1.43	
Incremental Delay, d2	8.0		0.6					2.6		3.5	0.5	
Delay (s)	38.6		0.6					20.4		38.4	11.5	
Level of Service	D		A					C		D	B	
Approach Delay (s)		12.1			0.0			20.4			14.2	
Approach LOS		B			A			C			B	

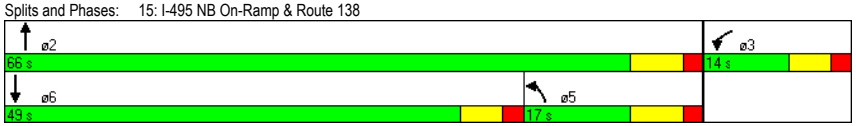
Intersection Summary			
HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	140	0	84	145	917	0	0	1271	278
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	10	12	12	12	12	16
Storage Length (ft)	0		0	0		300	225		0	0		0
Storage Lanes	0		0	1		1	1		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1384			1299			722			1195	
Travel Time (s)		31.5			29.5			16.4			27.2	
Peak Hour Factor	0.25	0.25	0.25	0.78	0.78	0.78	0.92	0.92	0.25	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	3%	3%	3%	4%	4%	0%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	179	0	108	158	997	0	0	1614	0
Turn Type				Prot		Free	Prot					
Protected Phases				3			5	2			6	
Permitted Phases						Free						
Detector Phase				3			5	2			6	
Switch Phase												
Minimum Initial (s)				5.0			5.0	10.0			10.0	
Minimum Split (s)				11.0			12.0	23.0			22.0	
Total Split (s)	0.0	0.0	0.0	14.0	0.0	0.0	17.0	66.0	0.0	0.0	49.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	17.5%	0.0%	0.0%	21.3%	82.5%	0.0%	0.0%	61.3%	0.0%
Maximum Green (s)				8.0			10.0	59.0			43.0	
Yellow Time (s)				4.0			5.0	5.0			4.0	
All-Red Time (s)				2.0			2.0	2.0			2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	6.0	4.0	4.0	7.0	7.0	4.0	4.0	6.0	4.0
Lead/Lag							Lag				Lead	
Lead-Lag Optimize?							Yes				Yes	
Vehicle Extension (s)				3.0			3.0	3.0			3.0	
Recall Mode				None			None	C-Min			C-Min	
v/c Ratio				0.86		0.06	0.80	0.39			0.88	
Control Delay				72.6		0.1	52.7	3.2			22.9	
Queue Delay				0.0		0.0	0.0	0.0			0.0	
Total Delay				72.6		0.1	52.7	3.2			22.9	
Queue Length 50th (ft)				90		0	86	67			426	
Queue Length 95th (ft)				#164		0	m#145	82			m514	
Internal Link Dist (ft)		1304			1219			642			1115	
Turn Bay Length (ft)						300	225					
Base Capacity (vph)				209		1777	203	2560			1851	
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				0.86		0.06	0.78	0.39			0.87	

Intersection Summary	
Area Type:	Other

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 76 (95%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: I-495 NB On-Ramp & Route 138



HCM Signalized Intersection Capacity Analysis
15: I-495 NB On-Ramp & Route 138

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	140	0	84	145	917	0	0	1271	278
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	10	12	12	12	12	16
Total Lost time (s)				6.0		4.0	7.0	7.0			6.0	
Lane Util. Factor				1.00		1.00	1.00	0.95			0.95	
Frt				1.00		0.85	1.00	1.00			0.97	
Flt Protected				0.95		1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1986		1777	1620	3471			3444	
Flt Permitted				0.95		1.00	0.95	1.00			1.00	
Satd. Flow (perm)				1986		1777	1620	3471			3444	
Peak-hour factor, PHF	0.25	0.25	0.25	0.78	0.78	0.78	0.92	0.92	0.25	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	179	0	108	158	997	0	0	1324	290
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	179	0	108	158	997	0	0	1614	0
Heavy Vehicles (%)	0%	0%	0%	3%	3%	3%	4%	4%	0%	2%	2%	2%
Turn Type				Prot		Free	Prot					
Protected Phases				3			5	2			6	
Permitted Phases						Free						
Actuated Green, G (s)				8.4		80.0	9.8	58.6			42.8	
Effective Green, g (s)				8.4		80.0	9.8	58.6			42.8	
Actuated g/C Ratio				0.11		1.00	0.12	0.73			0.53	
Clearance Time (s)				6.0			7.0	7.0			6.0	
Vehicle Extension (s)				3.0			3.0	3.0			3.0	
Lane Grp Cap (vph)				209		1777	198	2543			1843	
v/s Ratio Prot				c0.09			c0.10	0.29			c0.47	
v/s Ratio Perm						0.06						
v/c Ratio				0.86		0.06	0.80	0.39			0.88	
Uniform Delay, d1				35.2		0.0	34.1	4.0			16.3	
Progression Factor				1.00		1.00	0.86	0.72			1.13	
Incremental Delay, d2				27.4		0.1	14.8	0.3			3.9	
Delay (s)				62.6		0.1	44.2	3.2			22.2	
Level of Service				E		A	D	A			C	
Approach Delay (s)		0.0			39.1			8.8			22.2	
Approach LOS		A			D			A			C	

Intersection Summary				
HCM Average Control Delay	18.7	HCM Level of Service		B
HCM Volume to Capacity ratio	0.86			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)		19.0
Intersection Capacity Utilization	75.6%	ICU Level of Service		D
Analysis Period (min)	15			
c Critical Lane Group				

Lanes, Volumes, Timings
23: Center Street & Route 138

2030 Build Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	30	0	113	0	803	40	321	1311	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	14	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		60	0		200	200		0
Storage Lanes	0		0	0		1	0		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			No			No			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		155			915			1524			2001	
Travel Time (s)		3.5			20.8			34.6			45.5	
Peak Hour Factor	0.38	0.38	0.38	0.82	0.82	0.82	0.90	0.90	0.90	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	7%	7%	7%	3%	3%	3%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	37	138	0	936	0	0	1666	0
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0	20.0	20.0	20.0		9.0	20.0	
Total Split (s)	20.0	20.0	0.0	20.0	20.0	20.0	81.0	81.0	0.0	9.0	90.0	0.0
Total Split (%)	18.2%	18.2%	0.0%	18.2%	18.2%	18.2%	73.6%	73.6%	0.0%	8.2%	81.8%	0.0%
Maximum Green (s)	15.0	15.0		15.0	15.0	15.0	76.0	76.0		4.0	85.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max		None	Max	
v/c Ratio					0.22	0.74		0.34			1.00	
Control Delay					46.1	69.4		4.0			34.2	
Queue Delay					0.0	0.0		0.0			0.0	
Total Delay					46.1	69.4		4.0			34.2	
Queue Length 50th (ft)					24	94		88			~554	
Queue Length 95th (ft)					51	146		112			#791	
Internal Link Dist (ft)		75			835			1444			1921	
Turn Bay Length (ft)						60						
Base Capacity (vph)					186	209		2729			1673	
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					0.20	0.66		0.34			1.00	

Intersection Summary	
Area Type:	Other

Lanes, Volumes, Timings
23: Center Street & Route 138

2030 Build Condition - PM Peak Hour

Cycle Length: 110
Actuated Cycle Length: 108.4
Natural Cycle: 110
Control Type: Semi Act-Uncoord
~ 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.

Splits and Phases: 23: Center Street & Route 138

HCM Signalized Intersection Capacity Analysis
23: Center Street & Route 138

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	30	0	113	0	803	40	321	1311	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	14	12	12	12	12	12	12	12	12
Total Lost time (s)					5.0	5.0		5.0			5.0	
Lane Util. Factor					1.00	1.00		0.95			0.95	
Frt					1.00	0.85		0.99			1.00	
Flt Protected					0.95	1.00		1.00			0.99	
Satd. Flow (prot)					1687	1509		3480			3505	
Flt Permitted					0.76	1.00		1.00			0.60	
Satd. Flow (perm)					1345	1509		3480			2133	
Peak-hour factor, PHF	0.38	0.38	0.38	0.82	0.82	0.82	0.90	0.90	0.90	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	37	0	138	0	892	44	328	1338	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	37	138	0	936	0	0	1666	0
Heavy Vehicles (%)	0%	0%	0%	7%	7%	7%	3%	3%	3%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)					13.4	13.4		85.0			85.0	
Effective Green, g (s)					13.4	13.4		85.0			85.0	
Actuated g/C Ratio					0.12	0.12		0.78			0.78	
Clearance Time (s)					5.0	5.0		5.0			5.0	
Vehicle Extension (s)					3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)					166	187		2729			1673	
v/s Ratio Prot								0.27				
v/s Ratio Perm					0.03	c0.09					c0.78	
v/c Ratio					0.22	0.74		0.34			1.00	
Uniform Delay, d1					42.8	45.8		3.5			11.5	
Progression Factor					1.00	1.00		1.00			1.00	
Incremental Delay, d2					0.7	14.1		0.3			20.9	
Delay (s)					43.5	59.9		3.8			32.4	
Level of Service					D	E		A			C	
Approach Delay (s)		0.0			56.4			3.8			32.4	
Approach LOS		A			E			A			C	

Intersection Summary					
HCM Average Control Delay	24.3	HCM Level of Service		C	
HCM Volume to Capacity ratio	0.96				
Actuated Cycle Length (s)	108.4	Sum of lost time (s)		10.0	
Intersection Capacity Utilization	84.9%	ICU Level of Service		E	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	10	40	350	15	28	30	620	325	74	1149	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	160		0	0		0	0		205
Storage Lanes	0		0	1		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		820			1216			1195			808	
Travel Time (s)		18.6			27.6			27.2			18.4	
Peak Hour Factor	0.75	0.75	0.75	0.88	0.88	0.88	0.91	0.91	0.91	0.95	0.95	0.95
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	79	0	398	49	0	0	1071	0	0	1303	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		30.0	30.0		30.0	30.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		35.0	35.0		35.0	35.0	
Total Split (s)	12.0	12.0	0.0	12.0	24.0	0.0	56.0	56.0	0.0	56.0	56.0	0.0
Total Split (%)	15.0%	15.0%	0.0%	15.0%	30.0%	0.0%	70.0%	70.0%	0.0%	70.0%	70.0%	0.0%
Maximum Green (s)	7.0	7.0		7.0	19.0		51.0	51.0		51.0	51.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lead	Lead		Lag								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	
v/c Ratio		0.56		0.95	0.11			0.61			0.77	
Control Delay		51.3		66.2	24.6			6.3			14.8	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		51.3		66.2	24.6			6.3			14.8	
Queue Length 50th (ft)		38		~207	19			77			212	
Queue Length 95th (ft)		68		#381	45			92			287	
Internal Link Dist (ft)		740			1136			1115			728	
Turn Bay Length (ft)				160								
Base Capacity (vph)		146		421	441			1822			1765	
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		0.54		0.95	0.11			0.59			0.74	

Intersection Summary	
Area Type:	Other

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 36 (45%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
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.

Splits and Phases: 36: Elm Street & Route 138

HCM Signalized Intersection Capacity Analysis
36: Elm Street & Route 138

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	10	40	350	15	28	30	620	325	74	1149	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frt		0.91		1.00	0.90			0.95			1.00	
Flt Protected		0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1703		1770	1680			3261			3522	
Flt Permitted		0.93		0.76	1.00			0.87			0.78	
Satd. Flow (perm)		1599		1415	1680			2857			2771	
Peak-hour factor, PHF	0.75	0.75	0.75	0.88	0.88	0.88	0.91	0.91	0.91	0.95	0.95	0.95
Adj. Flow (vph)	13	13	53	398	17	32	33	681	357	78	1209	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	79	0	398	49	0	0	1071	0	0	1303	0
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.9		22.0	22.0			48.0			48.0	
Effective Green, g (s)		5.9		22.0	22.0			48.0			48.0	
Actuated g/C Ratio		0.07		0.28	0.28			0.60			0.60	
Clearance Time (s)		5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0			4.0			4.0	
Lane Grp Cap (vph)		118		438	462			1714			1663	
v/s Ratio Prot				c0.13	0.03							
v/s Ratio Perm		0.05		c0.12				0.37			c0.47	
v/c Ratio		0.67		0.91	0.11			0.62			0.78	
Uniform Delay, d1		36.1		27.5	21.7			10.2			12.1	
Progression Factor		1.00		1.00	1.00			0.50			1.00	
Incremental Delay, d2		13.5		22.3	0.1			1.6			3.8	
Delay (s)		49.6		49.8	21.8			6.7			15.8	
Level of Service		D		D	C			A			B	
Approach Delay (s)		49.6			46.7			6.7			15.8	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	101.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
44: Route 106 & Route 138

2030 Build Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	260	52	429	405	120	89	345	237	145	652	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1742			2236			4525			923	
Travel Time (s)		39.6			50.8			102.8			21.0	
Confl. Peds. (#/hr)												1
Peak Hour Factor	0.79	0.79	0.79	0.94	0.94	0.94	0.89	0.89	1.00	0.94	0.94	0.94
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	5%	5%	5%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	496	0	0	1015	0	0	725	0	0	976	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Detector Phase	2	2		2	2		1	1		1	1	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0		13.0	13.0	
Total Split (s)	35.0	35.0	0.0	35.0	35.0	0.0	35.0	35.0	0.0	35.0	35.0	0.0
Total Split (%)	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lead		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
v/c Ratio		0.56			1.27dl			0.76			1.00	
Control Delay		17.1			83.4			19.5			51.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		17.1			83.4			19.5			51.3	
Queue Length 50th (ft)		75			~264			106			~208	
Queue Length 95th (ft)		99			#382			172			#348	
Internal Link Dist (ft)		1662			2156			4445			843	
Turn Bay Length (ft)												
Base Capacity (vph)		885			922			958			974	
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		0.56			1.10			0.76			1.00	

Intersection Summary	
Area Type:	Other
Cycle Length: 70	
Actuated Cycle Length: 70	
Natural Cycle: 75	

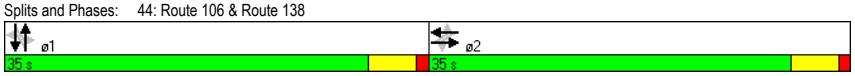
Control Type: Actuated-Uncoordinated

~ 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.

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 44: Route 106 & Route 138



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	260	52	429	405	120	89	345	237	145	652	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.98			0.95			0.98	
Flt Protected		0.99			0.98			0.99			0.99	
Satd. Flow (prot)		3434			3299			3247			3403	
Flt Permitted		0.58			0.63			0.62			0.65	
Satd. Flow (perm)		2024			2116			2040			2232	
Peak-hour factor, PHF	0.79	0.79	0.79	0.94	0.94	0.94	0.89	0.89	1.00	0.94	0.94	0.94
Adj. Flow (vph)	101	329	66	456	431	128	100	388	237	154	694	128
RTOR Reduction (vph)	0	17	0	0	16	0	0	84	0	0	17	0
Lane Group Flow (vph)	0	479	0	0	999	0	0	641	0	0	959	0
Confl. Peds. (#/hr)												1
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	5%	5%	5%	3%	3%	3%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		30.0			30.0			30.0			30.0	
Effective Green, g (s)		30.0			30.0			30.0			30.0	
Actuated g/C Ratio		0.43			0.43			0.43			0.43	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		867			907			874			957	
v/s Ratio Prot												
v/s Ratio Perm		0.24			c0.47			0.31			c0.43	
v/c Ratio		0.55			1.27dl			0.73			1.00	
Uniform Delay, d1		15.0			20.0			16.7			20.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.9			61.6			3.4			29.6	
Delay (s)		15.9			81.6			20.1			49.6	
Level of Service		B			F			C			D	
Approach Delay (s)		15.9			81.6			20.1			49.6	
Approach LOS		B			F			C			D	

Intersection Summary					
HCM Average Control Delay	47.8	HCM Level of Service		D	
HCM Volume to Capacity ratio	1.05				
Actuated Cycle Length (s)	70.0	Sum of lost time (s)		10.0	
Intersection Capacity Utilization	101.1%	ICU Level of Service		G	
Analysis Period (min)	15				

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
10: Robinson Street & Route 138

2030 Build Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	15	544	0	10	1283
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.63	0.63	0.90	0.90	0.91	0.91
Hourly flow rate (vph)	0	24	604	0	11	1410
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2036	604			604	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2036	604			604	
tC, single (s)	6.4	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	100	95			99	
cM capacity (veh/h)	63	487			983	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	24	604	1421
Volume Left	0	0	11
Volume Right	24	0	0
cSH	487	1700	983
Volume to Capacity	0.05	0.36	0.01
Queue Length 95th (ft)	4	0	1
Control Delay (s)	12.8	0.0	0.6
Lane LOS	B		A
Approach Delay (s)	12.8	0.0	0.6
Approach LOS	B		

Intersection Summary				
Average Delay		0.6		
Intersection Capacity Utilization		85.5%	ICU Level of Service	E
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
11: Station driveway & Route 138

2030 Build Condition - PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	57	208	54	605	1085	22
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.68	0.68	0.90	0.90	0.91	0.91
Hourly flow rate (vph)	84	306	60	672	1192	24
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1997	1204	1216			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1997	1204	1216			
tC, single (s)	6.7	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.8	3.3	2.3			
p0 queue free %	0	0	89			
cM capacity (veh/h)	49	226	559			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	390	732	1216
Volume Left	84	60	0
Volume Right	306	0	24
cSH	127	559	1700
Volume to Capacity	3.08	0.11	0.72
Queue Length 95th (ft)	Err	9	0
Control Delay (s)	Err	3.0	0.0
Lane LOS	F	A	
Approach Delay (s)	Err	3.0	0.0
Approach LOS	F		

Intersection Summary				
Average Delay		1667.3		
Intersection Capacity Utilization		99.2%	ICU Level of Service	F
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
24: Britton Street & Route 138

2030 Build Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	35	20	833	30	25	1331
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.75	0.75	0.85	0.85	0.97	0.97
Hourly flow rate (vph)	47	27	980	35	26	1372
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2421	998			1015	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2421	998			1015	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	91			96	
cM capacity (veh/h)	34	296			683	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	73	1015	1398
Volume Left	47	0	26
Volume Right	27	35	0
cSH	51	1700	683
Volume to Capacity	1.45	0.60	0.04
Queue Length 95th (ft)	172	0	3
Control Delay (s)	416.6	0.0	2.2
Lane LOS	F		A
Approach Delay (s)	416.6	0.0	2.2
Approach LOS	F		

Intersection Summary			
Average Delay	13.5		
Intersection Capacity Utilization	100.1%	ICU Level of Service	G
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
27: Britton Street & Route 138

2030 Build Condition - PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	15	5	5	818	1282	48
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.88	0.88	0.96	0.96
Hourly flow rate (vph)	18	6	6	930	1335	50
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2301	1360	1385			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2301	1360	1385			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	57	97	99			
cM capacity (veh/h)	43	183	491			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	935	1385
Volume Left	18	6	0
Volume Right	6	0	50
cSH	53	491	1700
Volume to Capacity	0.46	0.01	0.81
Queue Length 95th (ft)	43	1	0
Control Delay (s)	122.3	0.4	0.0
Lane LOS	F	A	
Approach Delay (s)	122.3	0.4	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
50: Wilbur Street & Route 138

2030 Build Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	5	638	10	20	1263
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.39	0.39	0.97	0.97	0.96	0.96
Hourly flow rate (vph)	13	13	658	10	21	1316
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2020	663			668	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2020	663			668	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	80	97			98	
cM capacity (veh/h)	63	465			922	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	26	668	1336
Volume Left	13	0	21
Volume Right	13	10	0
cSH	111	1700	922
Volume to Capacity	0.23	0.39	0.02
Queue Length 95th (ft)	21	0	2
Control Delay (s)	46.7	0.0	1.0
Lane LOS	E		A
Approach Delay (s)	46.7	0.0	1.0
Approach LOS	E		

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	92.5%	ICU Level of Service	F
Analysis Period (min)	15		

Easton

Lanes, Volumes, Timings
1: Main Street & Rte 138

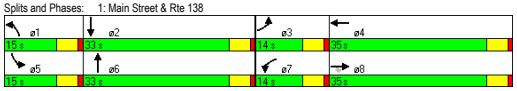
2030 Build Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	415	374	225	45	144	135	123	801	50	73	342	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	11	11	11	12	11	11	12	11	11
Storage Length (ft)	150		230	90		140	140		140	115		150
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			35			40			40	
Link Distance (ft)		1725			3218			4962			2928	
Travel Time (s)		26.1			62.7			84.6			49.9	
Peak Hour Factor	0.89	0.89	0.89	0.88	0.88	0.88	0.92	0.92	0.92	0.88	0.88	0.88
Heavy Vehicles (%)	11%	1%	4%	10%	6%	6%	4%	5%	2%	5%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	466	420	253	51	317	0	134	925	0	83	471	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8									
Detector Phase	3	8	8	7	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	15.0		7.0	15.0	
Minimum Split (s)	12.0	21.0	21.0	12.0	23.0		12.0	23.0		12.0	21.0	
Total Split (s)	14.0	35.0	35.0	14.0	35.0	0.0	15.0	33.0	0.0	15.0	33.0	0.0
Total Split (%)	14.4%	36.1%	36.1%	14.4%	36.1%	0.0%	15.5%	34.0%	0.0%	15.5%	34.0%	0.0%
Maximum Green (s)	9.0	30.0	30.0	9.0	30.0		10.0	28.0		10.0	28.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)					7.0			7.0				
Flash Dont Walk (s)					8.0			8.0				
Pedestrian Calls (#/hr)					0			0				
v/c Ratio	2.52	0.74	0.38	0.33	0.40		0.68	0.80		0.46	0.47	
Control Delay	719.1	37.0	5.3	46.1	14.9		58.2	34.0		48.2	25.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	719.1	37.0	5.3	46.1	14.9		58.2	34.0		48.2	25.2	
Queue Length 50th (ft)	~453	220	0	28	37		73	255		45	105	
Queue Length 95th (ft)	#687	340	52	66	69		#175	#427		95	162	
Internal Link Dist (ft)		1645			3138			4882			2848	
Turn Bay Length (ft)	150		230	90			140			115		
Base Capacity (vph)	185	689	746	180	1253		219	1172		217	1187	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	2.52	0.61	0.34	0.28	0.25		0.61	0.79		0.38	0.40	

Intersection Summary

Area Type: Other
Cycle Length: 97
Actuated Cycle Length: 82.4
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
~ 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.

Splits and Phases: 1: Main Street & Rte 138



HCM Signalized Intersection Capacity Analysis
1: Main Street & Rte 138

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	415	374	225	45	144	135	123	801	50	73	342	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	11	11	11	12	11	11	12	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1626	1818	1553	1586	3054		1736	3300		1719	3305	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1626	1818	1553	1586	3054		1736	3300		1719	3305	
Peak-hour factor, PHF	0.89	0.89	0.89	0.88	0.88	0.88	0.92	0.92	0.92	0.88	0.88	0.88
Adj. Flow (vph)	466	420	253	51	164	153	134	871	54	83	389	82
RTOR Reduction (vph)	0	0	177	0	116	0	0	5	0	0	18	0
Lane Group Flow (vph)	466	420	76	51	201	0	134	920	0	83	453	0
Heavy Vehicles (%)	11%	1%	4%	10%	6%	6%	4%	5%	2%	5%	3%	2%
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8									
Actuated Green, G (s)	9.4	25.6	25.6	4.4	20.6		9.3	28.9		6.6	26.2	
Effective Green, g (s)	9.4	25.6	25.6	4.4	20.6		9.3	28.9		6.6	26.2	
Actuated g/C Ratio	0.11	0.30	0.30	0.05	0.24		0.11	0.34		0.08	0.31	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	179	544	465	82	736		189	1115		133	1013	
v/s Ratio Prot	c0.29	c0.23		0.03	0.07		c0.08	c0.28		0.05	0.14	
v/s Ratio Perm			0.05									
v/c Ratio	2.60	0.77	0.16	0.62	0.27		0.71	0.83		0.62	0.45	
Uniform Delay, d1	38.1	27.3	22.1	39.7	26.4		36.8	26.0		38.2	23.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	737.5	6.1	0.1	10.1	0.1		9.5	5.3		6.4	0.4	
Delay (s)	775.5	33.4	22.1	49.8	26.4		46.3	31.3		44.7	24.3	
Level of Service	F	C	C	D	C		D	C		D	C	
Approach Delay (s)		334.5			29.7			33.2			27.3	
Approach LOS		F			C			C			C	

Intersection Summary

HCM Average Control Delay	141.8	HCM Level of Service		F		
HCM Volume to Capacity ratio	1.04					
Actuated Cycle Length (s)	85.5	Sum of lost time (s)		20.0		
Intersection Capacity Utilization	77.5%	ICU Level of Service		D		
Analysis Period (min)	15					

c Critical Lane Group

Lanes, Volumes, Timings
2: Belmont St (Rt. 123) & Route 138

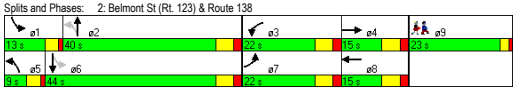
2030 Build Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	22	55	35	250	50	204	85	743	435	202	315	15	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	11	13	12	11	12	12	12	11	12	11	12	13	
Storage Length (ft)	0		0	475		0	0		0	200		300	
Storage Lanes	1		0	2		0	1		0	1		1	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		45			45			45			45		
Link Distance (ft)		387			2550			980			851		
Travel Time (s)		5.9			38.6			14.8			12.9		
Peak Hour Factor	0.72	0.72	0.72	0.82	0.82	0.82	0.93	0.93	0.93	0.92	0.92	0.92	
Heavy Vehicles (%)	13%	7%	0%	3%	15%	13%	0%	3%	3%	5%	4%	0%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	31	125	0	305	310	0	91	1267	0	220	358	0	
Turn Type	Prot			Prot			pm+pt			pm+pt			
Protected Phases	7	4		3	8		5	2		1	6		9
Permitted Phases							2			6			
Detector Phase	7	4		3	8		5	2		1	6		
Switch Phase													
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
Minimum Split (s)	22.0	10.0		22.0	10.0		8.0	10.0		8.0	10.0		23.0
Total Split (s)	22.0	15.0	0.0	22.0	15.0	0.0	9.0	40.0	0.0	13.0	44.0	0.0	23.0
Total Split (%)	19.5%	13.3%	0.0%	19.5%	13.3%	0.0%	8.0%	35.4%	0.0%	11.5%	38.9%	0.0%	20%
Maximum Green (s)	16.0	9.0		16.0	9.0		5.0	34.0		9.0	38.0		20.0
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	4.0	6.0	4.0	4.0	6.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max		None
Walk Time (s)													6.0
Flash Dont Walk (s)													14.0
Pedestrian Calls (#/hr)													4
v/c Ratio	0.29	0.69		0.72	0.78		0.18	0.98		0.65	0.21		
Control Delay	56.2	61.7		57.1	39.4		14.2	53.7		38.8	21.7		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	56.2	61.7		57.1	39.4		14.2	53.7		38.8	21.7		
Queue Length 50th (ft)	22	74		109	126		23	422		105	68		
Queue Length 95th (ft)	42	#112		141	#257		72	#706		#309	162		
Internal Link Dist (ft)		307			2470			900			771		
Turn Bay Length (ft)				475						200			
Base Capacity (vph)	219	182		465	400		516	1288		341	1735		
Starvation Cap Reductn	0	0		0	0		0	0		0	0		
Spillback Cap Reductn	0	0		0	0		0	0		0	0		
Storage Cap Reductn	0	0		0	0		0	0		0	0		
Reduced v/c Ratio	0.14	0.69		0.66	0.78		0.18	0.98		0.65	0.21		

Intersection Summary

Area Type: Other
Cycle Length: 113
Actuated Cycle Length: 113
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection
Natural Cycle: 150
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Belmont St (Rt. 123) & Route 138



HCM Signalized Intersection Capacity Analysis
2: Belmont St (Rt. 123) & Route 138

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	55	35	250	50	204	85	743	435	202	315	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	13	12	11	12	12	12	11	12	11	12	13
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	0.88		1.00	0.94		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1544	1772		3286	1474		1805	3200		1662	3454	
Flt Permitted	0.95	1.00		0.95	1.00		0.54	1.00		0.09	1.00	
Satd. Flow (perm)	1544	1772		3286	1474		1022	3200		165	3454	
Peak-hour factor, PHF	0.72	0.72	0.72	0.82	0.82	0.82	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	31	76	49	305	61	249	91	799	468	220	342	16
RTOR Reduction (vph)	0	20	0	0	114	0	0	71	0	0	2	0
Lane Group Flow (vph)	31	105	0	305	196	0	91	1196	0	220	356	0
Heavy Vehicles (%)	13%	7%	0%	3%	15%	13%	0%	3%	3%	5%	4%	0%
Turn Type	Prot			Prot			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)	5.4	12.7		14.6	21.9		44.0	38.4		60.7	51.1	
Effective Green, g (s)	5.4	12.7		14.6	21.9		44.0	38.4		60.7	51.1	
Actuated g/C Ratio	0.05	0.11		0.13	0.19		0.39	0.34		0.54	0.45	
Clearance Time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	74	199		425	286		437	1087		331	1562	
v/s Ratio Prot	0.02	0.06		c0.09	c0.13		0.01	c0.37		c0.11	0.10	
v/s Ratio Perm							0.07			0.25		
v/c Ratio	0.42	0.53		0.72	0.69		0.21	1.10		0.66	0.23	
Uniform Delay, d1	52.3	47.3		47.2	42.4		22.2	37.3		27.1	18.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.48	1.21	
Incremental Delay, d2	3.8	2.7		5.7	6.7		0.2	59.1		4.6	0.3	
Delay (s)	56.1	50.0		52.9	49.0		22.4	96.4		44.6	23.2	
Level of Service	E	D		D	D		C	F		D	C	
Approach Delay (s)		51.2			51.0			91.5			31.3	
Approach LOS		D			D			F			C	

Intersection Summary

HCM Average Control Delay	67.1	HCM Level of Service	E
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	113.0	Sum of lost time (s)	29.0
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

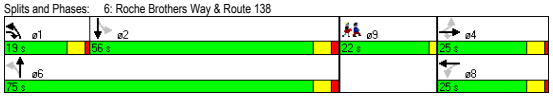
c Critical Lane Group

Lanes, Volumes, Timings
6: Roche Brothers Way & Route 138 — 2030 Build Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø9
Lane Configurations													
Volume (vph)	103	0	99	5	0	5	389	999	0	0	353	158	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	16	12	10	11	11	12	11	11	
Storage Length (ft)	0		100	0		0	350		0	0		0	
Storage Lanes	0		1	0		0	0		0	0		0	
Taper Length (ft)	25		25	25		25	25		25	25		25	
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		635			332			1623			2417		
Travel Time (s)		14.4			7.5			36.9			54.9		
Peak Hour Factor	0.82	0.82	0.82	0.63	0.63	0.63	0.85	0.85	0.85	0.84	0.84	0.84	
Heavy Vehicles (%)	4%	0%	6%	2%	0%	3%	3%	3%	0%	0%	4%	6%	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	126	121	0	16	0	0	1633	0	0	608	0	
Turn Type	Perm		pm+ov	Perm			pm+pt			Perm			
Protected Phases		4	1		8		1	6			2		9
Permitted Phases	4		4	8			6			2			
Detector Phase	4	4	1	8	8		1	6		2	2		
Switch Phase													
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		6.0	10.0		10.0	10.0		7.0
Minimum Split (s)	21.0	21.0	11.0	21.0	21.0		11.0	21.0		21.0	21.0		22.0
Total Split (s)	25.0	25.0	19.0	25.0	25.0	0.0	19.0	75.0	0.0	56.0	56.0	0.0	22.0
Total Split (%)	20.5%	20.5%	15.6%	20.5%	20.5%	0.0%	15.6%	61.5%	0.0%	45.9%	45.9%	0.0%	18%
Maximum Green (s)	20.0	20.0	14.0	20.0	20.0		14.0	69.0		50.0	50.0		20.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	2.0		2.0	2.0		0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	5.0	6.0	4.0	6.0	6.0	4.0	
Lead/Lag			Lead				Lead			Lag	Lag		
Lead-Lag Optimize?			Yes				Yes			Yes	Yes		
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None	None	None	None		None	Min		Min	Min		None
Walk Time (s)													7.0
Flash Dont Walk (s)													13.0
Pedestrian Calls (#/hr)													11
v/c Ratio		0.70	0.26		0.07			1.03			0.31		
Control Delay		62.2	7.6		28.4			47.0			10.4		
Queue Delay		0.0	0.0		0.0			0.0			0.0		
Total Delay		62.2	7.6		28.4			47.0			10.4		
Queue Length 50th (ft)		71	0		4			207			67		
Queue Length 95th (ft)		143	36		17			#925			167		
Internal Link Dist (ft)		555			252			1543			2337		
Turn Bay Length (ft)			100										
Base Capacity (vph)		280	580		348			1583			1957		
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		0.45	0.21		0.05			1.03			0.31		

Intersection Summary	
Area Type:	Other
Cycle Length: 122	
Actuated Cycle Length: 98.7	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 6: Roche Brothers Way & Route 138



HCM Signalized Intersection Capacity Analysis
6: Roche Brothers Way & Route 138 — 2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	103	0	99	5	0	5	389	999	0	0	353	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	12	10	11	11	12	11	11
Total Lost time (s)		5.0	5.0		5.0			6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00			0.95			0.95	
Frt		1.00	0.85		0.93			1.00			0.95	
Flt Protected		0.95	1.00		0.98			0.99			1.00	
Satd. Flow (prot)		1736	1524		1911			3341			3181	
Flt Permitted		0.75	1.00		0.85			0.62			1.00	
Satd. Flow (perm)		1365	1524		1668			2113			3181	
Peak-hour factor, PHF	0.82	0.82	0.82	0.63	0.63	0.63	0.85	0.85	0.85	0.84	0.84	0.84
Adj. Flow (vph)	126	0	121	8	0	8	458	1175	0	0	420	188
RTOR Reduction (vph)	0	0	98	0	7	0	0	0	0	0	29	0
Lane Group Flow (vph)	0	126	23	0	9	0	0	1633	0	0	579	0
Heavy Vehicles (%)	4%	0%	6%	2%	0%	3%	3%	3%	0%	0%	4%	6%
Turn Type	Perm		pm+ov	Perm			pm+pt			Perm		
Protected Phases		4	1		8		1	6			2	
Permitted Phases	4		4	8			6			2		
Actuated Green, G (s)		13.0	19.1		13.0			70.9			59.8	
Effective Green, g (s)		13.0	19.1		13.0			70.9			59.8	
Actuated g/C Ratio		0.13	0.19		0.13			0.71			0.60	
Clearance Time (s)		5.0	5.0		5.0			6.0			6.0	
Vehicle Extension (s)		2.0	2.0		2.0			2.0			2.0	
Lane Grp Cap (vph)		177	367		217			1571			1900	
v/s Ratio Prot			0.00					c0.06			0.18	
v/s Ratio Perm		c0.09	0.01		0.01			c0.67				
v/c Ratio		0.71	0.06		0.04			1.04			0.30	
Uniform Delay, d1		41.8	33.2		38.1			14.6			9.9	
Progression Factor		1.00	1.00		1.00			1.00			1.00	
Incremental Delay, d2		10.7	0.0		0.0			33.7			0.0	
Delay (s)		52.4	33.2		38.1			48.3			10.0	
Level of Service		D	C		D			D			A	
Approach Delay (s)		43.0			38.1			48.3			10.0	
Approach LOS		D			D			D			A	

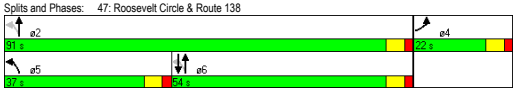
Intersection Summary					
HCM Average Control Delay	38.4	HCM Level of Service		D	
HCM Volume to Capacity ratio	0.98				
Actuated Cycle Length (s)	100.1	Sum of lost time (s)		16.2	
Intersection Capacity Utilization	78.0%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø2
Lane Configurations							
Volume (vph)	40	15	5	964	557	55	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	0	50			0	
Storage Lanes	1	0	1			0	
Taper Length (ft)	25	25	25			25	
Right Turn on Red		Yes				Yes	
Link Speed (mph)	30			40	45		
Link Distance (ft)	901			851	4962		
Travel Time (s)	20.5			14.5	75.2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	59	0	5	1048	665	0	
Turn Type			pm+pt				
Protected Phases	4		5	2 6	6		2
Permitted Phases			2 6				
Detector Phase	4		5	2 6	6		
Switch Phase							
Minimum Initial (s)	4.0		4.0		4.0		4.0
Minimum Split (s)	22.0		22.0		22.0		22.0
Total Split (s)	22.0	0.0	37.0	145.0	54.0	0.0	91.0
Total Split (%)	19.5%	0.0%	32.7%	128.3%	47.8%	0.0%	81%
Maximum Green (s)	16.0		31.0		48.0		85.0
Yellow Time (s)	4.0		4.0		4.0		4.0
All-Red Time (s)	2.0		2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	4.0	
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	3.0		3.0		3.0		3.0
Recall Mode	None		None		C-Max		C-Max
Walk Time (s)	5.0		5.0		5.0		5.0
Flash Dont Walk (s)	11.0		11.0		11.0		11.0
Pedestrian Calls (#/hr)	0		0		0		0
v/c Ratio	0.41		0.01	0.66	0.44		
Control Delay	47.7		0.4	4.7	5.3		
Queue Delay	0.0		0.0	1.3	0.0		
Total Delay	47.7		0.4	6.0	5.3		
Queue Length 50th (ft)	32		0	56	103		
Queue Length 95th (ft)	72		m0	m224	298		
Internal Link Dist (ft)	821			771	4882		
Turn Bay Length (ft)			50				
Base Capacity (vph)	257		846	1583	1526		
Starvation Cap Reductn	0		0	309	0		
Spillback Cap Reductn	0		0	0	0		
Storage Cap Reductn	0		0	0	0		
Reduced v/c Ratio	0.23		0.01	0.82	0.44		

Intersection Summary

Area Type: Other
Cycle Length: 113
Actuated Cycle Length: 113
Offset: 41 (36%), Referenced to phase 2:NBTL and 6:NBSB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 47: Roosevelt Circle & Route 138



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	40	15	5	964	557	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	
Lane Util. Factor	1.00		1.00	1.00	1.00	
Frt	0.96		1.00	1.00	0.99	
Flt Protected	0.96		0.95	1.00	1.00	
Satd. Flow (prot)	1731		1770	1863	1840	
Flt Permitted	0.96		0.34	1.00	1.00	
Satd. Flow (perm)	1731		639	1863	1840	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	16	5	1048	605	60
RTOR Reduction (vph)	13	0	0	0	1	0
Lane Group Flow (vph)	46	0	5	1048	664	0
Turn Type			pm+pt			
Protected Phases	4		5	2 6	6	
Permitted Phases			2 6			
Actuated Green, G (s)	7.4		93.6	93.6	86.5	
Effective Green, g (s)	7.4		93.6	93.6	86.5	
Actuated g/C Ratio	0.07		0.83	0.83	0.77	
Clearance Time (s)	6.0		6.0		6.0	
Vehicle Extension (s)	3.0		3.0		3.0	
Lane Grp Cap (vph)	113		540	1543	1408	
v/s Ratio Prot	c0.03		0.00	c0.56	0.36	
v/s Ratio Perm			0.01			
v/c Ratio	0.41		0.01	0.68	0.47	
Uniform Delay, d1	50.7		2.7	3.8	4.9	
Progression Factor	1.00		0.18	0.84	1.00	
Incremental Delay, d2	2.4		0.0	1.0	1.1	
Delay (s)	53.1		0.5	4.2	6.0	
Level of Service	D		A	A	A	
Approach Delay (s)	53.1			4.2	6.0	
Approach LOS	D			A	A	

Intersection Summary

HCM Average Control Delay	6.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	113.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
3: Elm St & Route 138

2030 Build Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	167	31	35	10	15	31	30	1370	15	0	438	54
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.68	0.68	0.68	0.91	0.91	0.91	0.89	0.89	0.89
Hourly flow rate (vph)	199	37	42	15	22	46	33	1505	16	0	492	61
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2159	2110	522	2162	2132	1514	553			1522		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2159	2110	522	2162	2132	1514	553			1522		
tC, single (s)	7.1	6.5	6.2	7.1	6.6	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.1	3.3	2.2			2.2		
p0 queue free %	0	25	92	0	50	69	97			100		
cM capacity (veh/h)	14	49	552	12	44	146	1007			444		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	277	82	1555	553
Volume Left	199	15	33	0
Volume Right	42	46	16	61
cSH	19	40	1007	444
Volume to Capacity	14.88	2.04	0.03	0.00
Queue Length 95th (ft)	Err	219	3	0
Control Delay (s)	Err	697.5	2.8	0.0
Lane LOS	F	F	A	
Approach Delay (s)	Err	697.5	2.8	0.0
Approach LOS	F	F		

Intersection Summary				
Average Delay	1149.1			
Intersection Capacity Utilization	123.5%	ICU Level of Service	H	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
10: Lincoln Street & Main Street

2030 Build Condition - AM Peak Hour

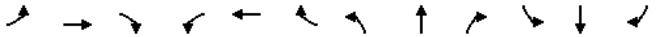
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	484	15	154	114	62	5	61	525	90	48	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.87	0.87	0.87	0.80	0.80	0.80	0.87	0.87	0.87
Hourly flow rate (vph)	5	532	16	177	131	71	6	76	656	103	55	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	131			548			1105	1036	540	1110	1080	167
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	131			548			1105	1036	540	1110	1080	167
tC, single (s)	4.1			4.1			7.3	6.5	6.2	7.1	6.7	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.7	4.0	3.3	3.5	4.1	3.3
p0 queue free %	100			82			95	60	0	0	67	99
cM capacity (veh/h)	1467			1011			114	190	542	0	169	883

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	554	379	739	164
Volume Left	5	177	6	103
Volume Right	16	71	656	6
cSH	1467	1011	443	0
Volume to Capacity	0.00	0.18	1.67	Err
Queue Length 95th (ft)	0	16	1084	Err
Control Delay (s)	0.1	5.3	332.5	Err
Lane LOS	A	A	F	F
Approach Delay (s)	0.1	5.3	332.5	Err
Approach LOS			F	F

Intersection Summary				
Average Delay	Err			
Intersection Capacity Utilization	102.0%	ICU Level of Service	G	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
11: Lincoln Street & Barrows Street

2030 Build Condition - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	187	499	0	0	124	0	0	0	5	0	0	84
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.92	0.92	0.88	0.88	0.88	0.88	0.88	0.92	0.92	0.59
Hourly flow rate (vph)	195	520	0	0	141	0	0	0	6	0	0	142
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	141			520			1193	1050	520	1056	1050	141
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	141			520			1193	1050	520	1056	1050	141
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 %	86			100			100	100	99	100	100	84
cM capacity (veh/h)	1442			1046			124	196	556	182	196	910

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	715	141	6	142
Volume Left	195	0	0	0
Volume Right	0	0	6	142
cSH	1442	1700	556	910
Volume to Capacity	0.14	0.08	0.01	0.16
Queue Length 95th (ft)	12	0	1	14
Control Delay (s)	3.3	0.0	11.5	9.7
Lane LOS	A		B	A
Approach Delay (s)	3.3	0.0	11.5	9.7
Approach LOS			B	A

Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	58.3%	ICU Level of Service		B
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
12: Union Street & Route 138

2030 Build Condition - AM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	65	121	1271	257	80	412
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.89	0.89	0.81	0.81
Hourly flow rate (vph)	74	138	1428	289	99	509
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2279	1572			1717	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2279	1572			1717	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	0			73	
cM capacity (veh/h)	33	134			366	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	211	1717	607
Volume Left	74	0	99
Volume Right	138	289	0
cSH	64	1700	366
Volume to Capacity	3.30	1.01	0.27
Queue Length 95th (ft)	Err	0	27
Control Delay (s)	Err	0.0	8.9
Lane LOS	F		A
Approach Delay (s)	Err	0.0	8.9
Approach LOS	F		

Intersection Summary			
Average Delay	835.6		
Intersection Capacity Utilization	107.7%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	53	15	160	134	50	158
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.86	0.86	0.73	0.73
Hourly flow rate (vph)	60	17	186	156	68	216
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	617	264			342	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	617	264			342	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	86	98			94	
cM capacity (veh/h)	419	763			1217	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	77	342	285
Volume Left	60	0	68
Volume Right	17	156	0
cSH	465	1700	1217
Volume to Capacity	0.17	0.20	0.06
Queue Length 95th (ft)	15	0	4
Control Delay (s)	14.3	0.0	2.4
Lane LOS	B		A
Approach Delay (s)	14.3	0.0	2.4
Approach LOS	B		

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	41.5%	ICU Level of Service	A
Analysis Period (min)	15		

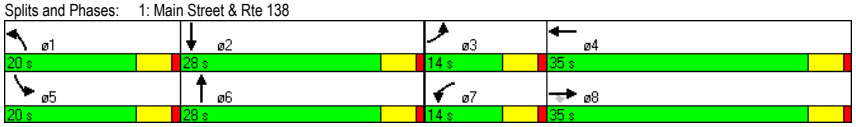
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	183	198	279	105	366	88	295	493	85	150	684	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	11	11	11	12	12	11	12	11	11
Storage Length (ft)	150		230	90		140	140		140	115		150
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			35			40			40	
Link Distance (ft)		1725			3218			4974			2928	
Travel Time (s)		26.1			62.7			84.8			49.9	
Peak Hour Factor	0.82	0.82	0.82	0.85	0.85	0.85	0.90	0.90	0.90	0.89	0.89	0.89
Heavy Vehicles (%)	2%	1%	2%	1%	1%	2%	2%	5%	0%	4%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	223	241	340	124	535	0	328	642	0	169	1105	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8									
Detector Phase	3	8	8	7	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	15.0		7.0	15.0	
Minimum Split (s)	12.0	12.0	12.0	12.0	21.0		12.0	21.0		12.0	20.0	
Total Split (s)	14.0	35.0	35.0	14.0	35.0	0.0	20.0	28.0	0.0	20.0	28.0	0.0
Total Split (%)	14.4%	36.1%	36.1%	14.4%	36.1%	0.0%	20.6%	28.9%	0.0%	20.6%	28.9%	0.0%
Maximum Green (s)	9.0	30.0	30.0	9.0	30.0		15.0	23.0		15.0	23.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)					5.0			5.0				
Flash Dont Walk (s)					11.0			11.0				
Pedestrian Calls (#/hr)					0			0				
v/c Ratio	1.17	0.64	0.57	0.70	0.76		1.04	0.60		0.69	1.18	
Control Delay	157.7	38.7	7.4	60.1	37.2		98.1	28.1		49.9	121.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	157.7	38.7	7.4	60.1	37.2		98.1	28.1		49.9	121.5	
Queue Length 50th (ft)	~142	118	0	64	133		~189	146		85	~360	
Queue Length 95th (ft)	#267	171	43	#142	173		#381	234		155	#530	
Internal Link Dist (ft)		1645			3138			4894			2848	
Turn Bay Length (ft)	150		230	90			140			115		
Base Capacity (vph)	190	649	784	185	1215		316	1068		310	935	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	1.17	0.37	0.43	0.67	0.44		1.04	0.60		0.55	1.18	

Lanes, Volumes, Timings
1: Main Street & Rte 138
2030 Build Condition - PM Peak Hour

Intersection Summary

Area Type: Other
Cycle Length: 97
Actuated Cycle Length: 84.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
~ 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.

Splits and Phases: 1: Main Street & Rte 138



HCM Signalized Intersection Capacity Analysis
1: Main Street & Rte 138

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	183	198	279	105	366	88	295	493	85	150	684	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	11	11	11	12	12	11	12	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.98		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1818	1583	1728	3348		1770	3386		1736	3243	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1818	1583	1728	3348		1770	3386		1736	3243	
Peak-hour factor, PHF	0.82	0.82	0.82	0.85	0.85	0.85	0.90	0.90	0.90	0.89	0.89	0.89
Adj. Flow (vph)	223	241	340	124	431	104	328	548	94	169	769	336
RTOR Reduction (vph)	0	0	269	0	25	0	0	13	0	0	48	0
Lane Group Flow (vph)	223	241	71	124	510	0	328	629	0	169	1057	0
Heavy Vehicles (%)	2%	1%	2%	1%	1%	2%	2%	5%	0%	4%	3%	2%
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8									
Actuated Green, G (s)	9.0	17.5	17.5	8.6	17.1		15.0	26.2		11.8	23.0	
Effective Green, g (s)	9.0	17.5	17.5	8.6	17.1		15.0	26.2		11.8	23.0	
Actuated g/C Ratio	0.11	0.21	0.21	0.10	0.20		0.18	0.31		0.14	0.27	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	189	378	329	177	681		316	1055		244	887	
v/s Ratio Prot	c0.13	0.13		0.07	c0.15		c0.19	c0.19		0.10	c0.33	
v/s Ratio Perm			0.04									
v/c Ratio	1.18	0.64	0.22	0.70	0.75		1.04	0.60		0.69	1.19	
Uniform Delay, d1	37.5	30.4	27.6	36.5	31.5		34.5	24.5		34.4	30.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	122.3	2.6	0.1	9.8	4.0		60.8	1.1		6.7	97.4	
Delay (s)	159.8	33.0	27.7	46.3	35.5		95.4	25.5		41.1	128.0	
Level of Service	F	C	C	D	D		F	C		D	F	
Approach Delay (s)		66.0			37.5			49.2			116.5	
Approach LOS		E			D			D			F	

Intersection Summary				
HCM Average Control Delay	73.9	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.12			
Actuated Cycle Length (s)	84.1	Sum of lost time (s)	25.0	
Intersection Capacity Utilization	84.5%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Lanes, Volumes, Timings
2: Belmont St (Rt. 123) & Route 138

2030 Build Condition - PM Peak Hour

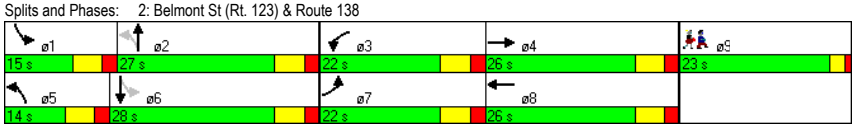
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	125	275	500	150	174	230	407	300	243	687	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	13	12	11	13	12	11	12	12	11	12	13
Storage Length (ft)	0		0	475		0	0		0	200		300
Storage Lanes	1		0	2		0	1		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		387			2550			908			849	
Travel Time (s)		5.9			38.6			13.8			12.9	
Peak Hour Factor	0.89	0.89	0.89	0.88	0.88	0.88	0.93	0.93	0.93	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	1%	0%	2%	0%	4%	1%	5%	3%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	80	449	0	568	368	0	247	761	0	267	824	0
Turn Type	Prot			Prot			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	22.0	10.0		22.0	22.0		10.0	10.0		10.0	10.0	
Total Split (s)	22.0	26.0	0.0	22.0	26.0	0.0	14.0	27.0	0.0	15.0	28.0	0.0
Total Split (%)	19.5%	23.0%	0.0%	19.5%	23.0%	0.0%	12.4%	23.9%	0.0%	13.3%	24.8%	0.0%
Maximum Green (s)	16.0	20.0		16.0	20.0		8.0	21.0		9.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.49	1.18		1.20	0.77		0.61	0.92		0.63	0.98	
Control Delay	58.3	137.1		150.3	48.8		32.4	52.3		29.5	55.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	58.3	137.1		150.3	48.8		32.4	52.3		29.5	55.0	
Queue Length 50th (ft)	56	~338		~258	228		96	228		76	282	
Queue Length 95th (ft)	102	#532		#356	#418		#347	#392		m#292	m#488	
Internal Link Dist (ft)		307			2470			828			769	
Turn Bay Length (ft)				475						200		
Base Capacity (vph)	247	382		474	476		402	827		423	844	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.32	1.18		1.20	0.77		0.61	0.92		0.63	0.98	

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	20%
Maximum Green (s)	20.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	6.0
Flash Dont Walk (s)	14.0
Pedestrian Calls (#/hr)	5
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	
Area Type:	Other
Cycle Length: 113	
Actuated Cycle Length: 113	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection	
Natural Cycle: 150	
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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Belmont St (Rt. 123) & Route 138



HCM Signalized Intersection Capacity Analysis
2: Belmont St (Rt. 123) & Route 138

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	125	275	500	150	174	230	407	300	243	687	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	13	12	11	13	12	11	12	12	11	12	13
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.90		1.00	0.92		1.00	0.94		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	1761		3351	1786		1745	3290		1662	3469	
Flt Permitted	0.95	1.00		0.95	1.00		0.19	1.00		0.17	1.00	
Satd. Flow (perm)	1745	1761		3351	1786		352	3290		295	3469	
Peak-hour factor, PHF	0.89	0.89	0.89	0.88	0.88	0.88	0.93	0.93	0.93	0.91	0.91	0.91
Adj. Flow (vph)	80	140	309	568	170	198	247	438	323	267	755	69
RTOR Reduction (vph)	0	69	0	0	34	0	0	118	0	0	6	0
Lane Group Flow (vph)	80	380	0	568	334	0	247	643	0	267	818	0
Heavy Vehicles (%)	0%	0%	0%	1%	0%	2%	0%	4%	1%	5%	3%	0%
Turn Type	Prot			Prot			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)	9.2	21.2		16.0	28.0		42.0	20.9		47.6	23.7	
Effective Green, g (s)	9.2	21.2		16.0	28.0		42.0	20.9		47.6	23.7	
Actuated g/C Ratio	0.08	0.19		0.14	0.25		0.37	0.18		0.42	0.21	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	142	330		474	443		391	609		413	728	
v/s Ratio Prot	0.05	c0.22		c0.17	0.19		0.12	0.20		c0.14	c0.24	
v/s Ratio Perm							0.12			0.14		
v/c Ratio	0.56	1.15		1.20	0.75		0.63	1.06		0.65	1.12	
Uniform Delay, d1	50.0	45.9		48.5	39.3		27.4	46.0		24.6	44.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.03	0.84	
Incremental Delay, d2	5.0	97.2		108.2	7.1		3.3	52.0		2.0	66.8	
Delay (s)	55.0	143.1		156.7	46.5		30.8	98.0		27.4	104.3	
Level of Service	E	F		F	D		C	F		C	F	
Approach Delay (s)		129.8			113.3			81.6			85.5	
Approach LOS		F			F			F			F	

Intersection Summary				
HCM Average Control Delay	98.3	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.04			
Actuated Cycle Length (s)	113.0	Sum of lost time (s)	31.0	
Intersection Capacity Utilization	92.1%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Lanes, Volumes, Timings
6: Roche Brothers Way & Route 138

2030 Build Condition - PM Peak Hour

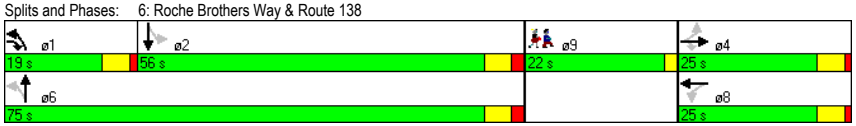
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	0	492	0	0	0	235	492	5	5	839	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	12	12	12	11	11	11	12	12	12
Storage Length (ft)	0		100	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			332			1623			2417	
Travel Time (s)		14.4			7.5			36.9			54.9	
Confl. Peds. (#/hr)	25		50	15		25	10		25	40		30
Peak Hour Factor	0.90	0.90	0.90	0.25	0.25	0.25	0.82	0.82	0.82	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	1%	4%	0%	0%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	183	547	0	0	0	0	893	0	0	1114	0
Turn Type	Perm		pm+ov	Perm			pm+pt			Perm		
Protected Phases		4	1		8		1	6			2	
Permitted Phases	4		4	8			6			2		
Detector Phase	4	4	1	8	8		1	6		2	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		10.0	10.0	
Minimum Split (s)	21.0	21.0	11.0	21.0	21.0		11.0	22.0		22.0	22.0	
Total Split (s)	25.0	25.0	19.0	25.0	25.0	0.0	19.0	75.0	0.0	56.0	56.0	0.0
Total Split (%)	20.5%	20.5%	15.6%	20.5%	20.5%	0.0%	15.6%	61.5%	0.0%	45.9%	45.9%	0.0%
Maximum Green (s)	20.0	20.0	14.0	20.0	20.0		14.0	69.0		50.0	50.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	5.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.64	0.78					0.99dl			0.78	
Control Delay		46.0	19.2					14.1			25.6	
Queue Delay		0.0	0.0					0.0			0.0	
Total Delay		46.0	19.2					14.1			25.6	
Queue Length 50th (ft)		79	68					109			228	
Queue Length 95th (ft)		#265	#343					228			493	
Internal Link Dist (ft)		555			252			1543			2337	
Turn Bay Length (ft)			100									
Base Capacity (vph)		349	773					1644			2081	
Starvation Cap Reductn		0	0					0			0	
Spillback Cap Reductn		0	0					0			0	
Storage Cap Reductn		0	0					0			0	

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour 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 (%)	18%
Maximum Green (s)	20.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	13.0
Pedestrian Calls (#/hr)	11
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.52	0.71					0.54			0.54	

Intersection Summary	
Area Type:	Other
Cycle Length: 122	
Actuated Cycle Length: 83.7	
Natural Cycle: 90	
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.	

Splits and Phases: 6: Roche Brothers Way & Route 138



Lane Group	ø9
Reduced v/c Ratio	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	0	492	0	0	0	235	492	5	5	839	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	11	12	12	12	11	11	11	12	12	12
Total Lost time (s)		5.0	5.0					6.0			6.0	
Lane Util. Factor		1.00	1.00					0.95			0.95	
Frpb, ped/bikes		1.00	0.94					1.00			0.99	
Flpb, ped/bikes		0.96	1.00					1.00			1.00	
Frt		1.00	0.85					1.00			0.98	
Flt Protected		0.95	1.00					0.98			1.00	
Satd. Flow (prot)		1739	1450					3329			3430	
Flt Permitted		0.76	1.00					0.52			0.95	
Satd. Flow (perm)		1386	1450					1771			3259	
Peak-hour factor, PHF	0.90	0.90	0.90	0.25	0.25	0.25	0.82	0.82	0.82	0.90	0.90	0.90
Adj. Flow (vph)	183	0	547	0	0	0	287	600	6	6	932	176
RTOR Reduction (vph)	0	0	232	0	0	0	0	0	0	0	12	0
Lane Group Flow (vph)	0	183	315	0	0	0	0	893	0	0	1102	0
Confl. Peds. (#/hr)	25		50	15		25	10		25	40		30
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	1%	4%	0%	0%	2%	1%
Turn Type	Perm		pm+ov	Perm			pm+pt			Perm		
Protected Phases		4	1		8		1	6			2	
Permitted Phases	4		4	8			6			2		
Actuated Green, G (s)		17.5	27.2					51.5			36.8	
Effective Green, g (s)		17.5	27.2					51.5			36.8	
Actuated g/C Ratio		0.21	0.32					0.61			0.43	
Clearance Time (s)		5.0	5.0					6.0			6.0	
Vehicle Extension (s)		3.0	3.0					3.0			3.0	
Lane Grp Cap (vph)		286	551					1255			1416	
v/s Ratio Prot			c0.07					c0.08				
v/s Ratio Perm		0.13	0.15					0.35			c0.34	
v/c Ratio		0.64	0.57					0.99dl			0.78	
Uniform Delay, d1		30.7	23.9					11.5			20.5	
Progression Factor		1.00	1.00					1.00			1.00	
Incremental Delay, d2		4.7	1.4					1.9			2.8	
Delay (s)		35.4	25.3					13.4			23.2	
Level of Service		D	C					B			C	
Approach Delay (s)		27.9			0.0			13.4			23.2	
Approach LOS		C			A			B			C	

Intersection Summary					
HCM Average Control Delay	21.3	HCM Level of Service		C	
HCM Volume to Capacity ratio	0.76				
Actuated Cycle Length (s)	84.7	Sum of lost time (s)		21.7	
Intersection Capacity Utilization	79.4%	ICU Level of Service		D	
Analysis Period (min)	15				

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø2
Lane Configurations							
Volume (vph)	160	50	0	623	893	155	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	0	50			0	
Storage Lanes	1	0	1			0	
Taper Length (ft)	25	25	25			25	
Right Turn on Red		Yes				Yes	
Link Speed (mph)	30			40	45		
Link Distance (ft)	1333			849	4974		
Travel Time (s)	30.3			14.5	75.4		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	228	0	0	677	1139	0	
Turn Type			pm+pt				
Protected Phases	4		5	2 6	6		2
Permitted Phases			2 6				
Detector Phase	4		5	2 6	6		
Switch Phase							
Minimum Initial (s)	4.0		4.0		4.0		4.0
Minimum Split (s)	22.0		22.0		22.0		22.0
Total Split (s)	35.0	0.0	22.0	134.0	56.0	0.0	78.0
Total Split (%)	31.0%	0.0%	19.5%	118.6%	49.6%	0.0%	69%
Maximum Green (s)	29.0		16.0		50.0		72.0
Yellow Time (s)	4.0		4.0		4.0		4.0
All-Red Time (s)	2.0		2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	4.0	
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	3.0		3.0		3.0		3.0
Recall Mode	None		None		C-Min		C-Min
v/c Ratio	0.74			0.50	0.86		
Control Delay	55.7			10.6	21.5		
Queue Delay	0.0			0.0	0.0		
Total Delay	55.7			10.6	21.5		
Queue Length 50th (ft)	150			158	529		
Queue Length 95th (ft)	220			m374	#1063		
Internal Link Dist (ft)	1253			769	4894		
Turn Bay Length (ft)							
Base Capacity (vph)	455			1346	1321		
Starvation Cap Reductn	0			0	0		
Spillback Cap Reductn	0			0	0		
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.50			0.50	0.86		

Intersection Summary	
Area Type:	Other
Cycle Length: 113	
Actuated Cycle Length: 113	

Lanes, Volumes, Timings
47: Roosevelt Circle & Route 138 2030 Build Condition - PM Peak Hour

Offset: 93 (82%), Referenced to phase 2:NBTL and 6:NBSB, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 47: Roosevelt Circle & Route 138

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	160	50	0	623	893	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			1.00	1.00	
Frt	0.97			1.00	0.98	
Flt Protected	0.96			1.00	1.00	
Satd. Flow (prot)	1737			1863	1826	
Flt Permitted	0.96			1.00	1.00	
Satd. Flow (perm)	1737			1863	1826	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	54	0	677	971	168
RTOR Reduction (vph)	11	0	0	0	3	0
Lane Group Flow (vph)	217	0	0	677	1136	0
Turn Type			pm+pt			
Protected Phases	4		5	2 6	6	
Permitted Phases			2 6			
Actuated Green, G (s)	19.4			81.6	81.6	
Effective Green, g (s)	19.4			81.6	81.6	
Actuated g/C Ratio	0.17			0.72	0.72	
Clearance Time (s)	6.0				6.0	
Vehicle Extension (s)	3.0				3.0	
Lane Grp Cap (vph)	298			1345	1319	
v/s Ratio Prot	c0.13			0.36	c0.62	
v/s Ratio Perm						
v/c Ratio	0.73			0.50	0.86	
Uniform Delay, d1	44.3			6.9	11.5	
Progression Factor	1.00			1.26	1.00	
Incremental Delay, d2	8.6			0.7	7.6	
Delay (s)	52.9			9.4	19.1	
Level of Service	D			A	B	
Approach Delay (s)	52.9			9.4	19.1	
Approach LOS	D			A	B	

Intersection Summary			
HCM Average Control Delay	19.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	113.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Elm St & Route 138

2030 Build Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	83	15	35	25	50	36	65	708	30	22	1113	235
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.86	0.86	0.86	0.88	0.88	0.88	0.85	0.85	0.85
Hourly flow rate (vph)	98	18	41	29	58	42	74	805	34	26	1309	276
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2540	2486	1448	2519	2607	822	1586			839		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2540	2486	1448	2519	2607	822	1586			839		
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 %	0	26	74	0	0	89	82			97		
cM capacity (veh/h)	0	24	159	5	20	373	414			805		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	156	129	912	1612
Volume Left	98	29	74	26
Volume Right	41	42	34	276
cSH	0	14	414	805
Volume to Capacity	Err	9.06	0.18	0.03
Queue Length 95th (ft)	Err	Err	16	2
Control Delay (s)	Err	Err	6.3	4.7
Lane LOS	F	F	A	A
Approach Delay (s)	Err	Err	6.3	4.7
Approach LOS	F	F		

Intersection Summary				
Average Delay			Err	
Intersection Capacity Utilization			99.0%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
10: Lincoln Street & Main Street

2030 Build Condition - PM Peak Hour

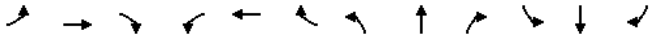
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	261	25	459	449	106	15	50	229	85	73	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.86	0.86	0.86	0.89	0.89	0.89	0.93	0.93	0.93
Hourly flow rate (vph)	6	307	29	534	522	123	17	56	257	91	78	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	522			336			2035	1923	322	2013	1999	584
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	522			336			2035	1923	322	2013	1999	584
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.6	4.0	3.3
p0 queue free %	99			57			0	0	64	0	0	98
cM capacity (veh/h)	1055			1228			0	37	717	0	33	515

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	342	1179	330	181
Volume Left	6	534	17	91
Volume Right	29	123	257	11
cSH	1055	1228	0	0
Volume to Capacity	0.01	0.43	Err	Err
Queue Length 95th (ft)	0	56	Err	Err
Control Delay (s)	0.2	8.5	Err	Err
Lane LOS	A	A	F	F
Approach Delay (s)	0.2	8.5	Err	Err
Approach LOS			F	F

Intersection Summary				
Average Delay			Err	
Intersection Capacity Utilization			111.1%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
11: Lincoln Street & Barrows Street

2030 Build Condition - PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	78	276	0	0	474	5	10	5	15	0	0	399
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.92	0.92	0.89	0.89	0.92	0.92	0.92	0.89	0.92	0.89
Hourly flow rate (vph)	93	329	0	0	533	6	11	5	16	0	0	448
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	538			329			1498	1052	329	1069	1050	535
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	538			329			1498	1052	329	1069	1050	535
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 %	91			100			37	97	98	100	100	18
cM capacity (veh/h)	1040			1231			17	206	713	179	207	549

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	421	538	33	448
Volume Left	93	0	11	0
Volume Right	0	6	16	448
cSH	1040	1700	48	549
Volume to Capacity	0.09	0.32	0.68	0.82
Queue Length 95th (ft)	7	0	67	203
Control Delay (s)	2.7	0.0	176.3	34.4
Lane LOS	A		F	D
Approach Delay (s)	2.7	0.0	176.3	34.4
Approach LOS			F	D

Intersection Summary				
Average Delay	15.5			
Intersection Capacity Utilization	78.8%	ICU Level of Service	D	
Analysis Period (min)	15			

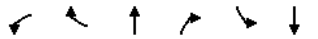
HCM Unsignalized Intersection Capacity Analysis
12: Union Street & Route 138

2030 Build Condition - PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	186	131	627	171	158	1203
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.80	0.80	0.84	0.84	0.92	0.92
Hourly flow rate (vph)	232	164	746	204	172	1308
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2499	848			950	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2499	848			950	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	55			76	
cM capacity (veh/h)	25	363			727	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	396	950	1479
Volume Left	232	0	172
Volume Right	164	204	0
cSH	40	1700	727
Volume to Capacity	9.90	0.56	0.24
Queue Length 95th (ft)	Err	0	23
Control Delay (s)	Err	0.0	11.5
Lane LOS	F		B
Approach Delay (s)	Err	0.0	11.5
Approach LOS	F		

Intersection Summary			
Average Delay	1408.2		
Intersection Capacity Utilization	143.8%	ICU Level of Service	H
Analysis Period (min)	15		

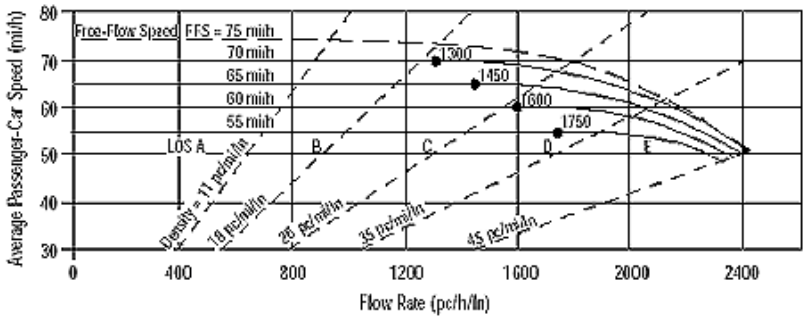


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	173	101	168	61	35	183
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.84	0.84	0.92	0.92	0.95	0.95
Hourly flow rate (vph)	206	120	183	66	37	193
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	482	216			249	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	482	216			249	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	61	85			97	
cM capacity (veh/h)	528	827			1329	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	326	249	229
Volume Left	206	0	37
Volume Right	120	66	0
cSH	609	1700	1329
Volume to Capacity	0.54	0.15	0.03
Queue Length 95th (ft)	79	0	2
Control Delay (s)	17.5	0.0	1.5
Lane LOS	C		A
Approach Delay (s)	17.5	0.0	1.5
Approach LOS	C		

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Northbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route I-93 South of F.B.P.*
Date Performed	*11/21/08*	Jurisdiction	*Braintree*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 Build*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7816*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.943*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*4*		f_N		mi/h
FFS (measured)	*58.3*	mi/h	FFS	*58.3*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2114*	pc/h/ln	Design LOS v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*54.9*	mi/h	S	mi/h
D = v_p / S	*38.5*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*E*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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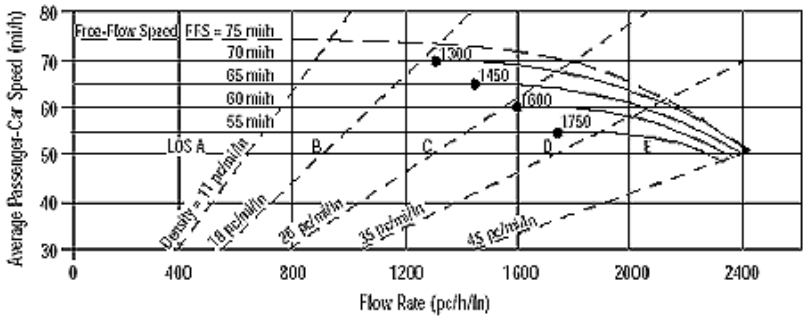
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Northbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route I-93 South of F.B.P.*
Date Performed	*11/21/08*	Jurisdiction	*Braintree*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 Build*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5361*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*4*		f_N		mi/h
FFS (measured)	*58.3*	mi/h	FFS	*58.3*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1445*	pc/h/ln	Design LOS v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*58.3*	mi/h	S	mi/h
D = v_p / S	*24.8*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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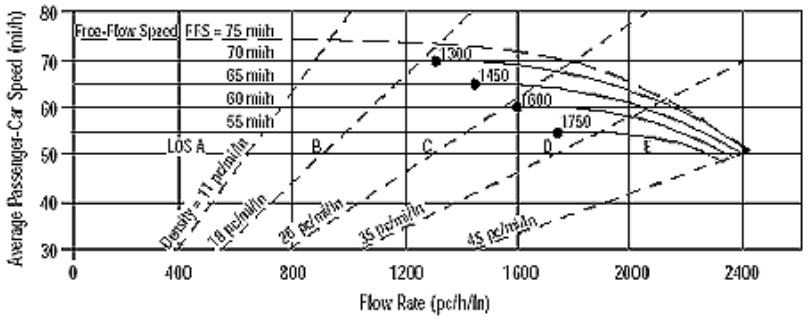
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route I-93 South of F.B.P.*
Date Performed	*11/21/08*	Jurisdiction	*Braintree*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 Build*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5156*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*4*		f_N		mi/h
FFS (measured)	*59.0*	mi/h	FFS	*59.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1404*	pc/h/ln	Design LOS v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*59.0*	mi/h	S	mi/h
D = v_p / S	*23.8*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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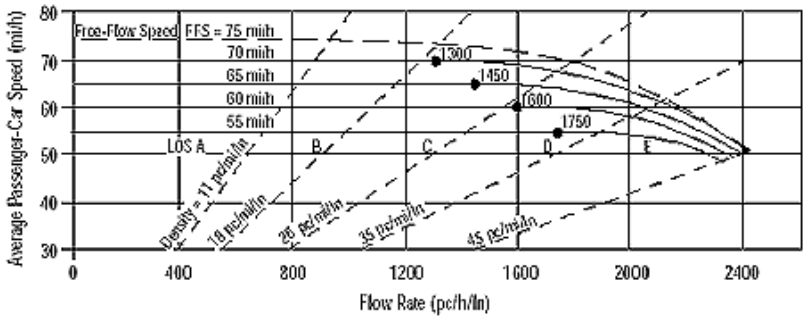

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route I-93 South of F.B.P.*
Date Performed	*11/21/08*	Jurisdiction	*Braintree*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 Build*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7207*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*4*		f_N		mi/h
FFS (measured)	*59.0*	mi/h	FFS	*59.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1922*	pc/h/ln	Design LOS	
			v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*58.0*	mi/h	S	mi/h
D = v_p / S	*33.1*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*D*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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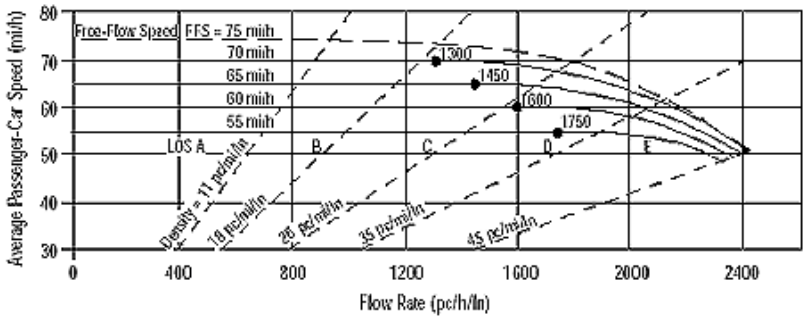
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Northbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route I-93 South of Route 3*
Date Performed	*11/21/08*	Jurisdiction	*Braintree*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 Build*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5701*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*4*		f_N		mi/h
FFS (measured)	*66.0*	mi/h	FFS	*66.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1559*	pc/h/ln	Design LOS	
			v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*65.9*	mi/h	S	mi/h
D = v_p / S	*23.7*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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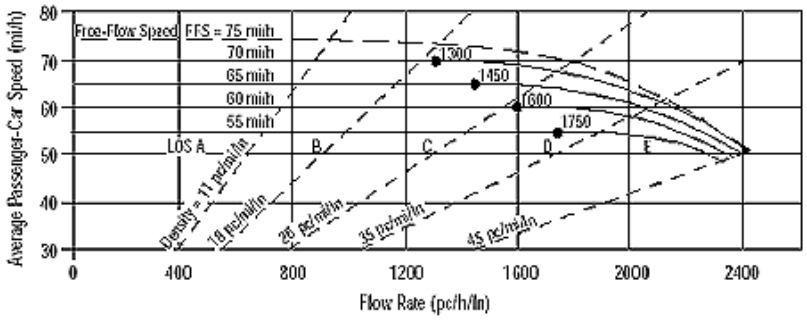
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Northbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route I-93 South of Route 3*
Date Performed	*11/18/2008*	Jurisdiction	*Braintree*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 Build*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*4791*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

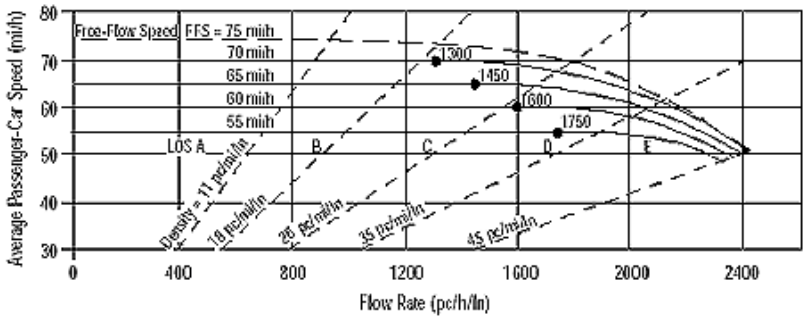
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*4*		f_N		mi/h
FFS (measured)	*66.0*	mi/h	FFS	*66.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1285*	pc/h/ln	Design LOS	
			v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*66.0*	mi/h	S	mi/h
D = v_p / S	*19.5*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/21/08*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route I-93 South of Route 3*
Jurisdiction	*Braintree*
Analysis Year	*2030 Build*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7096*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*4*	
FFS (measured)	*64.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*64.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1875*	pc/h/ln
S	*62.4*	mi/h
D = v_p / S	*30.0*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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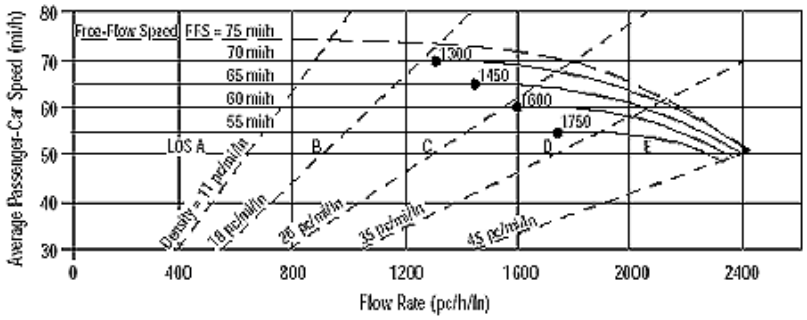
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		Site Information	
Analyst	*JBB*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route I-93 South of Route 3*
Date Performed	*11/21/08*	Jurisdiction	*Braintree*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 Build*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7342*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*4*	
FFS (measured)	*64.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*64.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1940*	pc/h/ln
S	*61.6*	mi/h
D = v_p / S	*31.5*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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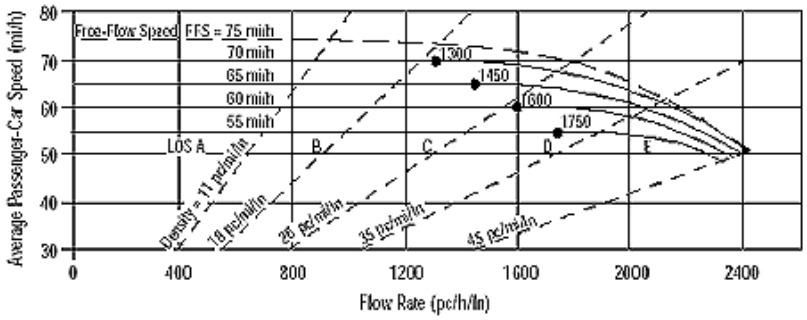
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Northbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24 at Freetown Line*
Date Performed	*11/19/08*	Jurisdiction	*Fall River*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 Rapid Bus*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*4846*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

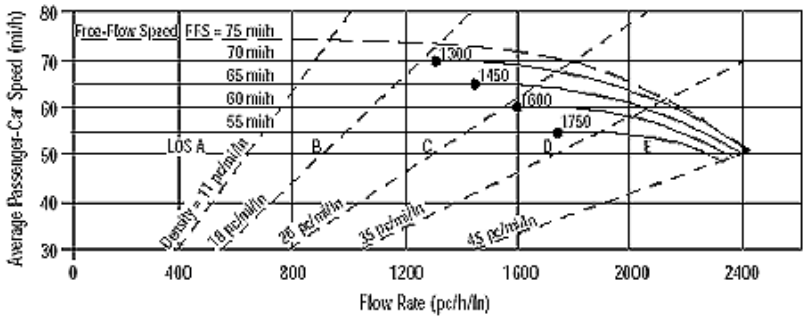
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*70.8*	mi/h	FFS	*70.8*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2773*	pc/h/ln	Design LOS v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S		mi/h	S	mi/h
D = v_p / S		pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*F*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Northbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24 at Freetown Line*
Date Performed	*11/19/08*	Jurisdiction	*Fall River*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 Rapid Bus*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2573*	veh/h	Peak-Hour Factor, PHF	*0.86*
AADT		veh/day	%Trucks and Buses, P_T	*3*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.985*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*70.8*	mi/h	FFS	*70.8*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1518*	pc/h/ln	Design LOS v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*70.5*	mi/h	S	mi/h
D = v_p / S	*21.5*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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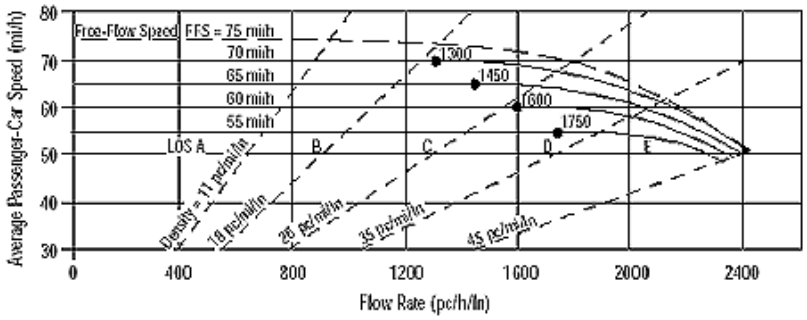


Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24 at Freetown Line*
Date Performed	*11/19/08*	Jurisdiction	*Fall River*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 Rapid Bus*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*2728*	veh/h	Peak-Hour Factor, PHF	*0.92*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

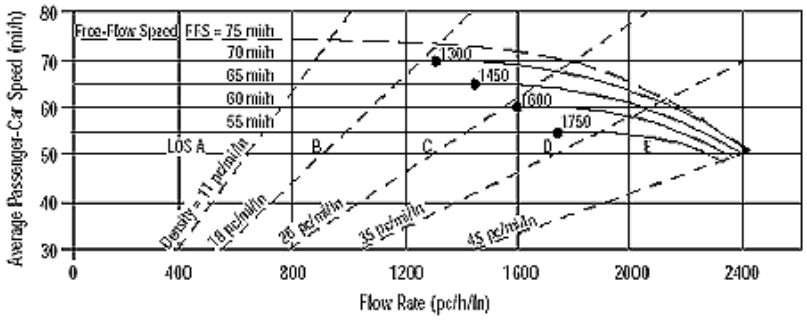
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*62.5*	mi/h	FFS	*62.5*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1534*	pc/h/ln	Design LOS v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*62.5*	mi/h	S	mi/h
D = v_p / S	*24.5*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24 at Freetown Line*
Date Performed	*11/19/08*	Jurisdiction	*Fall River*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 Rapid Bus*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*5496*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

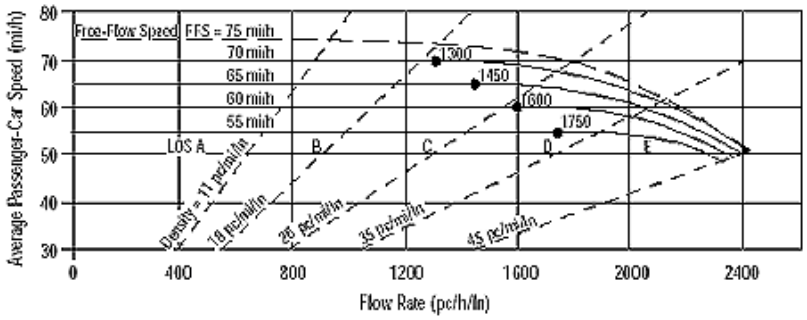
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*62.5*	mi/h	FFS	*62.5*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*3043*	pc/h/ln	Design LOS		
S		mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S		pc/mi/ln	S		mi/h
LOS	*F*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBC*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/18/08*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 South of Route I-93*
Jurisdiction	*Randolph*
Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4756*	veh/h	Peak-Hour Factor, PHF	*0.89*
AADT		veh/day	%Trucks and Buses, P_T	*16*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.926*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*63.9*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*63.9*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1924*	pc/h/ln
S	*61.8*	mi/h
D = v_p / S	*31.1*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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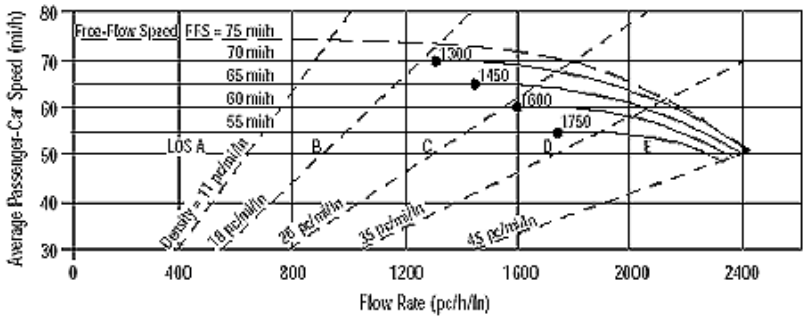
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Northbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24 South of Route I-93*
Date Performed	*11/18/08*	Jurisdiction	*Randolph*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*2786*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

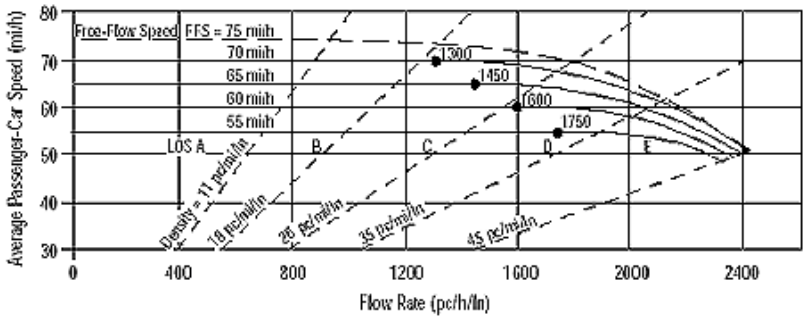
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*63.9*	mi/h	FFS	*63.9*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1503*	pc/h/ln	Design LOS	
			v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*63.9*	mi/h	S	mi/h
D = v_p / S	*23.5*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24 South of Route I-93*
Date Performed	*11/18/08*	Jurisdiction	*Randolph*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*3456*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

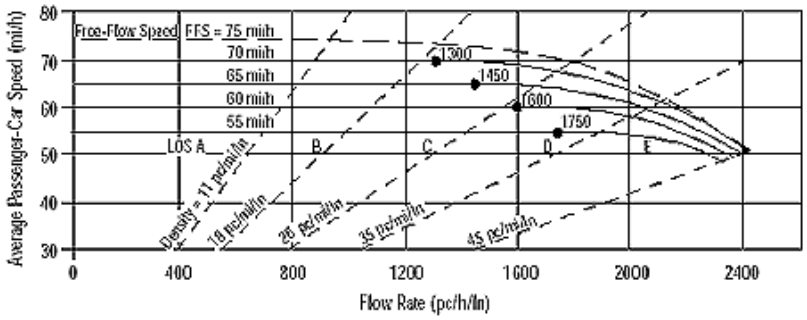
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.8*	mi/h	FFS	*65.8*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1923*	pc/h/ln	Design LOS	
			v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*63.2*	mi/h	S	mi/h
D = v_p / S	*30.4*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*D*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24 South of Route I-93*
Date Performed	*11/18/08*	Jurisdiction	*Randolph*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*5937*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*3*		f_N		mi/h
FFS (measured)	*65.8*	mi/h	FFS	*65.8*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2080*	pc/h/ln	Design LOS	
			v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*60.5*	mi/h	S	mi/h
D = v_p / S	*34.4*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*D*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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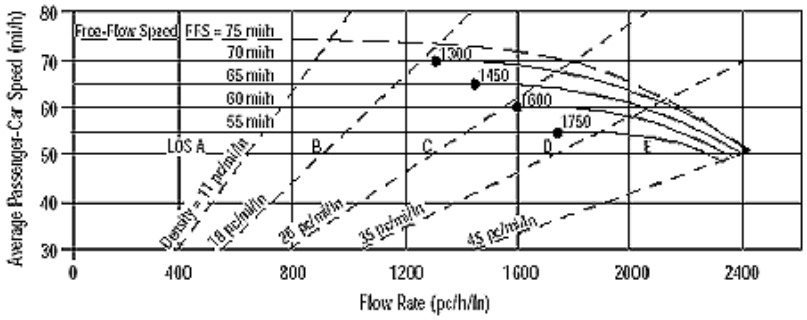


Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Northbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24, South of Pond St.*
Date Performed	*11/21/08*	Jurisdiction	*Avon*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*5041*	veh/h	Peak-Hour Factor, PHF	*0.99*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

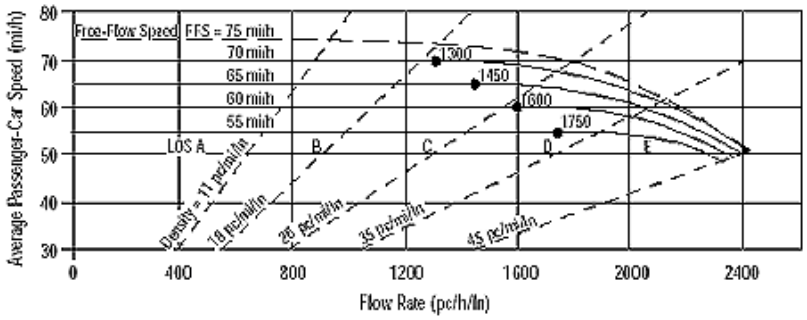
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*3*		f_N		mi/h
FFS (measured)	*66.4*	mi/h	FFS	*66.4*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1782*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*65.2*	mi/h	S	mi/h
D = v_p / S	*27.3*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*D*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		Site Information	
Analyst	*JBB*	Highway/Direction of Travel	*Northbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24, South of Pond St.*
Date Performed	*11/21/08*	Jurisdiction	*Avon*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3356*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*7*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.966*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*70.0*	mi/h	FFS	*70.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			Design (N)		
Operational (LOS)			Design (N)		
			Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1790*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S	*68.0*	mi/h	S		mi/h
D = v_p / S	*26.3*	pc/mi/ln	D = v_p / S		pc/mi/ln
LOS	*D*		Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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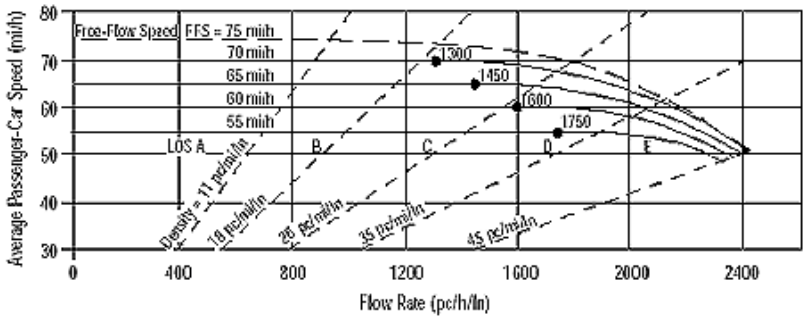


Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24, South of Pond St.*
Date Performed	*11/21/08*	Jurisdiction	*Avon*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*3116*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*9*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

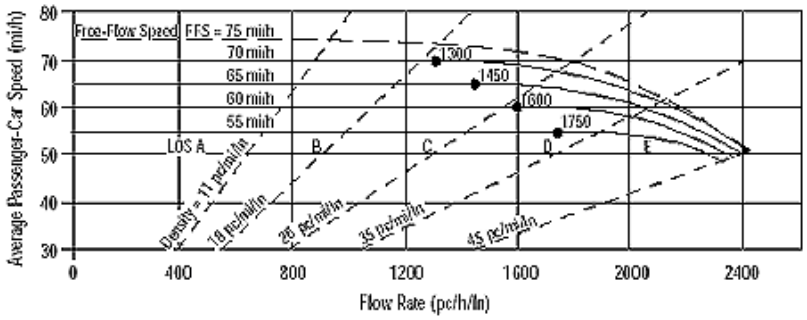
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.957*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*67.1*	mi/h	FFS	*67.1*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1678*	pc/h/ln	Design LOS v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S	*66.5*	mi/h	S		mi/h
D = v_p / S	*25.2*	pc/mi/ln	D = v_p / S		pc/mi/ln
LOS	*C*		Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24, South of Pond St.*
Date Performed	*11/21/08*	Jurisdiction	*Avon*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5822*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*3*		f_N		mi/h
FFS (measured)	*67.1*	mi/h	FFS	*67.1*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2051*	pc/h/ln	Design LOS	
			v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*61.9*	mi/h	S	mi/h
D = v_p / S	*33.1*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*D*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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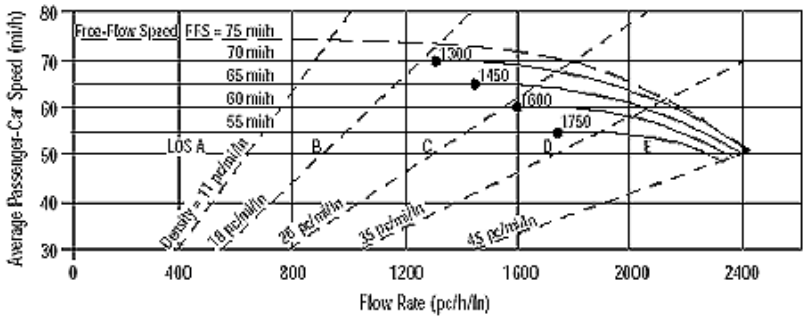

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/21/08*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 123*
Jurisdiction	*Brockton*
Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5106*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*67.1*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*67.1*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1842*	pc/h/ln
S	*65.2*	mi/h
D = v_p / S	*28.3*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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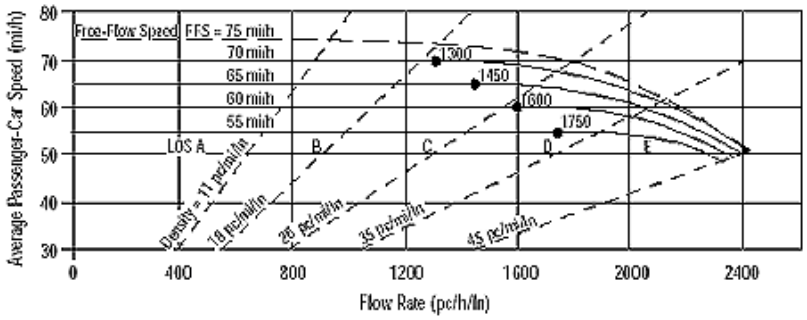
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Northbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24 North of Route 123*
Date Performed	*11/21/08*	Jurisdiction	*Brockton*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*3346*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

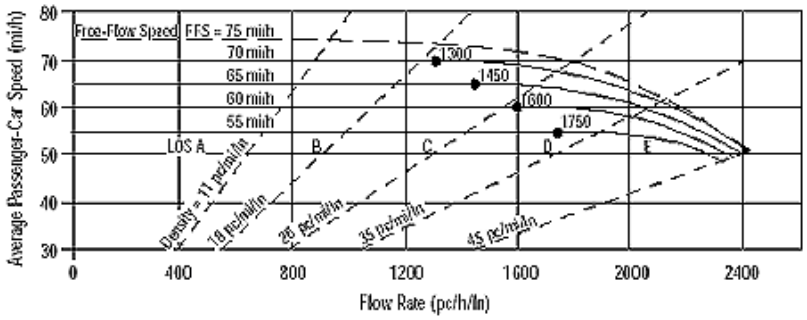
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*67.1*	mi/h	FFS	*67.1*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1805*	pc/h/ln	Design LOS		
			v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S	*65.5*	mi/h	S		mi/h
D = v_p / S	*27.5*	pc/mi/ln	D = v_p / S		pc/mi/ln
LOS	*D*		Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24 North of Route 123*
Date Performed	*11/21/08*	Jurisdiction	*Brockton*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*2446*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

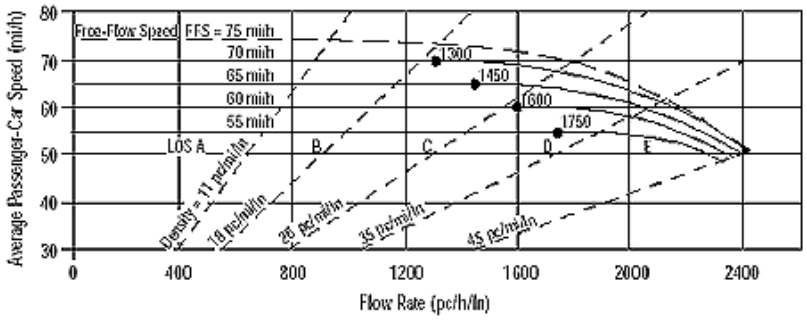
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*69.3*	mi/h	FFS	*69.3*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1339*	pc/h/ln	Design LOS v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*69.3*	mi/h	S	mi/h
D = v_p / S	*19.3*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24 North of Route 123*
Date Performed	*11/21/08*	Jurisdiction	*Brockton*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*5207*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

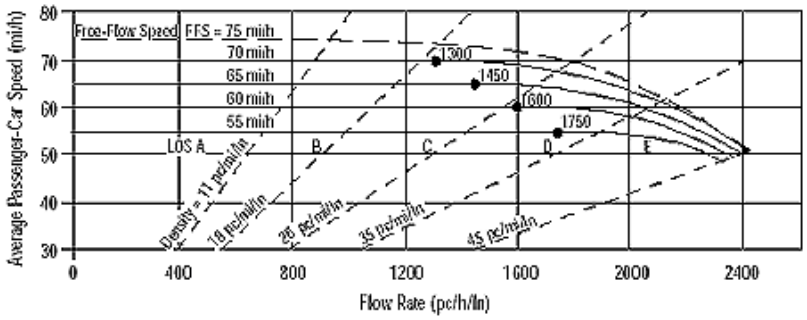
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*3*		f_N		mi/h
FFS (measured)	*69.3*	mi/h	FFS	*69.3*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1807*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*67.2*	mi/h	S	mi/h
D = v_p / S	*26.9*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*D*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	*04-30-09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 140*
Jurisdiction	
Analysis Year	*2030 Rapid Bus*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4387*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*71.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*71.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1583*	pc/h/ln
S	*70.4*	mi/h
D = v_p / S	*22.5*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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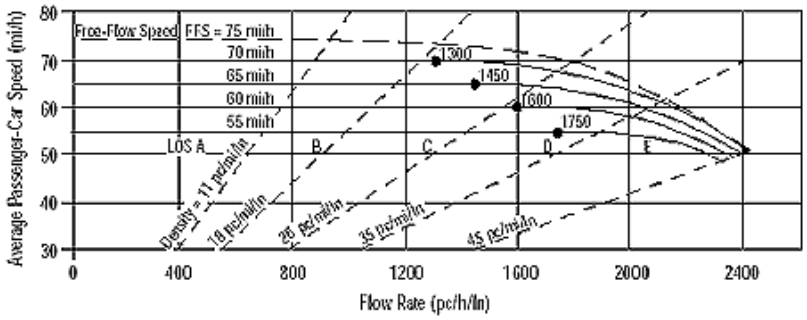

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 140*
Jurisdiction	
Analysis Year	*2030 Rapid Bas*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3692*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*71.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*71.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1389*	pc/h/ln
S	*70.9*	mi/h
D = v_p / S	*19.6*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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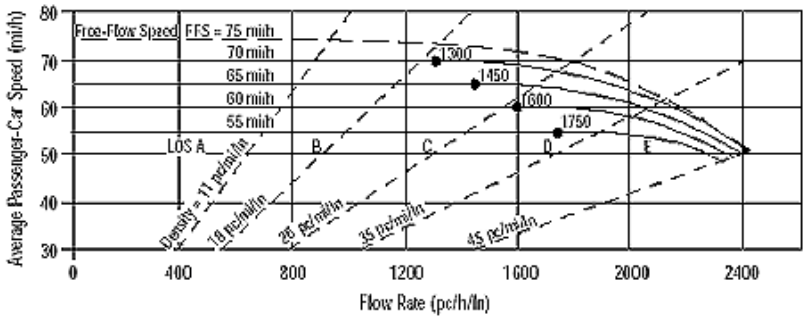

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of Route 140*
Jurisdiction	
Analysis Year	*2030 Rapid Bus*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3485*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*69.7*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.7*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1271*	pc/h/ln
S	*69.7*	mi/h
D = v_p / S	*18.2*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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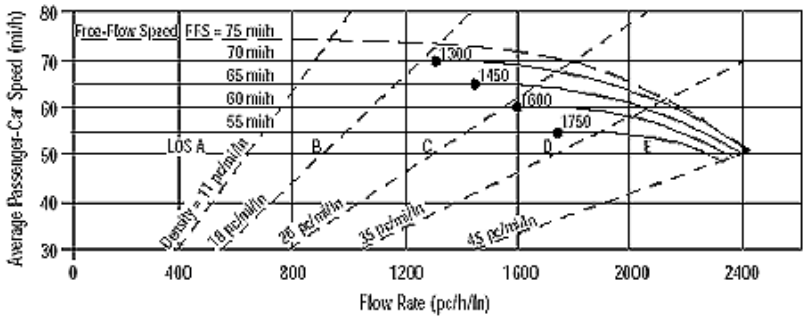

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of Route 140*
Jurisdiction	
Analysis Year	*2030 Rapid Bus*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4639*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*69.7*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.7*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1657*	pc/h/ln
S	*68.9*	mi/h
D = v_p / S	*24.1*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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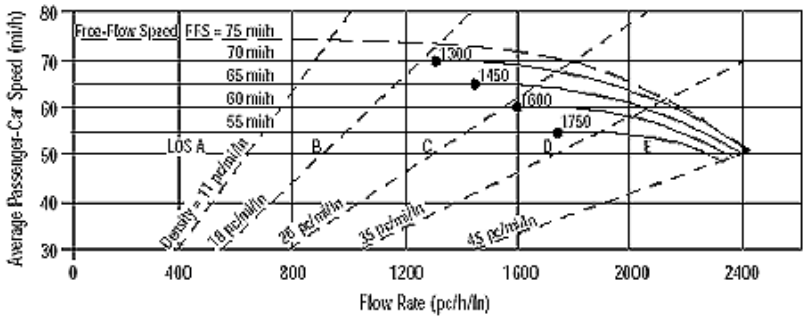
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBC*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/18/2008*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 44*
Jurisdiction	*Taunton*
Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4183*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*71.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*71.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1517*	pc/h/ln
S	*70.7*	mi/h
D = v_p / S	*21.5*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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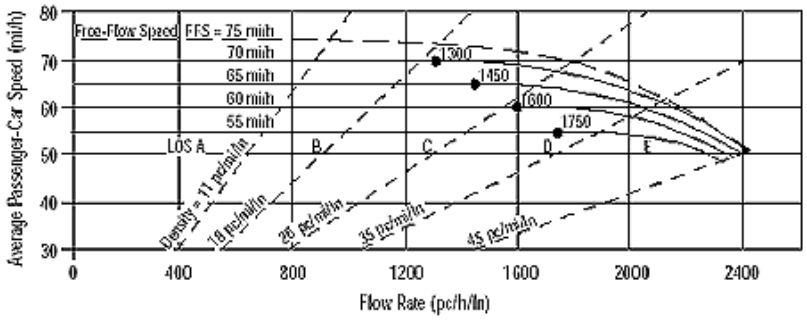
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBC*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 44*
Jurisdiction	*Taunton*
Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3620*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*71.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*71.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1362*	pc/h/ln
S	*71.0*	mi/h
D = v_p / S	*19.2*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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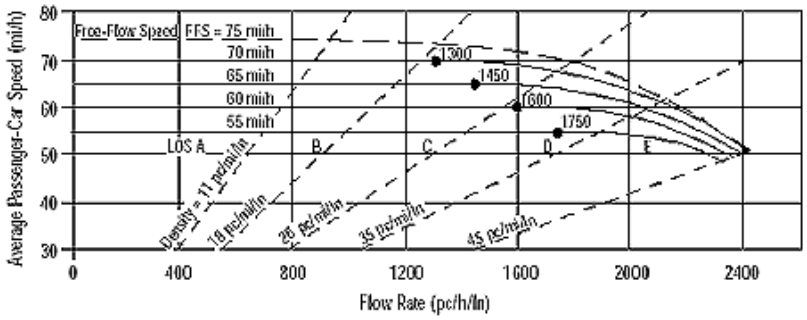
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBC*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of Route 44*
Jurisdiction	*Taunton*
Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3267*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*69.7*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.7*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1197*	pc/h/ln
S	*69.7*	mi/h
D = v_p / S	*17.2*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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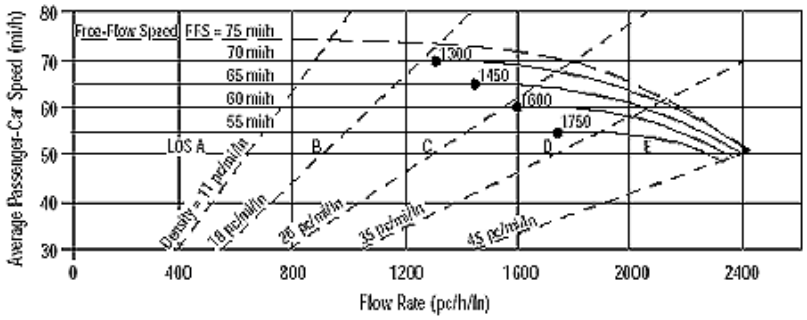
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBC*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of Route 44*
Jurisdiction	*Taunton*
Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4199*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.943*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*69.7*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*69.7*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1514*	pc/h/ln
S	*69.5*	mi/h
D = v_p / S	*21.8*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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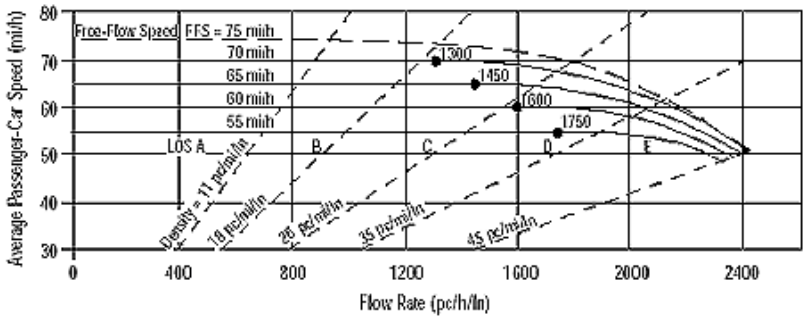
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Northbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24 North of Route I-495*
Date Performed	*11/21/08*	Jurisdiction	*Raynham*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*4988*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*3*		f_N		mi/h
FFS (measured)	*66.8*	mi/h	FFS	*66.8*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1784*	pc/h/ln	Design LOS v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*65.5*	mi/h	S	mi/h
D = v_p / S	*27.2*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*D*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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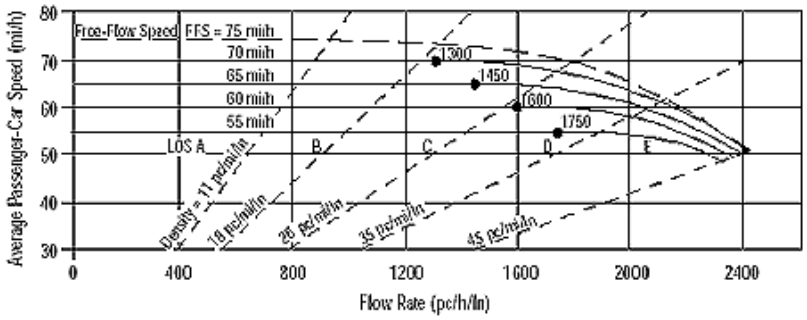
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Northbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24 North of I-495*
Date Performed	*11/21/08*	Jurisdiction	*Raynham*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*3635*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

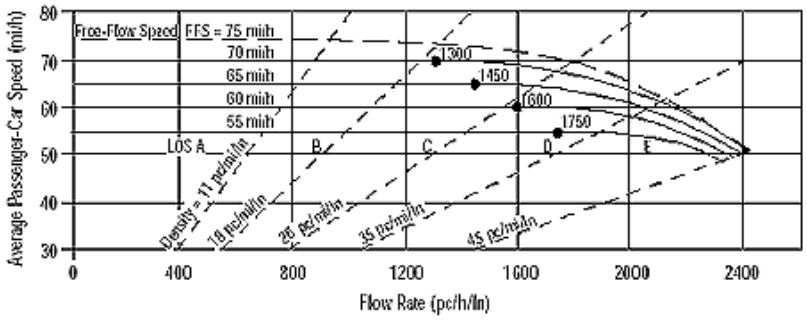
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*3*		f_N		mi/h
FFS (measured)	*66.8*	mi/h	FFS	*66.8*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1314*	pc/h/ln	Design LOS v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*66.8*	mi/h	S	mi/h
D = v_p / S	*19.7*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBB*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 24 North of I-495*
Date Performed	*11/21/08*	Jurisdiction	*Raynham*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*2847*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

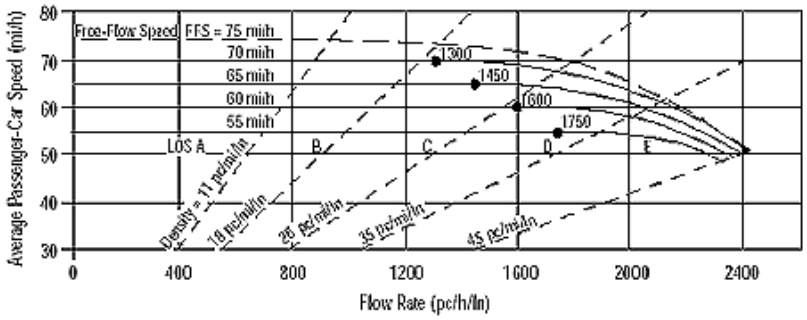
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*3*		f_N		mi/h
FFS (measured)	*63.0*	mi/h	FFS	*63.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1027*	pc/h/ln	Design LOS v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*63.0*	mi/h	S	mi/h
D = v_p / S	*16.3*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*B*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*JBB*
Agency or Company	*Coler & Colantonio, Inc.*
Date Performed	*11/21/08*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of I-495*
Jurisdiction	*Raynham*
Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4484*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	l/mi
Number of Lanes, N	*3*	
FFS (measured)	*63.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*63.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1571*	pc/h/ln
S	*63.0*	mi/h
D = v_p / S	*24.9*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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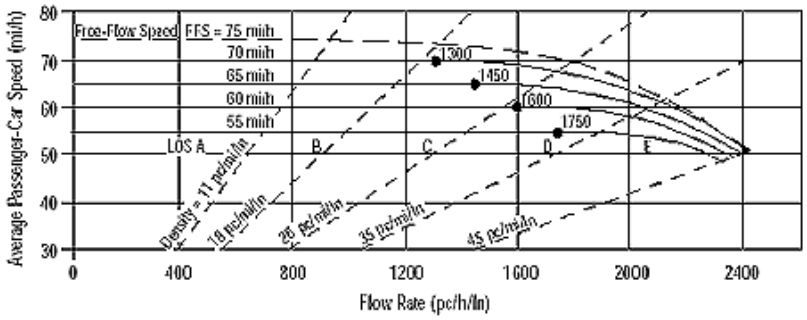

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	*04-30-09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 79*
Jurisdiction	
Analysis Year	*2030 Rapid Bus*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2449*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*3*	
FFS (measured)	*70.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*952*	pc/h/ln
S	*70.8*	mi/h
D = v_p / S	*13.4*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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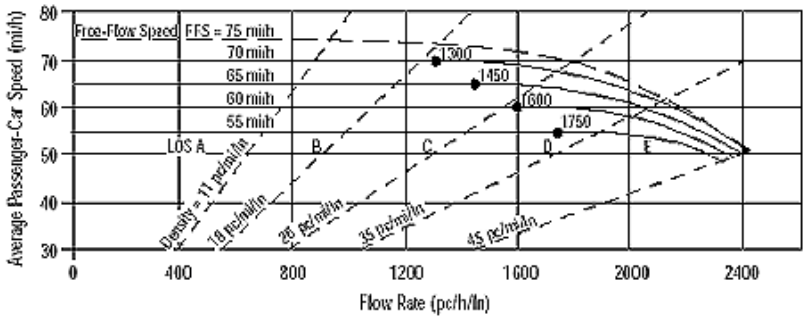

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	*04-30-09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 North of Route 79*
Jurisdiction	
Analysis Year	*2030 Rapid Bus*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3645*	veh/h	Peak-Hour Factor, PHF	*0.86*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*70.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2225*	pc/h/ln
S	*59.6*	mi/h
D = v_p / S	*37.4*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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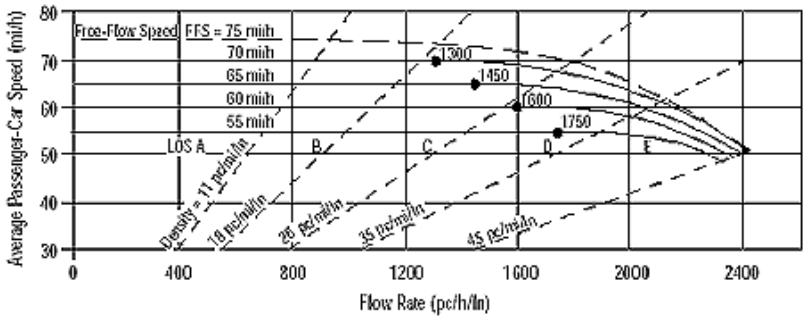

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	*11/21/08*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of Route 79*
Jurisdiction	
Analysis Year	*2030 Rapid Bus*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3442*	veh/h	Peak-Hour Factor, PHF	*0.92*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*62.5*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*62.5*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1964*	pc/h/ln
S	*60.2*	mi/h
D = v_p / S	*32.6*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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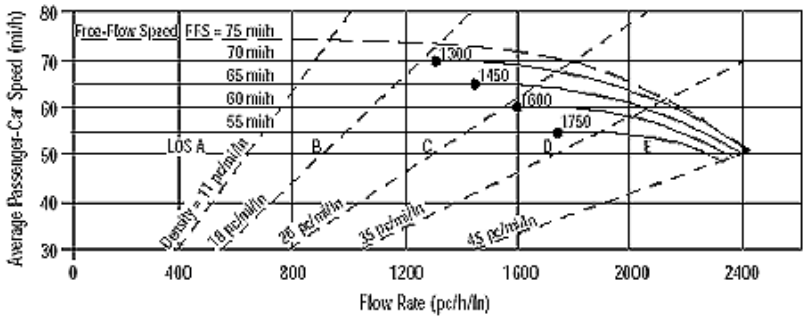

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	*04-30-09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 North of Route 79*
Jurisdiction	
Analysis Year	*2030 Rapid Bus*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3140*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*62.5*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*62.5*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1773*	pc/h/ln
S	*62.0*	mi/h
D = v_p / S	*28.6*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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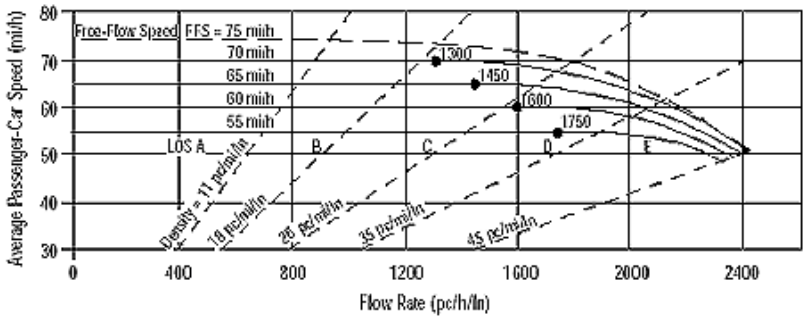

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	*4-30-09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 South of Route 140*
Jurisdiction	
Analysis Year	*2030 Rapid Bus*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3509*	veh/h	Peak-Hour Factor, PHF	*0.90*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*70.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2047*	pc/h/ln
S	*64.2*	mi/h
D = v_p / S	*31.9*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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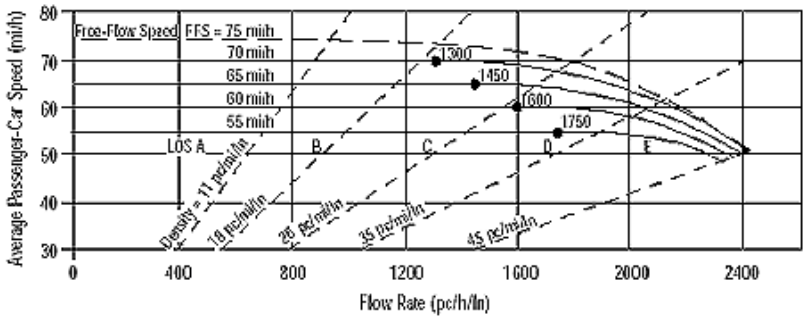
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	*04-30-09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Northbound*
From/To	*Route 24 South of Route 140*
Jurisdiction	
Analysis Year	*2030 Rapid Bus*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3535*	veh/h	Peak-Hour Factor, PHF	*0.86*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*70.8*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2158*	pc/h/ln
S	*61.5*	mi/h
D = v_p / S	*35.1*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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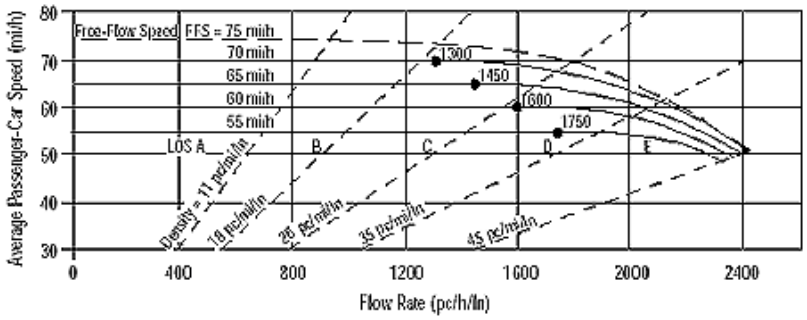
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	*04-30-09*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 South of Route 140*
Jurisdiction	
Analysis Year	*2030 Rapid Bus*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3267*	veh/h	Peak-Hour Factor, PHF	*0.92*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*62.5*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*62.5*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1864*	pc/h/ln
S	*61.3*	mi/h
D = v_p / S	*30.4*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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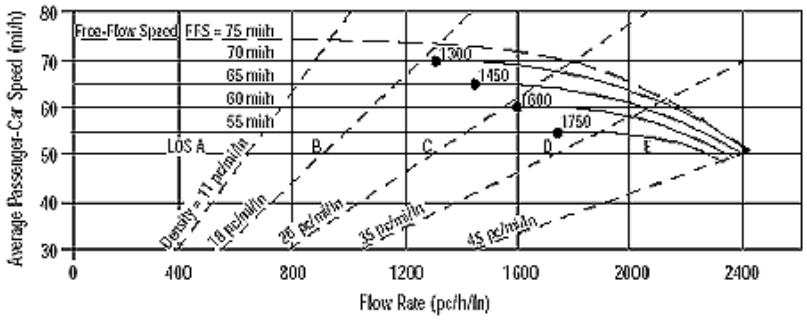
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*RMA*
Agency or Company	
Date Performed	*04-30-09*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Southbound*
From/To	*Route 24 South of Route 140*
Jurisdiction	
Analysis Year	*2030 Rapid Bus*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3660*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*2*	
FFS (measured)	*62.5*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*62.5*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2066*	pc/h/ln
S	*58.6*	mi/h
D = v_p / S	*35.3*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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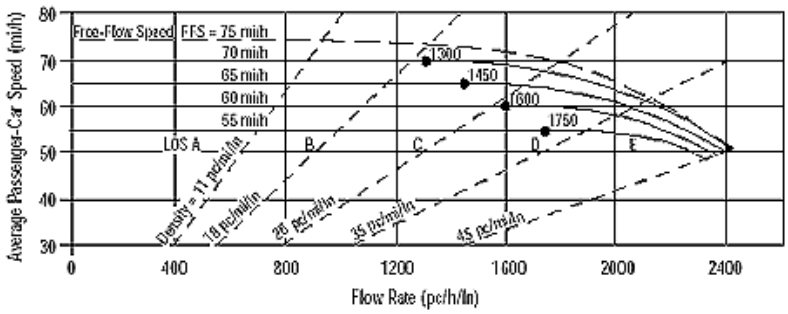


Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBC*	Highway/Direction of Travel	*Northbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 140 North of Hathaway Rd*
Date Performed	*11/18/2008*	Jurisdiction	*New Bedford*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*1715*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*9*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

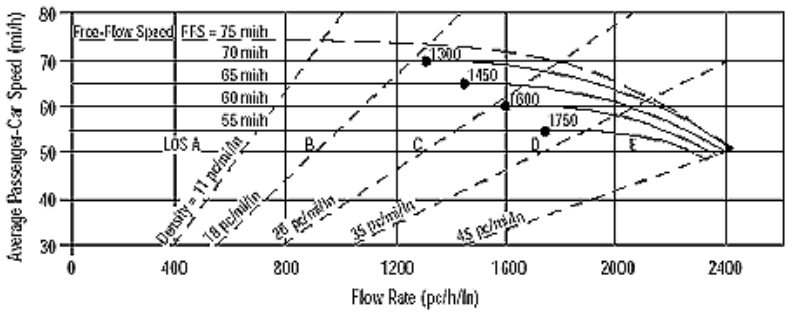
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.957*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*69.3*	mi/h	FFS	*69.3*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*953*	pc/h/ln	Design LOS		
S	*69.3*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*13.8*	pc/mi/ln	S		mi/h
LOS	*B*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBC*	Highway/Direction of Travel	*Northbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 140 North of Hathaway Rd*
Date Performed	*11/18/2008*	Jurisdiction	*New Bedford*
Analysis Time Period	*PM Peak Hour*	Analysis Year	

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*2340*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

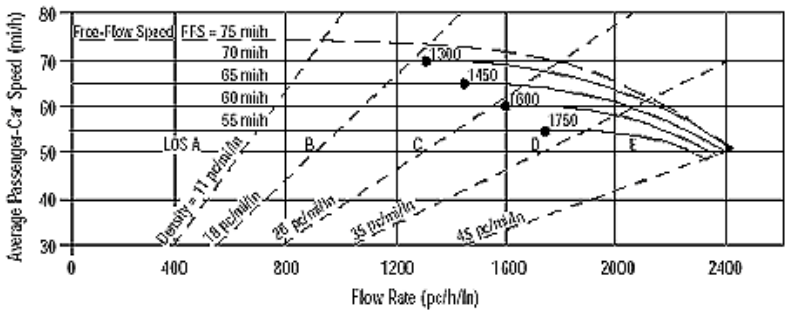
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*69.3*	mi/h	FFS	*69.3*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1294*	pc/h/ln	Design LOS		
S	*69.3*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*18.7*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBC*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 140 North of Hathaway Rd*
Date Performed	*11/18/2008*	Jurisdiction	*New Bedford*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*2434*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

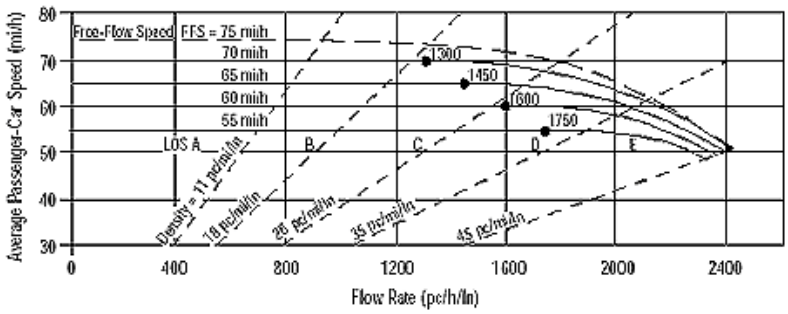
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*62.2*	mi/h	FFS	*62.2*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1348*	pc/h/ln	Design LOS		
S	*62.2*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*21.7*	pc/mi/ln	S		mi/h
LOS	*C*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBC*	Highway/Direction of Travel	*Southbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 140 North of Hathaway Rd*
Date Performed	*11/18/2008*	Jurisdiction	*New Bedford*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*2011*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

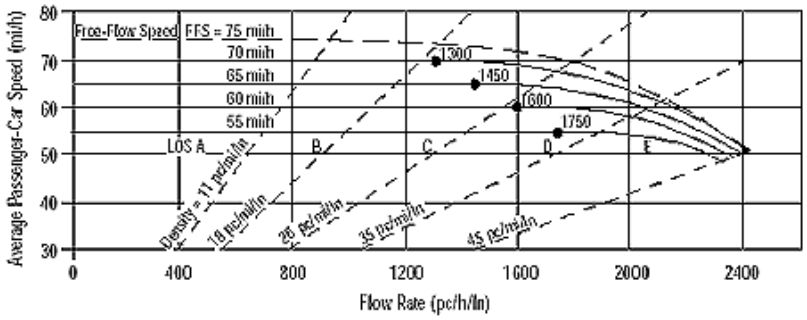
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*62.2*	mi/h	FFS	*62.2*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1080*	pc/h/ln	Design LOS		
S	*62.2*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*17.4*	pc/mi/ln	S		mi/h
LOS	*B*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBC*	Highway/Direction of Travel	*Eastbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 140 South of Route 24*
Date Performed	*11/19/08*	Jurisdiction	*Taunton*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*1289*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

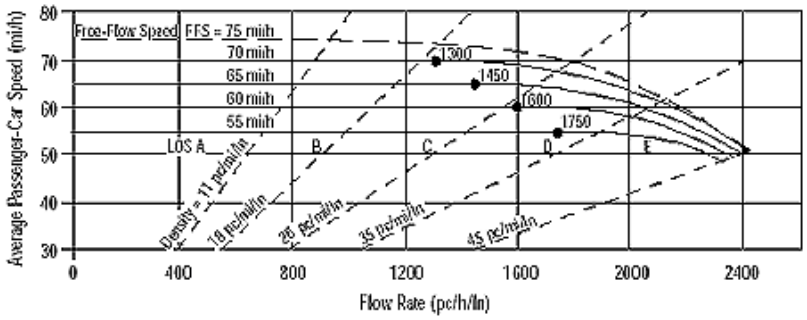
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*728*	pc/h/ln	Design LOS v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*65.0*	mi/h	S	mi/h
D = v_p / S	*11.2*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*B*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBC*	Highway/Direction of Travel	*Eastbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 140 South of Route 24*
Date Performed	*11/19/08*	Jurisdiction	*Taunton*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*1616*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

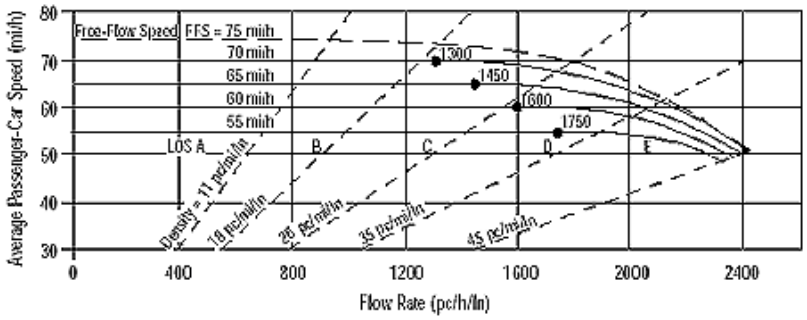
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*859*	pc/h/ln	Design LOS v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*65.0*	mi/h	S	mi/h
D = v_p / S	*13.2*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*B*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		***Site Information***	
Analyst	*JBC*	Highway/Direction of Travel	*Westbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 140 South of Route 24*
Date Performed	*11/18/2008*	Jurisdiction	*Taunton*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs				
Volume, V	*1400*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

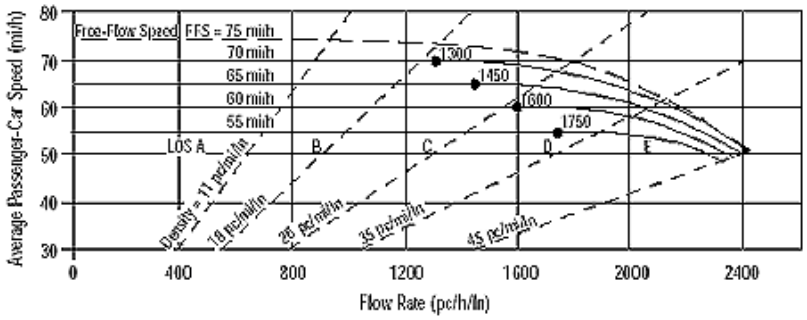
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*66.8*	mi/h	FFS	*66.8*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*775*	pc/h/ln	Design LOS v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*66.8*	mi/h	S	mi/h
D = v_p / S	*11.6*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*B*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information		Site Information	
Analyst	*JBC*	Highway/Direction of Travel	*Westbound*
Agency or Company	*Coler & Colantonio, Inc.*	From/To	*Route 140 South of Route 24*
Date Performed	*11/18/2008*	Jurisdiction	*Taunton*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 RBA*

Project Description South Coast Rail

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*1540*	veh/h	Peak-Hour Factor, PHF	*0.92*
AADT		veh/day	%Trucks and Buses, P_T	*6*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.971*

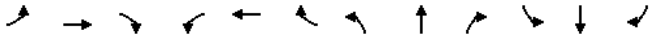
Speed Inputs			Calc Speed Adj and FFS		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*66.8*	mi/h	FFS	*66.8*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			Design (N)	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*862*	pc/h/ln	Design LOS v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*66.8*	mi/h	S	mi/h
D = v_p / S	*12.9*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*B*		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

Capacity Analysis Results
Build with Mitigation Condition

Fall River



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	412	0	0	352	203	100	492	308	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	11	12	12	11	12	12	12	12
Storage Length (ft)	0		0	0		165	0		125	0		0
Storage Lanes	0		0	0		1	0		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		272			959			475			333	
Travel Time (s)		6.2			21.8			10.8			7.6	
Peak Hour Factor	0.82	0.82	0.82	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	2%	0%	0%	3%	3%	1%	3%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	541	0	0	400	231	0	644	335	0	0	0
Turn Type	pm+pt					Perm	Perm		Perm			
Protected Phases	5	2			6			3				
Permitted Phases	2					6	3		3			
Detector Phase	5	2			6	6	3	3	3			
Switch Phase												
Minimum Initial (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0			
Minimum Split (s)	11.0	11.0			11.0	11.0	11.0	11.0	11.0			
Total Split (s)	12.0	30.0	0.0	0.0	18.0	18.0	35.0	35.0	35.0	0.0	0.0	0.0
Total Split (%)	13.8%	34.5%	0.0%	0.0%	20.7%	20.7%	40.2%	40.2%	40.2%	0.0%	0.0%	0.0%
Maximum Green (s)	7.0	25.0			13.0	13.0	30.0	30.0	30.0			
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.52			0.35	0.43		0.65	0.73			
Control Delay		26.4			23.7	27.0		29.8	36.7			
Queue Delay		1.4			0.0	0.0		0.0	0.0			
Total Delay		27.9			23.7	27.0		29.8	36.7			
Queue Length 50th (ft)		126			87	99		157	160			
Queue Length 95th (ft)		167			131	172		202	241			
Internal Link Dist (ft)		192			879			395			253	
Turn Bay Length (ft)						165			125			
Base Capacity (vph)		1036			1154	534		1163	546			
Starvation Cap Reductn		298			0	0		0	0			
Spillback Cap Reductn		0			0	0		0	0			
Storage Cap Reductn		0			0	0		0	0			
Reduced v/c Ratio		0.73			0.35	0.43		0.55	0.61			

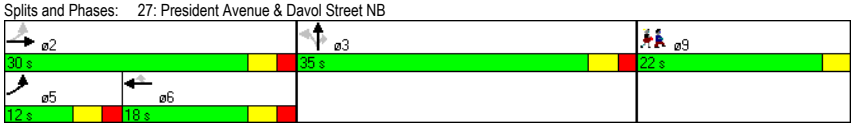
Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
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 (%)	25%
Maximum Green (s)	19.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	7
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	

Lanes, Volumes, Timings
27: President Avenue & Davol Street NB

2030 Build With Mitigation Condition - AM Peak Hour

Intersection Summary	
Area Type:	Other
Cycle Length: 87	
Actuated Cycle Length: 87	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green, Master Intersection	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	

Splits and Phases: 27: President Avenue & Davol Street NB



HCM Signalized Intersection Capacity Analysis
27: President Avenue & Davol Street NB

2030 Build With Mitigation Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	412	0	0	352	203	100	492	308	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	11	12	12	12	12
Total Lost time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		1.00			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3383			3388	1568		3371	1583			
Flt Permitted		0.90			1.00	1.00		0.99	1.00			
Satd. Flow (perm)		3042			3388	1568		3371	1583			
Peak-hour factor, PHF	0.82	0.82	0.82	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	502	0	0	400	231	109	535	335	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	541	0	0	400	231	0	644	335	0	0	0
Heavy Vehicles (%)	13%	2%	0%	0%	3%	3%	1%	3%	2%	0%	0%	0%
Turn Type	pm+pt					Perm	Perm		Perm			
Protected Phases	5	2			6			3				
Permitted Phases	2					6	3		3			
Actuated Green, G (s)		29.6			29.6	29.6		25.4	25.4			
Effective Green, g (s)		29.6			29.6	29.6		25.4	25.4			
Actuated g/C Ratio		0.34			0.34	0.34		0.29	0.29			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)		1035			1153	533		984	462			
v/s Ratio Prot					0.12							
v/s Ratio Perm		c0.18				0.15		0.19	c0.21			
v/c Ratio		0.52			0.35	0.43		0.65	0.73			
Uniform Delay, d1		23.0			21.5	22.2		27.0	27.7			
Progression Factor		1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2		0.5			0.8	2.6		1.6	5.6			
Delay (s)		23.5			22.3	24.8		28.5	33.2			
Level of Service		C			C	C		C	C			
Approach Delay (s)		23.5			23.2			30.1			0.0	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM Average Control Delay	26.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	32.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

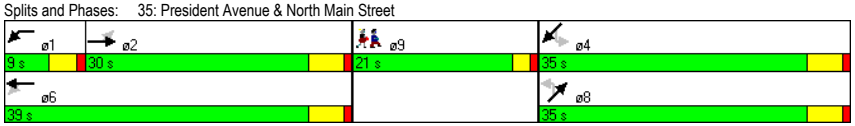
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	143	507	71	54	355	70	102	193	75	107	166	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	12	16	12	12	16	12	12	16	12
Storage Length (ft)	100		0	125		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		959			1952			265			1409	
Travel Time (s)		21.8			44.4			6.0			32.0	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.75	0.75	0.75
Heavy Vehicles (%)	2%	2%	3%	0%	2%	0%	9%	6%	9%	6%	3%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	0
Parking (#/hr)			5									
Shared Lane Traffic (%)												
Lane Group Flow (vph)	164	665	0	62	488	0	117	308	0	143	338	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	9.0	9.0		8.0	9.0		9.0	9.0		9.0	9.0	
Total Split (s)	30.0	30.0	0.0	9.0	39.0	0.0	35.0	35.0	0.0	35.0	35.0	0.0
Total Split (%)	31.6%	31.6%	0.0%	9.5%	41.1%	0.0%	36.8%	36.8%	0.0%	36.8%	36.8%	0.0%
Maximum Green (s)	25.0	25.0		5.0	34.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		3.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.49	0.79		0.26	0.50		0.70	0.56		0.73	0.60	
Control Delay	31.8	34.5		18.3	19.1		48.3	25.5		47.6	25.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	31.8	34.5		18.3	19.1		48.3	25.5		47.6	25.8	
Queue Length 50th (ft)	44	210		9	94		38	89		47	97	
Queue Length 95th (ft)	#186	#675		50	331		#128	210		112	185	
Internal Link Dist (ft)		879			1872			185			1329	
Turn Bay Length (ft)	100			125			150			150		
Base Capacity (vph)	336	838		243	1141		295	948		346	967	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	22%
Maximum Green (s)	18.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	13.0
Pedestrian Calls (#/hr)	20
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.49	0.79		0.26	0.43		0.40	0.32		0.41	0.35	

Intersection Summary	
Area Type:	Other
Cycle Length: 95	
Actuated Cycle Length: 68.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 35: President Avenue & North Main Street

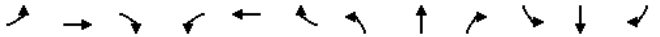


Lane Group	ø9
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	143	507	71	54	355	70	102	193	75	107	166	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	16	12	12	16	12	12	16	12
Total Lost time (s)	5.0	5.0		4.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.96		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	2070		1805	2066		1656	1931		1703	1962	
Flt Permitted	0.45	1.00		0.13	1.00		0.35	1.00		0.40	1.00	
Satd. Flow (perm)	831	2070		240	2066		607	1931		711	1962	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.75	0.75	0.75
Adj. Flow (vph)	164	583	82	62	408	80	117	222	86	143	221	117
RTOR Reduction (vph)	0	0	0	0	6	0	0	15	0	0	21	0
Lane Group Flow (vph)	164	665	0	62	482	0	117	293	0	143	317	0
Heavy Vehicles (%)	2%	2%	3%	0%	2%	0%	9%	6%	9%	6%	3%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	0
Parking (#/hr)			5									
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	27.7	27.7		34.3	34.3		19.0	19.0		19.0	19.0	
Effective Green, g (s)	27.7	27.7		34.3	34.3		19.0	19.0		19.0	19.0	
Actuated g/C Ratio	0.39	0.39		0.48	0.48		0.27	0.27		0.27	0.27	
Clearance Time (s)	5.0	5.0		4.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	322	802		172	991		161	513		189	521	
v/s Ratio Prot		c0.32		0.01	c0.23			0.15			0.16	
v/s Ratio Perm	0.20			0.16			0.19			c0.20		
v/c Ratio	0.51	0.83		0.36	0.49		0.73	0.57		0.76	0.61	
Uniform Delay, d1	16.7	19.8		14.5	12.6		23.9	22.7		24.1	23.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	7.1		1.3	0.4		15.0	1.5		15.8	2.0	
Delay (s)	18.0	26.9		15.8	13.0		38.9	24.3		39.9	25.0	
Level of Service	B	C		B	B		D	C		D	C	
Approach Delay (s)		25.1			13.3			28.3			29.4	
Approach LOS		C			B			C			C	

Intersection Summary				
HCM Average Control Delay	23.8	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	71.5	Sum of lost time (s)	23.2	
Intersection Capacity Utilization	70.8%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	37	509	0	0	291	364	146	666	371	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	11	12	12	11	12	12	12	12
Storage Length (ft)	0		0	0		165	0		125	0		0
Storage Lanes	0		0	0		1	0		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		272			959			475			333	
Travel Time (s)		6.2			21.8			10.8			7.6	
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.87	0.87	0.87	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	0%	0%	1%	1%	0%	1%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	593	0	0	327	409	0	934	426	0	0	0
Turn Type	pm+pt					Perm	Perm		Perm			
Protected Phases	5	2			6			3				
Permitted Phases	2					6	3		3			
Detector Phase	5	2			6	6	3	3	3			
Switch Phase												
Minimum Initial (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0			
Minimum Split (s)	11.0	11.0			11.0	11.0	11.0	11.0	11.0			
Total Split (s)	12.0	30.0	0.0	0.0	18.0	18.0	35.0	35.0	35.0	0.0	0.0	0.0
Total Split (%)	13.8%	34.5%	0.0%	0.0%	20.7%	20.7%	40.2%	40.2%	40.2%	0.0%	0.0%	0.0%
Maximum Green (s)	7.0	25.0			13.0	13.0	30.0	30.0	30.0			
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.64			0.32	0.86		0.81	0.79			
Control Delay		30.6			25.1	49.3		33.0	38.0			
Queue Delay		4.1			0.0	0.0		0.0	0.0			
Total Delay		34.7			25.1	49.3		33.0	38.0			
Queue Length 50th (ft)		150			73	214		239	205			
Queue Length 95th (ft)		207			108	#374		299	#306			
Internal Link Dist (ft)		192			879			395			253	
Turn Bay Length (ft)						165			125			
Base Capacity (vph)		928			1027	475		1183	557			
Starvation Cap Reductn		251			0	0		0	0			
Spillback Cap Reductn		0			0	0		0	0			
Storage Cap Reductn		0			0	0		0	0			
Reduced v/c Ratio		0.88			0.32	0.86		0.79	0.76			

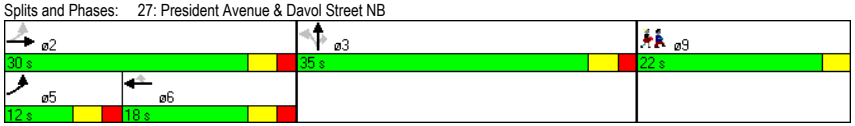
Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
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 (%)	25%
Maximum Green (s)	19.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	10
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	

Lanes, Volumes, Timings
27: President Avenue & Davol Street NB

2030 Build With Mitigation Condition - PM Peak Hour

Intersection Summary	
Area Type:	Other
Cycle Length: 87	
Actuated Cycle Length: 87	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green, Master Intersection	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 27: President Avenue & Davol Street NB



HCM Signalized Intersection Capacity Analysis
27: President Avenue & Davol Street NB

2030 Build With Mitigation Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	37	509	0	0	291	364	146	666	371	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	11	12	12	12	12
Total Lost time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		1.00			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3439			3455	1599		3430	1615			
Flt Permitted		0.91			1.00	1.00		0.99	1.00			
Satd. Flow (perm)		3123			3455	1599		3430	1615			
Peak-hour factor, PHF	0.92	0.92	0.92	0.89	0.89	0.89	0.87	0.87	0.87	0.92	0.92	0.92
Adj. Flow (vph)	40	553	0	0	327	409	168	766	426	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	593	0	0	327	409	0	934	426	0	0	0
Heavy Vehicles (%)	3%	1%	0%	0%	1%	1%	0%	1%	0%	0%	0%	0%
Turn Type	pm+pt					Perm	Perm		Perm			
Protected Phases	5	2			6			3				
Permitted Phases	2					6	3		3			
Actuated Green, G (s)		25.9			25.9	25.9		29.1	29.1			
Effective Green, g (s)		25.9			25.9	25.9		29.1	29.1			
Actuated g/C Ratio		0.30			0.30	0.30		0.33	0.33			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)		930			1029	476		1147	540			
v/s Ratio Prot					0.09							
v/s Ratio Perm		0.19				c0.26		0.27	0.26			
v/c Ratio		0.64			0.32	0.86		0.81	0.79			
Uniform Delay, d1		26.5			23.7	28.8		26.5	26.2			
Progression Factor		1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2		1.4			0.8	18.0		4.5	7.5			
Delay (s)		27.9			24.5	46.8		31.0	33.7			
Level of Service		C			C	D		C	C			
Approach Delay (s)		27.9			36.9			31.9			0.0	
Approach LOS		C			D			C			A	

Intersection Summary			
HCM Average Control Delay	32.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	32.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	134	622	119	59	435	59	118	257	75	155	193	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	11	11	12	11	12	12	11	12	12
Storage Length (ft)	100		0	125		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		959			1952			265			1409	
Travel Time (s)		21.8			44.4			6.0			32.0	
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.92	0.92	0.92	0.96	0.96	0.96
Heavy Vehicles (%)	3%	1%	3%	5%	1%	2%	1%	1%	0%	1%	2%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	0
Parking (#/hr)			5									
Shared Lane Traffic (%)												
Lane Group Flow (vph)	149	823	0	69	581	0	128	361	0	161	297	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		9.0	9.0		9.0	9.0	
Total Split (s)	40.0	40.0	0.0	9.0	49.0	0.0	35.0	35.0	0.0	35.0	35.0	0.0
Total Split (%)	38.1%	38.1%	0.0%	8.6%	46.7%	0.0%	33.3%	33.3%	0.0%	33.3%	33.3%	0.0%
Maximum Green (s)	35.0	35.0		5.0	44.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		3.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.60	0.97		0.39	0.66		0.44	0.56		0.69	0.46	
Control Delay	35.5	51.8		19.6	22.1		30.6	27.7		44.3	24.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	35.5	51.8		19.6	22.1		30.6	27.7		44.3	24.8	
Queue Length 50th (ft)	59	408		17	200		51	144		71	108	
Queue Length 95th (ft)	#194	#903		52	425		138	311		#224	245	
Internal Link Dist (ft)		879			1872			185			1329	
Turn Bay Length (ft)	100			125			150			150		
Base Capacity (vph)	250	850		177	923		288	649		235	640	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	

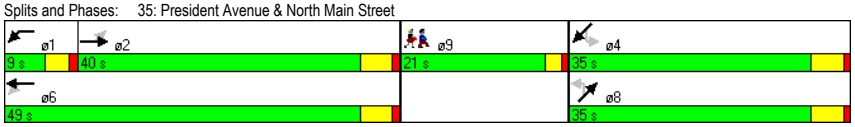
Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	20%
Maximum Green (s)	18.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	13.0
Pedestrian Calls (#/hr)	13
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.60	0.97		0.39	0.63		0.44	0.56		0.69	0.46	

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 86.4
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 35: President Avenue & North Main Street



Lane Group	ø9
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	134	622	119	59	435	59	118	257	75	155	193	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	11	11	12	11	12	12	11	12	12
Total Lost time (s)	5.0	5.0		4.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.97		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	2074		1662	1784		1728	1821		1728	1778	
Flt Permitted	0.33	1.00		0.10	1.00		0.45	1.00		0.37	1.00	
Satd. Flow (perm)	608	2074		178	1784		820	1821		670	1778	
Peak-hour factor, PHF	0.90	0.90	0.90	0.85	0.85	0.85	0.92	0.92	0.92	0.96	0.96	0.96
Adj. Flow (vph)	149	691	132	69	512	69	128	279	82	161	201	96
RTOR Reduction (vph)	0	0	0	0	4	0	0	9	0	0	15	0
Lane Group Flow (vph)	149	823	0	69	577	0	128	352	0	161	282	0
Heavy Vehicles (%)	3%	1%	3%	5%	1%	2%	1%	1%	0%	1%	2%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	0
Parking (#/hr)			5									
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.4	35.4		43.3	43.3		30.4	30.4		30.4	30.4	
Effective Green, g (s)	35.4	35.4		43.3	43.3		30.4	30.4		30.4	30.4	
Actuated g/C Ratio	0.39	0.39		0.48	0.48		0.34	0.34		0.34	0.34	
Clearance Time (s)	5.0	5.0		4.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	240	819		150	861		278	617		227	603	
v/s Ratio Prot		c0.40		0.02	c0.32			0.19			0.16	
v/s Ratio Perm	0.25			0.20			0.16			c0.24		
v/c Ratio	0.62	1.00		0.46	0.67		0.46	0.57		0.71	0.47	
Uniform Delay, d1	21.8	27.2		19.8	17.7		23.2	24.3		25.8	23.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.6	32.6		0.8	1.5		0.4	0.8		8.0	0.2	
Delay (s)	25.3	59.8		20.6	19.3		23.7	25.1		33.8	23.5	
Level of Service	C	E		C	B		C	C		C	C	
Approach Delay (s)		54.5			19.4			24.7			27.1	
Approach LOS		D			B			C			C	

Intersection Summary				
HCM Average Control Delay	35.1	HCM Level of Service		D
HCM Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	89.7	Sum of lost time (s)		21.0
Intersection Capacity Utilization	85.8%	ICU Level of Service		E
Analysis Period (min)	15			
c Critical Lane Group				

New Bedford

HCM Signalized Intersection Capacity Analysis
2: Jones Street & Mt Pleasant St

2030 Build Condition w/ Mitigation - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	5	0	189	10	563	0	75	294	193	195	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	16	12	12	16	12
Total Lost time (s)		6.0			6.0	6.0		6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Frt		1.00			1.00	0.85		0.89		1.00	1.00	
Flt Protected		1.00			0.95	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		1794			1681	1538		1776		1719	1912	
Flt Permitted		1.00			0.73	1.00		1.00		0.22	1.00	
Satd. Flow (perm)		1794			1290	1538		1776		402	1912	
Peak-hour factor, PHF	0.88	0.88	0.88	0.82	0.82	0.82	0.94	0.94	0.94	0.83	0.83	0.83
Adj. Flow (vph)	0	6	0	230	12	687	0	80	313	233	235	6
RTOR Reduction (vph)	0	0	0	0	0	165	0	275	0	0	3	0
Lane Group Flow (vph)	0	6	0	0	242	522	0	118	0	233	238	0
Heavy Vehicles (%)	0%	20%	0%	7%	25%	5%	0%	9%	8%	5%	11%	60%
Turn Type	Perm			Perm		pt+ov	Perm			pm+pt		
Protected Phases		8			4	4 1		2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		55.0			55.0	76.0		12.0		33.0	33.0	
Effective Green, g (s)		55.0			55.0	76.0		12.0		33.0	33.0	
Actuated g/C Ratio		0.55			0.55	0.76		0.12		0.33	0.33	
Clearance Time (s)		6.0			6.0			6.0		6.0	6.0	
Vehicle Extension (s)		2.0			2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		987			710	1169		213		330	631	
v/s Ratio Prot		0.00				c0.34		0.07		c0.11	0.12	
v/s Ratio Perm					0.19					c0.13		
v/c Ratio		0.01			0.34	0.45		0.55		0.71	0.38	
Uniform Delay, d1		10.2			12.5	4.4		41.5		27.1	25.6	
Progression Factor		1.00			0.62	3.41		1.00		1.00	1.00	
Incremental Delay, d2		0.0			1.3	0.1		1.8		5.5	0.1	
Delay (s)		10.2			8.9	15.0		43.2		32.6	25.8	
Level of Service		B			A	B		D		C	C	
Approach Delay (s)		10.2			13.4			43.2			29.1	
Approach LOS		B			B			D			C	

Intersection Summary				
HCM Average Control Delay	24.0	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.54			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	77.8%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
14: Tarkiln Hill Road & Church Street

2030 Build Condition w/ Mitigation - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	315	0	30	504	60	241	200	40	45	170	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	12	11	11	12	11	11	11	11	11	12
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)	1604	1801		1616	1772		1728	1761			1723	1615
Flt Permitted	0.25	1.00		0.45	1.00		0.53	1.00			0.88	1.00
Satd. Flow (perm)	429	1801		773	1772		965	1761			1533	1615
Peak-hour factor, PHF	0.81	0.81	0.81	0.87	0.87	0.87	0.84	0.84	0.84	0.90	0.90	0.90
Adj. Flow (vph)	75	389	0	34	579	69	287	238	48	50	189	102
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	75	389	0	34	648	0	287	286	0	0	239	102
Heavy Vehicles (%)	5%	2%	0%	8%	2%	2%	1%	2%	0%	11%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Actuated Green, G (s)	53.6	53.6		53.6	53.6		36.4	36.4			36.4	36.4
Effective Green, g (s)	53.6	53.6		53.6	53.6		36.4	36.4			36.4	36.4
Actuated g/C Ratio	0.54	0.54		0.54	0.54		0.36	0.36			0.36	0.36
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)	0.2	0.2		0.2	0.2		5.0	5.0			5.0	5.0
Lane Grp Cap (vph)	230	965		414	950		351	641			558	588
v/s Ratio Prot		0.22			c0.37			0.16				
v/s Ratio Perm	0.17			0.04			c0.30				0.16	0.06
v/c Ratio	0.33	0.40		0.08	0.68		0.82	0.45			0.43	0.17
Uniform Delay, d1	13.0	13.7		11.3	17.0		28.8	24.1			24.0	21.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	3.7	1.3		0.4	4.0		15.3	1.0			1.1	0.3
Delay (s)	16.8	15.0		11.6	20.9		44.1	25.2			25.1	21.9
Level of Service	B	B		B	C		D	C			C	C
Approach Delay (s)		15.3			20.5			34.7			24.1	
Approach LOS		B			C			C			C	

Intersection Summary				
HCM Average Control Delay	23.9	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.74			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	88.0%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
32: Coggeshall Street & North Front St

2030 Build Condition w/ Mitigation - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	390	54	119	320	50	37	67	52	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	15	16	16	15	16	16	15	16	16	16	16
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		1.00			1.00			1.00				
Frt		0.99			0.99			0.96				
Flt Protected		0.99			0.99			0.99				
Satd. Flow (prot)		1945			1968			1858				
Flt Permitted		0.90			0.77			0.99				
Satd. Flow (perm)		1759			1524			1858				
Peak-hour factor, PHF	0.89	0.89	0.89	0.84	0.84	0.84	0.86	0.86	0.86	0.92	0.92	0.92
Adj. Flow (vph)	56	438	61	142	381	60	43	78	60	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	555	0	0	583	0	0	181	0	0	0	0
Heavy Vehicles (%)	4%	5%	9%	2%	3%	10%	8%	3%	9%	0%	0%	0%
Turn Type	Perm			Perm			Perm					
Protected Phases		4			8			2				
Permitted Phases	4			8			2					
Actuated Green, G (s)		22.2			22.2			10.1				
Effective Green, g (s)		22.2			22.2			10.1				
Actuated g/C Ratio		0.50			0.50			0.23				
Clearance Time (s)		6.0			6.0			6.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		881			764			424				
v/s Ratio Prot												
v/s Ratio Perm		0.32			c0.38			0.10				
v/c Ratio		0.63			0.76			0.43				
Uniform Delay, d1		8.1			8.9			14.6				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		1.4			4.5			0.7				
Delay (s)		9.5			13.5			15.3				
Level of Service		A			B			B				
Approach Delay (s)		9.5			13.5			15.3			0.0	
Approach LOS		A			B			B			A	

Intersection Summary				
HCM Average Control Delay	12.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	44.3	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	69.3%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
49: Kings Highway & Stop & Shop driveway

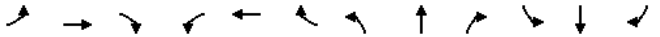
2030 Build Condition w/ Mitigation - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	455	159	157	579	95	52	5	78	55	10	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frt		0.97			0.98			0.91			0.92	
Flt Protected		0.99			0.99			0.98			0.98	
Satd. Flow (prot)		3291			3413			3027			3220	
Flt Permitted		0.70			0.63			0.78			0.80	
Satd. Flow (perm)		2305			2172			2406			2622	
Peak-hour factor, PHF	0.81	0.81	0.81	0.90	0.90	0.90	0.90	0.90	0.90	0.72	0.72	0.72
Adj. Flow (vph)	111	562	196	174	643	106	58	6	87	76	14	112
RTOR Reduction (vph)	0	11	0	0	4	0	0	79	0	0	102	0
Lane Group Flow (vph)	0	858	0	0	919	0	0	72	0	0	100	0
Heavy Vehicles (%)	6%	6%	3%	1%	4%	0%	12%	29%	2%	0%	13%	0%
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		79.1			79.1			8.9			8.9	
Effective Green, g (s)		79.1			79.1			8.9			8.9	
Actuated g/C Ratio		0.79			0.79			0.09			0.09	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		1823			1718			214			233	
v/s Ratio Prot												
v/s Ratio Perm		0.37			c0.42			0.03			c0.04	
v/c Ratio		0.47			0.53			0.34			0.43	
Uniform Delay, d1		3.5			3.8			42.8			43.1	
Progression Factor		0.23			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.2			0.3			0.5	
Delay (s)		0.9			3.9			43.1			43.6	
Level of Service		A			A			D			D	
Approach Delay (s)		0.9			3.9			43.1			43.6	
Approach LOS		A			A			D			D	

Intersection Summary				
HCM Average Control Delay	9.2	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.52			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	68.6%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
58: Coggeshall St & Purchase Street

2030 Build Condition w/ Mitigation - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	155	36	35	109	98	10	202	60	97	177	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	15	16	16	12	16	16	16	16	16	16	16
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			0.95			0.97			0.99	
Flt Protected		1.00			0.99			1.00			0.98	
Satd. Flow (prot)		1974			1672			1988			1922	
Flt Permitted		0.97			0.93			0.98			0.81	
Satd. Flow (perm)		1915			1562			1961			1585	
Peak-hour factor, PHF	0.80	0.80	0.80	0.83	0.83	0.83	0.89	0.89	0.89	0.88	0.88	0.88
Adj. Flow (vph)	19	194	45	42	131	118	11	227	67	110	201	17
RTOR Reduction (vph)	0	11	0	0	36	0	0	10	0	0	2	0
Lane Group Flow (vph)	0	247	0	0	255	0	0	295	0	0	326	0
Heavy Vehicles (%)	0%	4%	0%	11%	5%	7%	36%	4%	3%	6%	11%	13%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		12.6			12.6			20.9			20.9	
Effective Green, g (s)		12.6			12.6			20.9			20.9	
Actuated g/C Ratio		0.26			0.26			0.43			0.43	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		502			409			852			689	
v/s Ratio Prot												
v/s Ratio Perm		0.13			c0.16			0.15			c0.21	
v/c Ratio		0.49			0.62			0.35			0.47	
Uniform Delay, d1		15.0			15.7			9.1			9.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.8			2.9			0.2			0.5	
Delay (s)		15.8			18.6			9.3			10.2	
Level of Service		B			B			A			B	
Approach Delay (s)		15.8			18.6			9.3			10.2	
Approach LOS		B			B			A			B	

Intersection Summary				
HCM Average Control Delay	13.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.53			
Actuated Cycle Length (s)	48.1	Sum of lost time (s)	14.6	
Intersection Capacity Utilization	65.5%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
91: Route 140 NB On/Off Ramps & Kings Highway

2030 Build Condition w/ Mitigation - AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	361	100	90	342	664	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	12	12	16
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			0.95	0.95	
Frt	0.97			1.00	0.99	
Flt Protected	0.96			0.99	1.00	
Satd. Flow (prot)	1949			3389	3414	
Flt Permitted	0.96			0.62	1.00	
Satd. Flow (perm)	1949			2128	3414	
Peak-hour factor, PHF	0.83	0.83	0.85	0.85	0.85	0.85
Adj. Flow (vph)	435	120	106	402	781	56
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	555	0	0	508	837	0
Heavy Vehicles (%)	3%	4%	7%	5%	5%	0%
Turn Type			pm+pt			
Protected Phases	3		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	34.0			54.0	54.0	
Effective Green, g (s)	34.0			54.0	54.0	
Actuated g/C Ratio	0.34			0.54	0.54	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	663			1149	1844	
v/s Ratio Prot	c0.28				c0.25	
v/s Ratio Perm				0.24		
v/c Ratio	0.84			0.44	0.45	
Uniform Delay, d1	30.4			13.9	14.0	
Progression Factor	1.00			0.52	0.96	
Incremental Delay, d2	9.0			0.3	0.7	
Delay (s)	39.5			7.5	14.2	
Level of Service	D			A	B	
Approach Delay (s)	39.5			7.5	14.2	
Approach LOS	D			A	B	

Intersection Summary				
HCM Average Control Delay	19.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	73.1%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
96: Kings Highway & Shaw's driveway

2030 Build Condition w/ Mitigation - AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	388	105	91	673	90	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12
Total Lost time (s)	6.0			6.0	6.0	6.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	0.97			1.00	1.00	0.85
Flt Protected	1.00			0.99	0.95	1.00
Satd. Flow (prot)	3323			3447	1687	1538
Flt Permitted	1.00			0.80	0.95	1.00
Satd. Flow (perm)	3323			2780	1687	1538
Peak-hour factor, PHF	0.93	0.93	0.92	0.92	0.85	0.85
Adj. Flow (vph)	417	113	99	732	106	53
RTOR Reduction (vph)	12	0	0	0	0	47
Lane Group Flow (vph)	518	0	0	831	106	6
Heavy Vehicles (%)	6%	2%	5%	4%	7%	5%
Turn Type			pm+pt			Prot
Protected Phases	2		1	6	7	7
Permitted Phases			6			
Actuated Green, G (s)	77.1			77.1	10.9	10.9
Effective Green, g (s)	77.1			77.1	10.9	10.9
Actuated g/C Ratio	0.77			0.77	0.11	0.11
Clearance Time (s)	6.0			6.0	6.0	6.0
Vehicle Extension (s)	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	2562			2143	184	168
v/s Ratio Prot	0.16				c0.06	0.00
v/s Ratio Perm				c0.30		
v/c Ratio	0.20			0.39	0.58	0.03
Uniform Delay, d1	3.1			3.7	42.4	39.8
Progression Factor	0.52			0.32	1.00	1.00
Incremental Delay, d2	0.2			0.0	2.7	0.0
Delay (s)	1.8			1.3	45.1	39.9
Level of Service	A			A	D	D
Approach Delay (s)	1.8			1.3	43.3	
Approach LOS	A			A	D	

Intersection Summary			
HCM Average Control Delay	5.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
140: Mill Street & Pleasant St

2030 Build Condition w/ Mitigation - AM Peak Hour

Movement	EBL	EBT	EBR2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	225	185	5	410	180	187	20	55	219	30	57	287
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	16	16	11	12	10	16	10	12	14	16	14
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0			5.0
Lane Util. Factor	1.00	1.00		0.95	0.95	1.00		1.00	0.95			0.95
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.98			0.98
Flt Protected	0.95	1.00		0.95	0.98	1.00		0.95	1.00			0.99
Satd. Flow (prot)	1776	2124		1609	1718	1449		1581	3384			3714
Flt Permitted	0.95	1.00		0.95	0.98	1.00		0.95	1.00			0.99
Satd. Flow (perm)	1776	2124		1609	1718	1449		1581	3384			3714
Peak-hour factor, PHF	0.88	0.88	0.88	0.82	0.82	0.82	0.88	0.88	0.88	0.88	0.84	0.84
Adj. Flow (vph)	256	210	6	500	220	228	23	62	249	34	68	342
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	9	0	0	0
Lane Group Flow (vph)	256	215	0	355	365	228	0	85	274	0	0	466
Heavy Vehicles (%)	5%	1%	0%	3%	3%	4%	0%	9%	5%	3%	4%	0%
Turn Type	Split			Split		pt+ov	Split	Split			Split	
Protected Phases	4	4		8	8	8 6	2	2	2		6	6
Permitted Phases												
Actuated Green, G (s)	20.4	20.4		30.4	30.4	47.6		15.7	15.7			17.2
Effective Green, g (s)	20.4	20.4		30.4	30.4	47.6		15.7	15.7			17.2
Actuated g/C Ratio	0.18	0.18		0.27	0.27	0.43		0.14	0.14			0.16
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0	5.0			5.0
Vehicle Extension (s)	5.0	5.0		5.0	5.0			5.0	5.0			5.0
Lane Grp Cap (vph)	327	391		441	471	622		224	479			576
v/s Ratio Prot	c0.14	0.10		c0.22	0.21	0.16		0.05	c0.08			c0.13
v/s Ratio Perm												
v/c Ratio	0.78	0.55		0.80	0.77	0.37		0.38	0.57			0.81
Uniform Delay, d1	43.1	41.1		37.5	37.1	21.4		43.2	44.5			45.3
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00			1.00
Incremental Delay, d2	13.3	2.8		11.6	9.1	0.8		2.2	2.6			9.3
Delay (s)	56.4	43.9		49.1	46.2	22.2		45.4	47.1			54.6
Level of Service	E	D		D	D	C		D	D			D
Approach Delay (s)		50.7			41.5				46.7			54.6
Approach LOS		D			D				D			D

Intersection Summary			
HCM Average Control Delay	47.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	110.9	Sum of lost time (s)	27.2
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
140: Mill Street & Pleasant St

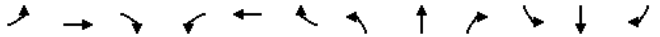
2030 Build Condition w/ Mitigation - AM Peak Hour

Movement	SBR
Lane Configurations	
Volume (vph)	47
Ideal Flow (vphpl)	1900
Lane Width	16
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.84
Adj. Flow (vph)	56
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	4%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

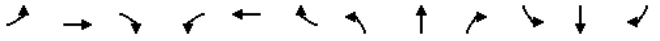
HCM Signalized Intersection Capacity Analysis
174: Union Street & Route 18

2030 Build Condition w/ Mitigation - AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	54	40	39	16	10	40	890	51	91	855	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	16	16	16	16	11	11	11	10	11	11
Total Lost time (s)	5.0	5.0			5.0		6.0	6.0	5.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.94			0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1616	1642			1921		1631	3261	1501	1574	3323	1516
Flt Permitted	0.72	1.00			0.79		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1221	1642			1563		1631	3261	1501	1574	3323	1516
Peak-hour factor, PHF	0.89	0.89	0.89	0.82	0.82	0.82	0.88	0.88	0.88	0.92	0.92	0.92
Adj. Flow (vph)	281	61	45	48	20	12	45	1011	58	99	929	261
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	128
Lane Group Flow (vph)	281	106	0	0	80	0	45	1011	58	99	929	133
Heavy Vehicles (%)	8%	6%	3%	6%	6%	10%	7%	7%	4%	7%	5%	3%
Turn Type	Perm			Perm			Prot		custom	Prot		Perm
Protected Phases		4			4		1	2	5	1	2	
Permitted Phases	4			4								2
Actuated Green, G (s)	28.0	28.0			28.0		12.0	33.2	9.3	12.0	33.2	33.2
Effective Green, g (s)	28.0	28.0			28.0		12.0	33.2	9.3	12.0	33.2	33.2
Actuated g/C Ratio	0.24	0.24			0.24		0.10	0.28	0.08	0.10	0.28	0.28
Clearance Time (s)	5.0	5.0			5.0		6.0	6.0	5.0	6.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0			5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	290	390			371		166	918	118	160	935	427
v/s Ratio Prot		0.06					0.03	c0.31	c0.04	c0.06	0.28	
v/s Ratio Perm	c0.23				0.05							0.09
v/c Ratio	0.97	0.27			0.22		0.27	1.10	0.49	0.62	0.99	0.31
Uniform Delay, d1	44.6	36.7			36.2		49.0	42.4	52.1	50.8	42.3	33.4
Progression Factor	1.00	1.00			1.80		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	44.5	0.8			0.6		1.2	61.4	4.3	7.9	27.7	0.6
Delay (s)	89.0	37.5			65.6		50.2	103.8	56.4	58.7	70.0	34.0
Level of Service	F	D			E		D	F	E	E	E	C
Approach Delay (s)		74.9			65.6			99.2			61.9	
Approach LOS		E			E			F			E	

Intersection Summary				
HCM Average Control Delay	78.2	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	118.0	Sum of lost time (s)	35.5	
Intersection Capacity Utilization	64.3%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	81	20	95	5	10	5	0	168	20	15	183	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	15	16	16	16	16	16	12	12
Total Lost time (s)		6.0			5.0			6.0			6.0	5.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frt		0.93			0.97			0.99			1.00	0.85
Flt Protected		0.98			0.99			1.00			1.00	1.00
Satd. Flow (prot)		1812			1708			1774			1674	1553
Flt Permitted		0.85			0.92			1.00			0.97	1.00
Satd. Flow (perm)		1573			1585			1774			1622	1553
Peak-hour factor, PHF	0.78	0.78	0.78	0.57	0.57	0.57	0.89	0.89	0.89	0.81	0.81	0.81
Adj. Flow (vph)	104	26	122	9	18	9	0	189	22	19	226	69
RTOR Reduction (vph)	0	0	0	0	7	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	252	0	0	29	0	0	208	0	0	245	69
Heavy Vehicles (%)	12%	14%	5%	0%	17%	33%	0%	22%	0%	14%	13%	4%
Turn Type	pm+pt			Perm						Perm		custom
Protected Phases	1	1 4			4			2			2	5
Permitted Phases	1 4			4						2		
Actuated Green, G (s)		40.0			28.0			33.2			33.2	9.3
Effective Green, g (s)		40.0			28.0			33.2			33.2	9.3
Actuated g/C Ratio		0.34			0.24			0.28			0.28	0.08
Clearance Time (s)					5.0			6.0			6.0	5.0
Vehicle Extension (s)					5.0			4.0			4.0	4.0
Lane Grp Cap (vph)		558			376			499			456	122
v/s Ratio Prot		c0.05						0.12				c0.04
v/s Ratio Perm		c0.11			0.02						c0.15	
v/c Ratio		0.45			0.08			0.42			0.54	0.57
Uniform Delay, d1		30.4			35.0			34.5			35.9	52.4
Progression Factor		0.64			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.8			0.2			0.8			1.6	7.1
Delay (s)		20.2			35.1			35.3			37.5	59.5
Level of Service		C			D			D			D	E
Approach Delay (s)		20.2			35.1			35.3			42.3	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	33.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	118.0	Sum of lost time (s)	36.5
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	0	5	328	5	502	5	160	407	424	330	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	12	12	12	12	16	12	11	11	12
Storage Length (ft)	0		0	0		0	0		0	300		0
Storage Lanes	0		0	0		1	0		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1031			525			388			877	
Travel Time (s)		23.4			11.9			8.8			19.9	
Peak Hour Factor	0.54	0.54	0.54	0.97	0.97	0.97	0.94	0.94	0.94	0.80	0.80	0.80
Heavy Vehicles (%)	0%	0%	0%	2%	0%	3%	0%	2%	2%	1%	5%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	18	0	0	343	518	0	608	0	530	412	0
Turn Type	Perm			Perm		pt+ov	Perm			pm+pt		
Protected Phases		8			4	4 1		2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4	4 1	2	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	13.0	13.0		13.0	13.0		27.0	27.0		19.0	22.0	
Total Split (s)	23.0	23.0	0.0	23.0	23.0	59.0	51.0	51.0	0.0	36.0	87.0	0.0
Total Split (%)	20.9%	20.9%	0.0%	20.9%	20.9%	53.6%	46.4%	46.4%	0.0%	32.7%	79.1%	0.0%
Maximum Green (s)	17.0	17.0		17.0	17.0		45.0	45.0		30.0	81.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		C-Max	C-Max		Min	Min		None	Min	
Walk Time (s)							5.0	5.0				
Flash Dont Walk (s)							16.0	16.0				
Pedestrian Calls (#/hr)							0	0				
v/c Ratio		0.04			0.98	0.46		0.88		0.95	0.37	
Control Delay		26.2			80.0	4.7		41.1		54.0	10.1	
Queue Delay		0.0			0.0	0.1		0.0		0.0	0.0	
Total Delay		26.2			80.0	4.8		41.1		54.0	10.1	
Queue Length 50th (ft)		5			~260	52		321		273	122	
Queue Length 95th (ft)		13			#542	167		412		314	106	
Internal Link Dist (ft)		951			445			308			797	
Turn Bay Length (ft)										300		
Base Capacity (vph)		442			349	1136		859		574	1288	
Starvation Cap Reductn		0			0	114		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		0.04			0.98	0.51		0.71		0.92	0.32	

Lanes, Volumes, Timings
2: Jones Street & Mt Pleasant St
2030 Build Condition w/ Mitigation - PM Peak Hour

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 90 (82%), Referenced to phase 4:WBTL, Start of Green	
Natural Cycle: 80	
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.	

Splits and Phases: 2: Jones Street & Mt Pleasant St

HCM Signalized Intersection Capacity Analysis
2: Jones Street & Mt Pleasant St

2030 Build Condition w/ Mitigation - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	0	5	328	5	502	5	160	407	424	330	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	16	12	11	11	12
Total Lost time (s)		6.0			6.0	6.0		6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Frt		0.93			1.00	0.85		0.90		1.00	1.00	
Flt Protected		0.98			0.95	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		1959			1776	1568		1908		1728	1749	
Flt Permitted		0.83			0.72	1.00		1.00		0.16	1.00	
Satd. Flow (perm)		1664			1335	1568		1901		290	1749	
Peak-hour factor, PHF	0.54	0.54	0.54	0.97	0.97	0.97	0.94	0.94	0.94	0.80	0.80	0.80
Adj. Flow (vph)	9	0	9	338	5	518	5	170	433	530	412	0
RTOR Reduction (vph)	0	7	0	0	0	220	0	94	0	0	0	0
Lane Group Flow (vph)	0	11	0	0	343	298	0	514	0	530	412	0
Heavy Vehicles (%)	0%	0%	0%	2%	0%	3%	0%	2%	2%	1%	5%	0%
Turn Type	Perm			Perm		pt+ov	Perm			pm+pt		
Protected Phases		8			4	4 1		2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		28.8			28.8	63.3		34.7		69.2	69.2	
Effective Green, g (s)		28.8			28.8	63.3		34.7		69.2	69.2	
Actuated g/C Ratio		0.26			0.26	0.58		0.32		0.63	0.63	
Clearance Time (s)		6.0			6.0			6.0		6.0	6.0	
Vehicle Extension (s)		2.0			2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		436			350	902		600		555	1100	
v/s Ratio Prot						0.19				c0.25	0.24	
v/s Ratio Perm		0.01			c0.26			0.27		c0.35		
v/c Ratio		0.03			0.98	0.33		0.86		0.95	0.37	
Uniform Delay, d1		30.2			40.3	12.2		35.3		28.0	9.9	
Progression Factor		1.00			0.83	2.37		1.00		1.00	1.00	
Incremental Delay, d2		0.0			40.3	0.1		11.2		26.9	0.1	
Delay (s)		30.2			73.9	29.1		46.5		54.9	10.0	
Level of Service		C			E	C		D		D	A	
Approach Delay (s)		30.2			46.9			46.5			35.2	
Approach LOS		C			D			D			D	

Intersection Summary				
HCM Average Control Delay	42.2	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.93			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	97.3%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Lanes, Volumes, Timings
14: Kings Highway & Church Street

2030 Build Condition w/ Mitigation - PM Peak Hour

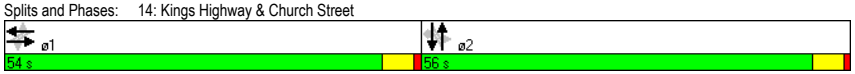
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	116	554	5	35	461	70	233	210	80	70	275	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	12	11	11	12	11	11	11	11	11	12
Storage Length (ft)	50		0	0		0	0		0	0		145
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		305			1116			176			552	
Travel Time (s)		6.9			25.4			4.0			12.5	
Peak Hour Factor	0.92	0.92	0.92	0.91	0.91	0.91	0.86	0.86	0.86	0.89	0.89	0.89
Heavy Vehicles (%)	3%	1%	0%	7%	2%	0%	1%	2%	4%	1%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	126	607	0	38	584	0	271	337	0	0	388	136
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Detector Phase	1	1		1	1		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	30.0	30.0		30.0	30.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	35.0	35.0		35.0	35.0		23.0	23.0		23.0	23.0	23.0
Total Split (s)	54.0	54.0	0.0	54.0	54.0	0.0	56.0	56.0	0.0	56.0	56.0	56.0
Total Split (%)	49.1%	49.1%	0.0%	49.1%	49.1%	0.0%	50.9%	50.9%	0.0%	50.9%	50.9%	50.9%
Maximum Green (s)	49.0	49.0		49.0	49.0		51.0	51.0		51.0	51.0	51.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		5.0	5.0	5.0
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	None
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
v/c Ratio	0.59	0.69		0.19	0.68		0.89	0.46			0.64	0.20
Control Delay	36.9	28.7		21.8	28.5		59.8	24.0			29.8	19.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	36.9	28.7		21.8	28.5		59.8	24.0			29.8	19.4
Queue Length 50th (ft)	67	348		16	333		161	154			197	55
Queue Length 95th (ft)	#163	494		42	475		#296	217			293	93
Internal Link Dist (ft)		225			1036			96			472	
Turn Bay Length (ft)	50											145
Base Capacity (vph)	214	878		198	855		331	797			656	741
Starvation Cap Reductn	0	0		0	0		0	0			0	0
Spillback Cap Reductn	0	0		0	0		0	0			0	0
Storage Cap Reductn	0	0		0	0		0	0			0	0
Reduced v/c Ratio	0.59	0.69		0.19	0.68		0.82	0.42			0.59	0.18

Lanes, Volumes, Timings
14: Kings Highway & Church Street

2030 Build Condition w/ Mitigation - PM Peak Hour

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 14: Kings Highway & Church Street



HCM Signalized Intersection Capacity Analysis
14: Kings Highway & Church Street

2030 Build Condition w/ Mitigation - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	116	554	5	35	461	70	233	210	80	70	275	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	12	11	11	12	11	11	11	11	11	12
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)	1636	1816		1631	1770		1728	1717			1786	1599
Flt Permitted	0.26	1.00		0.24	1.00		0.39	1.00			0.78	1.00
Satd. Flow (perm)	443	1816		410	1770		713	1717			1415	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.91	0.91	0.91	0.86	0.86	0.86	0.89	0.89	0.89
Adj. Flow (vph)	126	602	5	38	507	77	271	244	93	79	309	136
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	126	607	0	38	584	0	271	337	0	0	388	136
Heavy Vehicles (%)	3%	1%	0%	7%	2%	0%	1%	2%	4%	1%	2%	1%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Actuated Green, G (s)	53.1	53.1		53.1	53.1		46.9	46.9			46.9	46.9
Effective Green, g (s)	53.1	53.1		53.1	53.1		46.9	46.9			46.9	46.9
Actuated g/C Ratio	0.48	0.48		0.48	0.48		0.43	0.43			0.43	0.43
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0			5.0	5.0
Lane Grp Cap (vph)	214	877		198	854		304	732			603	682
v/s Ratio Prot		c0.33			0.33			0.20				
v/s Ratio Perm	0.28			0.09			c0.38				0.27	0.09
v/c Ratio	0.59	0.69		0.19	0.68		0.89	0.46			0.64	0.20
Uniform Delay, d1	20.6	22.1		16.2	22.0		29.2	22.5			24.9	19.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	11.3	4.5		2.1	4.4		27.6	1.0			3.2	0.3
Delay (s)	31.9	26.6		18.4	26.4		56.8	23.5			28.2	20.1
Level of Service	C	C		B	C		E	C			C	C
Approach Delay (s)		27.5			25.9			38.3			26.1	
Approach LOS		C			C			D			C	

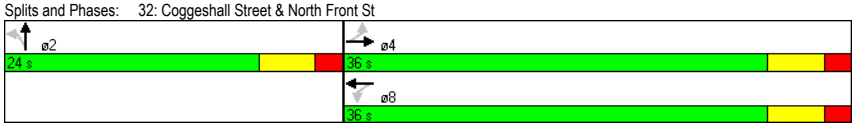
Intersection Summary			
HCM Average Control Delay	29.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	105.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	405	45	58	330	45	70	139	65	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	15	16	16	15	16	16	15	16	16	16	16
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		546			443			880			185	
Travel Time (s)		12.4			10.1			20.0			4.2	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.79	0.79	0.79	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	3%	4%	1%	0%	0%	2%	8%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	591	0	0	465	0	0	347	0	0	0	0
Turn Type	Perm			Perm			Perm					
Protected Phases		4			8			2				
Permitted Phases	4			8			2					
Detector Phase	4	4		8	8		2	2				
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0				
Minimum Split (s)	22.0	22.0		22.0	22.0		22.0	22.0				
Total Split (s)	36.0	36.0	0.0	36.0	36.0	0.0	24.0	24.0	0.0	0.0	0.0	0.0
Total Split (%)	60.0%	60.0%	0.0%	60.0%	60.0%	0.0%	40.0%	40.0%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		18.0	18.0				
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0				
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0				
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0				
Recall Mode	None	None		None	None		Min	Min				
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0				
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0				
Pedestrian Calls (#/hr)	0	0		0	0		0	0				
v/c Ratio		0.77			0.57			0.63				
Control Delay		19.0			13.1			22.2				
Queue Delay		0.0			0.0			0.0				
Total Delay		19.0			13.1			22.2				
Queue Length 50th (ft)		125			86			83				
Queue Length 95th (ft)		259			177			151				
Internal Link Dist (ft)		466			363			800			105	
Turn Bay Length (ft)												
Base Capacity (vph)		1127			1188			772				
Starvation Cap Reductn		0			0			0				
Spillback Cap Reductn		0			0			0				
Storage Cap Reductn		0			0			0				
Reduced v/c Ratio		0.52			0.39			0.45				

Intersection Summary	
Area Type:	Other

Cycle Length: 60
Actuated Cycle Length: 47.9
Natural Cycle: 55
Control Type: Semi Act-Uncoord

Splits and Phases: 32: Coggeshall Street & North Front St



HCM Signalized Intersection Capacity Analysis
32: Coggeshall Street & North Front St

2030 Build Condition w/ Mitigation - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	405	45	58	330	45	70	139	65	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	15	16	16	15	16	16	15	16	16	16	16
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		1.00			1.00			1.00				
Frt		0.99			0.99			0.97				
Flt Protected		0.99			0.99			0.99				
Satd. Flow (prot)		1992			2021			1941				
Flt Permitted		0.85			0.88			0.99				
Satd. Flow (perm)		1700			1790			1941				
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.79	0.79	0.79	0.92	0.92	0.92
Adj. Flow (vph)	108	435	48	62	355	48	89	176	82	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	591	0	0	465	0	0	347	0	0	0	0
Heavy Vehicles (%)	2%	3%	3%	4%	1%	0%	0%	2%	8%	0%	0%	0%
Turn Type	Perm			Perm			Perm					
Protected Phases		4			8			2				
Permitted Phases	4			8			2					
Actuated Green, G (s)		21.7			21.7			13.5				
Effective Green, g (s)		21.7			21.7			13.5				
Actuated g/C Ratio		0.46			0.46			0.29				
Clearance Time (s)		6.0			6.0			6.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		782			823			555				
v/s Ratio Prot												
v/s Ratio Perm		c0.35			0.26			0.18				
v/c Ratio		0.76			0.57			0.63				
Uniform Delay, d1		10.6			9.3			14.7				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		4.2			0.9			2.2				
Delay (s)		14.7			10.2			16.9				
Level of Service		B			B			B				
Approach Delay (s)		14.7			10.2			16.9			0.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	47.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
49: Kings Highway & Stop & Shop driveway

2030 Build Condition w/ Mitigation - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	700	134	175	420	210	166	45	289	210	25	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		515			191			360			359	
Travel Time (s)		11.7			4.3			8.2			8.2	
Peak Hour Factor	0.93	0.93	0.93	0.95	0.95	0.95	0.85	0.85	0.85	0.89	0.89	0.89
Heavy Vehicles (%)	1%	1%	0%	1%	1%	0%	2%	0%	0%	1%	0%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1112	0	0	847	0	0	588	0	0	472	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.0	13.0		11.0	13.0		13.0	13.0		19.0	19.0	
Total Split (s)	12.0	52.0	0.0	10.0	50.0	0.0	48.0	48.0	0.0	48.0	48.0	0.0
Total Split (%)	10.9%	47.3%	0.0%	9.1%	45.5%	0.0%	43.6%	43.6%	0.0%	43.6%	43.6%	0.0%
Maximum Green (s)	6.0	46.0		4.0	44.0		42.0	42.0		42.0	42.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	
Walk Time (s)										5.0	5.0	
Flash Dont Walk (s)										8.0	8.0	
Pedestrian Calls (#/hr)										0	0	
v/c Ratio		0.81			0.70			0.90			0.76	
Control Delay		18.9			17.9			42.9			27.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		18.9			17.9			42.9			27.9	
Queue Length 50th (ft)		243			180			147			92	
Queue Length 95th (ft)		m#516			333			176			133	
Internal Link Dist (ft)		435			111			280			279	
Turn Bay Length (ft)												
Base Capacity (vph)		1380			1208			889			838	
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		0.81			0.70			0.66			0.56	

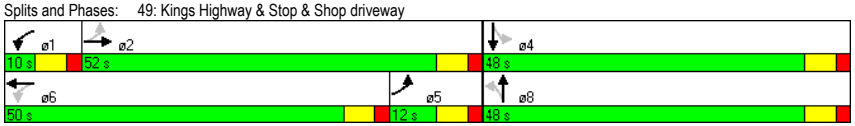
Intersection Summary	
Area Type:	Other

Lanes, Volumes, Timings
49: Kings Highway & Stop & Shop driveway

2030 Build Condition w/ Mitigation - PM Peak Hour

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green, Master Intersection
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 49: Kings Highway & Stop & Shop driveway



HCM Signalized Intersection Capacity Analysis
49: Kings Highway & Stop & Shop driveway

2030 Build Condition w/ Mitigation - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	700	134	175	420	210	166	45	289	210	25	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frt		0.98			0.96			0.91			0.93	
Flt Protected		0.99			0.99			0.98			0.98	
Satd. Flow (prot)		3476			3406			3222			3258	
Flt Permitted		0.61			0.54			0.61			0.56	
Satd. Flow (perm)		2150			1862			2012			1856	
Peak-hour factor, PHF	0.93	0.93	0.93	0.95	0.95	0.95	0.85	0.85	0.85	0.89	0.89	0.89
Adj. Flow (vph)	215	753	144	184	442	221	195	53	340	236	28	208
RTOR Reduction (vph)	0	7	0	0	20	0	0	146	0	0	155	0
Lane Group Flow (vph)	0	1105	0	0	827	0	0	442	0	0	317	0
Heavy Vehicles (%)	1%	1%	0%	1%	1%	0%	2%	0%	0%	1%	0%	1%
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		70.2			70.2			27.8			27.8	
Effective Green, g (s)		70.2			70.2			27.8			27.8	
Actuated g/C Ratio		0.64			0.64			0.25			0.25	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		1372			1188			508			469	
v/s Ratio Prot												
v/s Ratio Perm		c0.51			0.44			c0.22			0.17	
v/c Ratio		0.81			0.70			0.87			0.67	
Uniform Delay, d1		14.8			13.0			39.4			37.0	
Progression Factor		0.94			1.00			1.00			1.00	
Incremental Delay, d2		1.6			1.5			14.2			3.0	
Delay (s)		15.5			14.4			53.5			40.0	
Level of Service		B			B			D			D	
Approach Delay (s)		15.5			14.4			53.5			40.0	
Approach LOS		B			B			D			D	

Intersection Summary				
HCM Average Control Delay	26.4	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.82			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	101.0%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	136	10	20	158	118	20	333	75	111	234	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	15	16	16	12	16	16	16	16	16	16	16
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1098			686			1488			550	
Travel Time (s)		25.0			15.6			33.8			12.5	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.83	0.83	0.83	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	8%	0%	0%	3%	0%	4%	4%	5%	4%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	172	0	0	337	0	0	515	0	0	378	0
Turn Type	Perm			Perm			Perm			Perm		
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		4.0	4.0		4.0	4.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		9.0	9.0		9.0	9.0	
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	25.0	25.0	0.0	25.0	25.0	0.0
Total Split (%)	40.0%	40.0%	0.0%	40.0%	40.0%	0.0%	33.3%	33.3%	0.0%	33.3%	33.3%	0.0%
Maximum Green (s)	25.0	25.0		25.0	25.0		20.0	20.0		20.0	20.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.30			0.64			0.58			0.57	
Control Delay		14.6			18.9			17.1			18.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		14.6			18.9			17.1			18.9	
Queue Length 50th (ft)		30			58			76			57	
Queue Length 95th (ft)		90			164			#323			#303	
Internal Link Dist (ft)		1018			606			1408			470	
Turn Bay Length (ft)												
Base Capacity (vph)		1115			985			889			662	
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		0.15			0.34			0.58			0.57	

Intersection Summary	
Area Type:	Other

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	15.0
Total Split (s)	20.0
Total Split (%)	27%
Maximum Green (s)	17.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	6.0
Flash Dont Walk (s)	6.0
Pedestrian Calls (#/hr)	2
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

Lanes, Volumes, Timings
58: Coggeshall St & Purchase Street

2030 Build Condition w/ Mitigation - PM Peak Hour

Cycle Length: 75
Actuated Cycle Length: 46.8
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 58: Coggeshall St & Purchase Street

HCM Signalized Intersection Capacity Analysis
58: Coggeshall St & Purchase Street

2030 Build Condition w/ Mitigation - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	136	10	20	158	118	20	333	75	111	234	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	15	16	16	12	16	16	16	16	16	16	16
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.95			0.98			1.00	
Flt Protected		1.00			1.00			1.00			0.98	
Satd. Flow (prot)		2022			1771			2021			2027	
Flt Permitted		0.98			0.97			0.97			0.72	
Satd. Flow (perm)		1991			1723			1971			1478	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.83	0.83	0.83	0.94	0.94	0.94
Adj. Flow (vph)	6	155	11	23	180	134	24	401	90	118	249	11
RTOR Reduction (vph)	0	4	0	0	35	0	0	8	0	0	1	0
Lane Group Flow (vph)	0	168	0	0	302	0	0	507	0	0	377	0
Heavy Vehicles (%)	0%	2%	8%	0%	0%	3%	0%	4%	4%	5%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		13.3			13.3			20.9			20.9	
Effective Green, g (s)		13.3			13.3			20.9			20.9	
Actuated g/C Ratio		0.27			0.27			0.43			0.43	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		543			470			844			633	
v/s Ratio Prot												
v/s Ratio Perm		0.08			c0.18			c0.26			0.26	
v/c Ratio		0.31			0.64			0.60			0.60	
Uniform Delay, d1		14.1			15.7			10.7			10.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.3			3.0			1.2			1.5	
Delay (s)		14.4			18.7			11.9			12.2	
Level of Service		B			B			B			B	
Approach Delay (s)		14.4			18.7			11.9			12.2	
Approach LOS		B			B			B			B	

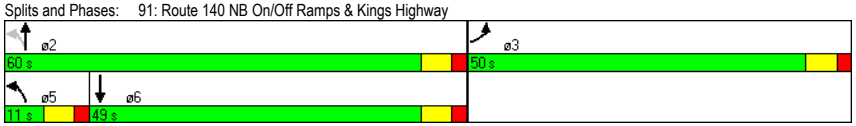
Intersection Summary			
HCM Average Control Delay	13.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	48.8	Sum of lost time (s)	14.6
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	493	160	150	541	666	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	12	12	16
Storage Length (ft)	0	100	0			100
Storage Lanes	1	0	0			0
Taper Length (ft)	25	25	25			25
Right Turn on Red		No				No
Link Speed (mph)	30			30	30	
Link Distance (ft)	268			574	515	
Travel Time (s)	6.1			13.0	11.7	
Peak Hour Factor	0.92	0.92	0.83	0.83	0.79	0.79
Heavy Vehicles (%)	2%	0%	3%	1%	2%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	710	0	0	833	984	0
Turn Type			pm+pt			
Protected Phases	3		5	2	6	
Permitted Phases			2			
Detector Phase	3		5	2	6	
Switch Phase						
Minimum Initial (s)	7.0		5.0	7.0	7.0	
Minimum Split (s)	13.0		11.0	13.0	13.0	
Total Split (s)	50.0	0.0	11.0	60.0	49.0	0.0
Total Split (%)	45.5%	0.0%	10.0%	54.5%	44.5%	0.0%
Maximum Green (s)	44.0		5.0	54.0	43.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	4.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	2.0		2.0	2.0	2.0	
Recall Mode	None		None	C-Min	C-Min	
v/c Ratio	0.94			0.92dl	0.56	
Control Delay	54.7			23.4	19.7	
Queue Delay	0.0			0.0	0.4	
Total Delay	54.7			23.4	20.1	
Queue Length 50th (ft)	462			200	243	
Queue Length 95th (ft)	#692			291	246	
Internal Link Dist (ft)	188			494	435	
Turn Bay Length (ft)						
Base Capacity (vph)	791			989	1760	
Starvation Cap Reductn	0			0	329	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.90			0.84	0.69	

Intersection Summary	
Area Type:	Other

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 52 (47%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
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.

Splits and Phases: 91: Route 140 NB On/Off Ramps & Kings Highway



HCM Signalized Intersection Capacity Analysis
91: Route 140 NB On/Off Ramps & Kings Highway

2030 Build Condition w/ Mitigation - PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	493	160	150	541	666	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	12	12	16
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			0.95	0.95	
Frt	0.97			1.00	0.98	
Flt Protected	0.96			0.99	1.00	
Satd. Flow (prot)	1977			3521	3449	
Flt Permitted	0.96			0.54	1.00	
Satd. Flow (perm)	1977			1939	3449	
Peak-hour factor, PHF	0.92	0.92	0.83	0.83	0.79	0.79
Adj. Flow (vph)	536	174	181	652	843	141
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	710	0	0	833	984	0
Heavy Vehicles (%)	2%	0%	3%	1%	2%	5%
Turn Type			pm+pt			
Protected Phases	3		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	41.9			56.1	56.1	
Effective Green, g (s)	41.9			56.1	56.1	
Actuated g/C Ratio	0.38			0.51	0.51	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	2.0			2.0	2.0	
Lane Grp Cap (vph)	753			989	1759	
v/s Ratio Prot	c0.36				0.29	
v/s Ratio Perm				c0.43		
v/c Ratio	0.94			0.92dl	0.56	
Uniform Delay, d1	32.9			23.1	18.5	
Progression Factor	1.00			0.58	0.97	
Incremental Delay, d2	19.9			6.2	1.1	
Delay (s)	52.8			19.7	19.0	
Level of Service	D			B	B	
Approach Delay (s)	52.8			19.7	19.0	
Approach LOS	D			B	B	

Intersection Summary			
HCM Average Control Delay	28.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

Lanes, Volumes, Timings
96: Kings Highway & Shaw's driveway

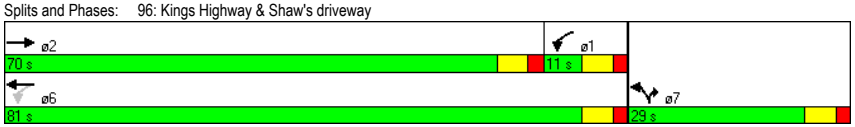
2030 Build Condition w/ Mitigation - PM Peak Hour

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	596	235	145	681	155	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	525			574	347	
Travel Time (s)	11.9			13.0	7.9	
Peak Hour Factor	0.91	0.91	0.96	0.96	0.89	0.89
Heavy Vehicles (%)	2%	0%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	913	0	0	860	174	107
Turn Type			pm+pt			Prot
Protected Phases	2		1	6	7	7
Permitted Phases			6			
Detector Phase	2		1	6	7	7
Switch Phase						
Minimum Initial (s)	7.0		5.0	7.0	7.0	7.0
Minimum Split (s)	24.0		11.0	13.0	13.0	13.0
Total Split (s)	70.0	0.0	11.0	81.0	29.0	29.0
Total Split (%)	63.6%	0.0%	10.0%	73.6%	26.4%	26.4%
Maximum Green (s)	64.0		5.0	75.0	23.0	23.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	2.0		2.0	2.0	2.0	2.0
Recall Mode	C-Min		None	C-Min	None	None
Walk Time (s)	7.0					
Flash Dont Walk (s)	11.0					
Pedestrian Calls (#/hr)	0					
v/c Ratio	0.35			0.51	0.71	0.34
Control Delay	0.8			6.1	60.8	10.7
Queue Delay	0.2			0.0	0.0	0.0
Total Delay	1.0			6.1	60.8	10.7
Queue Length 50th (ft)	16			89	119	0
Queue Length 95th (ft)	m0			m67	180	45
Internal Link Dist (ft)	445			494	267	
Turn Bay Length (ft)						
Base Capacity (vph)	2594			1671	374	419
Starvation Cap Reductn	798			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.51			0.51	0.47	0.26

Intersection Summary	
Area Type:	Other

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 53 (48%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 96: Kings Highway & Shaw's driveway



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	596	235	145	681	155	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12
Total Lost time (s)	6.0			6.0	6.0	6.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	0.96			1.00	1.00	0.85
Flt Protected	1.00			0.99	0.95	1.00
Satd. Flow (prot)	3408			3543	1787	1599
Flt Permitted	1.00			0.62	0.95	1.00
Satd. Flow (perm)	3408			2215	1787	1599
Peak-hour factor, PHF	0.91	0.91	0.96	0.96	0.89	0.89
Adj. Flow (vph)	655	258	151	709	174	107
RTOR Reduction (vph)	22	0	0	0	0	92
Lane Group Flow (vph)	891	0	0	860	174	15
Heavy Vehicles (%)	2%	0%	1%	1%	1%	1%
Turn Type			pm+pt			Prot
Protected Phases	2		1	6	7	7
Permitted Phases			6			
Actuated Green, G (s)	83.0			83.0	15.0	15.0
Effective Green, g (s)	83.0			83.0	15.0	15.0
Actuated g/C Ratio	0.75			0.75	0.14	0.14
Clearance Time (s)	6.0			6.0	6.0	6.0
Vehicle Extension (s)	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	2571			1671	244	218
v/s Ratio Prot	0.26				c0.10	0.01
v/s Ratio Perm				c0.39		
v/c Ratio	0.35			0.51	0.71	0.07
Uniform Delay, d1	4.5			5.4	45.4	41.4
Progression Factor	0.15			0.85	1.00	1.00
Incremental Delay, d2	0.2			0.1	7.9	0.0
Delay (s)	0.9			4.7	53.4	41.4
Level of Service	A			A	D	D
Approach Delay (s)	0.9			4.7	48.8	
Approach LOS	A			A	D	

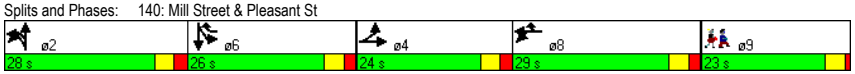
Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	260	203	360	205	248	25	135	455	105	117	345	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	16	11	12	10	16	10	12	14	16	14	16
Storage Length (ft)	0		0		0		100		0	0		0
Storage Lanes	1		1		1		1		0	0		0
Taper Length (ft)	25		25		25		25		25	25		25
Right Turn on Red					No				Yes			
Link Speed (mph)		30		30				30			30	
Link Distance (ft)		168		308				709			499	
Travel Time (s)		3.8		7.0				16.1			11.3	
Peak Hour Factor	0.96	0.96	0.93	0.93	0.93	0.87	0.87	0.87	0.87	0.83	0.83	0.83
Heavy Vehicles (%)	1%	1%	4%	1%	3%	0%	5%	3%	3%	0%	0%	3%
Shared Lane Traffic (%)			23%									
Lane Group Flow (vph)	271	211	298	309	267	0	184	644	0	0	628	0
Turn Type	Split		Split		pt+ov	Split	Split			Split		
Protected Phases	4	4	8	8	8 6	2	2	2		6	6	
Permitted Phases												
Detector Phase	4	4	8	8	8 6	2	2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0		7.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	12.0	12.0	12.0	12.0		12.0	12.0	12.0		12.0	12.0	
Total Split (s)	24.0	24.0	29.0	29.0	55.0	28.0	28.0	28.0	0.0	26.0	26.0	0.0
Total Split (%)	18.5%	18.5%	22.3%	22.3%	42.3%	21.5%	21.5%	21.5%	0.0%	20.0%	20.0%	0.0%
Maximum Green (s)	19.0	19.0	24.0	24.0		23.0	23.0	23.0		21.0	21.0	
Yellow Time (s)	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0		5.0	5.0	
Recall Mode	None	None	None	None		None	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.89	0.60	0.90	0.85	0.47		0.57	0.93			0.92	
Control Delay	78.9	54.9	75.6	67.3	18.3		52.1	65.5			67.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	78.9	54.9	75.6	67.3	18.3		52.1	65.5			67.8	
Queue Length 50th (ft)	181	133	206	211	61		112	219			221	
Queue Length 95th (ft)	#417	257	#469	#467	170		219	#402			#368	
Internal Link Dist (ft)		88		228				629			419	
Turn Bay Length (ft)							100					
Base Capacity (vph)	305	352	332	364	571		323	695			680	
Starvation Cap Reductn	0	0	0	0	0		0	0			0	
Spillback Cap Reductn	0	0	0	0	0		0	0			0	
Storage Cap Reductn	0	0	0	0	0		0	0			0	
Reduced v/c Ratio	0.89	0.60	0.90	0.85	0.47		0.57	0.93			0.92	

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	18%
Maximum Green (s)	19.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	18
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	

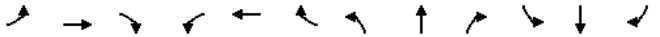
Intersection Summary	
Area Type:	Other
Cycle Length: 130	
Actuated Cycle Length: 116.2	
Natural Cycle: 130	
Control Type: Semi Act-Uncoord	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 140: Mill Street & Pleasant St



Movement	EBL	EBT	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	260	203	360	205	248	25	135	455	105	117	345	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	16	11	12	10	16	10	12	14	16	14	16
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0			5.0	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00		1.00	0.95			0.95	
Frt	1.00	1.00	1.00	1.00	0.85		1.00	0.97			0.98	
Flt Protected	0.95	1.00	0.95	0.99	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1847	2132	1594	1747	1463		1617	3406			3731	
Flt Permitted	0.95	1.00	0.95	0.99	1.00		0.95	1.00			0.99	
Satd. Flow (perm)	1847	2132	1594	1747	1463		1617	3406			3731	
Peak-hour factor, PHF	0.96	0.96	0.93	0.93	0.93	0.87	0.87	0.87	0.87	0.83	0.83	0.83
Adj. Flow (vph)	271	211	387	220	267	29	155	523	121	141	416	71
RTOR Reduction (vph)	0	0	0	0	0	0	0	15	0	0	0	0
Lane Group Flow (vph)	271	211	298	309	267	0	184	629	0	0	628	0
Heavy Vehicles (%)	1%	1%	4%	1%	3%	0%	5%	3%	3%	0%	0%	3%
Turn Type	Split		Split		pt+ov	Split	Split			Split		
Protected Phases	4	4	8	8	8 6	2	2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	19.2	19.2	24.2	24.2	45.4		23.2	23.2			21.2	
Effective Green, g (s)	19.2	19.2	24.2	24.2	45.4		23.2	23.2			21.2	
Actuated g/C Ratio	0.16	0.16	0.20	0.20	0.38		0.20	0.20			0.18	
Clearance Time (s)	5.0	5.0	5.0	5.0			5.0	5.0			5.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0			5.0	5.0			5.0	
Lane Grp Cap (vph)	299	345	325	356	560		316	666			667	
v/s Ratio Prot	c0.15	0.10	c0.19	0.18	0.18		0.11	c0.18			c0.17	
v/s Ratio Perm												
v/c Ratio	0.91	0.61	0.92	0.87	0.48		0.58	0.94			0.94	
Uniform Delay, d1	48.8	46.2	46.2	45.7	27.6		43.3	47.1			48.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	30.4	4.6	30.6	20.9	1.3		4.2	22.6			22.2	
Delay (s)	79.3	50.8	76.8	66.6	29.0		47.5	69.6			70.3	
Level of Service	E	D	E	E	C		D	E			E	
Approach Delay (s)		66.8		58.6				64.7			70.3	
Approach LOS		E		E				E			E	

Intersection Summary					
HCM Average Control Delay	64.4	HCM Level of Service		E	
HCM Volume to Capacity ratio	0.93				
Actuated Cycle Length (s)	118.6	Sum of lost time (s)		30.8	
Intersection Capacity Utilization	77.2%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	340	31	60	85	38	15	90	980	24	36	1150	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	11	11	11	10	11	11
Storage Length (ft)	0		0	0		0	150		225	150		225
Storage Lanes	0		0	0		0	1		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		432			82			365			2491	
Travel Time (s)		9.8			1.9			8.3			56.6	
Peak Hour Factor	0.93	0.93	0.93	0.85	0.85	0.85	0.91	0.91	0.91	0.99	0.99	0.99
Heavy Vehicles (%)	1%	3%	0%	2%	0%	0%	1%	4%	0%	17%	4%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	464	0	0	163	0	99	1077	26	36	1162	146
Turn Type	Perm			Perm			Prot		custom	Prot		Perm
Protected Phases		4			4		1	2	5	1	2	
Permitted Phases	4			4								2
Detector Phase	4	4		4	4		1	2	5	1	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		4.0	7.0	4.0	4.0	7.0	7.0
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0	13.0	9.0	10.0	13.0	13.0
Total Split (s)	42.0	42.0	0.0	42.0	42.0	0.0	12.0	49.0	16.0	12.0	49.0	49.0
Total Split (%)	28.0%	28.0%	0.0%	28.0%	28.0%	0.0%	8.0%	32.7%	10.7%	8.0%	32.7%	32.7%
Maximum Green (s)	37.0	37.0		37.0	37.0		6.0	43.0	11.0	6.0	43.0	43.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	5.0	5.0		5.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Recall Mode	None	None		None	None		None	None	None	None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		1.16			0.35		1.24	0.97	0.20	0.54	1.04	0.26
Control Delay		139.3			86.0		228.6	64.1	65.2	93.1	82.1	18.4
Queue Delay		0.0			0.0		0.0	167.9	0.8	0.9	0.0	0.0
Total Delay		139.3			86.0		228.6	232.0	66.0	94.0	82.1	18.4
Queue Length 50th (ft)		~394			130		~89	406	19	27	454	34
Queue Length 95th (ft)		#814			m159		#257	#775	58	#96	#866	110
Internal Link Dist (ft)		352			2			285			2411	
Turn Bay Length (ft)							150		225	150		225
Base Capacity (vph)		399			460		80	1112	132	67	1112	566
Starvation Cap Reductn		0			0		0	336	0	0	0	0
Spillback Cap Reductn		0			0		0	0	29	2	0	0
Storage Cap Reductn		0			0		0	0	0	0	0	0
Reduced v/c Ratio		1.16			0.35		1.24	1.39	0.25	0.55	1.04	0.26

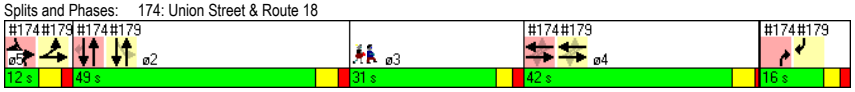
Lane Group	ø3
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	17.0
Minimum Split (s)	31.0
Total Split (s)	31.0
Total Split (%)	21%
Maximum Green (s)	26.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	0.2
Recall Mode	None
Walk Time (s)	17.0
Flash Dont Walk (s)	9.0
Pedestrian Calls (#/hr)	19
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	

Lanes, Volumes, Timings
174: Union Street & Route 18

2030 Build Condition w/ Mitigation - PM Peak Hour

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 131.4	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
~ 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.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 174: Union Street & Route 18

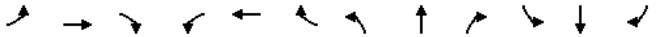


HCM Signalized Intersection Capacity Analysis
174: Union Street & Route 18

2030 Build Condition w/ Mitigation - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	340	31	60	85	38	15	90	980	24	36	1150	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	11	11	11	10	11	11
Total Lost time (s)		5.0			5.0		6.0	6.0	5.0	6.0	6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.98			0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		2012			2033		1728	3355	1561	1440	3355	1546
Flt Permitted		0.67			0.77		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1399			1613		1728	3355	1561	1440	3355	1546
Peak-hour factor, PHF	0.93	0.93	0.93	0.85	0.85	0.85	0.91	0.91	0.91	0.99	0.99	0.99
Adj. Flow (vph)	366	33	65	100	45	18	99	1077	26	36	1162	146
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	54
Lane Group Flow (vph)	0	464	0	0	163	0	99	1077	26	36	1162	92
Heavy Vehicles (%)	1%	3%	0%	2%	0%	0%	1%	4%	0%	17%	4%	1%
Turn Type	Perm			Perm			Prot		custom	Prot		Perm
Protected Phases		4			4		1	2	5	1	2	
Permitted Phases	4			4								2
Actuated Green, G (s)		37.5			37.5		6.1	43.6	11.1	6.1	43.6	43.6
Effective Green, g (s)		37.5			37.5		6.1	43.6	11.1	6.1	43.6	43.6
Actuated g/C Ratio		0.28			0.28		0.05	0.32	0.08	0.05	0.32	0.32
Clearance Time (s)		5.0			5.0		6.0	6.0	5.0	6.0	6.0	6.0
Vehicle Extension (s)		5.0			5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)		390			450		78	1088	129	65	1088	502
v/s Ratio Prot							c0.06	0.32	c0.02	0.03	c0.35	
v/s Ratio Perm		c0.33			0.10							0.06
v/c Ratio		1.19			0.36		1.27	0.99	0.20	0.55	1.07	0.18
Uniform Delay, d1		48.5			38.9		64.2	45.2	57.5	62.8	45.4	32.6
Progression Factor		1.00			2.09		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		108.2			0.3		190.4	24.6	1.1	12.0	47.4	0.2
Delay (s)		156.7			81.3		254.5	69.8	58.6	74.8	92.8	32.9
Level of Service		F			F		F	E	E	E	F	C
Approach Delay (s)		156.7			81.3			84.7			85.8	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	95.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	134.4	Sum of lost time (s)	36.1
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	5	35	0	15	5	0	206	5	5	252	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	15	16	16	16	16	16	12	12
Storage Length (ft)	0		0	0		0	0		0	0		50
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		82			609			920			687	
Travel Time (s)		1.9			13.8			20.9			15.6	
Peak Hour Factor	0.90	0.90	0.90	0.75	0.75	0.75	0.69	0.69	0.69	0.83	0.83	0.83
Heavy Vehicles (%)	0%	25%	16%	0%	0%	25%	0%	6%	20%	0%	6%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	101	0	0	27	0	0	306	0	0	310	149
Turn Type	pm+pt			Perm						Perm		custom
Protected Phases	1	1 4			4			2			2	5
Permitted Phases	1 4			4						2		
Detector Phase	1	1 4		4	4			2		2	2	5
Switch Phase												
Minimum Initial (s)	4.0			7.0	7.0			7.0		7.0	7.0	4.0
Minimum Split (s)	10.0			12.0	12.0			13.0		13.0	13.0	9.0
Total Split (s)	12.0	54.0	0.0	42.0	42.0	0.0	0.0	49.0	0.0	49.0	49.0	16.0
Total Split (%)	8.0%	36.0%	0.0%	28.0%	28.0%	0.0%	0.0%	32.7%	0.0%	32.7%	32.7%	10.7%
Maximum Green (s)	6.0			37.0	37.0			43.0		43.0	43.0	11.0
Yellow Time (s)	4.0			4.0	4.0			4.0		4.0	4.0	3.0
All-Red Time (s)	2.0			1.0	1.0			2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	4.0	6.0	4.0	6.0	6.0	5.0
Lead/Lag	Lead			Lag	Lag			Lag		Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes			Yes		Yes	Yes	
Vehicle Extension (s)	4.0			5.0	5.0			4.0		4.0	4.0	4.0
Recall Mode	None			None	None			None		None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.19			0.05			0.46			0.52	1.10
Control Delay		14.0			32.2			39.8			42.1	160.8
Queue Delay		0.0			0.0			0.0			0.0	604.3
Total Delay		14.0			32.2			39.8			42.1	765.1
Queue Length 50th (ft)		24			11			175			183	~118
Queue Length 95th (ft)		m42			34			254			333	#297
Internal Link Dist (ft)		2			529			840			607	
Turn Bay Length (ft)												50
Base Capacity (vph)		526			545			670			591	136
Starvation Cap Reductn		0			0			0			0	0
Spillback Cap Reductn		0			9			0			0	112
Storage Cap Reductn		0			0			0			0	0
Reduced v/c Ratio		0.19			0.05			0.46			0.52	6.21

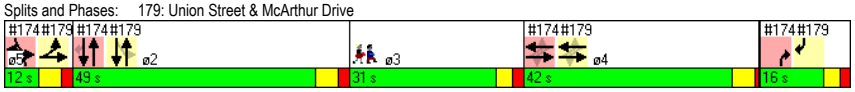
Lane Group	ø3
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	17.0
Minimum Split (s)	31.0
Total Split (s)	31.0
Total Split (%)	21%
Maximum Green (s)	26.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	0.2
Recall Mode	None
Walk Time (s)	17.0
Flash Dont Walk (s)	9.0
Pedestrian Calls (#/hr)	19
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	

Lanes, Volumes, Timings
179: Union Street & McArthur Drive

2030 Build Condition w/ Mitigation - PM Peak Hour

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 131.4	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
~ 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.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 179: Union Street & McArthur Drive



HCM Signalized Intersection Capacity Analysis
179: Union Street & McArthur Drive

2030 Build Condition w/ Mitigation - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	5	35	0	15	5	0	206	5	5	252	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	15	16	16	16	16	16	12	12
Total Lost time (s)		6.0			5.0			6.0			6.0	5.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frt		0.95			0.96			1.00			1.00	0.85
Flt Protected		0.97			1.00			1.00			1.00	1.00
Satd. Flow (prot)		1845			1894			2019			1793	1599
Flt Permitted		0.84			1.00			1.00			0.99	1.00
Satd. Flow (perm)		1589			1894			2019			1782	1599
Peak-hour factor, PHF	0.90	0.90	0.90	0.75	0.75	0.75	0.69	0.69	0.69	0.83	0.83	0.83
Adj. Flow (vph)	56	6	39	0	20	7	0	299	7	6	304	149
RTOR Reduction (vph)	0	0	0	0	5	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	101	0	0	22	0	0	305	0	0	310	149
Heavy Vehicles (%)	0%	25%	16%	0%	0%	25%	0%	6%	20%	0%	6%	1%
Turn Type	pm+pt			Perm						Perm		custom
Protected Phases	1	1 4			4			2			2	5
Permitted Phases	1 4			4						2		
Actuated Green, G (s)		43.6			37.5			43.6			43.6	11.1
Effective Green, g (s)		43.6			37.5			43.6			43.6	11.1
Actuated g/C Ratio		0.32			0.28			0.32			0.32	0.08
Clearance Time (s)					5.0			6.0			6.0	5.0
Vehicle Extension (s)					5.0			4.0			4.0	4.0
Lane Grp Cap (vph)		527			528			655			578	132
v/s Ratio Prot		c0.01			0.01			0.15				c0.09
v/s Ratio Perm		c0.05									c0.17	
v/c Ratio		0.19			0.04			0.47			0.54	1.13
Uniform Delay, d1		32.7			35.3			36.1			37.1	61.7
Progression Factor		0.57			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.2			0.1			0.7			1.2	117.1
Delay (s)		18.9			35.4			36.9			38.4	178.8
Level of Service		B			D			D			D	F
Approach Delay (s)		18.9			35.4			36.9			83.9	
Approach LOS		B			D			D			F	

Intersection Summary			
HCM Average Control Delay	59.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	134.4	Sum of lost time (s)	37.1
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Taunton

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	450	157	108	39	126	52	112	431	63	31	341	366
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	12	16	12	12	12	13	12	12	12	11	12
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		698			192			448			574	
Travel Time (s)		15.9			4.4			10.2			13.0	
Peak Hour Factor	0.97	0.97	0.97	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	10%	8%	1%	10%	8%	4%	6%	3%	6%	8%
Shared Lane Traffic (%)	20%											
Lane Group Flow (vph)	371	366	0	0	233	0	0	681	0	0	405	398
Turn Type	Split			Split			pm+pt			Perm		pm+ov
Protected Phases	1	1		2	2		3	8			4	1
Permitted Phases							8			4		4
Detector Phase	1	1		2	2		3	8		4	4	1
Switch Phase												
Minimum Initial (s)	18.0	18.0		7.0	7.0		6.0	18.0		18.0	18.0	18.0
Minimum Split (s)	24.0	24.0		12.0	12.0		11.0	24.0		24.0	24.0	24.0
Total Split (s)	35.0	35.0	0.0	22.0	22.0	0.0	11.0	56.0	0.0	45.0	45.0	35.0
Total Split (%)	25.5%	25.5%	0.0%	16.1%	16.1%	0.0%	8.0%	40.9%	0.0%	32.8%	32.8%	25.5%
Maximum Green (s)	29.0	29.0		17.0	17.0		6.0	50.0		39.0	39.0	29.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	1.0		1.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	5.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag	Lead	Lead		Lag	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Recall Mode	None	None		None	None		None	Min		Min	Min	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.87	0.91			0.91			0.86			0.75	0.35
Control Delay	68.0	73.0			89.1			48.5			45.0	1.9
Queue Delay	0.0	0.0			0.0			0.0			0.0	0.4
Total Delay	68.0	73.0			89.1			48.5			45.0	2.3
Queue Length 50th (ft)	350	~357			~216			290			314	0
Queue Length 95th (ft)	#571	#571			#390			#382			448	38
Internal Link Dist (ft)		618			112			368			494	
Turn Bay Length (ft)												
Base Capacity (vph)	428	403			256			908			563	1122
Starvation Cap Reductn	0	0			0			0			0	301
Spillback Cap Reductn	0	0			0			0			0	0
Storage Cap Reductn	0	0			0			0			0	0
Reduced v/c Ratio	0.87	0.91			0.91			0.75			0.72	0.48

Intersection Summary	
Area Type:	Other

Lane Group	ø5
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	5
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	3.0
Minimum Split (s)	24.0
Total Split (s)	24.0
Total Split (%)	18%
Maximum Green (s)	19.0
Yellow Time (s)	4.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	21
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	

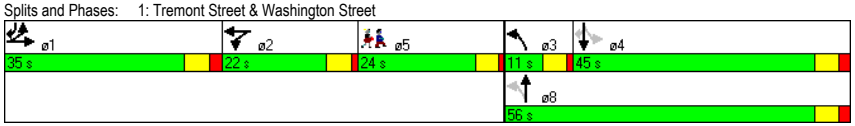
Intersection Summary

Lanes, Volumes, Timings
1: Tremont Street & Washington Street

9/17/2009

Cycle Length: 137
Actuated Cycle Length: 122.1
Natural Cycle: 125
Control Type: Actuated-Uncoordinated
~ 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.

Splits and Phases: 1: Tremont Street & Washington Street



HCM Signalized Intersection Capacity Analysis
1: Tremont Street & Washington Street

9/17/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	450	157	108	39	126	52	112	431	63	31	341	366
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	12	16	12	12	12	13	12	12	12	11	12
Total Lost time (s)	6.0	6.0			5.0			6.0			6.0	6.0
Lane Util. Factor	0.95	0.95			1.00			0.95			1.00	1.00
Frt	1.00	0.95			0.97			0.98			1.00	0.85
Flt Protected	0.95	0.99			0.99			0.99			1.00	1.00
Satd. Flow (prot)	1759	1608			1745			3355			1730	1495
Flt Permitted	0.95	0.99			0.99			0.64			0.85	1.00
Satd. Flow (perm)	1759	1608			1745			2150			1481	1495
Peak-hour factor, PHF	0.97	0.97	0.97	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92
Adj. Flow (vph)	464	162	111	42	135	56	126	484	71	34	371	398
RTOR Reduction (vph)	0	11	0	0	8	0	0	6	0	0	0	159
Lane Group Flow (vph)	371	355	0	0	225	0	0	675	0	0	405	239
Heavy Vehicles (%)	4%	4%	10%	8%	1%	10%	8%	4%	6%	3%	6%	8%
Turn Type	Split			Split			pm+pt			Perm		pm+ov
Protected Phases	1	1		2	2		3	8			4	1
Permitted Phases							8			4		4
Actuated Green, G (s)	29.7	29.7			17.4			44.7			44.7	74.4
Effective Green, g (s)	29.7	29.7			17.4			44.7			44.7	74.4
Actuated g/C Ratio	0.24	0.24			0.14			0.36			0.36	0.60
Clearance Time (s)	6.0	6.0			5.0			6.0			6.0	6.0
Vehicle Extension (s)	2.0	2.0			2.0			2.0			2.0	2.0
Lane Grp Cap (vph)	421	385			245			775			534	969
v/s Ratio Prot	0.21	c0.22			c0.13							0.06
v/s Ratio Perm								c0.31			0.27	0.10
v/c Ratio	0.88	0.92			0.92			0.87			0.76	0.25
Uniform Delay, d1	45.4	46.0			52.6			37.0			34.9	11.6
Progression Factor	1.00	1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2	18.5	26.7			35.5			10.2			5.4	0.0
Delay (s)	63.9	72.7			88.1			47.1			40.3	11.7
Level of Service	E	E			F			D			D	B
Approach Delay (s)		68.3			88.1			47.1			26.1	
Approach LOS		E			F			D			C	

Intersection Summary				
HCM Average Control Delay	50.5	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.90			
Actuated Cycle Length (s)	124.0	Sum of lost time (s)	32.2	
Intersection Capacity Utilization	87.8%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	819	296	185	655	95	127	350	270	125	220	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	16	10	12	13	12	11	16	12	11	12
Storage Length (ft)	100		70	100		70	0		50	0		100
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1663			1440			2994			1249	
Travel Time (s)		37.8			32.7			68.0			28.4	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.86	0.86	0.86	0.68	0.68	0.68
Heavy Vehicles (%)	18%	3%	3%	5%	4%	2%	8%	6%	3%	3%	8%	20%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1186	0	197	798	0	0	869	0	0	530	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			3			3	
Permitted Phases							3			3		
Detector Phase	5	2		1	6		3	3		3	3	
Switch Phase												
Minimum Initial (s)	9.0	12.0		9.0	12.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	14.0	17.0		14.0	17.0		13.0	13.0		13.0	13.0	
Total Split (s)	14.0	37.0	0.0	17.0	40.0	0.0	38.0	38.0	0.0	38.0	38.0	0.0
Total Split (%)	11.7%	30.8%	0.0%	14.2%	33.3%	0.0%	31.7%	31.7%	0.0%	31.7%	31.7%	0.0%
Maximum Green (s)	9.0	32.0		12.0	35.0		33.0	33.0		33.0	33.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	5.0		4.0	5.0		4.0	4.0		4.0	4.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.08	1.04		0.99	0.48			1.12			2.09dl	
Control Delay	46.6	68.7		106.2	21.0			100.1			49.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	46.6	68.7		106.2	21.0			100.1			49.5	
Queue Length 50th (ft)	6	347		116	138			~280			146	
Queue Length 95th (ft)	28	#740		#340	373			#532			#219	
Internal Link Dist (ft)		1583			1360			2914			1169	
Turn Bay Length (ft)	100			100								
Base Capacity (vph)	133	1144		199	1660			774			599	
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	0.08	1.04		0.99	0.48			1.12			0.88	

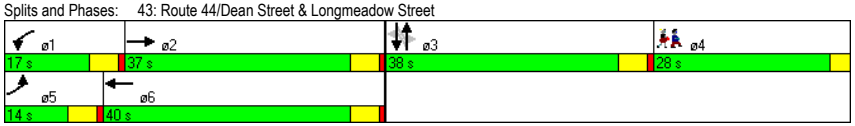
Lane Group	ø4
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	4
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	8.0
Minimum Split (s)	28.0
Total Split (s)	28.0
Total Split (%)	23%
Maximum Green (s)	25.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	0.2
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	18.0
Pedestrian Calls (#/hr)	12
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	

Lanes, Volumes, Timings
43: Route 44/Dean Street & Longmeadow Street

9/17/2009

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 97.6	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
~ 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.	
dl Defacto Left Lane. Recode with 1 though lane as a left lane.	

Splits and Phases: 43: Route 44/Dean Street & Longmeadow Street



HCM Signalized Intersection Capacity Analysis
43: Route 44/Dean Street & Longmeadow Street

9/17/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	819	296	185	655	95	127	350	270	125	220	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	16	10	12	13	12	11	16	12	11	12
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frt	1.00	0.96		1.00	0.98			0.95			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1428	3365		1604	3414			3109			3193	
Flt Permitted	0.95	1.00		0.95	1.00			0.67			0.54	
Satd. Flow (perm)	1428	3365		1604	3414			2089			1744	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.86	0.86	0.86	0.68	0.68	0.68
Adj. Flow (vph)	11	871	315	197	697	101	148	407	314	184	324	22
RTOR Reduction (vph)	0	27	0	0	7	0	0	62	0	0	3	0
Lane Group Flow (vph)	11	1159	0	197	791	0	0	807	0	0	527	0
Heavy Vehicles (%)	18%	3%	3%	5%	4%	2%	8%	6%	3%	3%	8%	20%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			3			3	
Permitted Phases							3			3		
Actuated Green, G (s)	1.5	36.7		12.1	47.3			33.4			33.4	
Effective Green, g (s)	1.5	36.7		12.1	47.3			33.4			33.4	
Actuated g/C Ratio	0.01	0.35		0.12	0.45			0.32			0.32	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	4.0	5.0		4.0	5.0			4.0			4.0	
Lane Grp Cap (vph)	21	1184		186	1548			669			558	
v/s Ratio Prot	0.01	c0.34		c0.12	0.23							
v/s Ratio Perm								c0.39			0.30	
v/c Ratio	0.52	0.98		1.06	0.51			1.21			2.09dl	
Uniform Delay, d1	51.0	33.4		46.1	20.3			35.5			34.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	27.4	21.1		82.5	0.6			106.6			25.2	
Delay (s)	78.5	54.6		128.6	20.8			142.1			59.7	
Level of Service	E	D		F	C			F			E	
Approach Delay (s)		54.8			42.2			142.1			59.7	
Approach LOS		D			D			F			E	

Intersection Summary					
HCM Average Control Delay	73.1	HCM Level of Service		E	
HCM Volume to Capacity ratio	1.08				
Actuated Cycle Length (s)	104.3	Sum of lost time (s)		22.1	
Intersection Capacity Utilization	91.2%	ICU Level of Service		F	
Analysis Period (min)	15				
dl Defacto Left Lane. Recode with 1 though lane as a left lane.					
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	165	307	134	110	245	141	636	62	160	558	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	12	12	11	11	11	12	12	12
Storage Length (ft)	0		50	0		50	50		0	50		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1373			971			2224			3692	
Travel Time (s)		31.2			22.1			43.3			71.9	
Peak Hour Factor	0.80	0.80	0.80	0.95	0.95	0.95	0.95	0.95	0.95	0.73	0.73	0.73
Heavy Vehicles (%)	0%	6%	3%	1%	4%	3%	4%	5%	2%	10%	6%	13%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	237	384	0	257	258	0	882	0	0	997	0
Turn Type	Perm		pt+ov	Perm		pt+ov	pm+pt			pm+pt		
Protected Phases		4	4 3		4	4 1	3	2 3		1	1 2	
Permitted Phases	4			4			2 3			1 2		
Detector Phase	4	4	4 3	4	4	4 1	3	2 3		1	1 2	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		6.0			6.0		
Minimum Split (s)	13.0	13.0		13.0	13.0		11.0			11.0		
Total Split (s)	32.0	32.0	43.0	32.0	32.0	45.0	11.0	52.0	0.0	13.0	54.0	0.0
Total Split (%)	26.2%	26.2%	35.2%	26.2%	26.2%	36.9%	9.0%	42.6%	0.0%	10.7%	44.3%	0.0%
Maximum Green (s)	27.0	27.0		27.0	27.0		6.0			8.0		
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0			4.0		
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0			1.0		
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead			Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0			3.0		
Recall Mode	None	None		None	None		None			None		
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.56	0.55		0.97	0.38		0.98			1.10	
Control Delay		39.8	15.4		87.9	11.4		54.9			88.9	
Queue Delay		0.0	0.0		0.0	0.0		0.0			0.0	
Total Delay		39.8	15.4		87.9	11.4		54.9			88.9	
Queue Length 50th (ft)		124	75		154	52		192			~246	
Queue Length 95th (ft)		228	171		#411	103		#500			#432	
Internal Link Dist (ft)		1293			891			2144			3612	
Turn Bay Length (ft)			50			50						
Base Capacity (vph)		426	699		265	684		896			903	
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		0.56	0.55		0.97	0.38		0.98			1.10	

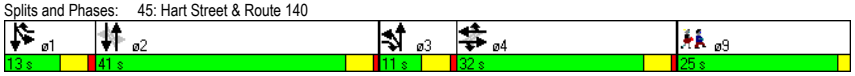
Lane Group	ø2	ø9
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	2	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	8.0	1.0
Minimum Split (s)	13.0	25.0
Total Split (s)	41.0	25.0
Total Split (%)	34%	20%
Maximum Green (s)	36.0	23.0
Yellow Time (s)	4.0	2.0
All-Red Time (s)	1.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		7.0
Flash Dont Walk (s)		16.0
Pedestrian Calls (#/hr)		4
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		

Lanes, Volumes, Timings
45: Hart Street & Route 140

9/17/2009

Intersection Summary	
Area Type:	Other
Cycle Length: 122	
Actuated Cycle Length: 102	
Natural Cycle: 150	
Control Type: Semi Act-Uncoord	
~ 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.	

Splits and Phases: 45: Hart Street & Route 140



HCM Signalized Intersection Capacity Analysis
45: Hart Street & Route 140

9/17/2009

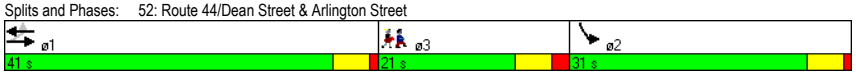
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	165	307	134	110	245	141	636	62	160	558	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12	11	11	11	12	12	12
Total Lost time (s)		5.0	5.0		5.0	5.0		5.0			5.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.95			0.95	
Frt		1.00	0.85		1.00	0.85		0.99			1.00	
Flt Protected		0.99	1.00		0.97	1.00		0.99			0.99	
Satd. Flow (prot)		1734	1516		1807	1568		3272			3331	
Flt Permitted		0.91	1.00		0.53	1.00		0.59			0.53	
Satd. Flow (perm)		1596	1516		992	1568		1960			1796	
Peak-hour factor, PHF	0.80	0.80	0.80	0.95	0.95	0.95	0.95	0.95	0.95	0.73	0.73	0.73
Adj. Flow (vph)	31	206	384	141	116	258	148	669	65	219	764	14
RTOR Reduction (vph)	0	0	131	0	0	82	0	4	0	0	1	0
Lane Group Flow (vph)	0	237	253	0	257	176	0	878	0	0	996	0
Heavy Vehicles (%)	0%	6%	3%	1%	4%	3%	4%	5%	2%	10%	6%	13%
Turn Type	Perm		pt+ov	Perm		pt+ov	pm+pt			pm+pt		
Protected Phases		4	4 3		4	4 1	3	2 3		1	1 2	
Permitted Phases	4			4			2 3			1 2		
Actuated Green, G (s)		27.2	38.3		27.2	35.3		42.4			44.4	
Effective Green, g (s)		27.2	38.3		27.2	35.3		42.4			44.4	
Actuated g/C Ratio		0.26	0.37		0.26	0.34		0.41			0.43	
Clearance Time (s)		5.0			5.0							
Vehicle Extension (s)		3.0			3.0							
Lane Grp Cap (vph)		419	561		261	535		880			891	
v/s Ratio Prot			0.17			0.11		c0.06			c0.09	
v/s Ratio Perm		0.15			c0.26			0.35			c0.39	
v/c Ratio		0.57	0.45		0.98	0.33		1.00			1.12	
Uniform Delay, d1		33.0	24.6		37.9	25.3		30.5			29.6	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		1.8	0.6		51.0	0.4		29.5			68.2	
Delay (s)		34.8	25.2		89.0	25.7		60.0			97.7	
Level of Service		C	C		F	C		E			F	
Approach Delay (s)		28.9			57.3			60.0			97.7	
Approach LOS		C			E			E			F	

Intersection Summary			
HCM Average Control Delay	65.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	103.5	Sum of lost time (s)	25.8
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	ø3
Lane Configurations							
Volume (vph)	48	800	655	142	296	57	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	16	12	14	12	
Storage Length (ft)	150			0	0	0	
Storage Lanes	1			0	1	0	
Taper Length (ft)	25			25	25	25	
Right Turn on Red				Yes		No	
Link Speed (mph)		30	30		30		
Link Distance (ft)		1036	1663		418		
Travel Time (s)		23.5	37.8		9.5		
Peak Hour Factor	0.87	0.87	0.86	0.86	0.81	0.81	
Heavy Vehicles (%)	3%	5%	5%	3%	4%	12%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	55	920	927	0	435	0	
Turn Type	Perm						
Protected Phases		1	1		2		3
Permitted Phases	1						
Detector Phase	1	1	1		2		
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		5.0		5.0
Minimum Split (s)	15.0	15.0	15.0		10.0		21.0
Total Split (s)	41.0	41.0	41.0	0.0	31.0	0.0	21.0
Total Split (%)	44.1%	44.1%	44.1%	0.0%	33.3%	0.0%	23%
Maximum Green (s)	36.0	36.0	36.0		26.0		15.0
Yellow Time (s)	4.0	4.0	4.0		4.0		4.0
All-Red Time (s)	1.0	1.0	1.0		1.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	4.0	5.0	4.0	
Lead/Lag	Lead	Lead	Lead				Lag
Lead-Lag Optimize?	Yes	Yes	Yes				Yes
Vehicle Extension (s)	3.0	3.0	3.0		3.0		1.0
Recall Mode	None	None	None		None		None
Walk Time (s)							5.0
Flash Dont Walk (s)							10.0
Pedestrian Calls (#/hr)							0
v/c Ratio	0.54	0.96	0.86		0.75		
Control Delay	38.2	39.7	25.8		29.3		
Queue Delay	0.0	0.0	0.0		0.0		
Total Delay	38.2	39.7	25.8		29.3		
Queue Length 50th (ft)	15	352	317		159		
Queue Length 95th (ft)	#71	#620	#563		219		
Internal Link Dist (ft)		956	1583		338		
Turn Bay Length (ft)	150						
Base Capacity (vph)	101	960	1072		692		
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	0.54	0.96	0.86		0.63		

Intersection Summary	
Area Type:	Other
Cycle Length: 93	
Actuated Cycle Length: 68.1	
Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 52: Route 44/Dean Street & Arlington Street



HCM Signalized Intersection Capacity Analysis
52: Route 44/Dean Street & Arlington Street

9/17/2009

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	48	800	655	142	296	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	16	12	14	12
Total Lost time (s)	5.0	5.0	5.0		5.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.98		0.98	
Flt Protected	0.95	1.00	1.00		0.96	
Satd. Flow (prot)	1636	1810	2008		1807	
Flt Permitted	0.11	1.00	1.00		0.96	
Satd. Flow (perm)	191	1810	2008		1807	
Peak-hour factor, PHF	0.87	0.87	0.86	0.86	0.81	0.81
Adj. Flow (vph)	55	920	762	165	365	70
RTOR Reduction (vph)	0	0	7	0	0	0
Lane Group Flow (vph)	55	920	920	0	435	0
Heavy Vehicles (%)	3%	5%	5%	3%	4%	12%
Turn Type	Perm					
Protected Phases		1	1		2	
Permitted Phases	1					
Actuated Green, G (s)	36.1	36.1	36.1		21.9	
Effective Green, g (s)	36.1	36.1	36.1		21.9	
Actuated g/C Ratio	0.53	0.53	0.53		0.32	
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	101	961	1066		582	
v/s Ratio Prot		c0.51	0.46		c0.24	
v/s Ratio Perm	0.29					
v/c Ratio	0.54	0.96	0.86		0.75	
Uniform Delay, d1	10.5	15.2	13.8		20.6	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	5.9	19.3	7.4		5.2	
Delay (s)	16.4	34.5	21.2		25.8	
Level of Service	B	C	C		C	
Approach Delay (s)		33.5	21.2		25.8	
Approach LOS		C	C		C	

Intersection Summary			
HCM Average Control Delay	27.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	68.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
61: Taunton Green & Broadway

9/17/2009

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	179	794	193	0	0	1051	0	306	89	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	10	10	12	12	12
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		304			913			579			302	
Travel Time (s)		6.9			20.8			13.2			6.9	
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	11%	0%	0%	6%	2%	6%	8%	0%	0%	0%
Parking (#/hr)			0			0			0			
Shared Lane Traffic (%)												
Lane Group Flow (vph)	197	873	212	0	0	1142	0	340	99	0	0	0
Turn Type	Perm		Perm			Free			Perm			
Protected Phases		1						3				
Permitted Phases	1		1			Free			3			
Detector Phase	1	1	1					3	3			
Switch Phase												
Minimum Initial (s)	30.0	30.0	30.0					25.0	25.0			
Minimum Split (s)	35.0	35.0	35.0					30.0	30.0			
Total Split (s)	35.0	35.0	35.0	0.0	0.0	0.0	0.0	30.0	30.0	0.0	0.0	0.0
Total Split (%)	39.3%	39.3%	39.3%	0.0%	0.0%	0.0%	0.0%	33.7%	33.7%	0.0%	0.0%	0.0%
Maximum Green (s)	30.0	30.0	30.0					25.0	25.0			
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0			
All-Red Time (s)	1.0	1.0	1.0					1.0	1.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lead									
Lead-Lag Optimize?	Yes	Yes	Yes									
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0			
Recall Mode	Max	Max	Max					Max	Max			
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.30	0.76	0.33			0.45		0.72	0.23			
Control Delay	8.1	30.5	4.2			0.6		39.2	6.9			
Queue Delay	0.0	0.0	0.0			0.0		0.0	0.0			
Total Delay	8.1	30.5	4.2			0.6		39.2	6.9			
Queue Length 50th (ft)	20	227	0			0		172	0			
Queue Length 95th (ft)	m66	298	m40			0		#279	36			
Internal Link Dist (ft)		224			833			499			222	
Turn Bay Length (ft)												
Base Capacity (vph)	664	1148	641			2547		470	424			
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	0.76	0.33			0.45		0.72	0.23			

Intersection Summary

Lane Group	ø2
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Parking (#/hr)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	24.0
Total Split (s)	24.0
Total Split (%)	27%
Maximum Green (s)	20.0
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	2.0
Recall Mode	Ped
Walk Time (s)	7.0
Flash Dont Walk (s)	13.0
Pedestrian Calls (#/hr)	0
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	

Area Type: Other
Cycle Length: 89
Actuated Cycle Length: 89
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 61: Taunton Green & Broadway

HCM Signalized Intersection Capacity Analysis
61: Taunton Green & Broadway

9/17/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	179	794	193	0	0	1051	0	306	89	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	16	12	12	12	12	10	10	12	12	12
Total Lost time (s)	5.0	5.0	5.0			4.0		5.0	5.0			
Lane Util. Factor	1.00	0.95	1.00			0.88		1.00	1.00			
Frt	1.00	1.00	0.85			0.85		1.00	0.85			
Flt Protected	0.95	1.00	1.00			1.00		1.00	1.00			
Satd. Flow (prot)	1703	3406	1484			2547		1673	1256			
Flt Permitted	0.95	1.00	1.00			1.00		1.00	1.00			
Satd. Flow (perm)	1703	3406	1484			2547		1673	1256			
Peak-hour factor, PHF	0.91	0.91	0.91	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.92	0.92
Adj. Flow (vph)	197	873	212	0	0	1142	0	340	99	0	0	0
RTOR Reduction (vph)	89	0	141	0	0	0	0	0	71	0	0	0
Lane Group Flow (vph)	108	873	71	0	0	1142	0	340	28	0	0	0
Heavy Vehicles (%)	6%	6%	11%	0%	0%	6%	2%	6%	8%	0%	0%	0%
Parking (#/hr)			0			0			0			
Turn Type	Perm		Perm			Free			Perm			
Protected Phases		1						3				
Permitted Phases	1		1			Free			3			
Actuated Green, G (s)	30.0	30.0	30.0			89.0		25.0	25.0			
Effective Green, g (s)	30.0	30.0	30.0			89.0		25.0	25.0			
Actuated g/C Ratio	0.34	0.34	0.34			1.00		0.28	0.28			
Clearance Time (s)	5.0	5.0	5.0					5.0	5.0			
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0			
Lane Grp Cap (vph)	574	1148	500			2547		470	353			
v/s Ratio Prot		c0.26						c0.20				
v/s Ratio Perm	0.06		0.05			c0.45			0.02			
v/c Ratio	0.19	0.76	0.14			0.45		0.72	0.08			
Uniform Delay, d1	20.9	26.3	20.5			0.0		28.9	23.5			
Progression Factor	0.89	0.96	0.85			1.00		1.00	1.00			
Incremental Delay, d2	0.7	4.8	0.6			0.6		9.3	0.4			
Delay (s)	19.4	30.1	18.0			0.6		38.2	24.0			
Level of Service	B	C	B			A		D	C			
Approach Delay (s)		26.5			0.6			35.0			0.0	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	89.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
71: Court Street & Washington Street

9/17/2009

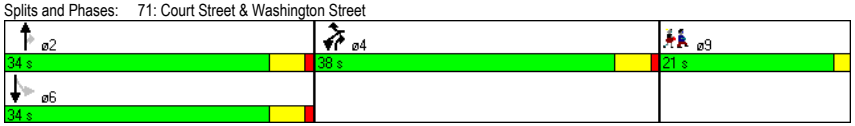
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø9
Lane Configurations							
Volume (vph)	438	21	638	295	37	421	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	14	10	9	12	12	
Storage Length (ft)	0	50		0	0		
Storage Lanes	1	1		1	1		
Taper Length (ft)	25	25		25	25		
Right Turn on Red		Yes		Yes			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1051		260			584	
Travel Time (s)	23.9		5.9			13.3	
Peak Hour Factor	0.88	0.88	0.87	0.87	0.85	0.85	
Heavy Vehicles (%)	9%	0%	3%	4%	0%	3%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	498	24	733	339	44	495	
Turn Type		Prot		pm+ov	Perm		
Protected Phases	4	4	2	4		6	9
Permitted Phases				2	6		
Detector Phase	4	4	2	4	6	6	
Switch Phase							
Minimum Initial (s)	5.0	5.0	10.0	5.0	10.0	10.0	3.0
Minimum Split (s)	10.0	10.0	15.0	10.0	15.0	15.0	21.0
Total Split (s)	38.0	38.0	34.0	38.0	34.0	34.0	21.0
Total Split (%)	40.9%	40.9%	36.6%	40.9%	36.6%	36.6%	23%
Maximum Green (s)	33.0	33.0	29.0	33.0	29.0	29.0	19.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0	3.0	4.0	3.0	4.0	4.0	0.7
Recall Mode	None	None	C-Min	None	C-Min	C-Min	None
Walk Time (s)							7.0
Flash Dont Walk (s)							12.0
Pedestrian Calls (#/hr)							19
v/c Ratio	0.89	0.04	0.90	0.26	0.40	0.57	
Control Delay	48.5	14.8	42.6	1.0	39.3	25.3	
Queue Delay	0.0	0.0	175.4	0.1	0.0	0.0	
Total Delay	48.5	14.8	218.0	1.1	39.3	25.3	
Queue Length 50th (ft)	263	6	328	0	14	174	
Queue Length 95th (ft)	#415	22	#755	18	#73	#405	
Internal Link Dist (ft)	971		180			504	
Turn Bay Length (ft)		50					
Base Capacity (vph)	607	617	816	1275	110	874	
Starvation Cap Reductn	0	0	290	160	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.82	0.04	1.39	0.30	0.40	0.57	

Lanes, Volumes, Timings
71: Court Street & Washington Street

9/17/2009

Intersection Summary	
Area Type:	Other
Cycle Length: 93	
Actuated Cycle Length: 93	
Offset: 8 (9%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 71: Court Street & Washington Street

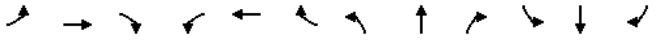


HCM Signalized Intersection Capacity Analysis
71: Court Street & Washington Street

9/17/2009

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	438	21	638	295	37	421
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	14	10	9	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1723	1722	1398	1805	1845
Flt Permitted	0.95	1.00	1.00	1.00	0.12	1.00
Satd. Flow (perm)	1711	1723	1722	1398	231	1845
Peak-hour factor, PHF	0.88	0.88	0.87	0.87	0.85	0.85
Adj. Flow (vph)	498	24	733	339	44	495
RTOR Reduction (vph)	0	6	0	71	0	0
Lane Group Flow (vph)	498	18	733	268	44	495
Heavy Vehicles (%)	9%	0%	3%	4%	0%	3%
Turn Type		Prot		pm+ov	Perm	
Protected Phases	4	4	2	4		6
Permitted Phases				2	6	
Actuated Green, G (s)	30.5	30.5	42.9	73.4	42.9	42.9
Effective Green, g (s)	30.5	30.5	42.9	73.4	42.9	42.9
Actuated g/C Ratio	0.33	0.33	0.46	0.79	0.46	0.46
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	561	565	794	1179	107	851
v/s Ratio Prot	c0.29	0.01	c0.43	0.07		0.27
v/s Ratio Perm				0.12	0.19	
v/c Ratio	0.89	0.03	0.92	0.23	0.41	0.58
Uniform Delay, d1	29.6	21.2	23.5	2.5	16.7	18.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.6	0.0	17.9	0.1	11.3	2.9
Delay (s)	45.3	21.2	41.4	2.6	27.9	21.3
Level of Service	D	C	D	A	C	C
Approach Delay (s)	44.2		29.2			21.9
Approach LOS	D		C			C

Intersection Summary			
HCM Average Control Delay	31.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	93.0	Sum of lost time (s)	19.6
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	0	0	104	0	136	0	776	164	105	745	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	16	16	12	9	12	12	12	12
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		216			709			574			260	
Travel Time (s)		4.9			16.1			13.0			5.9	
Peak Hour Factor	0.42	0.42	0.42	0.87	0.87	0.87	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	9%	0%	3%	0%	3%	15%	5%	6%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	0	0	120	156	0	1068	0	0	972	0
Turn Type	Perm			Perm		pm+ov	Perm			pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	1	2	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	15.0	15.0		15.0	15.0	9.0	15.0	15.0		9.0	9.0	
Total Split (s)	15.0	15.0	0.0	15.0	15.0	9.0	42.0	42.0	0.0	9.0	51.0	0.0
Total Split (%)	16.5%	16.5%	0.0%	16.5%	16.5%	9.9%	46.2%	46.2%	0.0%	9.9%	56.0%	0.0%
Maximum Green (s)	10.0	10.0		10.0	10.0	4.0	37.0	37.0		4.0	46.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag						Lead	Lag	Lag		Lead		
Lead-Lag Optimize?						Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min		None	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.08			0.67	0.30		0.59			0.61	
Control Delay		36.8			57.9	5.2		14.7			10.7	
Queue Delay		0.0			0.0	0.0		0.0			5.3	
Total Delay		36.8			57.9	5.2		14.7			16.0	
Queue Length 50th (ft)		6			65	0		164			88	
Queue Length 95th (ft)		11			#147	28		357			#250	
Internal Link Dist (ft)		136			629			494			180	
Turn Bay Length (ft)												
Base Capacity (vph)		156			186	516		1825			1589	
Starvation Cap Reductn		0			0	0		0			544	
Spillback Cap Reductn		0			0	0		0			0	
Storage Cap Reductn		0			0	0		0			0	
Reduced v/c Ratio		0.08			0.65	0.30		0.59			0.93	

Intersection Summary	
Area Type:	Other

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	25.0
Total Split (s)	25.0
Total Split (%)	27%
Maximum Green (s)	23.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	16.0
Pedestrian Calls (#/hr)	12
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	

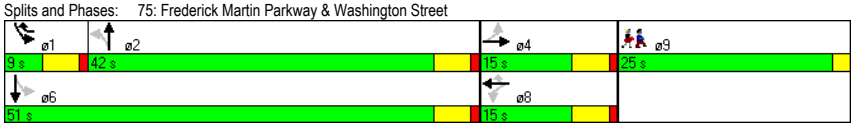
Intersection Summary

Lanes, Volumes, Timings
75: Frederick Martin Parkway & Washington Street

9/17/2009

Cycle Length: 91
Actuated Cycle Length: 91
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 75: Frederick Martin Parkway & Washington Street

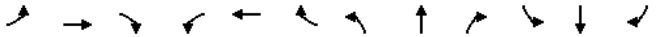


HCM Signalized Intersection Capacity Analysis
75: Frederick Martin Parkway & Washington Street

9/17/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	0	0	104	0	136	0	776	164	105	745	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	16	16	12	9	12	12	12	12
Total Lost time (s)		5.0			5.0	5.0		5.0			5.0	
Lane Util. Factor		1.00			1.00	1.00		0.95			0.95	
Frt		1.00			1.00	0.85		0.97			1.00	
Flt Protected		0.95			0.95	1.00		1.00			0.99	
Satd. Flow (prot)		1865			1877	1777		3011			3387	
Flt Permitted		0.64			0.75	1.00		1.00			0.62	
Satd. Flow (perm)		1248			1481	1777		3011			2123	
Peak-hour factor, PHF	0.42	0.42	0.42	0.87	0.87	0.87	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	12	0	0	120	0	156	0	882	186	119	847	6
RTOR Reduction (vph)	0	0	0	0	0	128	0	14	0	0	0	0
Lane Group Flow (vph)	0	12	0	0	120	28	0	1054	0	0	972	0
Heavy Vehicles (%)	0%	0%	0%	9%	0%	3%	0%	3%	15%	5%	6%	0%
Turn Type	Perm			Perm		pm+ov	Perm			pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		11.0			11.0	16.2		53.2			63.4	
Effective Green, g (s)		11.0			11.0	16.2		53.2			63.4	
Actuated g/C Ratio		0.12			0.12	0.18		0.58			0.70	
Clearance Time (s)		5.0			5.0	5.0		5.0			5.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)		151			179	316		1760			1551	
v/s Ratio Prot						0.01		0.35			c0.04	
v/s Ratio Perm		0.01			c0.08	0.01					c0.40	
v/c Ratio		0.08			0.67	0.09		0.60			0.63	
Uniform Delay, d1		35.5			38.3	31.2		12.1			7.4	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		0.2			9.5	0.1		1.5			0.8	
Delay (s)		35.7			47.7	31.4		13.6			8.2	
Level of Service		D			D	C		B			A	
Approach Delay (s)		35.7			38.5			13.6			8.2	
Approach LOS		D			D			B			A	

Intersection Summary				
HCM Average Control Delay	14.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	16.6	
Intersection Capacity Utilization	68.4%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	112	5	21	137	36	5	65	42	109	45	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	11	12	12	11	12	12	11	12
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		367			1375			1388			879	
Travel Time (s)		8.3			31.3			31.5			20.0	
Peak Hour Factor	0.69	0.69	0.69	0.68	0.68	0.68	0.68	0.68	0.68	0.70	0.70	0.70
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	2%	2%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	169	0	0	285	0	0	165	0	0	234	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	829	356	405	769	220	78	330	220	150	235	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	16	10	12	13	12	11	16	12	11	12
Storage Length (ft)	100		70	100		70	0		50	0		100
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1663			1440			2994			1249	
Travel Time (s)		37.8			32.7			68.0			28.4	
Peak Hour Factor	0.93	0.93	0.93	0.96	0.96	0.96	0.92	0.92	0.92	0.84	0.84	0.84
Heavy Vehicles (%)	0%	3%	3%	2%	3%	3%	1%	2%	1%	1%	1%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1274	0	422	1030	0	0	683	0	0	471	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			4			8	
Permitted Phases							4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	8.0	12.0		9.0	12.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	14.0	17.0		14.0	17.0		13.0	13.0		13.0	13.0	
Total Split (s)	14.0	39.0	0.0	26.0	51.0	0.0	30.0	30.0	0.0	30.0	30.0	0.0
Total Split (%)	11.4%	31.7%	0.0%	21.1%	41.5%	0.0%	24.4%	24.4%	0.0%	24.4%	24.4%	0.0%
Maximum Green (s)	9.0	34.0		21.0	46.0		25.0	25.0		25.0	25.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	4.0	5.0		4.0	5.0		4.0	4.0		4.0	4.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.08	1.08		1.21	0.52			1.12			2.42dl	
Control Delay	48.4	82.3		154.7	16.5			105.1			73.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	48.4	82.3		154.7	16.5			105.1			73.1	
Queue Length 50th (ft)	6	~426		~303	150			~224			145	
Queue Length 95th (ft)	28	#816		#668	457			#473			#316	
Internal Link Dist (ft)		1583			1360			2914			1169	
Turn Bay Length (ft)	100			100								
Base Capacity (vph)	153	1179		348	1981			612			485	
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	0.07	1.08		1.21	0.52			1.12			0.97	

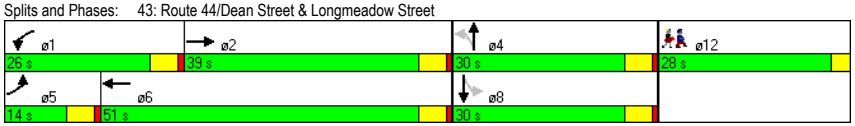
Lane Group	ø12
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	12
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	8.0
Minimum Split (s)	28.0
Total Split (s)	28.0
Total Split (%)	23%
Maximum Green (s)	25.0
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	18.0
Pedestrian Calls (#/hr)	7
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	

Lanes, Volumes, Timings
43: Route 44/Dean Street & Longmeadow Street

2030 Build Condition w/ mitigation - PM Peak Hour

Intersection Summary	
Area Type:	Other
Cycle Length: 123	
Actuated Cycle Length: 100.6	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
~ 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.	
dl Defacto Left Lane. Recode with 1 though lane as a left lane.	

Splits and Phases: 43: Route 44/Dean Street & Longmeadow Street

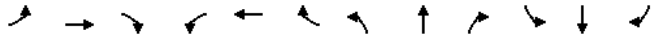


HCM Signalized Intersection Capacity Analysis
43: Route 44/Dean Street & Longmeadow Street

2030 Build Condition w/ mitigation - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	829	356	405	769	220	78	330	220	150	235	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	16	10	12	13	12	11	16	12	11	12
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frt	1.00	0.95		1.00	0.97			0.95			1.00	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1685	3347		1652	3388			3237			3379	
Flt Permitted	0.95	1.00		0.95	1.00			0.68			0.56	
Satd. Flow (perm)	1685	3347		1652	3388			2217			1924	
Peak-hour factor, PHF	0.93	0.93	0.93	0.96	0.96	0.96	0.92	0.92	0.92	0.84	0.84	0.84
Adj. Flow (vph)	11	891	383	422	801	229	85	359	239	179	280	12
RTOR Reduction (vph)	0	35	0	0	15	0	0	56	0	0	2	0
Lane Group Flow (vph)	11	1239	0	422	1015	0	0	627	0	0	469	0
Heavy Vehicles (%)	0%	3%	3%	2%	3%	3%	1%	2%	1%	1%	1%	0%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	1.5	38.7		21.2	58.4			25.3			25.3	
Effective Green, g (s)	1.5	38.7		21.2	58.4			25.3			25.3	
Actuated g/C Ratio	0.01	0.36		0.20	0.54			0.24			0.24	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	4.0	5.0		4.0	5.0			4.0			4.0	
Lane Grp Cap (vph)	24	1207		326	1844			523			454	
v/s Ratio Prot	0.01	c0.37		c0.26	0.30							
v/s Ratio Perm								c0.28			0.24	
v/c Ratio	0.46	1.03		1.29	0.55			1.20			2.42dl	
Uniform Delay, d1	52.5	34.3		43.0	15.9			41.0			41.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	17.7	33.0		153.5	0.6			107.0			51.3	
Delay (s)	70.2	67.3		196.5	16.5			148.0			92.3	
Level of Service	E	E		F	B			F			F	
Approach Delay (s)		67.3			68.8			148.0			92.3	
Approach LOS		E			E			F			F	

Intersection Summary			
HCM Average Control Delay	85.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	107.3	Sum of lost time (s)	22.1
Intersection Capacity Utilization	103.0%	ICU Level of Service	G
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	105	173	106	170	240	290	803	122	120	882	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	12	12	11	11	11	12	12	12
Storage Length (ft)	0		50	0		50	50		0	50		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1373			971			2224			3692	
Travel Time (s)		31.2			22.1			43.3			71.9	
Peak Hour Factor	0.68	0.68	0.68	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96	0.96
Heavy Vehicles (%)	0%	1%	2%	2%	1%	1%	1%	1%	1%	2%	3%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	205	254	0	291	253	0	1278	0	0	1054	0
Turn Type	Perm		pt+ov	Perm		pt+ov	pm+pt			pm+pt		
Protected Phases		4	4 3		4	4 1	3	2 3		1	1 2	
Permitted Phases	4			4			2 3			1 2		
Detector Phase	4	4	4 3	4	4	4 1	3	2 3		1	1 2	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		4.0			4.0		
Minimum Split (s)	13.0	13.0		13.0	13.0		9.0			9.0		
Total Split (s)	36.0	36.0	45.0	36.0	36.0	46.0	9.0	79.0	0.0	10.0	80.0	0.0
Total Split (%)	24.0%	24.0%	30.0%	24.0%	24.0%	30.7%	6.0%	52.7%	0.0%	6.7%	53.3%	0.0%
Maximum Green (s)	31.0	31.0		31.0	31.0		4.0			5.0		
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0			4.0		
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0			1.0		
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	5.0	5.0	4.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead			Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0			3.0		
Recall Mode	None	None		None	None		None			None		
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.75	0.44		1.03	0.44		1.13			0.96	
Control Delay		61.6	19.7		108.3	24.5		96.6			42.9	
Queue Delay		0.0	0.0		0.0	0.0		0.0			0.0	
Total Delay		61.6	19.7		108.3	24.5		96.6			42.9	
Queue Length 50th (ft)		154	81		~252	106		~406			242	
Queue Length 95th (ft)		173	92		#432	185		#617			#371	
Internal Link Dist (ft)		1293			891			2144			3612	
Turn Bay Length (ft)			50			50						
Base Capacity (vph)		274	573		282	580		1129			1101	
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		0.75	0.44		1.03	0.44		1.13			0.96	

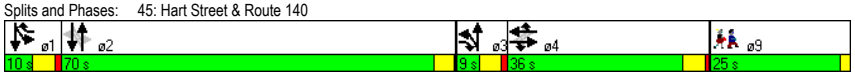
Lane Group	ø2	ø9
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	2	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	1.0
Minimum Split (s)	20.0	25.0
Total Split (s)	70.0	25.0
Total Split (%)	47%	17%
Maximum Green (s)	66.0	23.0
Yellow Time (s)	3.5	2.0
All-Red Time (s)	0.5	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		7.0
Flash Dont Walk (s)		16.0
Pedestrian Calls (#/hr)		0
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		

Lanes, Volumes, Timings
45: Hart Street & Route 140

2030 Build Condition w/ mitigation - PM Peak Hour

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 125	
Natural Cycle: 150	
Control Type: Semi Act-Uncoord	
~ 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.	

Splits and Phases: 45: Hart Street & Route 140



HCM Signalized Intersection Capacity Analysis
45: Hart Street & Route 140

2030 Build Condition w/ mitigation - PM Peak Hour

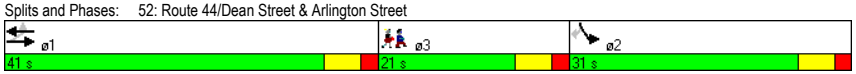
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	105	173	106	170	240	290	803	122	120	882	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12	11	11	11	12	12	12
Total Lost time (s)		5.0	5.0		5.0	5.0		4.0			5.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.95			0.95	
Frt		1.00	0.85		1.00	0.85		0.98			1.00	
Flt Protected		0.99	1.00		0.98	1.00		0.99			0.99	
Satd. Flow (prot)		1801	1531		1839	1599		3363			3484	
Flt Permitted		0.60	1.00		0.61	1.00		0.55			0.53	
Satd. Flow (perm)		1103	1531		1137	1599		1875			1848	
Peak-hour factor, PHF	0.68	0.68	0.68	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96	0.96
Adj. Flow (vph)	51	154	254	112	179	253	305	845	128	125	919	10
RTOR Reduction (vph)	0	0	83	0	0	55	0	5	0	0	0	0
Lane Group Flow (vph)	0	205	171	0	291	198	0	1273	0	0	1054	0
Heavy Vehicles (%)	0%	1%	2%	2%	1%	1%	1%	1%	1%	2%	3%	0%
Turn Type	Perm		pt+ov	Perm		pt+ov	pm+pt			pm+pt		
Protected Phases		4	4 3		4	4 1	3	2 3		1	1 2	
Permitted Phases	4			4			2 3			1 2		
Actuated Green, G (s)		31.0	40.0		31.0	41.0		70.0			71.0	
Effective Green, g (s)		31.0	40.0		31.0	41.0		70.0			71.0	
Actuated g/C Ratio		0.25	0.32		0.25	0.33		0.56			0.57	
Clearance Time (s)		5.0			5.0							
Vehicle Extension (s)		3.0			3.0							
Lane Grp Cap (vph)		274	490		282	524		1098			1115	
v/s Ratio Prot			0.11			0.12		c0.04			c0.04	
v/s Ratio Perm		0.19			c0.26			c0.61			0.50	
v/c Ratio		0.75	0.35		1.03	0.38		1.16			0.94	
Uniform Delay, d1		43.4	32.5		47.0	32.2		27.5			25.2	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		10.6	0.4		62.1	0.5		82.2			15.4	
Delay (s)		54.0	33.0		109.1	32.7		109.7			40.6	
Level of Service		D	C		F	C		F			D	
Approach Delay (s)		42.4			73.6			109.7			40.6	
Approach LOS		D			E			F			D	

Intersection Summary					
HCM Average Control Delay	72.7	HCM Level of Service		E	
HCM Volume to Capacity ratio	1.10				
Actuated Cycle Length (s)	125.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	100.8%	ICU Level of Service		G	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	ø3
Lane Configurations							
Volume (vph)	25	795	750	93	406	79	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	16	12	14	12	
Storage Length (ft)	150			0	0	0	
Storage Lanes	1			0	1	1	
Taper Length (ft)	25			25	25	25	
Right Turn on Red				Yes		No	
Link Speed (mph)		30	30		30		
Link Distance (ft)		1036	1663		418		
Travel Time (s)		23.5	37.8		9.5		
Peak Hour Factor	0.89	0.89	0.98	0.98	0.97	0.97	
Heavy Vehicles (%)	0%	3%	3%	0%	1%	5%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	28	893	860	0	419	81	
Turn Type	Perm					Perm	
Protected Phases		1	1		2		3
Permitted Phases	1					2	
Detector Phase	1	1	1		2	2	
Switch Phase							
Minimum Initial (s)	9.0	9.0	9.0		4.0	4.0	5.0
Minimum Split (s)	15.0	15.0	15.0		10.0	10.0	21.0
Total Split (s)	41.0	41.0	41.0	0.0	31.0	31.0	21.0
Total Split (%)	44.1%	44.1%	44.1%	0.0%	33.3%	33.3%	23%
Maximum Green (s)	35.0	35.0	35.0		25.0	25.0	15.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0	6.0	
Lead/Lag	Lead	Lead	Lead				Lag
Lead-Lag Optimize?	Yes	Yes	Yes				Yes
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	1.0
Recall Mode	None	None	None		None	None	None
Walk Time (s)							5.0
Flash Dont Walk (s)							10.0
Pedestrian Calls (#/hr)							0
v/c Ratio	0.26	0.93	0.79		0.74	0.18	
Control Delay	18.4	34.2	21.2		29.7	18.0	
Queue Delay	0.0	0.0	0.0		0.0	0.0	
Total Delay	18.4	34.2	21.2		29.7	18.0	
Queue Length 50th (ft)	6	319	268		153	24	
Queue Length 95th (ft)	28	#620	#545		244	53	
Internal Link Dist (ft)		956	1583		338		
Turn Bay Length (ft)	150						
Base Capacity (vph)	108	965	1084		712	574	
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	0.26	0.93	0.79		0.59	0.14	

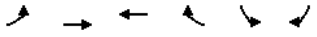
Intersection Summary	
Area Type:	Other
Cycle Length: 93	
Actuated Cycle Length: 67.2	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 52: Route 44/Dean Street & Arlington Street



HCM Signalized Intersection Capacity Analysis
52: Route 44/Dean Street & Arlington Street

2030 Build Condition w/ mitigation - PM Peak Hour

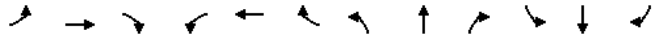


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	25	795	750	93	406	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	16	12	14	12
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1685	1845	2066		1906	1538
Flt Permitted	0.12	1.00	1.00		0.95	1.00
Satd. Flow (perm)	205	1845	2066		1906	1538
Peak-hour factor, PHF	0.89	0.89	0.98	0.98	0.97	0.97
Adj. Flow (vph)	28	893	765	95	419	81
RTOR Reduction (vph)	0	0	4	0	0	0
Lane Group Flow (vph)	28	893	856	0	419	81
Heavy Vehicles (%)	0%	3%	3%	0%	1%	5%
Turn Type	Perm					Perm
Protected Phases		1	1		2	
Permitted Phases	1					2
Actuated Green, G (s)	35.1	35.1	35.1		20.0	20.0
Effective Green, g (s)	35.1	35.1	35.1		20.0	20.0
Actuated g/C Ratio	0.52	0.52	0.52		0.30	0.30
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	107	965	1081		568	458
v/s Ratio Prot		c0.48	0.41		c0.22	
v/s Ratio Perm	0.14					0.05
v/c Ratio	0.26	0.93	0.79		0.74	0.18
Uniform Delay, d1	8.8	14.8	13.0		21.2	17.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.3	14.2	4.0		5.0	0.2
Delay (s)	10.1	29.0	17.1		26.2	17.6
Level of Service	B	C	B		C	B
Approach Delay (s)		28.4	17.1		24.8	
Approach LOS		C	B		C	

Intersection Summary				
HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	67.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
61: Taunton Green & Broadway

2030 Build Condition w/ mitigation - PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	168	961	347	0	0	1155	0	202	131	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	10	10	12	12	12
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		304			913			579			302	
Travel Time (s)		6.9			20.8			13.2			6.9	
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.88	0.88	0.88	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	2%	0%	0%	2%	0%	2%	2%	0%	0%	0%
Parking (#/hr)			0			0			0			
Shared Lane Traffic (%)												
Lane Group Flow (vph)	181	1033	373	0	0	1255	0	230	149	0	0	0
Turn Type	Perm		Perm			Free			Perm			
Protected Phases		1						3				
Permitted Phases	1		1			Free			3			
Detector Phase	1	1	1					3	3			
Switch Phase												
Minimum Initial (s)	30.0	30.0	30.0					25.0	25.0			
Minimum Split (s)	35.0	35.0	35.0					30.0	30.0			
Total Split (s)	35.0	35.0	35.0	0.0	0.0	0.0	0.0	30.0	30.0	0.0	0.0	0.0
Total Split (%)	39.3%	39.3%	39.3%	0.0%	0.0%	0.0%	0.0%	33.7%	33.7%	0.0%	0.0%	0.0%
Maximum Green (s)	30.0	30.0	30.0					25.0	25.0			
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0			
All-Red Time (s)	1.0	1.0	1.0					1.0	1.0			
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lead									
Lead-Lag Optimize?	Yes	Yes	Yes									
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0			
Recall Mode	Max	Max	Max					Max	Max			
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.26	0.87	0.47			0.47		0.47	0.31			
Control Delay	7.5	37.0	4.2			0.6		30.4	6.4			
Queue Delay	0.0	0.0	0.0			0.0		0.0	0.0			
Total Delay	7.5	37.0	4.2			0.6		30.4	6.4			
Queue Length 50th (ft)	16	283	0			0		107	0			
Queue Length 95th (ft)	60	#397	53			0		172	41			
Internal Link Dist (ft)		224			833			499			222	
Turn Bay Length (ft)												
Base Capacity (vph)	684	1181	792			2647		488	481			
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	0.26	0.87	0.47			0.47		0.47	0.31			

Intersection Summary

Lane Group	ø2
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Parking (#/hr)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	24.0
Total Split (s)	24.0
Total Split (%)	27%
Maximum Green (s)	20.0
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	2.0
Recall Mode	Ped
Walk Time (s)	7.0
Flash Dont Walk (s)	13.0
Pedestrian Calls (#/hr)	0
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

Area Type: Other
Cycle Length: 89
Actuated Cycle Length: 89
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 61: Taunton Green & Broadway

HCM Signalized Intersection Capacity Analysis
61: Taunton Green & Broadway

2030 Build Condition w/ mitigation - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	168	961	347	0	0	1155	0	202	131	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	16	12	12	12	12	10	10	12	12	12
Total Lost time (s)	5.0	5.0	5.0			4.0		5.0	5.0			
Lane Util. Factor	1.00	0.95	1.00			0.88		1.00	1.00			
Frt	1.00	1.00	0.85			0.85		1.00	0.85			
Flt Protected	0.95	1.00	1.00			1.00		1.00	1.00			
Satd. Flow (prot)	1770	3505	1615			2647		1739	1330			
Flt Permitted	0.95	1.00	1.00			1.00		1.00	1.00			
Satd. Flow (perm)	1770	3505	1615			2647		1739	1330			
Peak-hour factor, PHF	0.93	0.93	0.93	0.92	0.92	0.92	0.88	0.88	0.88	0.92	0.92	0.92
Adj. Flow (vph)	181	1033	373	0	0	1255	0	230	149	0	0	0
RTOR Reduction (vph)	88	0	247	0	0	0	0	0	107	0	0	0
Lane Group Flow (vph)	93	1033	126	0	0	1255	0	230	42	0	0	0
Heavy Vehicles (%)	2%	3%	2%	0%	0%	2%	0%	2%	2%	0%	0%	0%
Parking (#/hr)			0			0			0			
Turn Type	Perm		Perm			Free			Perm			
Protected Phases		1						3				
Permitted Phases	1		1			Free			3			
Actuated Green, G (s)	30.0	30.0	30.0			89.0		25.0	25.0			
Effective Green, g (s)	30.0	30.0	30.0			89.0		25.0	25.0			
Actuated g/C Ratio	0.34	0.34	0.34			1.00		0.28	0.28			
Clearance Time (s)	5.0	5.0	5.0					5.0	5.0			
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0			
Lane Grp Cap (vph)	597	1181	544			2647		488	374			
v/s Ratio Prot		c0.29						0.13				
v/s Ratio Perm	0.05		0.08			c0.47			0.03			
v/c Ratio	0.16	0.87	0.23			0.47		0.47	0.11			
Uniform Delay, d1	20.6	27.7	21.2			0.0		26.5	23.8			
Progression Factor	0.92	0.98	0.86			1.00		1.00	1.00			
Incremental Delay, d2	0.6	9.1	1.0			0.6		3.2	0.6			
Delay (s)	19.5	36.2	19.3			0.6		29.8	24.4			
Level of Service	B	D	B			A		C	C			
Approach Delay (s)		30.3			0.6			27.6			0.0	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM Average Control Delay	18.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	89.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

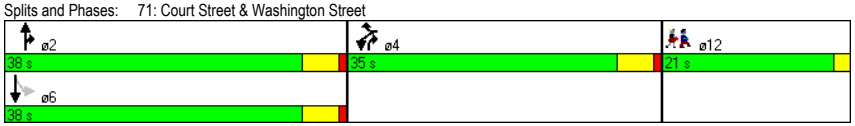
Lanes, Volumes, Timings
71: Court Street & Washington Street

2030 Build Condition w/ mitigation - PM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø12
Lane Configurations							
Volume (vph)	457	21	578	289	52	694	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	14	10	9	12	12	
Storage Length (ft)	0	50		0	0		
Storage Lanes	1	1		1	1		
Taper Length (ft)	25	25		25	25		
Right Turn on Red		Yes		Yes			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1051		260			584	
Travel Time (s)	23.9		5.9			13.3	
Peak Hour Factor	0.94	0.94	0.92	0.92	0.95	0.95	
Heavy Vehicles (%)	3%	0%	1%	2%	8%	1%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	486	22	628	314	55	731	
Turn Type		Prot		pt+ov	Perm		
Protected Phases	4	4	2	2 4		6	12
Permitted Phases					6		
Detector Phase	4	4	2	2 4	6	6	
Switch Phase							
Minimum Initial (s)	5.0	5.0	10.0		10.0	10.0	3.0
Minimum Split (s)	10.0	10.0	15.0		15.0	15.0	21.0
Total Split (s)	35.0	35.0	38.0	73.0	38.0	38.0	21.0
Total Split (%)	37.2%	37.2%	40.4%	77.7%	40.4%	40.4%	22%
Maximum Green (s)	30.0	30.0	33.0		33.0	33.0	19.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0	3.0	4.0		4.0	4.0	0.7
Recall Mode	None	None	C-Min		C-Min	C-Min	None
Walk Time (s)							7.0
Flash Dont Walk (s)							12.0
Pedestrian Calls (#/hr)							21
v/c Ratio	0.90	0.04	0.71	0.24	0.26	0.77	
Control Delay	52.8	16.9	28.0	0.9	23.8	30.1	
Queue Delay	0.0	0.0	105.9	0.1	0.0	0.0	
Total Delay	52.8	16.9	134.0	1.0	23.8	30.1	
Queue Length 50th (ft)	267	6	231	0	15	283	
Queue Length 95th (ft)	#438	23	#609	20	62	#719	
Internal Link Dist (ft)	971		180			504	
Turn Bay Length (ft)		50					
Base Capacity (vph)	578	555	889	1296	212	952	
Starvation Cap Reductn	0	0	377	173	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.84	0.04	1.23	0.28	0.26	0.77	

Intersection Summary	
Area Type:	Other
Cycle Length: 94	
Actuated Cycle Length: 94	
Offset: 4 (4%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 71: Court Street & Washington Street



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	457	21	578	289	52	694
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	14	10	9	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1811	1723	1756	1425	1671	1881
Flt Permitted	0.95	1.00	1.00	1.00	0.24	1.00
Satd. Flow (perm)	1811	1723	1756	1425	419	1881
Peak-hour factor, PHF	0.94	0.94	0.92	0.92	0.95	0.95
Adj. Flow (vph)	486	22	628	314	55	731
RTOR Reduction (vph)	0	6	0	49	0	0
Lane Group Flow (vph)	486	16	628	265	55	731
Heavy Vehicles (%)	3%	0%	1%	2%	8%	1%
Turn Type		Prot		pt+ov	Perm	
Protected Phases	4	4	2	2 4		6
Permitted Phases					6	
Actuated Green, G (s)	28.0	28.0	46.4	79.4	46.4	46.4
Effective Green, g (s)	28.0	28.0	46.4	79.4	46.4	46.4
Actuated g/C Ratio	0.30	0.30	0.49	0.84	0.49	0.49
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	4.0		4.0	4.0
Lane Grp Cap (vph)	539	513	867	1204	207	928
v/s Ratio Prot	c0.27	0.01	0.36	0.19		c0.39
v/s Ratio Perm					0.13	
v/c Ratio	0.90	0.03	0.72	0.22	0.27	0.79
Uniform Delay, d1	31.7	23.4	18.8	1.4	13.9	19.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.2	0.0	5.2	0.1	3.1	6.7
Delay (s)	49.9	23.4	24.0	1.5	17.0	26.4
Level of Service	D	C	C	A	B	C
Approach Delay (s)	48.8		16.5			25.8
Approach LOS	D		B			C

Intersection Summary			
HCM Average Control Delay	27.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	94.0	Sum of lost time (s)	19.6
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	5	98	0	173	5	705	323	241	878	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	16	16	12	9	12	12	12	12
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		216			530			574			260	
Travel Time (s)		4.9			12.0			13.0			5.9	
Peak Hour Factor	0.50	0.50	0.50	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%	0%	2%	3%	1%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	10	0	0	108	190	0	1110	0	0	1190	0
Turn Type	Perm			Perm		pt+ov	Perm			pm+pt		
Protected Phases		4			8	8 1		2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8	8 1	2	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	10.0		15.0	15.0		15.0	15.0		10.0	10.0	
Total Split (s)	15.0	15.0	0.0	15.0	15.0	25.0	41.0	41.0	0.0	10.0	51.0	0.0
Total Split (%)	16.5%	16.5%	0.0%	16.5%	16.5%	27.5%	45.1%	45.1%	0.0%	11.0%	56.0%	0.0%
Maximum Green (s)	10.0	10.0		10.0	10.0		36.0	36.0		5.0	46.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Min	C-Min		None	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.05			0.63	0.48		0.63			0.81	
Control Delay		37.2			56.2	31.7		16.3			15.7	
Queue Delay		0.0			0.0	0.0		0.0			26.5	
Total Delay		37.2			56.2	31.7		16.3			42.2	
Queue Length 50th (ft)		5			60	94		165			92	
Queue Length 95th (ft)		12			#128	110		#471			#501	
Internal Link Dist (ft)		136			450			494			180	
Turn Bay Length (ft)												
Base Capacity (vph)		187			176	380		1750			1465	
Starvation Cap Reductn		0			0	0		0			326	
Spillback Cap Reductn		0			0	0		0			0	
Storage Cap Reductn		0			0	0		0			0	
Reduced v/c Ratio		0.05			0.61	0.50		0.63			1.04	

Intersection Summary	
Area Type:	Other

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	25.0
Total Split (s)	25.0
Total Split (%)	27%
Maximum Green (s)	23.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	16.0
Pedestrian Calls (#/hr)	9
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	

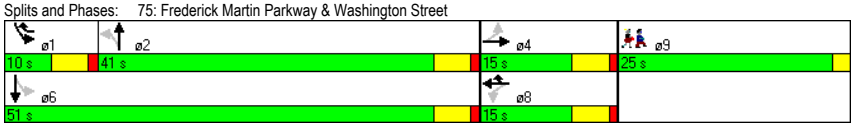
Intersection Summary

Lanes, Volumes, Timings
75: Frederick Martin Parkway & Washington Street

2030 Build Condition w/ mitigation - PM Peak Hour

Cycle Length: 91
Actuated Cycle Length: 91
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 75: Frederick Martin Parkway & Washington Street



HCM Signalized Intersection Capacity Analysis
75: Frederick Martin Parkway & Washington Street

2030 Build Condition w/ mitigation - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	5	98	0	173	5	705	323	241	878	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	16	16	12	9	12	12	12	12
Total Lost time (s)		5.0			5.0	5.0		5.0			5.0	
Lane Util. Factor		1.00			1.00	1.00		0.95			0.95	
Frt		0.86			1.00	0.85		0.95			1.00	
Flt Protected		1.00			0.95	1.00		1.00			0.99	
Satd. Flow (prot)		1698			2025	1830		3026			3509	
Flt Permitted		1.00			0.75	1.00		0.95			0.53	
Satd. Flow (perm)		1698			1601	1830		2876			1867	
Peak-hour factor, PHF	0.50	0.50	0.50	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Adj. Flow (vph)	0	0	10	108	0	190	5	758	347	256	934	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	10	0	0	108	190	0	1110	0	0	1190	0
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%	0%	2%	3%	1%	2%	0%
Turn Type	Perm			Perm		pt+ov	Perm			pm+pt		
Protected Phases		4			8	8 1		2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.7			9.7	15.6		53.8			64.7	
Effective Green, g (s)		9.7			9.7	15.6		53.8			64.7	
Actuated g/C Ratio		0.11			0.11	0.17		0.59			0.71	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		181			171	314		1700			1434	
v/s Ratio Prot		0.01				0.10					c0.05	
v/s Ratio Perm					c0.07			0.39			c0.54	
v/c Ratio		0.06			0.63	0.61		0.65			0.83	
Uniform Delay, d1		36.5			38.9	34.9		12.4			9.3	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		0.1			7.4	3.3		2.0			4.1	
Delay (s)		36.7			46.3	38.1		14.4			13.4	
Level of Service		D			D	D		B			B	
Approach Delay (s)		36.7			41.1			14.4			13.4	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	503	173	118	27	131	37	160	384	61	37	395	513
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	12	16	12	12	12	13	12	12	12	11	12
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		698			192			454			574	
Travel Time (s)		15.9			4.4			10.3			13.0	
Peak Hour Factor	0.97	0.97	0.97	0.81	0.81	0.81	0.94	0.94	0.94	0.88	0.88	0.88
Heavy Vehicles (%)	1%	2%	2%	0%	2%	3%	3%	6%	0%	0%	4%	2%
Shared Lane Traffic (%)	20%											
Lane Group Flow (vph)	415	404	0	0	241	0	0	644	0	0	491	583
Turn Type	Split			Split			pm+pt			Perm		pm+ov
Protected Phases	1	1		2	2		3	8			4	1
Permitted Phases							8			4		4
Detector Phase	1	1		2	2		3	8		4	4	1
Switch Phase												
Minimum Initial (s)	18.0	18.0		7.0	7.0		6.0	18.0		18.0	18.0	18.0
Minimum Split (s)	24.0	24.0		12.0	12.0		11.0	24.0		24.0	24.0	24.0
Total Split (s)	38.0	38.0	0.0	22.0	22.0	0.0	11.0	63.0	0.0	52.0	52.0	38.0
Total Split (%)	25.9%	25.9%	0.0%	15.0%	15.0%	0.0%	7.5%	42.9%	0.0%	35.4%	35.4%	25.9%
Maximum Green (s)	32.0	32.0		17.0	17.0		6.0	57.0		46.0	46.0	32.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	1.0		1.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	5.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag	Lead	Lead		Lag	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Recall Mode	None	None		None	None		None	Max		Max	Max	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.98	1.00			1.04			0.78			0.75	0.46
Control Delay	91.0	96.4			126.9			44.1			44.8	2.0
Queue Delay	0.0	0.0			0.0			0.0			3.6	0.6
Total Delay	91.0	96.4			126.9			44.1			48.4	2.5
Queue Length 50th (ft)	~455	~442			~260			291			418	0
Queue Length 95th (ft)	#682	#668			#373			#385			554	35
Internal Link Dist (ft)		618			112			374			494	
Turn Bay Length (ft)												
Base Capacity (vph)	425	403			231			821			652	1279
Starvation Cap Reductn	0	0			0			0			91	334
Spillback Cap Reductn	0	0			0			0			0	0
Storage Cap Reductn	0	0			0			0			0	0
Reduced v/c Ratio	0.98	1.00			1.04			0.78			0.88	0.62

Intersection Summary	
Area Type:	Other

Lane Group	ø5
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	5
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	3.0
Minimum Split (s)	24.0
Total Split (s)	24.0
Total Split (%)	16%
Maximum Green (s)	19.0
Yellow Time (s)	4.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	22
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	

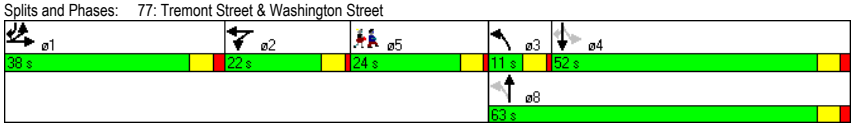
Intersection Summary

Lanes, Volumes, Timings
77: Tremont Street & Washington Street

2030 Build Condition w/ mitigation - PM Peak Hour

Cycle Length: 147
Actuated Cycle Length: 137.4
Natural Cycle: 145
Control Type: Semi Act-Uncoord
~ 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.

Splits and Phases: 77: Tremont Street & Washington Street

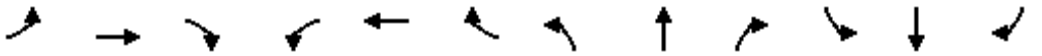


HCM Signalized Intersection Capacity Analysis
77: Tremont Street & Washington Street

2030 Build Condition w/ mitigation - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	503	173	118	27	131	37	160	384	61	37	395	513
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	12	16	12	12	12	13	12	12	12	11	12
Total Lost time (s)	6.0	6.0			5.0			6.0			6.0	6.0
Lane Util. Factor	0.95	0.95			1.00			0.95			1.00	1.00
Frt	1.00	0.95			0.97			0.98			1.00	0.85
Flt Protected	0.95	0.99			0.99			0.99			1.00	1.00
Satd. Flow (prot)	1811	1672			1804			3355			1764	1583
Flt Permitted	0.95	0.99			0.99			0.57			0.88	1.00
Satd. Flow (perm)	1811	1672			1804			1952			1559	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.81	0.81	0.81	0.94	0.94	0.94	0.88	0.88	0.88
Adj. Flow (vph)	519	178	122	33	162	46	170	409	65	42	449	583
RTOR Reduction (vph)	0	11	0	0	6	0	0	5	0	0	0	208
Lane Group Flow (vph)	415	393	0	0	235	0	0	639	0	0	491	375
Heavy Vehicles (%)	1%	2%	2%	0%	2%	3%	3%	6%	0%	0%	4%	2%
Turn Type	Split			Split			pm+pt			Perm		pm+ov
Protected Phases	1	1		2	2		3	8			4	1
Permitted Phases							8			4		4
Actuated Green, G (s)	32.2	32.2			17.1			57.4			57.4	89.6
Effective Green, g (s)	32.2	32.2			17.1			57.4			57.4	89.6
Actuated g/C Ratio	0.23	0.23			0.12			0.41			0.41	0.64
Clearance Time (s)	6.0	6.0			5.0			6.0			6.0	6.0
Vehicle Extension (s)	2.0	2.0			2.0			2.0			2.0	2.0
Lane Grp Cap (vph)	418	386			221			804			642	1086
v/s Ratio Prot	0.23	c0.24			c0.13							0.08
v/s Ratio Perm								c0.33			0.32	0.16
v/c Ratio	0.99	1.02			1.06			0.79			0.76	0.35
Uniform Delay, d1	53.5	53.6			61.2			35.8			35.2	11.4
Progression Factor	1.00	1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2	41.9	50.6			78.1			5.1			8.4	0.1
Delay (s)	95.4	104.2			139.2			40.9			43.6	11.5
Level of Service	F	F			F			D			D	B
Approach Delay (s)		99.7			139.2			40.9			26.2	
Approach LOS		F			F			D			C	

Intersection Summary				
HCM Average Control Delay	61.1	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.90			
Actuated Cycle Length (s)	139.4	Sum of lost time (s)	32.7	
Intersection Capacity Utilization	91.9%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	503	173	118	27	131	37	160	384	61	37	395	513
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	12	16	12	12	12	13	12	12	12	11	12
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		698			192			454			574	
Travel Time (s)		15.9			4.4			10.3			13.0	
Peak Hour Factor	0.97	0.97	0.97	0.81	0.81	0.81	0.94	0.94	0.94	0.88	0.88	0.88
Heavy Vehicles (%)	1%	2%	2%	0%	2%	3%	3%	6%	0%	0%	4%	2%
Shared Lane Traffic (%)	20%											
Lane Group Flow (vph)	415	404	0	0	241	0	0	644	0	0	491	583
Turn Type	Split			Split			pm+pt			Perm		pm+ov
Protected Phases	1	1		2	2		3	8			4	1
Permitted Phases							8			4		4
Detector Phase	1	1		2	2		3	8		4	4	1
Switch Phase												
Minimum Initial (s)	18.0	18.0		7.0	7.0		6.0	18.0		18.0	18.0	18.0
Minimum Split (s)	24.0	24.0		12.0	12.0		11.0	24.0		24.0	24.0	24.0
Total Split (s)	38.0	38.0	0.0	22.0	22.0	0.0	11.0	63.0	0.0	52.0	52.0	38.0
Total Split (%)	25.9%	25.9%	0.0%	15.0%	15.0%	0.0%	7.5%	42.9%	0.0%	35.4%	35.4%	25.9%
Maximum Green (s)	32.0	32.0		17.0	17.0		6.0	57.0		46.0	46.0	32.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		1.0	1.0		1.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	5.0	5.0	4.0	5.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag	Lead	Lead		Lag	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Recall Mode	None	None		None	None		None	Max		Max	Max	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.98	1.00			1.04			0.78			0.75	0.46
Control Delay	91.0	96.4			126.9			44.1			44.8	2.0
Queue Delay	0.0	0.0			0.0			0.0			3.6	0.6
Total Delay	91.0	96.4			126.9			44.1			48.4	2.5
Queue Length 50th (ft)	~455	~442			~260			291			418	0
Queue Length 95th (ft)	#682	#668			#373			#385			554	35
Internal Link Dist (ft)		618			112			374			494	
Turn Bay Length (ft)												
Base Capacity (vph)	425	403			231			821			652	1279
Starvation Cap Reductn	0	0			0			0			91	334
Spillback Cap Reductn	0	0			0			0			0	0
Storage Cap Reductn	0	0			0			0			0	0
Reduced v/c Ratio	0.98	1.00			1.04			0.78			0.88	0.62

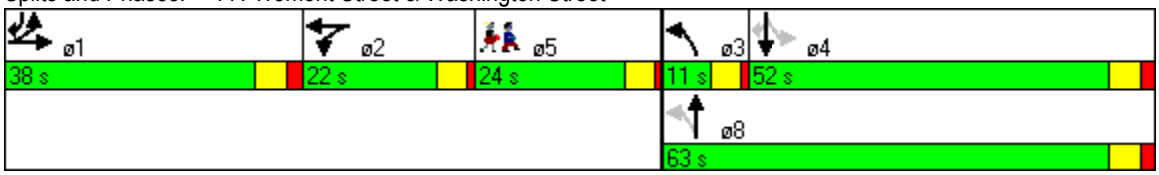
Intersection Summary	
Area Type:	Other

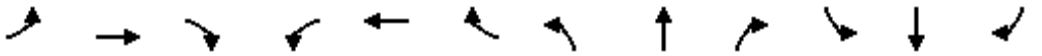
Lane Group	ø5
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	5
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	3.0
Minimum Split (s)	24.0
Total Split (s)	24.0
Total Split (%)	16%
Maximum Green (s)	19.0
Yellow Time (s)	4.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	22
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

Cycle Length: 147
Actuated Cycle Length: 137.4
Natural Cycle: 145
Control Type: Semi Act-Uncoord
~ 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.

Splits and Phases: 77: Tremont Street & Washington Street





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	503	173	118	27	131	37	160	384	61	37	395	513
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	12	16	12	12	12	13	12	12	12	11	12
Total Lost time (s)	6.0	6.0			5.0			6.0			6.0	6.0
Lane Util. Factor	0.95	0.95			1.00			0.95			1.00	1.00
Frt	1.00	0.95			0.97			0.98			1.00	0.85
Flt Protected	0.95	0.99			0.99			0.99			1.00	1.00
Satd. Flow (prot)	1811	1672			1804			3355			1764	1583
Flt Permitted	0.95	0.99			0.99			0.57			0.88	1.00
Satd. Flow (perm)	1811	1672			1804			1952			1559	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.81	0.81	0.81	0.94	0.94	0.94	0.88	0.88	0.88
Adj. Flow (vph)	519	178	122	33	162	46	170	409	65	42	449	583
RTOR Reduction (vph)	0	11	0	0	6	0	0	5	0	0	0	208
Lane Group Flow (vph)	415	393	0	0	235	0	0	639	0	0	491	375
Heavy Vehicles (%)	1%	2%	2%	0%	2%	3%	3%	6%	0%	0%	4%	2%
Turn Type	Split			Split			pm+pt			Perm		pm+ov
Protected Phases	1	1		2	2		3	8			4	1
Permitted Phases							8			4		4
Actuated Green, G (s)	32.2	32.2			17.1			57.4			57.4	89.6
Effective Green, g (s)	32.2	32.2			17.1			57.4			57.4	89.6
Actuated g/C Ratio	0.23	0.23			0.12			0.41			0.41	0.64
Clearance Time (s)	6.0	6.0			5.0			6.0			6.0	6.0
Vehicle Extension (s)	2.0	2.0			2.0			2.0			2.0	2.0
Lane Grp Cap (vph)	418	386			221			804			642	1086
v/s Ratio Prot	0.23	c0.24			c0.13							0.08
v/s Ratio Perm								c0.33			0.32	0.16
v/c Ratio	0.99	1.02			1.06			0.79			0.76	0.35
Uniform Delay, d1	53.5	53.6			61.2			35.8			35.2	11.4
Progression Factor	1.00	1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2	41.9	50.6			78.1			5.1			8.4	0.1
Delay (s)	95.4	104.2			139.2			40.9			43.6	11.5
Level of Service	F	F			F			D			D	B
Approach Delay (s)		99.7			139.2			40.9			26.2	
Approach LOS		F			F			D			C	

Intersection Summary			
HCM Average Control Delay	61.1	HCM Level of Service	E
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	139.4	Sum of lost time (s)	32.7
Intersection Capacity Utilization	91.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

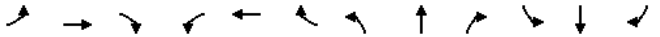
Norton

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	355	180	52	310	50	198	128	132	70	65	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	16	12	12	16	12
Storage Length (ft)	0		0	0		0	200		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		221			255			2304			335	
Travel Time (s)		5.0			5.8			44.9			6.5	
Peak Hour Factor	0.91	0.91	0.91	0.81	0.81	0.81	0.79	0.79	0.79	0.67	0.67	0.67
Heavy Vehicles (%)	13%	4%	7%	0%	3%	2%	1%	5%	5%	13%	9%	9%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	604	0	0	447	62	0	580	0	0	216	0
Turn Type	Perm			Perm		Perm	pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	5	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	24.0	24.0		24.0	24.0	24.0	8.0	24.0		24.0	24.0	
Total Split (s)	60.0	60.0	0.0	60.0	60.0	60.0	8.0	32.0	0.0	24.0	24.0	0.0
Total Split (%)	65.2%	65.2%	0.0%	65.2%	65.2%	65.2%	8.7%	34.8%	0.0%	26.1%	26.1%	0.0%
Maximum Green (s)	54.0	54.0		54.0	54.0	54.0	4.0	26.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.5	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	0.5	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		7.0	7.0	7.0		5.0		5.0	5.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0		0	0	
v/c Ratio		0.82			0.66	0.09		0.96			0.47	
Control Delay		26.7			19.9	10.6		53.7			22.6	
Queue Delay		0.0			0.0	0.0		0.0			0.0	
Total Delay		26.7			19.9	10.6		53.7			22.6	
Queue Length 50th (ft)		208			139	14		224			64	
Queue Length 95th (ft)		324			188	29		#458			112	
Internal Link Dist (ft)		141			175			2224			255	
Turn Bay Length (ft)												
Base Capacity (vph)		1369			1259	1276		604			464	
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			0.36	0.05		0.96			0.47	

Intersection Summary

Area Type: Other
Cycle Length: 92
Actuated Cycle Length: 68.1
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Route 123 & N. Worcester Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	355	180	52	310	50	198	128	132	70	65	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	16	12	12	16	12
Total Lost time (s)		6.0			6.0	6.0		6.0			6.0	
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	
Frt		0.96			1.00	0.85		0.96			0.99	
Flt Protected		1.00			0.99	1.00		0.98			0.98	
Satd. Flow (prot)		1724			1839	1583		1962			1878	
Flt Permitted		0.98			0.84	1.00		0.78			0.62	
Satd. Flow (perm)		1698			1562	1583		1557			1193	
Peak-hour factor, PHF	0.91	0.91	0.91	0.81	0.81	0.81	0.79	0.79	0.79	0.67	0.67	0.67
Adj. Flow (vph)	16	390	198	64	383	62	251	162	167	104	97	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	604	0	0	447	62	0	580	0	0	216	0
Heavy Vehicles (%)	13%	4%	7%	0%	3%	2%	1%	5%	5%	13%	9%	9%
Turn Type	Perm			Perm		Perm	pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		29.5			29.5	29.5		26.4			26.4	
Effective Green, g (s)		29.5			29.5	29.5		26.4			26.4	
Actuated g/C Ratio		0.43			0.43	0.43		0.39			0.39	
Clearance Time (s)		6.0			6.0	6.0		6.0			6.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)		738			679	688		605			464	
v/s Ratio Prot												
v/s Ratio Perm		c0.36			0.29	0.04		c0.37			0.18	
v/c Ratio		0.82			0.66	0.09		0.96			0.47	
Uniform Delay, d1		16.8			15.2	11.3		20.2			15.5	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		7.0			2.3	0.1		26.3			0.7	
Delay (s)		23.9			17.5	11.4		46.5			16.2	
Level of Service		C			B	B		D			B	
Approach Delay (s)		23.9			16.8			46.5			16.2	
Approach LOS		C			B			D			B	

Intersection Summary				
HCM Average Control Delay	28.0	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	67.9	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	83.5%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Lanes, Volumes, Timings
1: Route 123 & N. Worcester Street

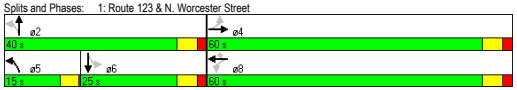
2030 Build with Mitigation Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	295	255	154	425	75	179	74	119	65	159	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	11	11	11	12	16	12
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		221			255			2304			335	
Travel Time (s)		5.0			5.8			44.9			6.5	
Peak Hour Factor	0.97	0.97	0.97	0.89	0.89	0.89	0.93	0.93	0.93	0.88	0.88	0.88
Heavy Vehicles (%)	0%	2%	0%	1%	2%	0%	1%	2%	1%	0%	0%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	582	0	0	651	84	0	400	0	0	278	0
Turn Type	Perm			Perm		Perm	pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	5	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	24.0	24.0		24.0	24.0	24.0	8.0	24.0		24.0	24.0	
Total Split (s)	60.0	60.0	0.0	60.0	60.0	60.0	15.0	40.0	0.0	25.0	25.0	0.0
Total Split (%)	60.0%	60.0%	0.0%	60.0%	60.0%	60.0%	15.0%	40.0%	0.0%	25.0%	25.0%	0.0%
Maximum Green (s)	54.0	54.0		54.0	54.0	54.0	11.0	34.0		19.0	19.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.5	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	0.5	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0		7.0	7.0	
Flash Dont Walk (s)	7.0	7.0		7.0	7.0	7.0		5.0		5.0	5.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0		0	0	
v/c Ratio		0.62			0.98	0.10		1.02			0.48	
Control Delay		19.7			55.7	11.6		85.1			29.5	
Queue Delay		0.0			0.0	0.0		0.0			0.0	
Total Delay		19.7			55.7	11.6		85.1			29.5	
Queue Length 50th (ft)		244			386	25		~263			139	
Queue Length 95th (ft)		358			#631	48		#455			211	
Internal Link Dist (ft)		141			175			2224			255	
Turn Bay Length (ft)												
Base Capacity (vph)		934			662	872		392			575	
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		0.62			0.98	0.10		1.02			0.48	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	

~ 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.

Splits and Phases: 1: Route 123 & N. Worcester Street



HCM Signalized Intersection Capacity Analysis
1: Route 123 & N. Worcester Street

2030 Build with Mitigation Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	295	255	154	425	75	179	74	119	65	159	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	16	12
Total Lost time (s)		6.0			6.0	6.0		6.0			6.0	
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	
Frt		0.94			1.00	0.85		0.96			0.99	
Flt Protected		1.00			0.99	1.00		0.98			0.99	
Satd. Flow (prot)		1763			1843	1615		1696			2091	
Flt Permitted		0.98			0.66	1.00		0.66			0.80	
Satd. Flow (perm)		1729			1225	1615		1153			1690	
Peak-hour factor, PHF	0.97	0.97	0.97	0.89	0.89	0.89	0.93	0.93	0.93	0.88	0.88	0.88
Adj. Flow (vph)	15	304	263	173	478	84	192	80	128	74	181	23
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	582	0	0	651	84	0	400	0	0	278	0
Heavy Vehicles (%)	0%	2%	0%	1%	2%	0%	1%	2%	1%	0%	0%	6%
Turn Type	Perm			Perm		Perm	pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		54.0			54.0	54.0		34.0			34.0	
Effective Green, g (s)		54.0			54.0	54.0		34.0			34.0	
Actuated g/C Ratio		0.54			0.54	0.54		0.34			0.34	
Clearance Time (s)		6.0			6.0	6.0		6.0			6.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)		934			662	872		392			575	
v/s Ratio Prot												
v/s Ratio Perm		0.34			c0.53	0.05		c0.35			0.16	
v/c Ratio		0.62			0.98	0.10		1.02			0.48	
Uniform Delay, d1		15.9			22.6	11.2		33.0			26.1	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		1.3			30.6	0.0		50.7			0.6	
Delay (s)		17.2			53.2	11.2		83.7			26.7	
Level of Service		B			D	B		F			C	
Approach Delay (s)		17.2			48.4			83.7			26.7	
Approach LOS		B			D			F			C	

Intersection Summary			
HCM Average Control Delay	43.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	114.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

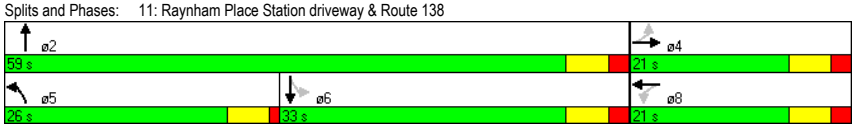
Raynham

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	0	48	0	0	20	211	1220	0	5	355	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	175		0	200		0
Storage Lanes	1		0	0		0	1		1	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		897			574			510			2071	
Travel Time (s)		20.4			13.0			11.6			47.1	
Peak Hour Factor	0.68	0.68	0.68	0.56	0.56	0.56	0.91	0.91	0.91	0.79	0.79	0.79
Heavy Vehicles (%)	75%	0%	50%	0%	0%	0%	11%	3%	0%	0%	12%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	71	0	0	36	0	232	1341	0	0	517	0
Turn Type	Perm			Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		10.0	10.0		10.0	10.0		10.0	10.0	
Total Split (s)	21.0	21.0	0.0	21.0	21.0	0.0	26.0	59.0	0.0	33.0	33.0	0.0
Total Split (%)	26.3%	26.3%	0.0%	26.3%	26.3%	0.0%	32.5%	73.8%	0.0%	41.3%	41.3%	0.0%
Maximum Green (s)	15.0	15.0		15.0	15.0		21.0	53.0		27.0	27.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	5.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		Min	Min	
Walk Time (s)	7.0	7.0										
Flash Dont Walk (s)	7.0	7.0										
Pedestrian Calls (#/hr)	5	5										
v/c Ratio	0.39	0.11			0.11		0.60	0.55			0.50	
Control Delay	33.4	0.3			2.6		27.8	7.2			19.2	
Queue Delay	0.0	0.0			0.0		0.0	0.0			0.0	
Total Delay	33.4	0.3			2.6		27.8	7.2			19.2	
Queue Length 50th (ft)	15	0			0		67	120			73	
Queue Length 95th (ft)	39	0			0		163	220			126	
Internal Link Dist (ft)		817			494			430			1991	
Turn Bay Length (ft)							175					
Base Capacity (vph)	220	716			507		629	3143			1496	
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	0.23	0.10			0.07		0.37	0.43			0.35	

Intersection Summary

Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 56.9	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	

Splits and Phases: 11: Raynham Place Station driveway & Route 138



HCM Signalized Intersection Capacity Analysis
11: Raynham Place Station driveway & Route 138

2030 Build with Mitigation Condition- AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	0	48	0	0	20	211	1220	0	5	355	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0		5.0	6.0			6.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95			0.95	
Frt	1.00	0.85			0.86		1.00	1.00			0.98	
Flt Protected	0.95	1.00			1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1031	1077			1644		1626	3505			3209	
Flt Permitted	0.73	1.00			1.00		0.95	1.00			0.93	
Satd. Flow (perm)	797	1077			1644		1626	3505			2990	
Peak-hour factor, PHF	0.68	0.68	0.68	0.56	0.56	0.56	0.91	0.91	0.91	0.79	0.79	0.79
Adj. Flow (vph)	51	0	71	0	0	36	232	1341	0	6	449	62
RTOR Reduction (vph)	0	61	0	0	31	0	0	0	0	0	13	0
Lane Group Flow (vph)	51	10	0	0	5	0	232	1341	0	0	504	0
Heavy Vehicles (%)	75%	0%	50%	0%	0%	0%	11%	3%	0%	0%	12%	0%
Turn Type	Perm			Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8						6		
Actuated Green, G (s)	7.9	7.9			7.9		13.6	38.1			19.5	
Effective Green, g (s)	7.9	7.9			7.9		13.6	38.1			19.5	
Actuated g/C Ratio	0.14	0.14			0.14		0.23	0.66			0.34	
Clearance Time (s)	6.0	6.0			6.0		5.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	109	147			224		381	2302			1005	
v/s Ratio Prot		0.01			0.00		0.14	c0.38				
v/s Ratio Perm	c0.06										0.17	
v/c Ratio	0.47	0.07			0.02		0.61	0.58			0.50	
Uniform Delay, d1	23.1	21.8			21.7		19.8	5.5			15.4	
Progression Factor	1.00	1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2	3.2	0.2			0.0		2.8	0.4			0.4	
Delay (s)	26.3	22.0			21.7		22.6	5.9			15.8	
Level of Service	C	C			C		C	A			B	
Approach Delay (s)		23.8			21.7			8.4			15.8	
Approach LOS		C			C			A			B	

Intersection Summary				
HCM Average Control Delay	11.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	58.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	68.8%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Lanes, Volumes, Timings
36: Elm Street & Route 138

2030 Build with Mitigation Condition- AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	20	25	225	5	87	5	1276	205	44	358	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	160		0	0		0	0		205
Storage Lanes	0		0	1		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		820			1216			1195			808	
Travel Time (s)		18.6			27.6			27.2			18.4	
Confl. Peds. (#/hr)			1	1								
Peak Hour Factor	0.83	0.83	0.83	0.69	0.69	0.69	0.94	0.94	0.94	0.82	0.82	0.82
Heavy Vehicles (%)	2%	2%	2%	7%	7%	7%	3%	3%	3%	13%	13%	13%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	103	0	326	133	0	0	1580	0	0	521	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		30.0	30.0		30.0	30.0	
Minimum Split (s)	23.0	23.0		12.0	23.0		35.0	35.0		35.0	35.0	
Total Split (s)	23.0	23.0	0.0	13.0	35.0	0.0	60.0	60.0	0.0	60.0	60.0	0.0
Total Split (%)	24.0%	24.0%	0.0%	13.5%	36.5%	0.0%	62.5%	62.5%	0.0%	62.5%	62.5%	0.0%
Maximum Green (s)	18.0	18.0		8.0	30.0		55.0	55.0		55.0	55.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lead	Lead		Lag								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	10.0	10.0			10.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
v/c Ratio		0.60		0.85	0.32			0.78			0.40	
Control Delay		53.4		53.9	28.4			17.9			11.3	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		53.4		53.9	28.4			17.9			11.3	
Queue Length 50th (ft)		60		173	62			360			82	
Queue Length 95th (ft)		98		181	80			501			112	
Internal Link Dist (ft)		740			1136			1115			728	
Turn Bay Length (ft)				160								
Base Capacity (vph)		258		385	492			2038			1291	
Starvation Cap Reductn		0		0	0			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	

Lanes, Volumes, Timings
36: Elm Street & Route 138

2030 Build with Mitigation Condition- AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.40		0.85	0.27			0.78			0.40	

Intersection Summary	
Area Type:	Other
Cycle Length: 96	
Actuated Cycle Length: 96	
Offset: 28 (29%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	

Splits and Phases: 36: Elm Street & Route 138

HCM Signalized Intersection Capacity Analysis
36: Elm Street & Route 138

2030 Build with Mitigation Condition- AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	20	25	225	5	87	5	1276	205	44	358	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.96		1.00	0.86			0.98			0.99	
Flt Protected		0.98		0.95	1.00			1.00			0.99	
Satd. Flow (prot)		1799		1686	1523			3432			3151	
Flt Permitted		0.75		0.67	1.00			0.95			0.66	
Satd. Flow (perm)		1375		1192	1523			3274			2074	
Peak-hour factor, PHF	0.83	0.83	0.83	0.69	0.69	0.69	0.94	0.94	0.94	0.82	0.82	0.82
Adj. Flow (vph)	49	24	30	326	7	126	5	1357	218	54	437	30
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	103	0	326	133	0	0	1580	0	0	521	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	2%	2%	2%	7%	7%	7%	3%	3%	3%	13%	13%	13%
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		10.6		27.2	27.2			58.8			58.8	
Effective Green, g (s)		10.6		27.2	27.2			58.8			58.8	
Actuated g/C Ratio		0.11		0.28	0.28			0.61			0.61	
Clearance Time (s)		5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0			4.0			4.0	
Lane Grp Cap (vph)		152		397	432			2005			1270	
v/s Ratio Prot				c0.10	0.09							
v/s Ratio Perm		0.07		c0.13				c0.48			0.25	
v/c Ratio		0.68		0.82	0.31			0.79			0.41	
Uniform Delay, d1		41.1		33.2	27.0			13.9			9.6	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		11.4		12.8	0.4			3.2			1.0	
Delay (s)		52.4		46.0	27.4			17.2			10.6	
Level of Service		D		D	C			B			B	
Approach Delay (s)		52.4			40.6			17.2			10.6	
Approach LOS		D			D			B			B	

Intersection Summary					
HCM Average Control Delay	21.3	HCM Level of Service		C	
HCM Volume to Capacity ratio	0.79				
Actuated Cycle Length (s)	96.0	Sum of lost time (s)		10.0	
Intersection Capacity Utilization	72.8%	ICU Level of Service		C	
Analysis Period (min)	15				

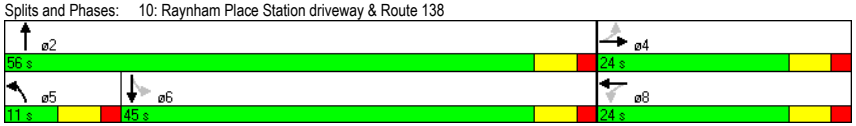
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	0	208	0	0	15	54	590	0	10	1075	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	175		0	200		0
Storage Lanes	1		0	0		0	1		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		758			664			485			2063	
Travel Time (s)		17.2			15.1			11.0			46.9	
Peak Hour Factor	0.92	0.92	0.92	0.63	0.63	0.63	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	33%	0%	0%	0%	0%	8%	6%	5%	0%	0%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	226	0	0	24	0	60	656	0	0	1216	0
Turn Type	Perm			Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		10.0	10.0		10.0	20.0		20.0	20.0	
Total Split (s)	24.0	24.0	0.0	24.0	24.0	0.0	11.0	56.0	0.0	45.0	45.0	0.0
Total Split (%)	30.0%	30.0%	0.0%	30.0%	30.0%	0.0%	13.8%	70.0%	0.0%	56.3%	56.3%	0.0%
Maximum Green (s)	18.0	18.0		18.0	18.0		5.0	50.0		39.0	39.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		Min	Min	
Walk Time (s)	7.0	7.0										
Flash Dont Walk (s)	7.0	7.0										
Pedestrian Calls (#/hr)	0	0										
v/c Ratio	0.37	0.58			0.05		0.42	0.30			0.66	
Control Delay	33.0	16.1			0.2		42.9	5.5			13.7	
Queue Delay	0.0	0.0			0.0		0.0	0.0			0.0	
Total Delay	33.0	16.1			0.2		42.9	5.5			13.7	
Queue Length 50th (ft)	23	23			0		23	45			183	
Queue Length 95th (ft)	60	88			0		#79	92			310	
Internal Link Dist (ft)		678			584			405			1983	
Turn Bay Length (ft)							175					
Base Capacity (vph)	321	601			655		143	2814			2196	
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	0.19	0.38			0.04		0.42	0.23			0.55	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 62.2
Natural Cycle: 60
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Raynham Place Station driveway & Route 138



HCM Signalized Intersection Capacity Analysis
10: Raynham Place Station driveway & Route 138

2030 Build with Mitigation Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	0	208	0	0	15	54	590	0	10	1075	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0		6.0	6.0			6.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95			0.95	
Frt	1.00	0.85			0.86		1.00	1.00			1.00	
Flt Protected	0.95	1.00			1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1357	1615			1522		1703	3438			3529	
Flt Permitted	0.74	1.00			1.00		0.95	1.00			0.95	
Satd. Flow (perm)	1059	1615			1522		1703	3438			3347	
Peak-hour factor, PHF	0.92	0.92	0.92	0.63	0.63	0.63	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	62	0	226	0	0	24	60	656	0	11	1181	24
RTOR Reduction (vph)	0	137	0	0	20	0	0	0	0	0	1	0
Lane Group Flow (vph)	62	89	0	0	4	0	60	656	0	0	1215	0
Heavy Vehicles (%)	33%	0%	0%	0%	0%	8%	6%	5%	0%	0%	2%	0%
Turn Type	Perm			Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8						6		
Actuated Green, G (s)	9.7	9.7			9.7		2.6	42.8			34.2	
Effective Green, g (s)	9.7	9.7			9.7		2.6	42.8			34.2	
Actuated g/C Ratio	0.15	0.15			0.15		0.04	0.66			0.53	
Clearance Time (s)	6.0	6.0			6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	159	243			229		69	2281			1775	
v/s Ratio Prot		0.06			0.00		c0.04	0.19				
v/s Ratio Perm	c0.06										c0.36	
v/c Ratio	0.39	0.37			0.02		0.87	0.29			0.68	
Uniform Delay, d1	24.7	24.6			23.3		30.8	4.5			11.2	
Progression Factor	1.00	1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2	1.6	0.9			0.0		64.4	0.1			1.1	
Delay (s)	26.3	25.6			23.4		95.1	4.6			12.3	
Level of Service	C	C			C		F	A			B	
Approach Delay (s)		25.7			23.4			12.2			12.3	
Approach LOS		C			C			B			B	

Intersection Summary				
HCM Average Control Delay	14.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	64.5	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	67.8%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Lanes, Volumes, Timings
36: Elm Street & Route 138

2030 Build with Mitigation Condition - PM Peak Hour

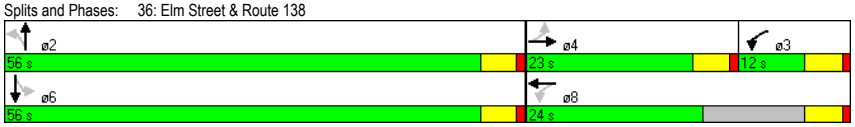
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	10	40	350	15	28	30	620	325	74	1149	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	160		0	0		0	0		205
Storage Lanes	0		0	1		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		820			1216			1195			808	
Travel Time (s)		18.6			27.6			27.2			18.4	
Peak Hour Factor	0.75	0.75	0.75	0.88	0.88	0.88	0.91	0.91	0.91	0.95	0.95	0.95
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	79	0	398	49	0	0	1071	0	0	1303	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		30.0	30.0		30.0	30.0	
Minimum Split (s)	23.0	23.0		12.0	23.0		35.0	35.0		35.0	35.0	
Total Split (s)	23.0	23.0	0.0	12.0	24.0	0.0	56.0	56.0	0.0	56.0	56.0	0.0
Total Split (%)	25.3%	25.3%	0.0%	13.2%	26.4%	0.0%	61.5%	61.5%	0.0%	61.5%	61.5%	0.0%
Maximum Green (s)	18.0	18.0		7.0	19.0		51.0	51.0		51.0	51.0	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag	Lead	Lead		Lag								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	10.0	10.0			10.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
v/c Ratio		0.46		0.87	0.10			0.63			0.81	
Control Delay		46.1		51.2	22.2			14.8			20.8	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		46.1		51.2	22.2			14.8			20.8	
Queue Length 50th (ft)		43		200	20			207			305	
Queue Length 95th (ft)		69		#319	43			285			#431	
Internal Link Dist (ft)		740			1136			1115			728	
Turn Bay Length (ft)				160								
Base Capacity (vph)		318		459	554			1700			1606	
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		0.25		0.87	0.09			0.63			0.81	

Lanes, Volumes, Timings
36: Elm Street & Route 138

2030 Build with Mitigation Condition - PM Peak Hour

Intersection Summary	
Area Type:	Other
Cycle Length: 91	
Actuated Cycle Length: 91	
Offset: 36 (40%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 36: Elm Street & Route 138



HCM Signalized Intersection Capacity Analysis
36: Elm Street & Route 138

2030 Build with Mitigation Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	10	40	350	15	28	30	620	325	74	1149	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frt		0.91		1.00	0.90			0.95			1.00	
Flt Protected		0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1703		1770	1680			3261			3522	
Flt Permitted		0.94		0.72	1.00			0.87			0.76	
Satd. Flow (perm)		1606		1349	1680			2842			2684	
Peak-hour factor, PHF	0.75	0.75	0.75	0.88	0.88	0.88	0.91	0.91	0.91	0.95	0.95	0.95
Adj. Flow (vph)	13	13	53	398	17	32	33	681	357	78	1209	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	79	0	398	49	0	0	1071	0	0	1303	0
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		8.5		27.5	27.5			53.5			53.5	
Effective Green, g (s)		8.5		27.5	27.5			53.5			53.5	
Actuated g/C Ratio		0.09		0.30	0.30			0.59			0.59	
Clearance Time (s)		5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0			4.0			4.0	
Lane Grp Cap (vph)		150		472	508			1671			1578	
v/s Ratio Prot				c0.13	0.03							
v/s Ratio Perm		0.05		c0.12				0.38			c0.49	
v/c Ratio		0.53		0.84	0.10			0.64			0.83	
Uniform Delay, d1		39.3		29.6	22.8			12.4			15.0	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		3.3		12.9	0.1			1.9			5.1	
Delay (s)		42.6		42.5	22.9			14.3			20.1	
Level of Service		D		D	C			B			C	
Approach Delay (s)		42.6			40.3			14.3			20.1	
Approach LOS		D			D			B			C	

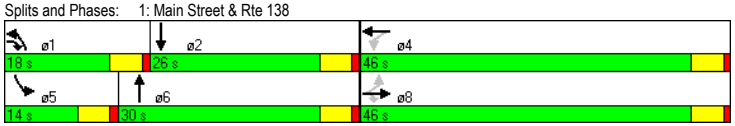
Intersection Summary			
HCM Average Control Delay	21.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	101.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Easton

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	415	374	225	45	144	135	123	801	50	73	342	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	11	11	11	12	11	11	12	11	11
Storage Length (ft)	150		230	90		140	140		140	115		150
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			35			40			40	
Link Distance (ft)		1725			3218			4948			2928	
Travel Time (s)		26.1			62.7			84.3			49.9	
Peak Hour Factor	0.89	0.89	0.89	0.88	0.88	0.88	0.92	0.92	0.92	0.88	0.88	0.88
Heavy Vehicles (%)	11%	1%	4%	10%	6%	6%	4%	5%	2%	5%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	466	420	253	51	317	0	134	925	0	83	471	0
Turn Type	Perm		pm+ov	Perm			Prot			Prot		
Protected Phases		8	1		4		1	6		5	2	
Permitted Phases	8		8	4								
Detector Phase	8	8	1	4	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	15.0		7.0	15.0	
Minimum Split (s)	21.0	21.0	12.0	23.0	23.0		12.0	23.0		12.0	21.0	
Total Split (s)	46.0	46.0	18.0	46.0	46.0	0.0	18.0	30.0	0.0	14.0	26.0	0.0
Total Split (%)	51.1%	51.1%	20.0%	51.1%	51.1%	0.0%	20.0%	33.3%	0.0%	15.6%	28.9%	0.0%
Maximum Green (s)	41.0	41.0	13.0	41.0	41.0		13.0	25.0		9.0	21.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag			Lead				Lead	Lag		Lead	Lag	
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)				7.0	7.0			7.0				
Flash Dont Walk (s)				8.0	8.0			8.0				
Pedestrian Calls (#/hr)				0	0			0				
v/c Ratio	1.03	0.49	0.24	0.16	0.21		0.64	0.95		0.52	0.59	
Control Delay	77.0	19.0	3.9	16.2	7.6		50.7	51.7		50.5	31.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	77.0	19.0	3.9	16.2	7.6		50.7	51.7		50.5	31.7	
Queue Length 50th (ft)	~294	162	27	16	26		73	~273		46	115	
Queue Length 95th (ft)	#474	243	52	39	50		130	#414		90	165	
Internal Link Dist (ft)		1645			3138			4868			2848	
Turn Bay Length (ft)	150		230	90			140			115		
Base Capacity (vph)	452	858	1093	314	1522		260	971		178	844	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	1.03	0.49	0.23	0.16	0.21		0.52	0.95		0.47	0.56	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 87.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
~	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.

Splits and Phases: 1: Main Street & Rte 138



HCM Signalized Intersection Capacity Analysis
1: Main Street & Rte 138

2030 Build with Mitigation Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	415	374	225	45	144	135	123	801	50	73	342	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	11	11	11	12	11	11	12	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1626	1818	1553	1586	3054		1736	3300		1719	3305	
Flt Permitted	0.56	1.00	1.00	0.40	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	958	1818	1553	667	3054		1736	3300		1719	3305	
Peak-hour factor, PHF	0.89	0.89	0.89	0.88	0.88	0.88	0.92	0.92	0.92	0.88	0.88	0.88
Adj. Flow (vph)	466	420	253	51	164	153	134	871	54	83	389	82
RTOR Reduction (vph)	0	0	50	0	82	0	0	5	0	0	20	0
Lane Group Flow (vph)	466	420	203	51	235	0	134	920	0	83	451	0
Heavy Vehicles (%)	11%	1%	4%	10%	6%	6%	4%	5%	2%	5%	3%	2%
Turn Type	Perm		pm+ov	Perm			Prot			Prot		
Protected Phases		8	1		4		1	6		5	2	
Permitted Phases	8		8	4								
Actuated Green, G (s)	41.1	41.1	51.7	41.1	41.1		10.6	25.5		6.6	21.5	
Effective Green, g (s)	41.1	41.1	51.7	41.1	41.1		10.6	25.5		6.6	21.5	
Actuated g/C Ratio	0.47	0.47	0.59	0.47	0.47		0.12	0.29		0.07	0.24	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	446	847	998	311	1423		209	954		129	806	
v/s Ratio Prot		0.23	0.02		0.08		c0.08	c0.28		0.05	0.14	
v/s Ratio Perm	c0.49		0.11	0.08								
v/c Ratio	1.04	0.50	0.20	0.16	0.17		0.64	0.96		0.64	0.56	
Uniform Delay, d1	23.6	16.4	8.6	13.6	13.6		37.0	30.9		39.7	29.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	54.8	0.2	0.0	0.1	0.0		5.0	20.9		8.0	1.0	
Delay (s)	78.4	16.5	8.6	13.7	13.6		41.9	51.8		47.6	30.3	
Level of Service	E	B	A	B	B		D	D		D	C	
Approach Delay (s)		40.1			13.7			50.6			32.9	
Approach LOS		D			B			D			C	

Intersection Summary				
HCM Average Control Delay	39.2	HCM Level of Service	D	
HCM Volume to Capacity ratio	1.00			
Actuated Cycle Length (s)	88.2	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	77.5%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Lanes, Volumes, Timings
2: Belmont St (Rt. 123) & Route 138

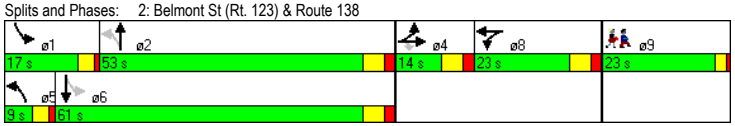
2030 Build with Mitigation Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	55	35	250	50	204	85	743	435	202	315	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	13	12	11	12	12	12	11	12	11	12	13
Storage Length (ft)	0		0	475		0	0		0	200		300
Storage Lanes	0		1	2		0	1		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		387			2550			980			853	
Travel Time (s)		5.9			38.6			14.8			12.9	
Peak Hour Factor	0.72	0.72	0.72	0.82	0.82	0.82	0.93	0.93	0.93	0.92	0.92	0.92
Heavy Vehicles (%)	13%	7%	0%	3%	15%	13%	0%	3%	3%	5%	4%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	107	49	305	310	0	91	1267	0	220	358	0
Turn Type	Split		Perm	Split			pm+pt			pm+pt		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0		8.0	10.0		8.0	10.0	
Total Split (s)	14.0	14.0	14.0	23.0	23.0	0.0	9.0	53.0	0.0	17.0	61.0	0.0
Total Split (%)	10.8%	10.8%	10.8%	17.7%	17.7%	0.0%	6.9%	40.8%	0.0%	13.1%	46.9%	0.0%
Maximum Green (s)	8.0	8.0	8.0	17.0	17.0		5.0	47.0		13.0	55.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	4.0	6.0	4.0	4.0	6.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.97	0.34	0.71	1.01		0.16	0.83		0.73	0.19	
Control Delay		139.2	22.0	64.1	87.2		12.4	34.5		46.4	14.4	
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		139.2	22.0	64.1	87.2		12.4	34.5		46.4	14.4	
Queue Length 50th (ft)		92	0	128	~167		23	433		83	60	
Queue Length 95th (ft)		#153	25	161	#296		69	#715		#319	107	
Internal Link Dist (ft)		307			2470			900			773	
Turn Bay Length (ft)				475						200		
Base Capacity (vph)		110	145	430	306		580	1528		303	1903	
Starvation Cap Reductn		0	0	0	0		0	0		0	0	
Spillback Cap Reductn		0	0	0	0		0	0		0	0	
Storage Cap Reductn		0	0	0	0		0	0		0	0	
Reduced v/c Ratio		0.97	0.34	0.71	1.01		0.16	0.83		0.73	0.19	

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	18%
Maximum Green (s)	20.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	6.0
Flash Dont Walk (s)	14.0
Pedestrian Calls (#/hr)	2
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	
Area Type:	Other
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection	
Natural Cycle: 140	
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.	

Splits and Phases: 2: Belmont St (Rt. 123) & Route 138



HCM Signalized Intersection Capacity Analysis
2: Belmont St (Rt. 123) & Route 138

2030 Build with Mitigation Condition - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	55	35	250	50	204	85	743	435	202	315	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	13	12	11	12	12	12	11	12	11	12	13
Total Lost time (s)		6.0	6.0	6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.95		1.00	0.95	
Frt		1.00	0.85	1.00	0.88		1.00	0.94		1.00	0.99	
Flt Protected		0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1780	1615	3286	1474		1805	3200		1662	3454	
Flt Permitted		0.99	1.00	0.95	1.00		0.54	1.00		0.07	1.00	
Satd. Flow (perm)		1780	1615	3286	1474		1022	3200		129	3454	
Peak-hour factor, PHF	0.72	0.72	0.72	0.82	0.82	0.82	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	31	76	49	305	61	249	91	799	468	220	342	16
RTOR Reduction (vph)	0	0	46	0	113	0	0	57	0	0	2	0
Lane Group Flow (vph)	0	107	3	305	197	0	91	1210	0	220	356	0
Heavy Vehicles (%)	13%	7%	0%	3%	15%	13%	0%	3%	3%	5%	4%	0%
Turn Type	Split		Perm	Split			pm+pt			pm+pt		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		
Actuated Green, G (s)		8.0	8.0	17.0	17.0		64.2	57.4		80.0	69.2	
Effective Green, g (s)		8.0	8.0	17.0	17.0		64.2	57.4		80.0	69.2	
Actuated g/C Ratio		0.06	0.06	0.13	0.13		0.49	0.44		0.62	0.53	
Clearance Time (s)		6.0	6.0	6.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		110	99	430	193		546	1413		299	1839	
v/s Ratio Prot		c0.06		0.09	c0.13		0.01	c0.38		c0.11	0.10	
v/s Ratio Perm			0.00				0.07			0.35		
v/c Ratio		0.97	0.03	0.71	1.02		0.17	0.86		0.74	0.19	
Uniform Delay, d1		60.9	57.4	54.1	56.5		17.5	32.6		34.3	15.9	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00		1.20	0.89	
Incremental Delay, d2		76.7	0.1	5.3	70.3		0.1	6.9		8.5	0.2	
Delay (s)		137.6	57.5	59.4	126.8		17.7	39.5		49.6	14.4	
Level of Service		F	E	E	F		B	D		D	B	
Approach Delay (s)		112.4			93.4			38.0			27.8	
Approach LOS		F			F			D			C	

Intersection Summary				
HCM Average Control Delay	52.7	HCM Level of Service		D
HCM Volume to Capacity ratio	0.87			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)		29.0
Intersection Capacity Utilization	81.2%	ICU Level of Service		D
Analysis Period (min)	15			
c Critical Lane Group				

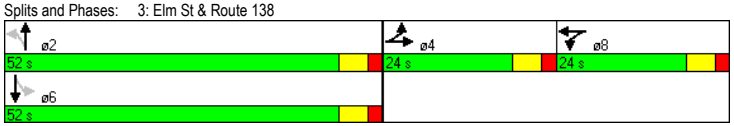
Lanes, Volumes, Timings
3: Elm St & Route 138

2030 Build with Mitigation Condition - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	31	35	10	15	31	30	1370	15	0	438	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	11	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		0	0		300	0		300
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2352			2953			2928			3218	
Travel Time (s)		53.5			67.1			66.5			73.1	
Peak Hour Factor	0.84	0.84	0.84	0.68	0.68	0.68	0.91	0.91	0.91	0.89	0.89	0.89
Heavy Vehicles (%)	0%	3%	3%	0%	15%	4%	4%	3%	0%	0%	3%	7%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	278	0	0	83	0	0	1554	0	0	553	0
Turn Type	Split			Split			Perm			Perm		
Protected Phases	4	4		8	8			2			6	
Permitted Phases							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		4.0	4.0		4.0	4.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	24.0	24.0	0.0	24.0	24.0	0.0	52.0	52.0	0.0	52.0	52.0	0.0
Total Split (%)	24.0%	24.0%	0.0%	24.0%	24.0%	0.0%	52.0%	52.0%	0.0%	52.0%	52.0%	0.0%
Maximum Green (s)	18.0	18.0		18.0	18.0		46.0	46.0		46.0	46.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	4.0	4.0		4.0	4.0		5.0	5.0		5.0	5.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
v/c Ratio		0.77			0.46			0.90			0.30	
Control Delay		51.3			46.6			29.7			13.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		51.3			46.6			29.7			13.3	
Queue Length 50th (ft)		153			46			435			93	
Queue Length 95th (ft)		#247			68			#664			139	
Internal Link Dist (ft)		2272			2873			2848			3138	
Turn Bay Length (ft)												
Base Capacity (vph)		406			329			1729			1829	
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		0.68			0.25			0.90			0.30	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 88.1	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: Elm St & Route 138



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	31	35	10	15	31	30	1370	15	0	438	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	12	12	11	12	12	12	12	12	12	12
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.98			0.93			1.00			0.98	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1960			1586			3496			3432	
Flt Permitted		0.97			0.99			0.93			1.00	
Satd. Flow (perm)		1960			1586			3259			3432	
Peak-hour factor, PHF	0.84	0.84	0.84	0.68	0.68	0.68	0.91	0.91	0.91	0.89	0.89	0.89
Adj. Flow (vph)	199	37	42	15	22	46	33	1505	16	0	492	61
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	278	0	0	83	0	0	1554	0	0	544	0
Heavy Vehicles (%)	0%	3%	3%	0%	15%	4%	4%	3%	0%	0%	3%	7%
Turn Type	Split			Split			Perm			Perm		
Protected Phases	4	4		8	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)		16.1			8.5			46.7			46.7	
Effective Green, g (s)		16.1			8.5			46.7			46.7	
Actuated g/C Ratio		0.18			0.10			0.52			0.52	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		353			151			1704			1795	
v/s Ratio Prot		c0.14			c0.05						0.16	
v/s Ratio Perm								c0.48				
v/c Ratio		0.79			0.55			0.91			0.30	
Uniform Delay, d1		35.0			38.6			19.4			12.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		11.0			4.1			8.9			0.1	
Delay (s)		46.0			42.6			28.3			12.2	
Level of Service		D			D			C			B	
Approach Delay (s)		46.0			42.6			28.3			12.2	
Approach LOS		D			D			C			B	

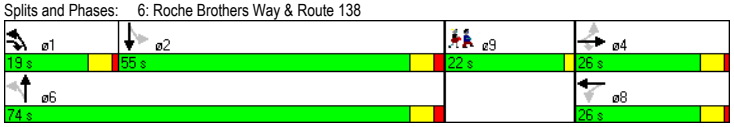
Intersection Summary			
HCM Average Control Delay	27.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	89.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	103	0	99	5	0	5	389	999	0	0	353	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	10	11	11	12	11	11
Storage Length (ft)	0		100	0		0	350		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			332			1623			2417	
Travel Time (s)		14.4			7.5			36.9			54.9	
Peak Hour Factor	0.82	0.82	0.82	0.63	0.63	0.63	0.85	0.85	0.85	0.84	0.84	0.84
Heavy Vehicles (%)	4%	0%	6%	2%	0%	3%	3%	3%	0%	0%	4%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	126	121	0	16	0	0	1633	0	0	608	0
Turn Type	Perm		pm+ov	Perm			pm+pt			Perm		
Protected Phases		4	1		8		1	6			2	
Permitted Phases	4		4	8			6			2		
Detector Phase	4	4	1	8	8		1	6		2	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		6.0	10.0		10.0	10.0	
Minimum Split (s)	21.0	21.0	11.0	21.0	21.0		11.0	21.0		21.0	21.0	
Total Split (s)	26.0	26.0	19.0	26.0	26.0	0.0	19.0	74.0	0.0	55.0	55.0	0.0
Total Split (%)	21.3%	21.3%	15.6%	21.3%	21.3%	0.0%	15.6%	60.7%	0.0%	45.1%	45.1%	0.0%
Maximum Green (s)	21.0	21.0	14.0	21.0	21.0		14.0	68.0		49.0	49.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	5.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None	None	None	None		None	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.69	0.26		0.07			1.04			0.31	
Control Delay		60.4	7.4		27.9			48.9			10.6	
Queue Delay		0.0	0.0		0.0			0.0			0.0	
Total Delay		60.4	7.4		27.9			48.9			10.6	
Queue Length 50th (ft)		70	0		4			~206			67	
Queue Length 95th (ft)		141	36		17			#933			170	
Internal Link Dist (ft)		555			252			1543			2337	
Turn Bay Length (ft)			100									
Base Capacity (vph)		297	586		369			1574			1942	
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		0.42	0.21		0.04			1.04			0.31	

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour 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 (%)	18%
Maximum Green (s)	20.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	13.0
Pedestrian Calls (#/hr)	11
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	
Area Type:	Other
Cycle Length: 122	
Actuated Cycle Length: 97.7	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
~ 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.	

Splits and Phases: 6: Roche Brothers Way & Route 138



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	103	0	99	5	0	5	389	999	0	0	353	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	12	10	11	11	12	11	11
Total Lost time (s)		5.0	5.0		5.0			6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00			0.95			0.95	
Frt		1.00	0.85		0.93			1.00			0.95	
Flt Protected		0.95	1.00		0.98			0.99			1.00	
Satd. Flow (prot)		1736	1524		1911			3341			3181	
Flt Permitted		0.75	1.00		0.85			0.62			1.00	
Satd. Flow (perm)		1365	1524		1669			2112			3181	
Peak-hour factor, PHF	0.82	0.82	0.82	0.63	0.63	0.63	0.85	0.85	0.85	0.84	0.84	0.84
Adj. Flow (vph)	126	0	121	8	0	8	458	1175	0	0	420	188
RTOR Reduction (vph)	0	0	98	0	7	0	0	0	0	0	29	0
Lane Group Flow (vph)	0	126	23	0	9	0	0	1633	0	0	579	0
Heavy Vehicles (%)	4%	0%	6%	2%	0%	3%	3%	3%	0%	0%	4%	6%
Turn Type	Perm		pm+ov	Perm			pm+pt			Perm		
Protected Phases		4	1		8		1	6			2	
Permitted Phases	4		4	8			6			2		
Actuated Green, G (s)		13.1	19.2		13.1			69.9			58.8	
Effective Green, g (s)		13.1	19.2		13.1			69.9			58.8	
Actuated g/C Ratio		0.13	0.19		0.13			0.70			0.59	
Clearance Time (s)		5.0	5.0		5.0			6.0			6.0	
Vehicle Extension (s)		2.0	2.0		2.0			2.0			2.0	
Lane Grp Cap (vph)		180	372		220			1564			1886	
v/s Ratio Prot			0.00					c0.06			0.18	
v/s Ratio Perm		c0.09	0.01		0.01			c0.67				
v/c Ratio		0.70	0.06		0.04			1.04			0.31	
Uniform Delay, d1		41.2	32.7		37.6			14.6			10.1	
Progression Factor		1.00	1.00		1.00			1.00			1.00	
Incremental Delay, d2		9.2	0.0		0.0			35.2			0.0	
Delay (s)		50.4	32.7		37.6			49.9			10.1	
Level of Service		D	C		D			D			B	
Approach Delay (s)		41.7			37.6			49.9			10.1	
Approach LOS		D			D			D			B	

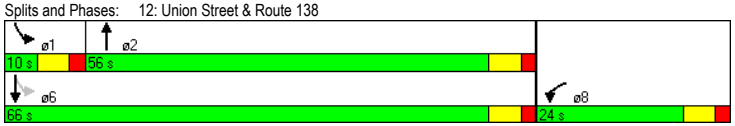
Intersection Summary			
HCM Average Control Delay	39.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	99.2	Sum of lost time (s)	16.2
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

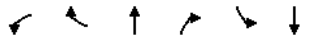
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	65	121	1271	257	80	412
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Right Turn on Red		Yes		No		
Link Speed (mph)	30		30			30
Link Distance (ft)	1092		3218			1623
Travel Time (s)	24.8		73.1			36.9
Peak Hour Factor	0.88	0.88	0.89	0.89	0.81	0.81
Heavy Vehicles (%)	0%	5%	3%	2%	3%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	212	0	1717	0	0	608
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Detector Phase	8		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		4.0		4.0	4.0
Minimum Split (s)	24.0		20.0		10.0	20.0
Total Split (s)	24.0	0.0	56.0	0.0	10.0	66.0
Total Split (%)	26.7%	0.0%	62.2%	0.0%	11.1%	73.3%
Maximum Green (s)	18.0		50.0		4.0	60.0
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	6.0	4.0	6.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		Min		None	Min
Walk Time (s)	7.0					
Flash Dont Walk (s)	8.0					
Pedestrian Calls (#/hr)	0					
v/c Ratio	0.64		0.74			0.88dl
Control Delay	25.8		10.6			7.3
Queue Delay	0.0		0.0			0.0
Total Delay	25.8		10.6			7.3
Queue Length 50th (ft)	51		213			54
Queue Length 95th (ft)	110		375			94
Internal Link Dist (ft)	1012		3138			1543
Turn Bay Length (ft)						
Base Capacity (vph)	487		2416			1646
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.44		0.71			0.37

Intersection Summary	
Area Type:	Other
Cycle Length: 90	

Actuated Cycle Length: 71.6
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 12: Union Street & Route 138





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	65	121	1271	257	80	412
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0			6.0
Lane Util. Factor	1.00		0.95			0.95
Frt	0.91		0.97			1.00
Flt Protected	0.98		1.00			0.99
Satd. Flow (prot)	1650		3422			3421
Flt Permitted	0.98		1.00			0.57
Satd. Flow (perm)	1650		3422			1951
Peak-hour factor, PHF	0.88	0.88	0.89	0.89	0.81	0.81
Adj. Flow (vph)	74	138	1428	289	99	509
RTOR Reduction (vph)	79	0	0	0	0	0
Lane Group Flow (vph)	133	0	1717	0	0	608
Heavy Vehicles (%)	0%	5%	3%	2%	3%	5%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	10.8		48.7			48.7
Effective Green, g (s)	10.8		48.7			48.7
Actuated g/C Ratio	0.15		0.68			0.68
Clearance Time (s)	6.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	249		2331			1329
v/s Ratio Prot	c0.08		c0.50			
v/s Ratio Perm						0.31
v/c Ratio	0.53		0.74			0.88dl
Uniform Delay, d1	28.0		7.3			5.3
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	2.2		1.2			0.3
Delay (s)	30.2		8.5			5.5
Level of Service	C		A			A
Approach Delay (s)	30.2		8.5			5.5
Approach LOS	C		A			A

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	71.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

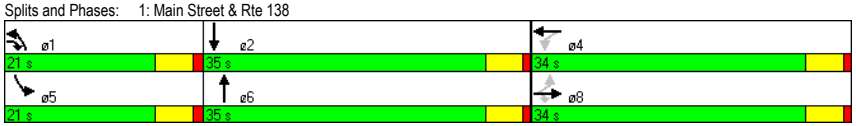
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	183	198	274	105	366	88	295	493	85	150	684	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	11	11	11	12	12	11	12	11	11
Storage Length (ft)	150		230	90		140	140		140	115		150
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			35			40			40	
Link Distance (ft)		1725			3218			4950			2928	
Travel Time (s)		26.1			62.7			84.4			49.9	
Peak Hour Factor	0.82	0.82	0.82	0.85	0.85	0.85	0.90	0.90	0.90	0.89	0.89	0.89
Heavy Vehicles (%)	2%	1%	2%	1%	1%	2%	2%	5%	0%	4%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	223	241	334	124	535	0	328	642	0	169	1105	0
Turn Type	Perm		pm+ov	Perm			Prot			Prot		
Protected Phases		8	1		4		1	6		5	2	
Permitted Phases	8		8	4								
Detector Phase	8	8	1	4	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	15.0		7.0	15.0	
Minimum Split (s)	12.0	12.0	12.0	21.0	21.0		12.0	21.0		12.0	20.0	
Total Split (s)	34.0	34.0	21.0	34.0	34.0	0.0	21.0	35.0	0.0	21.0	35.0	0.0
Total Split (%)	37.8%	37.8%	23.3%	37.8%	37.8%	0.0%	23.3%	38.9%	0.0%	23.3%	38.9%	0.0%
Maximum Green (s)	29.0	29.0	16.0	29.0	29.0		16.0	30.0		16.0	30.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0
Lead/Lag			Lead				Lead	Lag		Lead	Lag	
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)				5.0	5.0			5.0				
Flash Dont Walk (s)				11.0	11.0			11.0				
Pedestrian Calls (#/hr)				0	0			0				
v/c Ratio	1.05	0.41	0.37	0.41	0.49		1.04	0.50		0.70	0.97	
Control Delay	109.4	26.5	10.8	28.9	24.6		100.2	23.4		51.7	49.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	109.4	26.5	10.8	28.9	24.6		100.2	23.4		51.7	49.7	
Queue Length 50th (ft)	~140	106	83	55	118		~204	142		92	303	
Queue Length 95th (ft)	#244	154	121	100	155		#367	205		152	#439	
Internal Link Dist (ft)		1645			3138			4870			2848	
Turn Bay Length (ft)	150		230	90			140			115		
Base Capacity (vph)	212	586	901	302	1102		315	1272		309	1135	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	1.05	0.41	0.37	0.41	0.49		1.04	0.50		0.55	0.97	

Lanes, Volumes, Timings
1: Main Street & Rte 138
2030 Build with Mitigation Condition - PM Peak Hour

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
~ 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.

Splits and Phases: 1: Main Street & Rte 138



HCM Signalized Intersection Capacity Analysis
1: Main Street & Rte 138

2030 Build with Mitigation Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	183	198	274	105	366	88	295	493	85	150	684	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	11	11	11	12	12	11	12	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.98		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1818	1583	1728	3348		1770	3386		1736	3243	
Flt Permitted	0.35	1.00	1.00	0.52	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	660	1818	1583	938	3348		1770	3386		1736	3243	
Peak-hour factor, PHF	0.82	0.82	0.82	0.85	0.85	0.85	0.90	0.90	0.90	0.89	0.89	0.89
Adj. Flow (vph)	223	241	334	124	431	104	328	548	94	169	769	336
RTOR Reduction (vph)	0	0	25	0	23	0	0	14	0	0	55	0
Lane Group Flow (vph)	223	241	310	124	512	0	328	628	0	169	1050	0
Heavy Vehicles (%)	2%	1%	2%	1%	1%	2%	2%	5%	0%	4%	3%	2%
Turn Type	Perm		pm+ov	Perm			Prot			Prot		
Protected Phases		8	1		4		1	6		5	2	
Permitted Phases	8		8	4								
Actuated Green, G (s)	29.0	29.0	45.0	29.0	29.0		16.0	33.4		12.6	30.0	
Effective Green, g (s)	29.0	29.0	45.0	29.0	29.0		16.0	33.4		12.6	30.0	
Actuated g/C Ratio	0.32	0.32	0.50	0.32	0.32		0.18	0.37		0.14	0.33	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	213	586	879	302	1079		315	1257		243	1081	
v/s Ratio Prot		0.13	0.06		0.15		c0.19	c0.19		0.10	c0.32	
v/s Ratio Perm	c0.34		0.13	0.13								
v/c Ratio	1.05	0.41	0.35	0.41	0.47		1.04	0.50		0.70	0.97	
Uniform Delay, d1	30.5	23.8	13.7	23.8	24.4		37.0	21.8		36.9	29.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	74.5	0.2	0.1	0.3	0.1		61.9	0.4		6.8	20.8	
Delay (s)	105.0	24.0	13.7	24.2	24.5		98.9	22.3		43.7	50.4	
Level of Service	F	C	B	C	C		F	C		D	D	
Approach Delay (s)		42.4			24.5			48.2			49.5	
Approach LOS		D			C			D			D	

Intersection Summary				
HCM Average Control Delay	43.1	HCM Level of Service	D	
HCM Volume to Capacity ratio	1.08			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	84.5%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Lanes, Volumes, Timings
2: Belmont St (Rt. 123) & Route 138

2030 Build with Mitigation Condition - PM Peak Hour

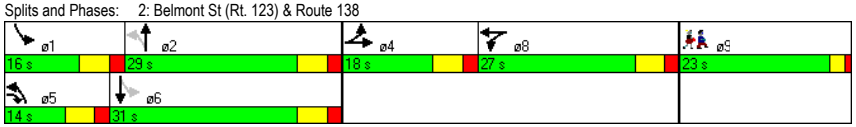
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	125	275	500	150	174	230	407	300	243	687	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	13	12	11	13	12	11	12	12	11	12	13
Storage Length (ft)	0		0	475		0	0		0	200		300
Storage Lanes	0		1	2		0	1		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		387			2550			908			849	
Travel Time (s)		5.9			38.6			13.8			12.9	
Peak Hour Factor	0.89	0.89	0.89	0.88	0.88	0.88	0.93	0.93	0.93	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	1%	0%	2%	0%	4%	1%	5%	3%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	220	309	568	368	0	247	761	0	267	824	0
Turn Type	Split		Over	Split			pm+pt			pm+pt		
Protected Phases	4	4	5	8	8		5	2		1	6	
Permitted Phases							2			6		
Detector Phase	4	4	5	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0		10.0	10.0		10.0	10.0	
Total Split (s)	18.0	18.0	14.0	27.0	27.0	0.0	14.0	29.0	0.0	16.0	31.0	0.0
Total Split (%)	15.9%	15.9%	12.4%	23.9%	23.9%	0.0%	12.4%	25.7%	0.0%	14.2%	27.4%	0.0%
Maximum Green (s)	12.0	12.0	8.0	21.0	21.0		8.0	23.0		10.0	25.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag			Lead				Lead	Lag		Lead	Lag	
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		1.07	0.56	0.91	1.00		0.63	0.83		0.64	0.87	
Control Delay		131.9	9.9	65.5	87.2		33.2	41.4		31.1	39.2	
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		131.9	9.9	65.5	87.2		33.2	41.4		31.1	39.2	
Queue Length 50th (ft)		~178	0	210	240		98	216		85	256	
Queue Length 95th (ft)		#328	#107	#298	#421		#356	#367		m#276	m#437	
Internal Link Dist (ft)		307			2470			828			769	
Turn Bay Length (ft)				475						200		
Base Capacity (vph)		205	549	623	369		393	916		417	944	
Starvation Cap Reductn		0	0	0	0		0	0		0	0	
Spillback Cap Reductn		0	0	0	0		0	0		0	0	
Storage Cap Reductn		0	0	0	0		0	0		0	0	
Reduced v/c Ratio		1.07	0.56	0.91	1.00		0.63	0.83		0.64	0.87	

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	20%
Maximum Green (s)	20.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	6.0
Flash Dont Walk (s)	14.0
Pedestrian Calls (#/hr)	5
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	
Area Type:	Other
Cycle Length: 113	
Actuated Cycle Length: 113	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection	
Natural Cycle: 130	
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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Belmont St (Rt. 123) & Route 138



HCM Signalized Intersection Capacity Analysis
2: Belmont St (Rt. 123) & Route 138

2030 Build with Mitigation Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	125	275	500	150	174	230	407	300	243	687	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	13	12	11	13	12	11	12	12	11	12	13
Total Lost time (s)		6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.95		1.00	0.95	
Frt		1.00	0.85	1.00	0.92		1.00	0.94		1.00	0.99	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1928	1615	3351	1786		1745	3290		1662	3469	
Flt Permitted		0.98	1.00	0.95	1.00		0.16	1.00		0.14	1.00	
Satd. Flow (perm)		1928	1615	3351	1786		292	3290		248	3469	
Peak-hour factor, PHF	0.89	0.89	0.89	0.88	0.88	0.88	0.93	0.93	0.93	0.91	0.91	0.91
Adj. Flow (vph)	80	140	309	568	170	198	247	438	323	267	755	69
RTOR Reduction (vph)	0	0	252	0	37	0	0	116	0	0	6	0
Lane Group Flow (vph)	0	220	57	568	331	0	247	645	0	267	818	0
Heavy Vehicles (%)	0%	0%	0%	1%	0%	2%	0%	4%	1%	5%	3%	0%
Turn Type	Split		Over	Split			pm+pt			pm+pt		
Protected Phases	4	4	5	8	8		5	2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		12.0	20.8	21.0	21.0		46.0	25.2		52.0	28.2	
Effective Green, g (s)		12.0	20.8	21.0	21.0		46.0	25.2		52.0	28.2	
Actuated g/C Ratio		0.11	0.18	0.19	0.19		0.41	0.22		0.46	0.25	
Clearance Time (s)		6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		205	297	623	332		386	734		412	866	
v/s Ratio Prot		c0.11	0.04	0.17	c0.19		0.12	0.20		c0.14	c0.24	
v/s Ratio Perm							0.14			0.16		
v/c Ratio		1.07	0.19	0.91	1.00		0.64	0.88		0.65	0.94	
Uniform Delay, d1		50.5	39.0	45.1	46.0		25.0	42.4		23.7	41.6	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00		1.15	0.82	
Incremental Delay, d2		83.6	0.3	17.7	47.9		3.5	14.1		1.9	12.7	
Delay (s)		134.1	39.3	62.8	93.9		28.5	56.6		29.1	46.7	
Level of Service		F	D	E	F		C	E		C	D	
Approach Delay (s)		78.7			75.0			49.7			42.4	
Approach LOS		E			E			D			D	

Intersection Summary				
HCM Average Control Delay	58.4	HCM Level of Service		E
HCM Volume to Capacity ratio	0.93			
Actuated Cycle Length (s)	113.0	Sum of lost time (s)		31.0
Intersection Capacity Utilization	83.4%	ICU Level of Service		E
Analysis Period (min)	15			
c Critical Lane Group				

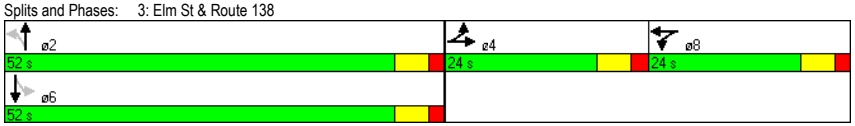
Lanes, Volumes, Timings
3: Elm St & Route 138

2030 Build with Mitigation Condition - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	15	35	25	50	36	65	708	30	22	1113	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	11	12	12	12	12	12	11	12
Storage Length (ft)	0		0	0		0	0		300	0		300
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			No			No			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2352			2953			2928			3218	
Travel Time (s)		53.5			67.1			66.5			73.1	
Peak Hour Factor	0.85	0.85	0.85	0.86	0.86	0.86	0.88	0.88	0.88	0.85	0.85	0.85
Heavy Vehicles (%)	2%	0%	4%	0%	0%	3%	2%	3%	4%	0%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	157	0	0	129	0	0	913	0	0	1611	0
Turn Type	Split			Split			Perm			Perm		
Protected Phases	4	4		8	8			2			6	
Permitted Phases							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		4.0	4.0		4.0	4.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	24.0	24.0	0.0	24.0	24.0	0.0	52.0	52.0	0.0	52.0	52.0	0.0
Total Split (%)	24.0%	24.0%	0.0%	24.0%	24.0%	0.0%	52.0%	52.0%	0.0%	52.0%	52.0%	0.0%
Maximum Green (s)	18.0	18.0		18.0	18.0		46.0	46.0		46.0	46.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	4.0	4.0		4.0	4.0		5.0	5.0		5.0	5.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
v/c Ratio		0.59			0.56			0.88			0.98	
Control Delay		45.6			46.4			32.6			41.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		45.6			46.4			32.6			41.8	
Queue Length 50th (ft)		83			68			225			437	
Queue Length 95th (ft)		144			124			#428			#685	
Internal Link Dist (ft)		2272			2873			2848			3138	
Turn Bay Length (ft)												
Base Capacity (vph)		386			347			1035			1636	
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		0.41			0.37			0.88			0.98	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 89.7	
Natural Cycle: 110	
Control Type: Semi Act-Uncoord	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: Elm St & Route 138



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	15	35	25	50	36	65	708	30	22	1113	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	12	12	11	12	12	12	12	12	11	12
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.96			0.96			0.99			0.97	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1911			1720			3473			3337	
Flt Permitted		0.97			0.99			0.57			0.93	
Satd. Flow (perm)		1911			1720			1972			3093	
Peak-hour factor, PHF	0.85	0.85	0.85	0.86	0.86	0.86	0.88	0.88	0.88	0.85	0.85	0.85
Adj. Flow (vph)	98	18	41	29	58	42	74	805	34	26	1309	276
RTOR Reduction (vph)	0	0	0	0	0	0	0	2	0	0	15	0
Lane Group Flow (vph)	0	157	0	0	129	0	0	911	0	0	1596	0
Heavy Vehicles (%)	2%	0%	4%	0%	0%	3%	2%	3%	4%	0%	2%	1%
Turn Type	Split			Split			Perm			Perm		
Protected Phases	4	4		8	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)		12.6			12.0			47.0			47.0	
Effective Green, g (s)		12.6			12.0			47.0			47.0	
Actuated g/C Ratio		0.14			0.13			0.52			0.52	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		269			230			1034			1622	
v/s Ratio Prot		c0.08			c0.08							
v/s Ratio Perm								0.46			c0.52	
v/c Ratio		0.58			0.56			0.88			0.98	
Uniform Delay, d1		36.0			36.3			18.8			20.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		3.2			3.1			8.9			18.5	
Delay (s)		39.3			39.4			27.7			39.4	
Level of Service		D			D			C			D	
Approach Delay (s)		39.3			39.4			27.7			39.4	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	35.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	89.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

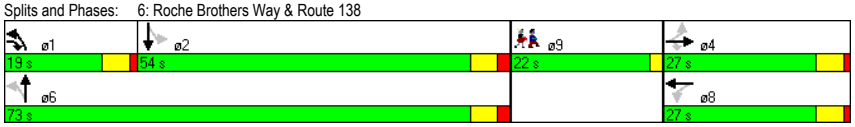
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	0	492	0	0	0	235	492	5	5	839	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	12	12	12	11	11	11	12	12	12
Storage Length (ft)	0		100	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			332			1623			2417	
Travel Time (s)		14.4			7.5			36.9			54.9	
Confl. Peds. (#/hr)	25		50	15		25	10		25	40		30
Peak Hour Factor	0.90	0.90	0.90	0.25	0.25	0.25	0.82	0.82	0.82	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	1%	4%	0%	0%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	183	547	0	0	0	0	893	0	0	1114	0
Turn Type	Perm		pm+ov	Perm			pm+pt			Perm		
Protected Phases		4	1		8		1	6			2	
Permitted Phases	4		4	8			6			2		
Detector Phase	4	4	1	8	8		1	6		2	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		10.0	10.0	
Minimum Split (s)	21.0	21.0	11.0	21.0	21.0		11.0	22.0		22.0	22.0	
Total Split (s)	27.0	27.0	19.0	27.0	27.0	0.0	19.0	73.0	0.0	54.0	54.0	0.0
Total Split (%)	22.1%	22.1%	15.6%	22.1%	22.1%	0.0%	15.6%	59.8%	0.0%	44.3%	44.3%	0.0%
Maximum Green (s)	22.0	22.0	14.0	22.0	22.0		14.0	67.0		48.0	48.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	5.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.63	0.78					1.06dl			0.77	
Control Delay		44.3	18.4					15.4			24.9	
Queue Delay		0.0	0.0					0.0			0.0	
Total Delay		44.3	18.4					15.4			24.9	
Queue Length 50th (ft)		79	67					104			216	
Queue Length 95th (ft)		#246	284					238			508	
Internal Link Dist (ft)		555			252			1543			2337	
Turn Bay Length (ft)			100									
Base Capacity (vph)		393	799					1605			2038	
Starvation Cap Reductn		0	0					0			0	
Spillback Cap Reductn		0	0					0			0	
Storage Cap Reductn		0	0					0			0	

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour 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 (%)	18%
Maximum Green (s)	20.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	13.0
Pedestrian Calls (#/hr)	11
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.47	0.68					0.56			0.55	

Intersection Summary
Area Type: Other
Cycle Length: 122
Actuated Cycle Length: 82.6
Natural Cycle: 90
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.

Splits and Phases: 6: Roche Brothers Way & Route 138



Lane Group	ø9
Reduced v/c Ratio	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
6: Roche Brothers Way & Route 138

2030 Build with Mitigation Condition - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	0	492	0	0	0	235	492	5	5	839	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	11	12	12	12	11	11	11	12	12	12
Total Lost time (s)		5.0	5.0					6.0			6.0	
Lane Util. Factor		1.00	1.00					0.95			0.95	
Frpb, ped/bikes		1.00	0.96					1.00			0.99	
Flpb, ped/bikes		0.96	1.00					1.00			1.00	
Frt		1.00	0.85					1.00			0.98	
Flt Protected		0.95	1.00					0.98			1.00	
Satd. Flow (prot)		1740	1484					3329			3431	
Flt Permitted		0.76	1.00					0.52			0.95	
Satd. Flow (perm)		1387	1484					1768			3260	
Peak-hour factor, PHF	0.90	0.90	0.90	0.25	0.25	0.25	0.82	0.82	0.82	0.90	0.90	0.90
Adj. Flow (vph)	183	0	547	0	0	0	287	600	6	6	932	176
RTOR Reduction (vph)	0	0	239	0	0	0	0	0	0	0	12	0
Lane Group Flow (vph)	0	183	308	0	0	0	0	893	0	0	1102	0
Confl. Peds. (#/hr)	25		50	15		25	10		25	40		30
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	1%	4%	0%	0%	2%	1%
Turn Type	Perm		pm+ov	Perm			pm+pt			Perm		
Protected Phases		4	1		8		1	6			2	
Permitted Phases	4		4	8			6			2		
Actuated Green, G (s)		17.5	25.9					50.3			36.9	
Effective Green, g (s)		17.5	25.9					50.3			36.9	
Actuated g/C Ratio		0.21	0.31					0.60			0.44	
Clearance Time (s)		5.0	5.0					6.0			6.0	
Vehicle Extension (s)		3.0	3.0					3.0			3.0	
Lane Grp Cap (vph)		291	549					1222			1441	
v/s Ratio Prot			c0.06					c0.07				
v/s Ratio Perm		0.13	0.15					c0.37			0.34	
v/c Ratio		0.63	0.56					1.06dl			0.76	
Uniform Delay, d1		30.0	24.0					11.8			19.6	
Progression Factor		1.00	1.00					1.00			1.00	
Incremental Delay, d2		4.2	1.3					2.3			2.5	
Delay (s)		34.3	25.4					14.1			22.1	
Level of Service		C	C					B			C	
Approach Delay (s)		27.6			0.0			14.1			22.1	
Approach LOS		C			A			B			C	

Intersection Summary				
HCM Average Control Delay	21.0	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.69			
Actuated Cycle Length (s)	83.5	Sum of lost time (s)	15.7	
Intersection Capacity Utilization	79.4%	ICU Level of Service	D	
Analysis Period (min)	15			

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

Lanes, Volumes, Timings
12: Union Street & Route 138

2030 Build with Mitigation Condition - PM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	186	131	627	171	158	1203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	10	11
Storage Length (ft)	0	0		0	120	
Storage Lanes	1	0		0	0	
Taper Length (ft)	25	25		25	25	
Right Turn on Red		No		No		
Link Speed (mph)	30		30			30
Link Distance (ft)	1092		3218			1623
Travel Time (s)	24.8		73.1			36.9
Peak Hour Factor	0.80	0.80	0.84	0.84	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	3%	1%	3%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	396	0	950	0	0	1480
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Detector Phase	8		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		4.0		4.0	4.0
Minimum Split (s)	24.0		20.0		10.0	20.0
Total Split (s)	33.0	0.0	51.0	0.0	26.0	77.0
Total Split (%)	30.0%	0.0%	46.4%	0.0%	23.6%	70.0%
Maximum Green (s)	28.0		46.0		21.0	72.0
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	1.0		1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	4.0	5.0	4.0	5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	Min		Min		Min	Min
Walk Time (s)	7.0					
Flash Dont Walk (s)	8.0					
Pedestrian Calls (#/hr)	0					
v/c Ratio	0.95		0.49			1.05
Control Delay	73.3		15.6			58.9
Queue Delay	0.0		0.0			0.0
Total Delay	73.3		15.6			58.9
Queue Length 50th (ft)	274		203			~360
Queue Length 95th (ft)	#372		231			#557
Internal Link Dist (ft)	1012		3138			1543
Turn Bay Length (ft)						
Base Capacity (vph)	430		1953			1403
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.92		0.49			1.05

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 109.3	
Natural Cycle: 130	
Control Type: Actuated-Uncoordinated	

~ 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.

Splits and Phases: 12: Union Street & Route 138

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	186	131	627	171	158	1203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	10	11
Total Lost time (s)	5.0		5.0			5.0
Lane Util. Factor	1.00		0.95			0.95
Frt	0.94		0.97			1.00
Flt Protected	0.97		1.00			0.99
Satd. Flow (prot)	1678		3471			3376
Flt Permitted	0.97		1.00			0.60
Satd. Flow (perm)	1678		3471			2027
Peak-hour factor, PHF	0.80	0.80	0.84	0.84	0.92	0.92
Adj. Flow (vph)	232	164	746	204	172	1308
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	396	0	950	0	0	1480
Heavy Vehicles (%)	0%	1%	0%	3%	1%	3%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	27.3		61.5			72.0
Effective Green, g (s)	27.3		61.5			72.0
Actuated g/C Ratio	0.25		0.56			0.66
Clearance Time (s)	5.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	419		1953			1403
v/s Ratio Prot	c0.24		0.27			c0.05
v/s Ratio Perm						c0.64
v/c Ratio	0.95		0.49			1.05
Uniform Delay, d1	40.3		14.4			18.6
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	30.1		0.2			39.9
Delay (s)	70.4		14.6			58.6
Level of Service	E		B			E
Approach Delay (s)	70.4		14.6			58.6
Approach LOS	E		B			E

Intersection Summary			
HCM Average Control Delay	45.5	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	109.3	Sum of lost time (s)	10.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			