CENTRAL MASSACHUSETTS

METROPOLITAN PLANNING ORGANIZATION

Worcester & Auburn
Southbridge Street Corridor Profile
Technical Appendix

Document Prepared by:
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2 Washington Square, Worcester MA 01604-4016

Prepared in cooperation with the Massachusetts Department of Transportation and the U.S. Department of Transportation – Federal Highway Administration and the Federal Transit Administration. The views and opinions of the Central Massachusetts Metropolitan Planning Organization expressed herein do not necessarily reflect those of the Massachusetts Department of Transportation or the U.S. Department of Transportation.

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Worcester: Brosnihan Square – Gateway 1, Phase 2

BROSNIHAN SQ. - GATEWAY 1 PHASE 2

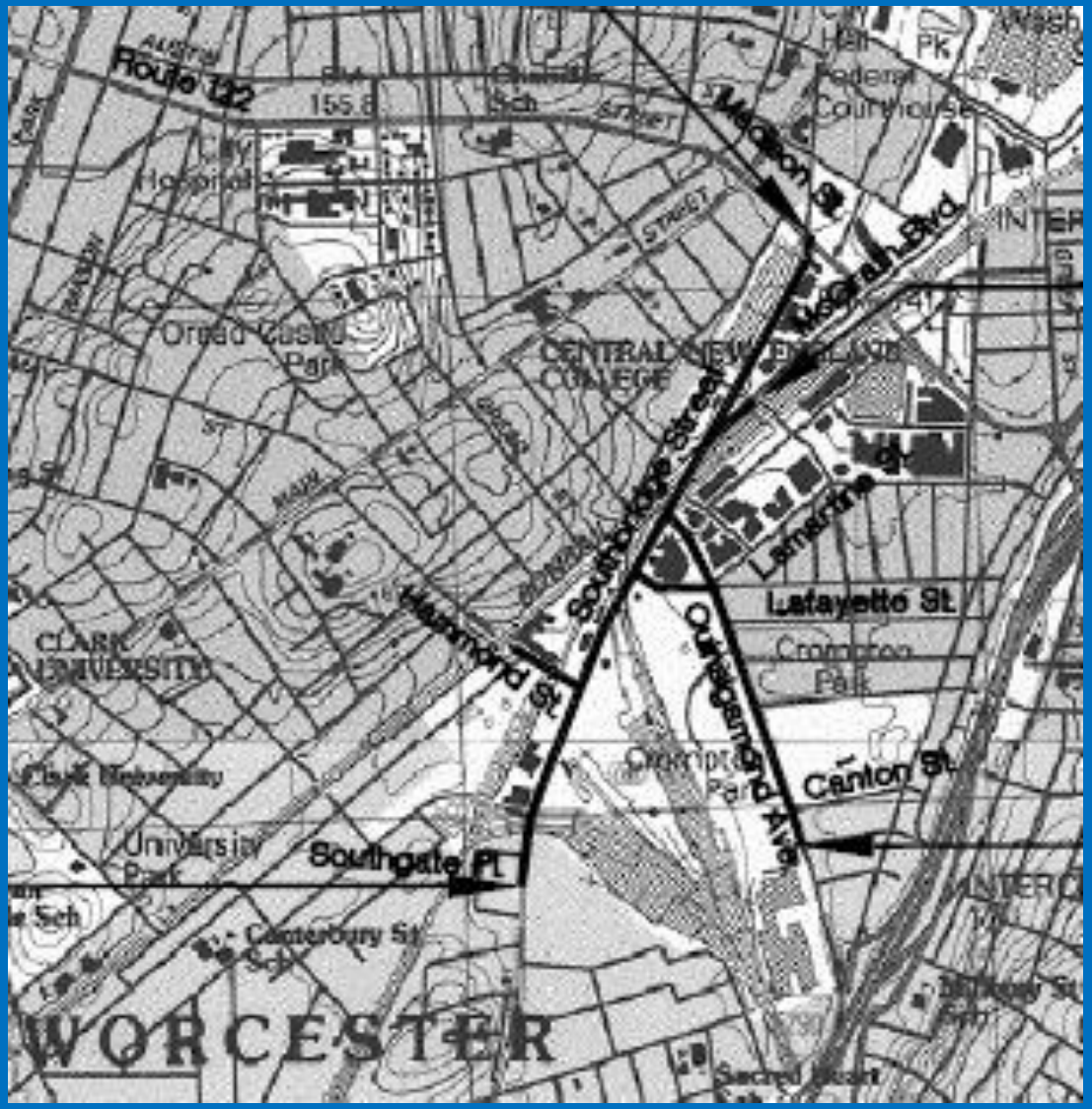
ROADWAY IMPROVEMENT PROJECT
WORCESTER, MA

MDOT Project #027260

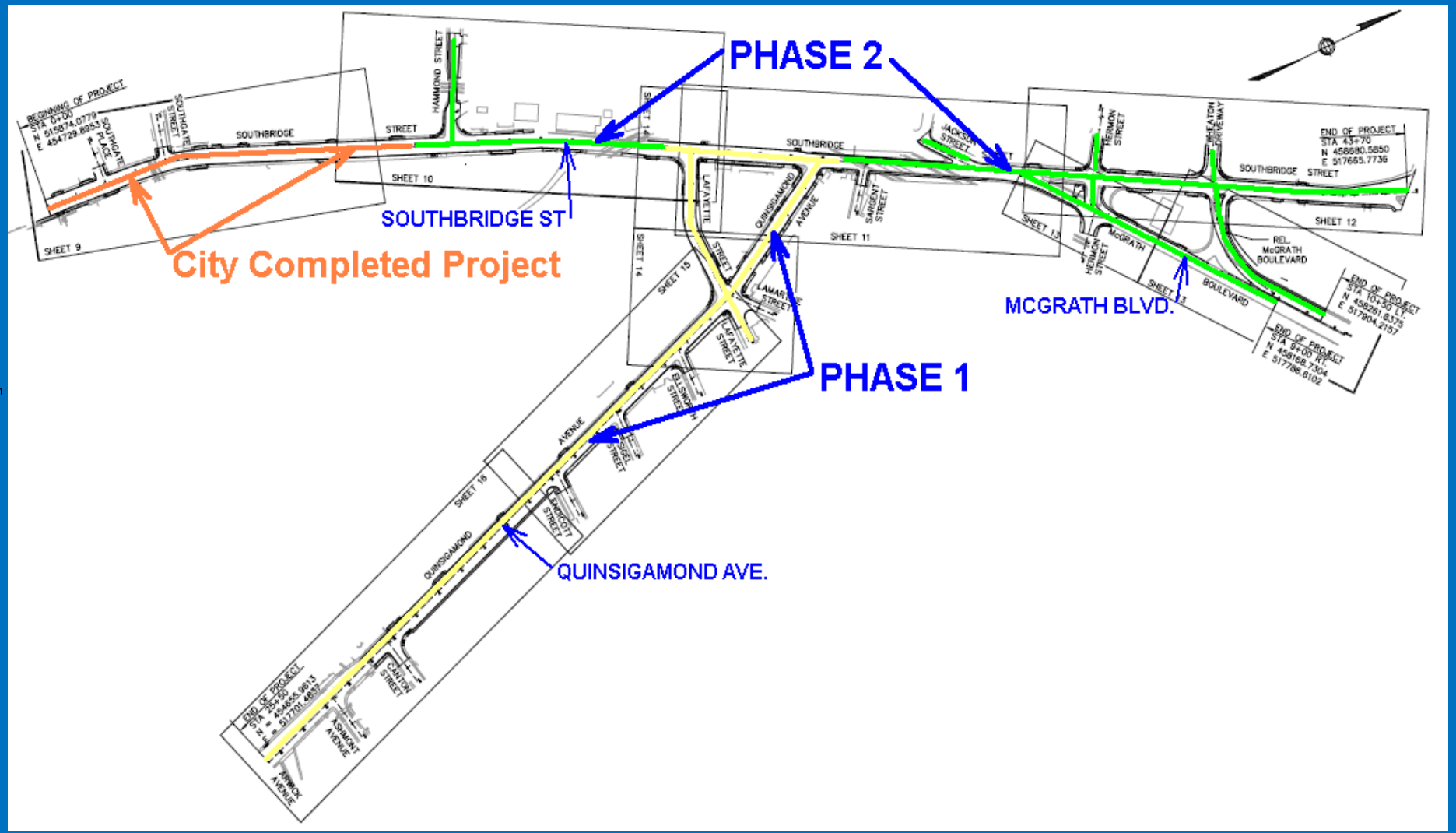
Southbridge Street

Hammond St. North to Madison St.

GATEWAY 1 LOCUS

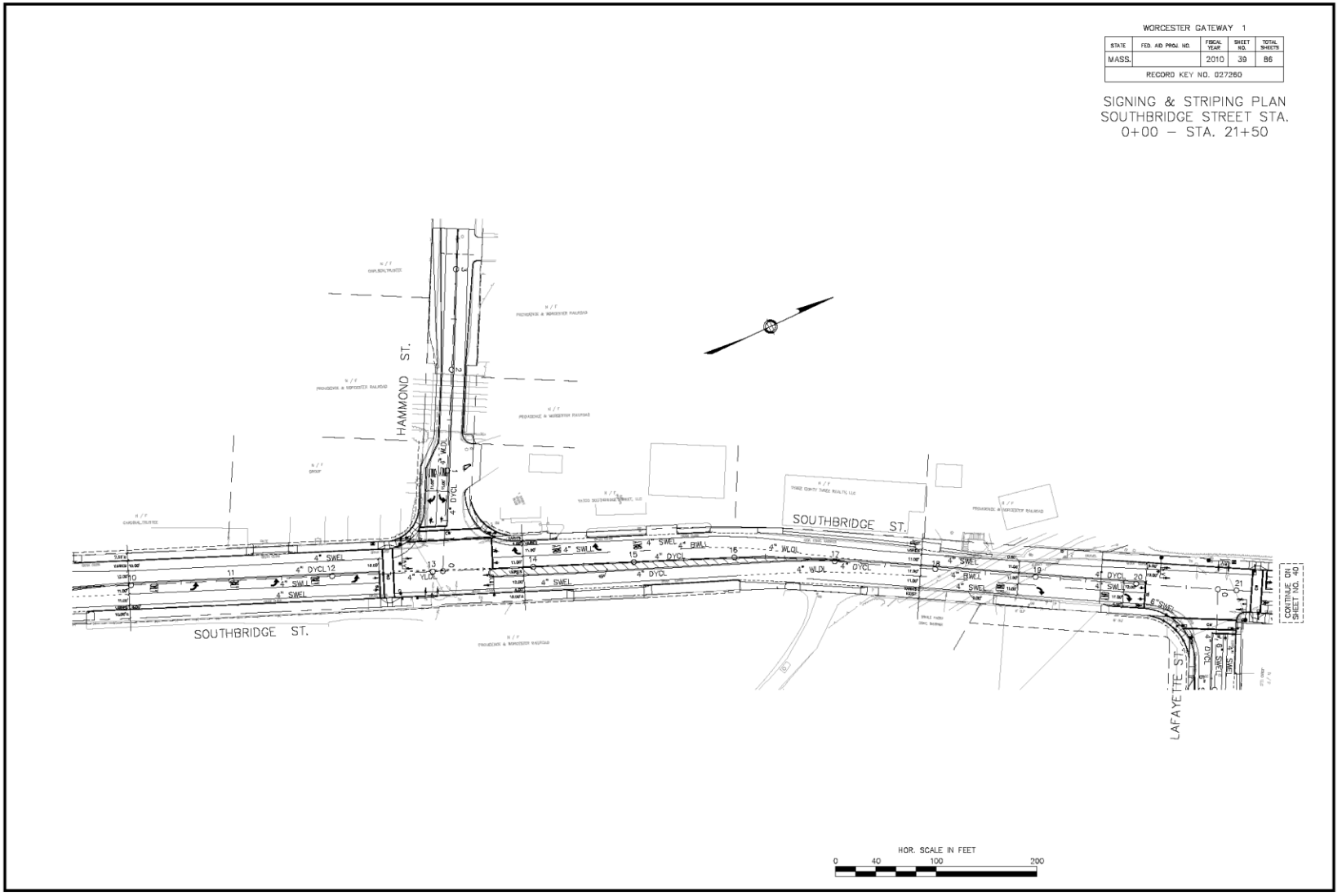


GATEWAY 1 – PHASE 2 Project Limits



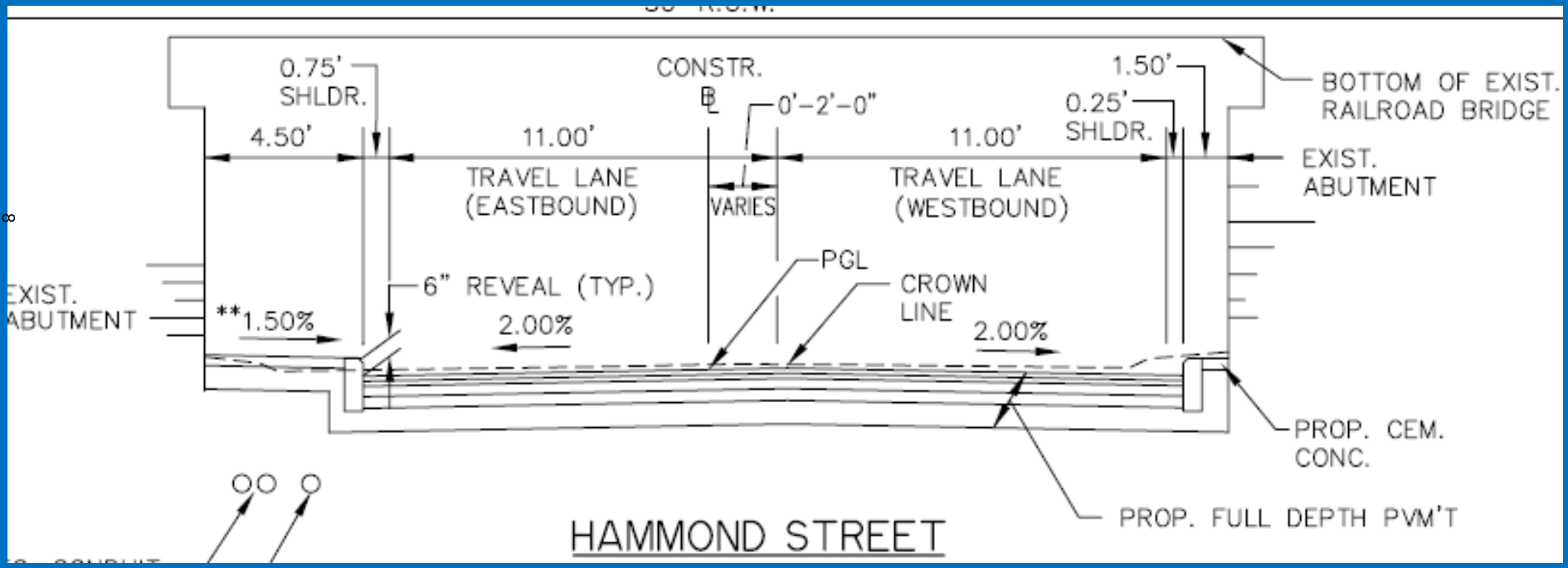
Striping Plan

Hammond St. to Lafayette St.



Hammond St. P&WRR Bridge
No existing sidewalks.

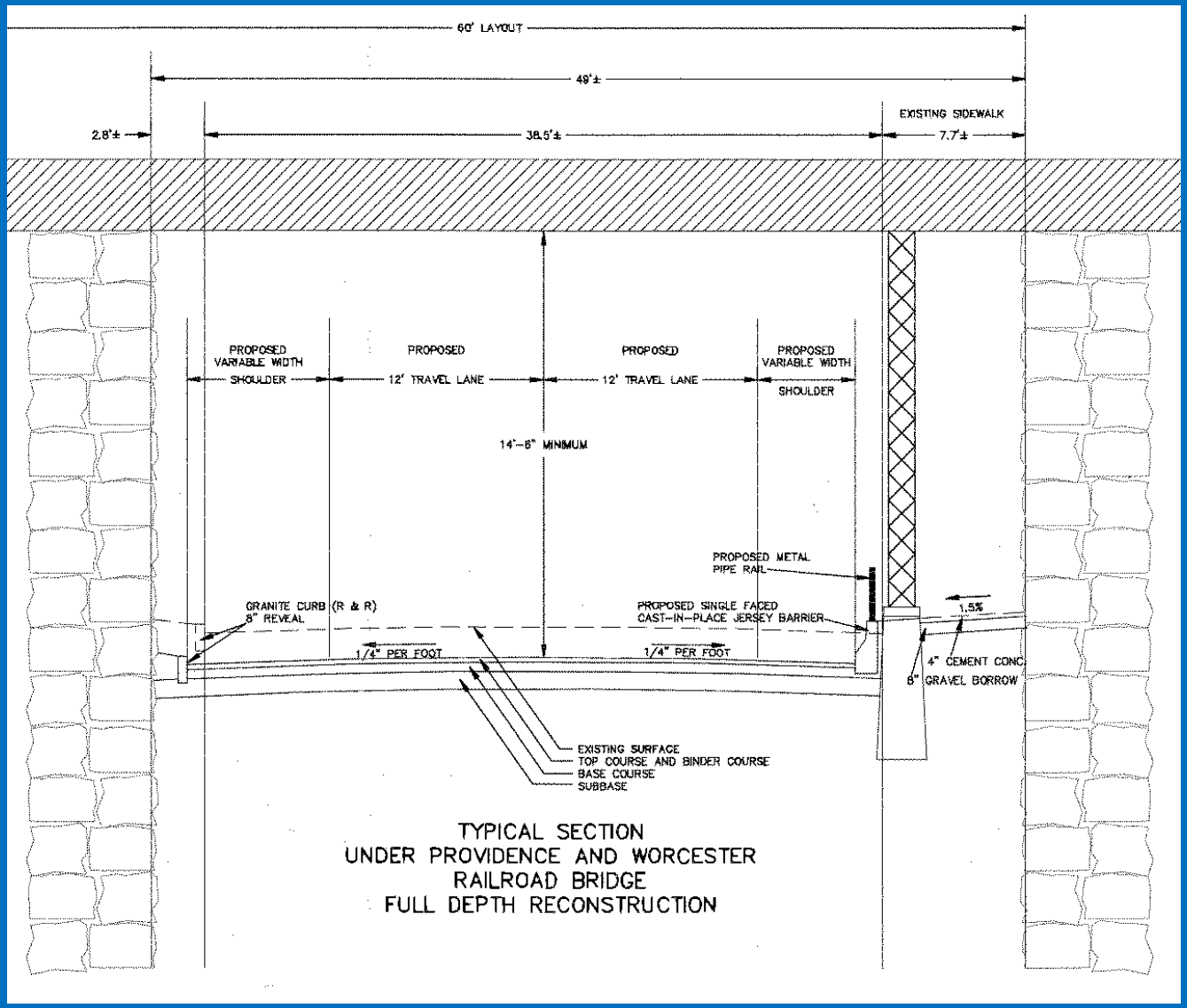
Hammond St. Design for under bridge Shift curblines to provide a 4 Ft sidewalk on south side.



Southbridge St North of Hammond St

MDOT lowered street for height with concrete barriers both sides. 1 SWalk.

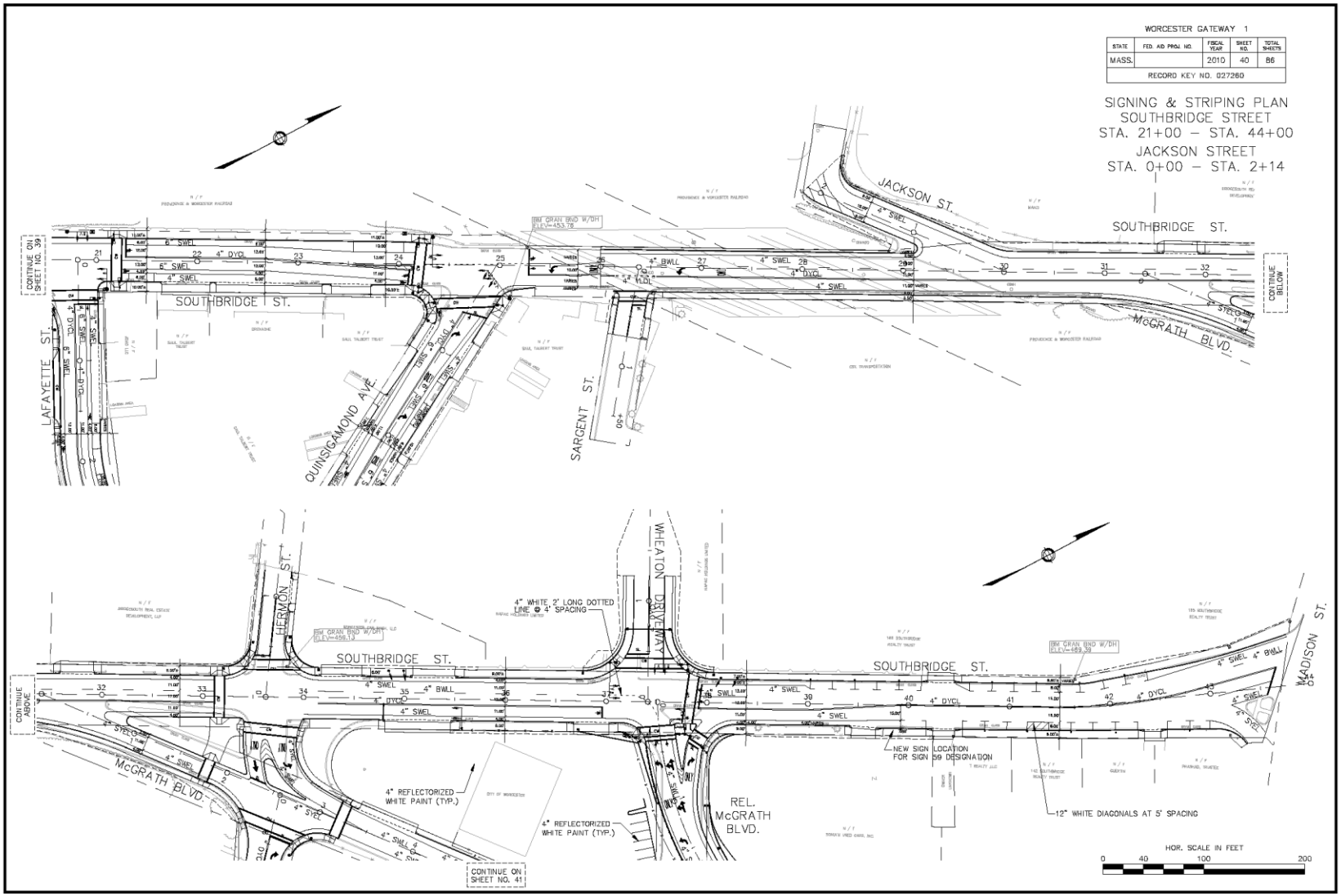
Southbridge St. MDOT Lowered Road for height clearance at Bridge



Southbridge St. North of lowered St.

Short right turn lane at Lafayette St.

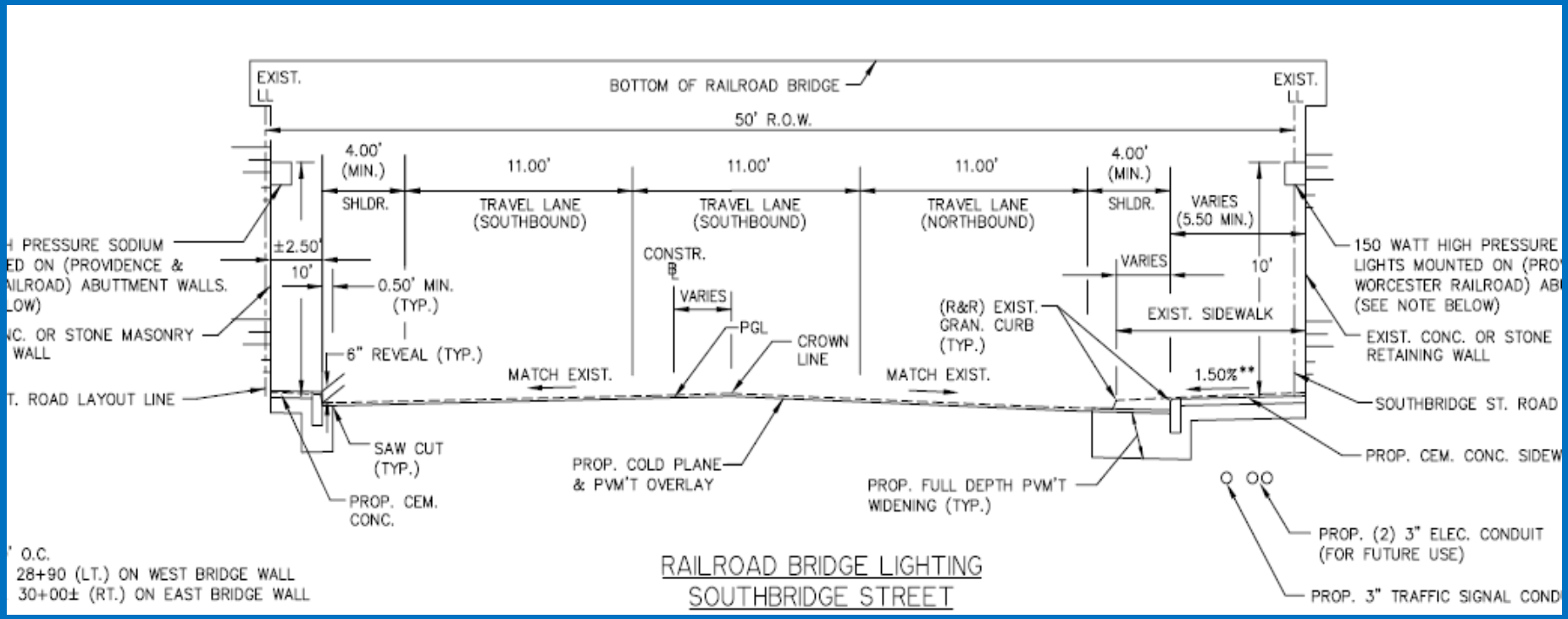
Striping Plan
Lafayette St. to Madison St.



Southbridge St. dual Bridge North

of Quinsigamond Ave. Poor Lighting, no Swalk west side, 3 lanes.

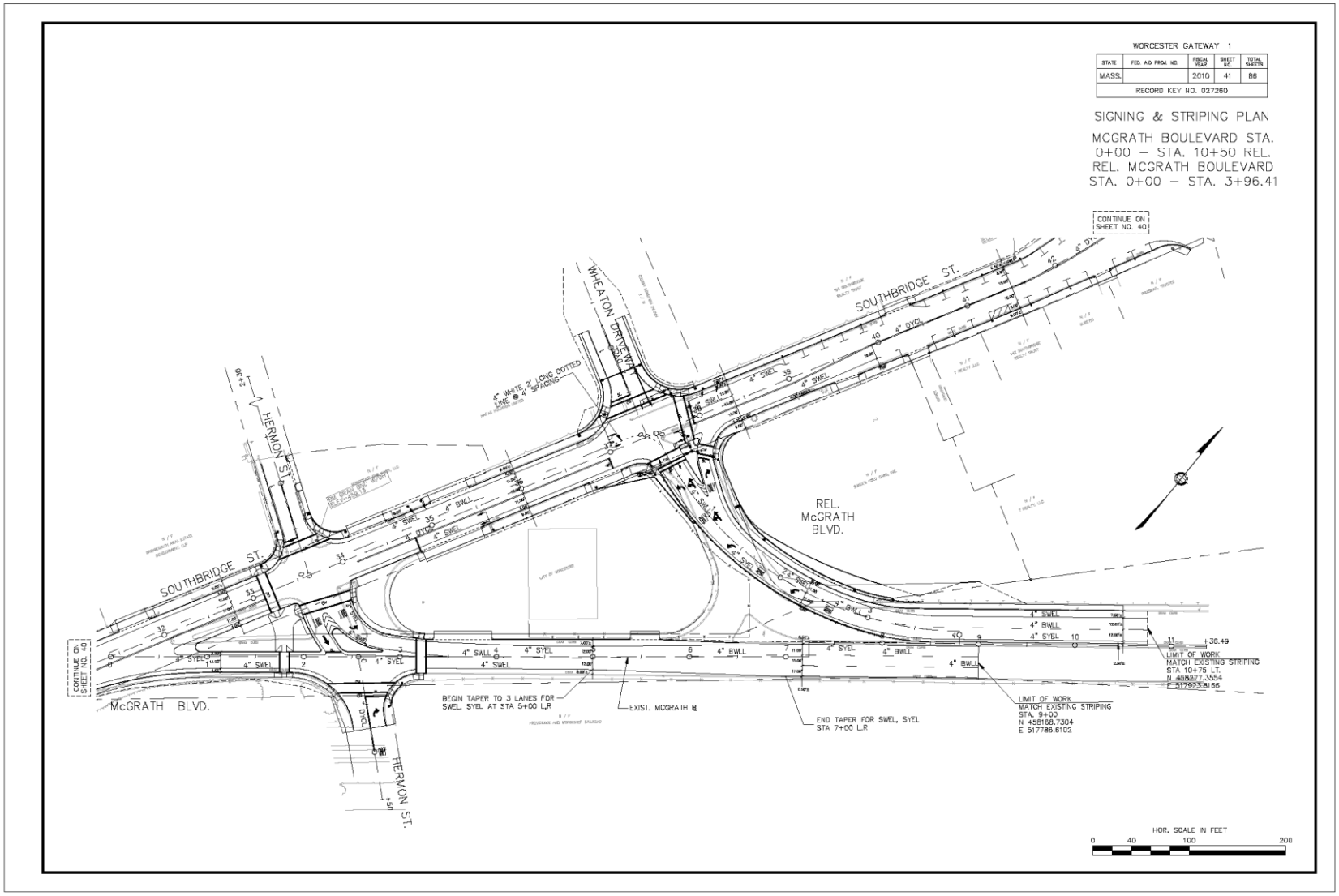
Southbridge St. Dual Bridge North of Quinsigamond Ave. Add Lighting and Shoulders, Narrow to 5 Ft Sidewalk on East Side. Southbound Left turn lane.



Striping Plan

Relocated McGrath Blvd. & Southbridge St.

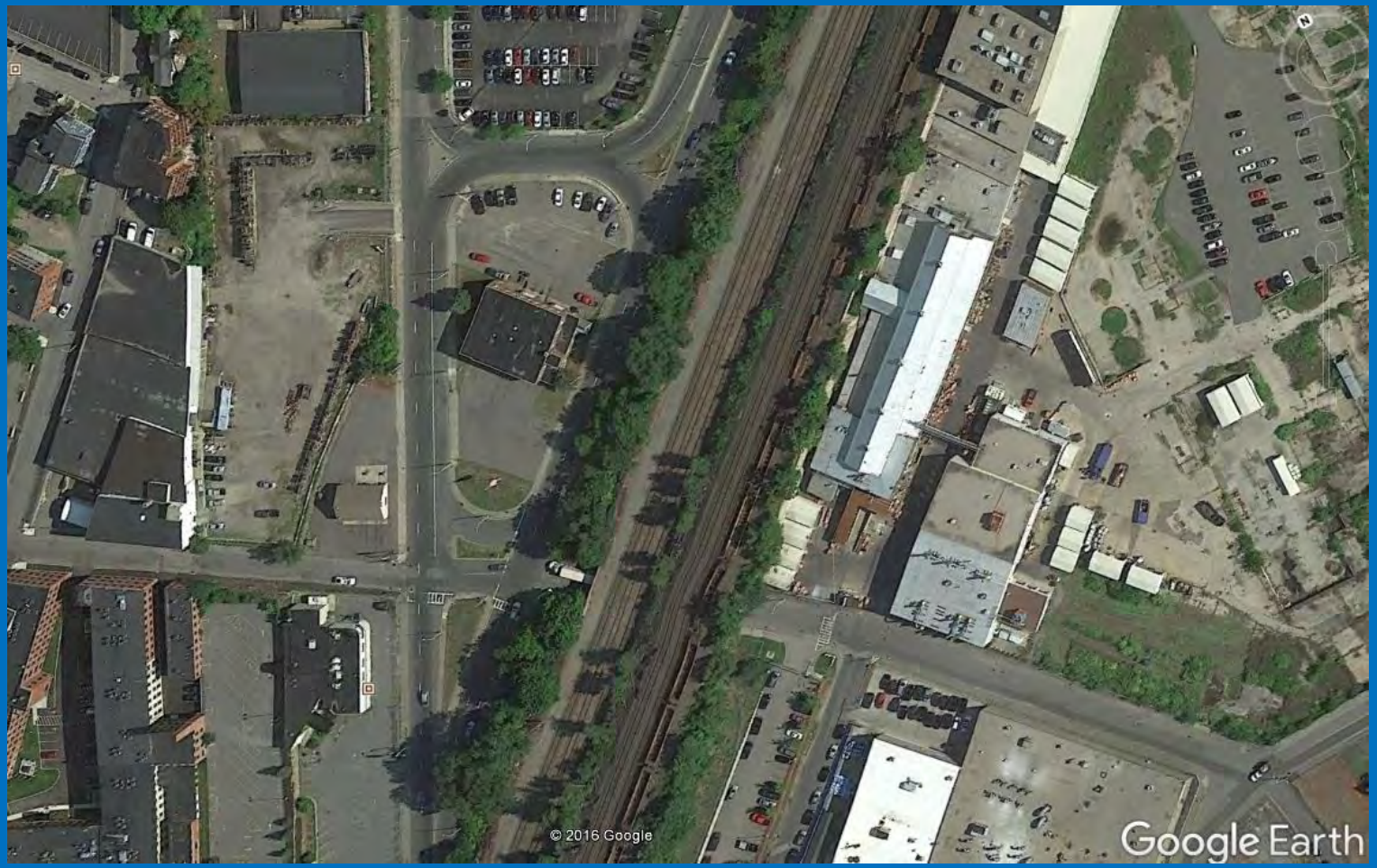
2-Way Traffic Flow



Southbridge St. / McGrath Blvd

One-way pairing.

Cross-over north of Fire Station.



Mitigation for Rte. 146 added traffic.

- Define a direct Route to Downtown Worcester from Rte 146
- Reduce safety issue at McGrath / Southbridge St. cross-over north of firestation.
- Change Southbridge St. on west side of firestation to 2-way flow providing direct access to City Center.
- Realign Southbound McGrath with a new signal at Southbridge St.
- Firestation Cross-over has peak hour 1100+ crossing vehicle paths northbound vs southbound in 1 hour with many accidents north side of firestation.
- Upgrade traffic signal at Hammond St.
- Add pedestrian underpass sidewalk to Hammond St. Railroad Bridge.
- Add 4-5 FT shoulder to Southbridge St. with exception at P&WRR bridge between Hammond St. and Lafayette St.
- Interconnect Southbridge traffic signals at Hammond, Lafayette, Quinsigamond, McGrath and Madison plus Quinsigamond at Lafayette.

BROSNIHAN SQ. - GATEWAY 1 PHASE 2

ROADWAY IMPROVEMENT PROJECT
WORCESTER, MA

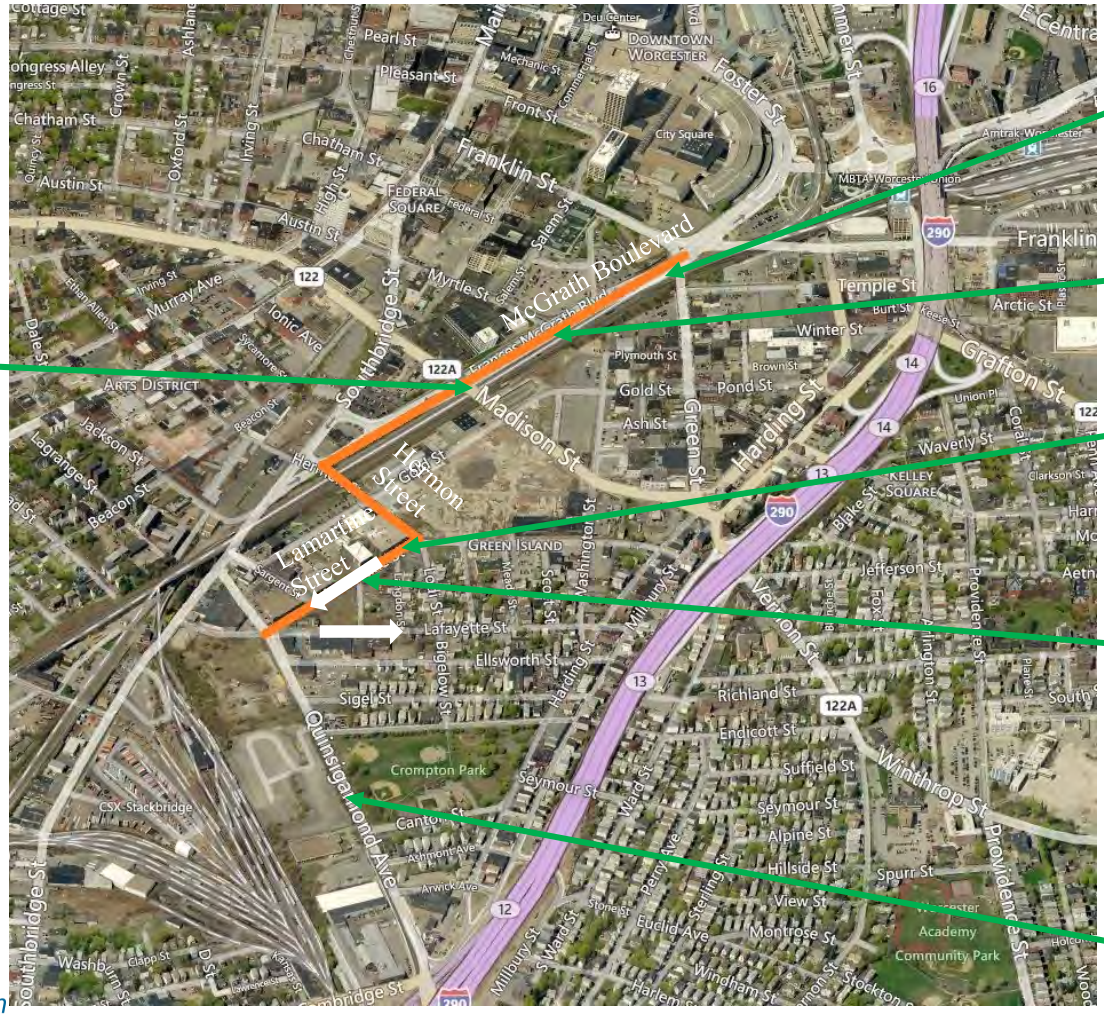
MDOT Project #027260

Southbridge Street

Hammond St. North to Madison St.

Worcester: Blackstone River Bikeway, Segment 7

Project Overview



Widen/Upgrade Madison Street Bridge

Remove Right Turn Lane

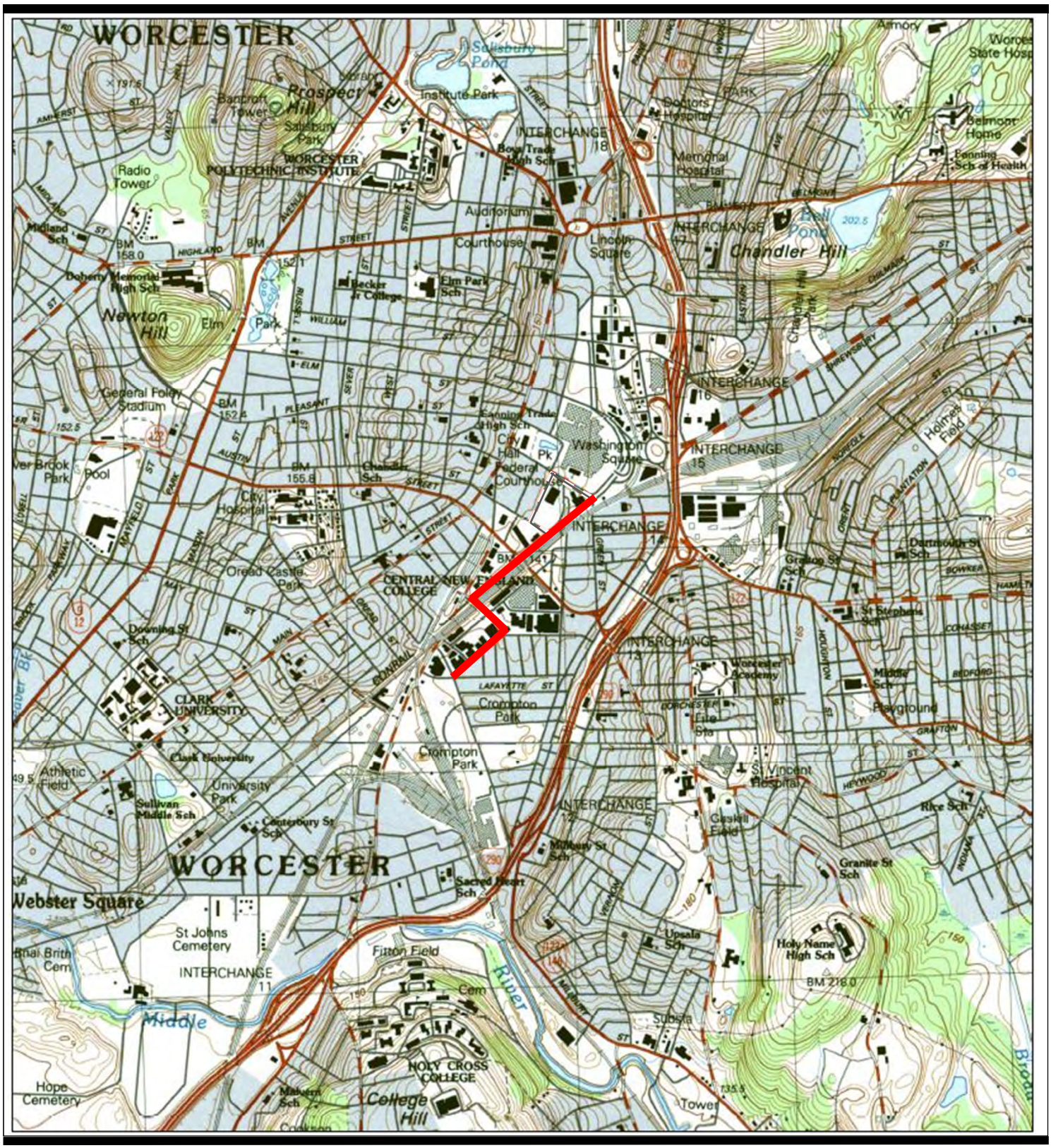
Replace One Travel Lane in each direction with Shoulders/Mutliuse Path

Improve Geometry at Lamartine/ Hermon Street

Change Lamartine Street to One Way

Proposed Bike Lanes (Work by Others)

Photo Source: bing.com



Schematic Diagram: Not to Scale

Figure 1
Locus Map

Blackstone Bikeway Segment 7
City of Worcester, Massachusetts

Project Area

Stantec

Auburn: Auburn Street

T.I.P. PROJECT STATUS UPDATE

Date : 2/16/16

Project Number: 607733 Town/City : Auburn MDOT DISTRICT: 3

Project Name : Rehabilitation of Auburn Street, from Walsh Avenue to Millbury Street

STATUS

Design Level : preliminary Engineers Estimate : $2.1 million

PRC Approved ? yes TIP Schedule : unknown

Is the Project eligible for "HSIP" ? potentially Is the Project eligible for "CMAQ" ? potentially

Has an RSA been held/scheduled : no Does the Project comply with Healthy Transportation Policy ? yes

Project Overview :

Project length is approximately 0.5 miles and would consist of reconstructed sidewalks, along with new sidewalks where none currently exist, with improved handicap accessibility. New and reset granite curbing, and a reconstructed/resurfaced roadway with bicycle accommodating shoulders is also proposed. Minor drainage and utility improvements are proposed. New signage and striping, upgrades/improvements to two signal systems (Route 12/Brotherton Way), which may include new ornamental signal poles and mast arms are also proposed. The possibility of including ornamental street lighting into the project will be investigated during the design phase.

Regional Significance :

Improvements to Auburn Street will provide local and regional benefits. Worcester area shoppers who utilize the Worcester Regional Transit Authority (WRTA) to access the Auburn Mall would more easily access other businesses within this area. Easier access to this area increases regional transit ridership which in turn would increase foot traffic along the Route 12 business corridor, which would benefit local and potentially new businesses along Route 12 and Auburn Street.

What Permits and/or ROW are anticipated : Environmental: Notice of Intent (NOI) – BVW buffer impacts. ROW: Perm. & Temp. Easements.

Are there EJ Concerns N/A – no environmental justice areas within the Town of Auburn.

Are there ED Benefits : **The project area is serviced by the WRTA. Proposed improvements could increase transit use, thus increasing visitors to the area. This could then promote economic growth. Project improvements, combined with the future redevelopment of the Auburn Mall, will also increase economic benefits to the project area.**

Can the Project be PHASED : Possibly – Walsh Avenue to Route 12/Route 12 to Millbury Street

What is Next in the Schedule : 25% Design submission to MassDOT.

Source: USGS 2009

N

0 200 400 800 Feet

Vanasse Hangen Brustlin, Inc.

Figure 1
Aerial Locus Map

May 2013

Auburn Street
Auburn, Massachusetts

NORTHERLY PROJECT LIMITS – AUBURN STREET AT WALSH AVENUE

AUBURN STREET – CROSSWALK NORTH OF HIGH SCHOOL ENTRANCE (ADA ACCESSIBILITY ISSUE)

AUBURN STREET CROSSWALK SOUTH OF HIGH SCHOOL ENTRANCE (ADA ACCESSIBILITY ISSUE)

AUBURN STREET – SIDEWALK, GRANITE CURBING AND PAVEMENT CONDITIONS

AUBURN STREET BRIDGE OVER RAMSHORN BROOK (ADA ACCESSIBILITY ISSUE)

AUBURN STREET CROSSWALK AT POST OFFICE – SIGNING/ADA ACCESSIBILITY ISSUES

AUBURN STREET TRAFFIC SIGNAL AT SOUTHBRIDGE STREET (RTE. 12) INTERSECTION

AUBURN STREET – SIDEWALK, GRANITE CURBING, STRIPING, DRAINAGE, PAVEMENT CONDITIONS

AUBURN STREET – DRAINAGE CONDITIONS

AUBURN STREET – DRIVEWAY CONDITIONS

AUBURN STREET – SIDEWALK, GRANITE CURBING, STRIPING AND PAVEMENT CONDITIONS

AUBURN STREET TRAFFIC SIGNAL AT BROTHERTON WAY INTERSECTION

AUBURN STREET TRAFFIC SIGNAL AT BROTHERTON WAY INTERSECTION

BROTHERTON WAY CROSSWALK (ADA ACCESSIBILITY ISSUE)

AUBURN STREET AT BROTHERTON WAY INTERSECTION – GUARDRAIL CONDITION

AUBURN STREET (LOOKING SOUTH) PAVEMENT CONDITION/LACK OF SIDEWALK

SOUTHERLY PROJECT LIMITS - AUBURN STREET NORTH OF CENTRAL SQUARE

Southbridge Street Data Collection

- City of Worcester
- Town of Auburn

Southbridge Street Corridor Profile:
Traffic Volume Data Collection Effort

Town of Auburn

ATRs: Southbridge Street at Worcester City Line, **2015**
Southbridge Street north of Auburn Street, **2014**

TMCs: Southbridge Street/Sword Street, **5/22/14**
Southbridge Street/Auburn Street, **6/3/14**

City of Worcester

ATRs: Southbridge Street south of Madison Street, **2015**
Southbridge Street north of Cambridge Street, **2015**
Southbridge Street north of Hope Avenue, **2015**

TMCs: Southbridge Street/Madison Street, **8/27/13**
Southbridge Street/Quinsigamond Avenue, **6/26/14**
Southbridge Street/LaFayette Street, **6/5/14**
Southbridge Street/Hammond Street, **8/8/13**
Southbridge Street/Cambridge Street, **8/25/11**
Southbridge Street/Hope Avenue, **6/20/13**

City of Worcester

- Traffic Counts

- Turning Movement Counts: Existing Balanced and Projected 2025 Level of Service Results

CMRPC
2 Washington Square, Union Station
Worcester, MA 01604-4016

City/Town: : Worcester
Street: : Southbridge St
Location: : South of Madison St

Site: 2015162

Weekly Volume

Interval Start	Mon 9/14/2015		Tue 9/15/2015		Wed 9/16/2015		Thu 9/17/2015		Fri 9/18/2015		Sat 9/19/2015		Sun 9/20/2015		Mon - Fri Average		Weekly Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	-	-	40	33	20	43	-	-	-	-	-	-	-	-	30.0	38.0	30.0	38.0
1:00 AM	-	-	19	29	28	31	-	-	-	-	-	-	-	-	23.5	30.0	23.5	30.0
2:00 AM	-	-	6	15	16	13	-	-	-	-	-	-	-	-	11.0	14.0	11.0	14.0
3:00 AM	-	-	17	22	9	15	-	-	-	-	-	-	-	-	13.0	18.5	13.0	18.5
4:00 AM	-	-	21	21	22	30	-	-	-	-	-	-	-	-	21.5	25.5	21.5	25.5
5:00 AM	-	-	51	59	54	54	-	-	-	-	-	-	-	-	52.5	56.5	52.5	56.5
6:00 AM	-	-	172	124	130	125	-	-	-	-	-	-	-	-	151.0	124.5	151.0	124.5
7:00 AM	-	-	456	182	486	168	-	-	-	-	-	-	-	-	471.0	175.0	471.0	175.0
8:00 AM	-	-	706	226	611	199	-	-	-	-	-	-	-	-	658.5	212.5	658.5	212.5
9:00 AM	-	-	300	208	-	-	-	-	-	-	-	-	-	-	300.0	208.0	300.0	208.0
10:00 AM	262	240	200	260	-	-	-	-	-	-	-	-	-	-	231.0	250.0	231.0	250.0
11:00 AM	185	244	239	262	-	-	-	-	-	-	-	-	-	-	212.0	253.0	212.0	253.0
12:00 PM	162	218	230	274	-	-	-	-	-	-	-	-	-	-	196.0	246.0	196.0	246.0
1:00 PM	163	252	239	316	-	-	-	-	-	-	-	-	-	-	201.0	284.0	201.0	284.0
2:00 PM	225	370	263	336	-	-	-	-	-	-	-	-	-	-	244.0	353.0	244.0	353.0
3:00 PM	275	371	286	383	-	-	-	-	-	-	-	-	-	-	280.5	377.0	280.5	377.0
4:00 PM	283	534	288	422	-	-	-	-	-	-	-	-	-	-	285.5	478.0	285.5	478.0
5:00 PM	300	461	245	485	-	-	-	-	-	-	-	-	-	-	272.5	473.0	272.5	473.0
6:00 PM	228	271	219	297	-	-	-	-	-	-	-	-	-	-	223.5	284.0	223.5	284.0
7:00 PM	169	211	169	278	-	-	-	-	-	-	-	-	-	-	169.0	244.5	169.0	244.5
8:00 PM	141	134	138	174	-	-	-	-	-	-	-	-	-	-	139.5	154.0	139.5	154.0
9:00 PM	77	118	96	141	-	-	-	-	-	-	-	-	-	-	86.5	129.5	86.5	129.5
10:00 PM	70	81	105	89	-	-	-	-	-	-	-	-	-	-	87.5	85.0	87.5	85.0
11:00 PM	43	72	48	55	-	-	-	-	-	-	-	-	-	-	45.5	63.5	45.5	63.5
Totals	2583	3577	4553	4691	1376	678	0	0	0	0	0	0	0	0	4406.0	4577.0	4406.0	4577.0
Combined	6160		9244		2054		0		0		0		0		8983.0		8983.0	
Split (%)	41.9	58.1	49.3	50.7	67.0	33.0	-	-	-	-	-	-	-	-	49.0	51.0	49.0	51.0

Peak Hours

12:00 AM - 12:00 PM	10:00 AM	11:00 AM	8:00 AM	11:00 AM	8:00 AM	8:00 AM	-	-	-	-	-	-	-	-	8:00 AM	11:00 AM	8:00 AM	11:00 AM
Volume	262	244	706	262	611	199	-	-	-	-	-	-	-	-	658.5	253.0	658.5	253.0
12:00 PM - 12:00 AM	5:00 PM	4:00 PM	4:00 PM	5:00 PM	-	-	-	-	-	-	-	-	-	-	4:00 PM	4:00 PM	4:00 PM	4:00 PM
Volume	300	534	288	485	-	-	-	-	-	-	-	-	-	-	285.5	478.0	285.5	478.0

CMRPC
2 Washington Square, Union Station
Worcester, MA 01604-4016

City/Town: : Worcester
Street: : Southbridge St
Location: : North of Cambridge St

Site: 2015165

Weekly Volume

Interval Start	Mon 8/24/2015		Tue 8/25/2015		Wed 8/26/2015		Thu 8/27/2015		Fri 8/28/2015		Sat 8/29/2015		Sun 8/30/2015		Mon - Fri Average		Weekly Average	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
12:00 AM	-	-	-	-	-	-	57	45	101	54	-	-	-	-	79.0	49.5	79.0	49.5
1:00 AM	-	-	-	-	-	-	39	32	60	35	-	-	-	-	49.5	33.5	49.5	33.5
2:00 AM	-	-	-	-	-	-	34	17	44	20	-	-	-	-	39.0	18.5	39.0	18.5
3:00 AM	-	-	-	-	-	-	15	11	18	18	-	-	-	-	16.5	14.5	16.5	14.5
4:00 AM	-	-	-	-	-	-	44	26	36	24	-	-	-	-	40.0	25.0	40.0	25.0
5:00 AM	-	-	-	-	-	-	120	57	115	58	-	-	-	-	117.5	57.5	117.5	57.5
6:00 AM	-	-	-	-	-	-	256	153	206	359	-	-	-	-	231.0	256.0	231.0	256.0
7:00 AM	-	-	-	-	-	-	296	559	314	530	-	-	-	-	305.0	544.5	305.0	544.5
8:00 AM	-	-	-	-	-	-	347	637	381	481	-	-	-	-	364.0	559.0	364.0	559.0
9:00 AM	-	-	-	-	-	-	451	392	441	387	-	-	-	-	446.0	389.5	446.0	389.5
10:00 AM	-	-	-	-	-	-	416	381	499	359	-	-	-	-	457.5	370.0	457.5	370.0
11:00 AM	-	-	-	-	-	-	481	399	523	432	-	-	-	-	502.0	415.5	502.0	415.5
12:00 PM	-	-	-	-	-	-	480	441	588	438	-	-	-	-	534.0	439.5	534.0	439.5
1:00 PM	-	-	-	-	-	-	503	375	-	-	-	-	-	-	503.0	375.0	503.0	375.0
2:00 PM	-	-	-	-	542	410	552	428	-	-	-	-	-	-	547.0	419.0	547.0	419.0
3:00 PM	-	-	-	-	679	395	711	416	-	-	-	-	-	-	695.0	405.5	695.0	405.5
4:00 PM	-	-	-	-	788	332	780	411	-	-	-	-	-	-	784.0	371.5	784.0	371.5
5:00 PM	-	-	-	-	798	332	873	379	-	-	-	-	-	-	835.5	355.5	835.5	355.5
6:00 PM	-	-	-	-	487	353	527	383	-	-	-	-	-	-	507.0	368.0	507.0	368.0
7:00 PM	-	-	-	-	442	328	435	347	-	-	-	-	-	-	438.5	337.5	438.5	337.5
8:00 PM	-	-	-	-	361	251	362	295	-	-	-	-	-	-	361.5	273.0	361.5	273.0
9:00 PM	-	-	-	-	237	180	310	210	-	-	-	-	-	-	273.5	195.0	273.5	195.0
10:00 PM	-	-	-	-	159	121	202	132	-	-	-	-	-	-	180.5	126.5	180.5	126.5
11:00 PM	-	-	-	-	92	76	132	93	-	-	-	-	-	-	112.0	84.5	112.0	84.5
Totals	0	0	0	0	4585	2778	8423	6619	3326	3195	0	0	0	0	8418.5	6483.5	8418.5	6483.5
Combined	0		0		7363		15042		6521		0		0		14902.0		14902.0	
Split (%)	-	-	-	-	62.3	37.7	56.0	44.0	51.0	49.0	-	-	-	-	56.5	43.5	56.5	43.5

Peak Hours

12:00 AM - 12:00 PM	-	-	-	-	-	-	11:00 AM	8:00 AM	11:00 AM	7:00 AM	-	-	-	-	11:00 AM	8:00 AM	11:00 AM	8:00 AM
Volume	-	-	-	-	-	-	481	637	523	530	-	-	-	-	502.0	559.0	502.0	559.0
12:00 PM - 12:00 AM	-	-	-	-	5:00 PM	2:00 PM	5:00 PM	12:00 PM	12:00 PM	12:00 PM	-	-	-	-	5:00 PM	12:00 PM	5:00 PM	12:00 PM
Volume	-	-	-	-	798	410	873	441	588	438	-	-	-	-	835.5	439.5	835.5	439.5

CMRPC
2 Washington Square, Union Station
Worcester, MA 01604-4016

City/Town: : Worcester
Street: : Southbridge St
Location: : North of Hope Ave

Site: 2015164

Weekly Volume

Interval Start	Mon 9/14/2015		Tue 9/15/2015		Wed 9/16/2015		Thu 9/17/2015		Fri 9/18/2015		Sat 9/19/2015		Sun 9/20/2015		Mon - Fri Average		Weekly Average	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
12:00 AM	-	-	22	77	13	44	-	-	-	-	-	-	-	-	17.5	60.5	17.5	60.5
1:00 AM	-	-	12	46	20	27	-	-	-	-	-	-	-	-	16.0	36.5	16.0	36.5
2:00 AM	-	-	10	33	23	29	-	-	-	-	-	-	-	-	16.5	31.0	16.5	31.0
3:00 AM	-	-	9	27	27	31	-	-	-	-	-	-	-	-	18.0	29.0	18.0	29.0
4:00 AM	-	-	26	39	75	41	-	-	-	-	-	-	-	-	50.5	40.0	50.5	40.0
5:00 AM	-	-	86	126	61	136	-	-	-	-	-	-	-	-	73.5	131.0	73.5	131.0
6:00 AM	-	-	184	300	168	330	-	-	-	-	-	-	-	-	176.0	315.0	176.0	315.0
7:00 AM	-	-	313	632	301	694	-	-	-	-	-	-	-	-	307.0	663.0	307.0	663.0
8:00 AM	-	-	301	679	311	654	-	-	-	-	-	-	-	-	306.0	666.5	306.0	666.5
9:00 AM	-	-	295	316	291	365	-	-	-	-	-	-	-	-	293.0	340.5	293.0	340.5
10:00 AM	272	297	289	306	-	-	-	-	-	-	-	-	-	-	280.5	301.5	280.5	301.5
11:00 AM	284	322	353	361	-	-	-	-	-	-	-	-	-	-	318.5	341.5	318.5	341.5
12:00 PM	336	361	310	397	-	-	-	-	-	-	-	-	-	-	323.0	379.0	323.0	379.0
1:00 PM	296	350	314	399	-	-	-	-	-	-	-	-	-	-	305.0	374.5	305.0	374.5
2:00 PM	414	371	363	406	-	-	-	-	-	-	-	-	-	-	388.5	388.5	388.5	388.5
3:00 PM	400	448	385	456	-	-	-	-	-	-	-	-	-	-	392.5	452.0	392.5	452.0
4:00 PM	402	447	386	442	-	-	-	-	-	-	-	-	-	-	394.0	444.5	394.0	444.5
5:00 PM	352	386	356	382	-	-	-	-	-	-	-	-	-	-	354.0	384.0	354.0	384.0
6:00 PM	235	269	318	295	-	-	-	-	-	-	-	-	-	-	276.5	282.0	276.5	282.0
7:00 PM	190	240	190	246	-	-	-	-	-	-	-	-	-	-	190.0	243.0	190.0	243.0
8:00 PM	108	223	151	212	-	-	-	-	-	-	-	-	-	-	129.5	217.5	129.5	217.5
9:00 PM	73	216	101	224	-	-	-	-	-	-	-	-	-	-	87.0	220.0	87.0	220.0
10:00 PM	50	137	61	178	-	-	-	-	-	-	-	-	-	-	55.5	157.5	55.5	157.5
11:00 PM	25	105	30	75	-	-	-	-	-	-	-	-	-	-	27.5	90.0	27.5	90.0
Totals	3437	4172	4865	6654	1290	2351	0	0	0	0	0	0	0	0	4796.0	6588.5	4796.0	6588.5
Combined	7609		11519		3641		0		0		0		0		11384.5		11384.5	
Split (%)	45.2	54.8	42.2	57.8	35.4	64.6	-	-	-	-	-	-	-	-	42.1	57.9	42.1	57.9

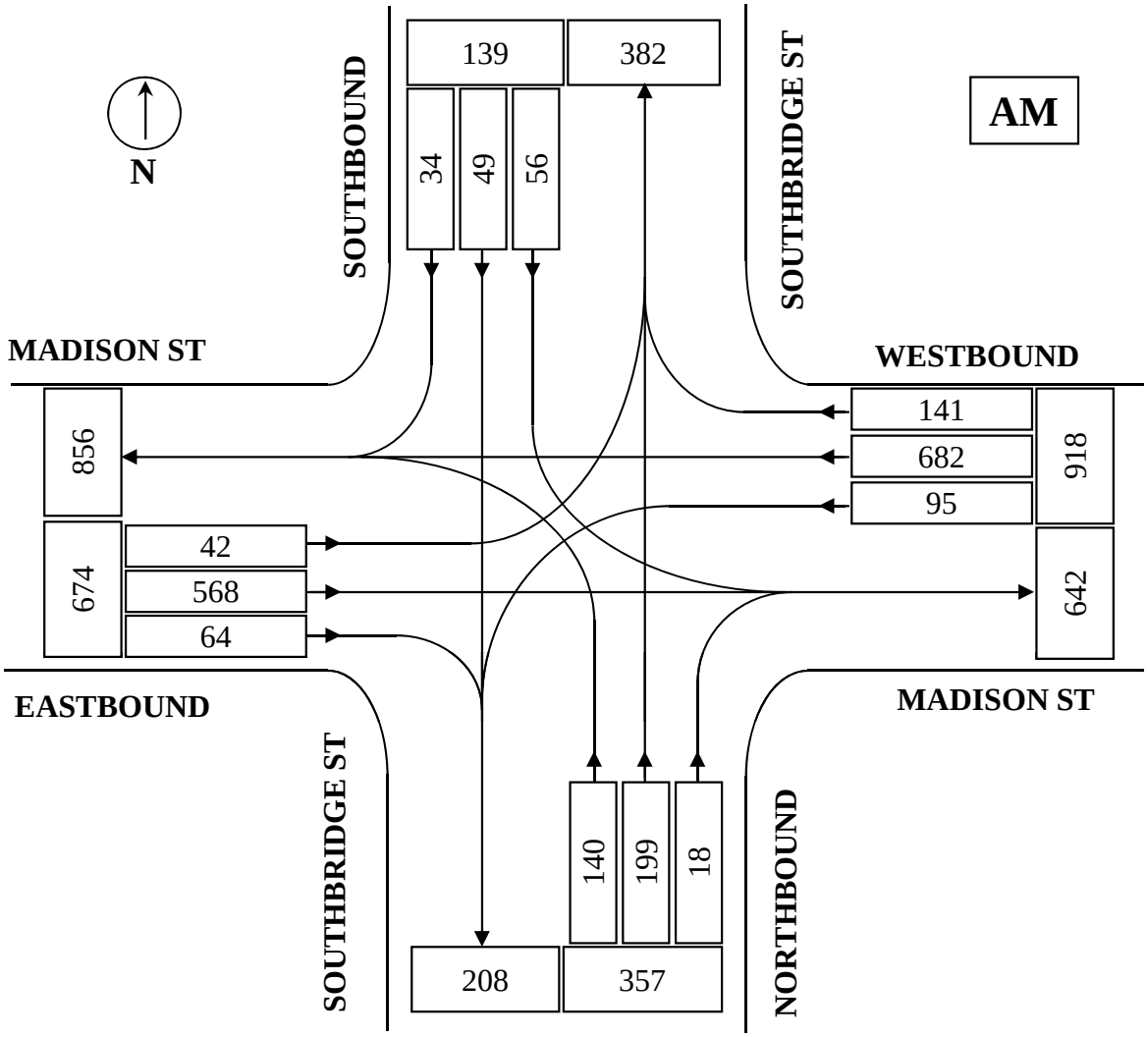
Peak Hours

12:00 AM - 12:00 PM	11:00 AM	11:00 AM	11:00 AM	8:00 AM	8:00 AM	7:00 AM	-	-	-	-	-	-	-	-	11:00 AM	8:00 AM	11:00 AM	8:00 AM
Volume	284	322	353	679	311	694	-	-	-	-	-	-	-	-	318.5	666.5	318.5	666.5
12:00 PM - 12:00 AM	2:00 PM	3:00 PM	4:00 PM	3:00 PM	-	-	-	-	-	-	-	-	-	-	4:00 PM	3:00 PM	4:00 PM	3:00 PM
Volume	414	448	386	456	-	-	-	-	-	-	-	-	-	-	394.0	452.0	394.0	452.0

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Worcester **DATE:** 8/27/13 **DAY OF WEEK:** Tuesday
INTERSECTION: Southbridge Street / Madison Street

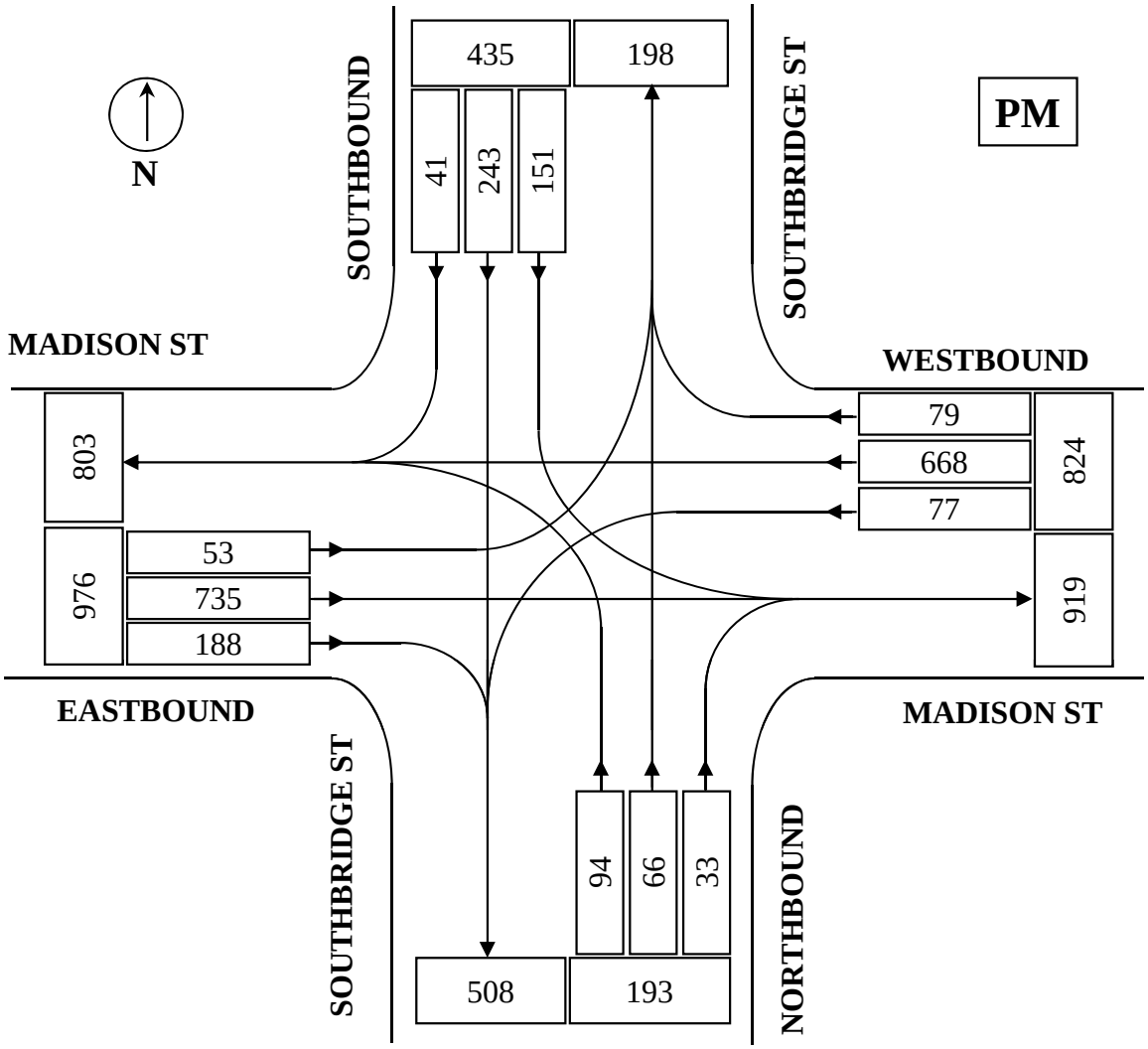


STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
Madison St EB	674	32.3%	7:45 - 8:45 AM
Madison St WB	918	44.0%	PHF = .95
Southbridge St NB	357	17.0%	**VEHICLES COUNTED**
Southbridge St SB	139	6.7%	**ALL VEHICLES:** 2088
TOTAL	2088	100.0%	**TRUCKS:** 78
			PERCENT TRUCKS: 3.74%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Worcester **DATE:** 8/27/13 **DAY OF WEEK:** Tuesday
INTERSECTION: Southbridge Street / Madison Street



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
Madison St EB	976	40.2%	4:30 - 5:30 PM
Madison St WB	824	34.0%	PHF = .95
Southbridge St NB	193	7.9%	**VEHICLES COUNTED**
Southbridge St SB	435	17.9%	**ALL VEHICLES:** 2428
TOTAL	2428	100.0%	**TRUCKS:** 38
			PERCENT TRUCKS: 1.57%

TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: City of Worcester

DATE: 8/27/2013

LOCATION: Southbridge Street / Madison Street

DAY OF WEEK: Tuesday

WEATHER: AM: Clear PM: Clear

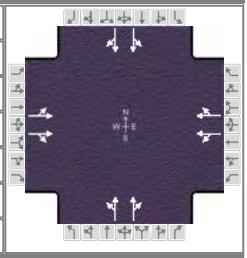
TECHNICIAN: RR

Time Period	Madison Street EB				Madison St WB				Southbridge St NB				Southbridge St SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15	1	107	7	7	13	109	19	7	18	25	5	4	7	7	1	0	319	
7:15 - 7:30	9	150	11	2	12	82	20	3	24	34	3	3	8	7	7	1	367	
7:30 - 7:45	7	173	20	5	12	139	17	4	22	44	4	4	18	14	7	2	477	
7:45 - 8:00	14	155	15	7	24	189	29	6	41	51	5	2	10	6	9	2	548	1711
8:00 - 8:15	11	130	10	3	23	169	36	11	37	60	4	3	11	11	8	1	510	1902
8:15 - 8:30	8	148	15	7	23	169	41	8	33	48	6	3	17	19	9	4	536	2071
8:30 - 8:45	9	135	24	5	25	155	35	10	29	40	3	3	18	13	8	3	494	2088
8:45 - 9:00	15	124	21	7	14	174	32	5	30	30	6	0	14	16	11	1	487	2027
TOTAL	74	1122	123	43	146	1186	229	54	234	332	36	22	103	93	60	14	3738	
		EBPct	32.3			**WBPct**	44.0			**NBPct**	17.1			**SBPct**	6.7			
Peak Sums:	**42**	**568**	**64**	**22**	**95**	**682**	**141**	**35**	**140**	**199**	**18**	**11**	**56**	**49**	**34**	**10**	**2088**	
Total Trucks	78					**TrkPct**	3.74			**PHF**	0.95							

Time Period	Madison Street EB				Madison St WB				Southbridge St NB				Southbridge St SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15	14	162	40	4	17	166	31	2	16	27	11	4	26	54	5	2	569	
4:15 - 4:30	17	197	42	8	18	123	22	4	23	21	10	3	32	44	16	2	565	
4:30 - 4:45	12	179	55	5	14	172	12	3	22	13	5	1	35	62	10	5	591	
4:45 - 5:00	11	196	31	2	22	155	20	3	25	20	11	1	33	68	15	1	607	2332
5:00 - 5:15	16	200	58	3	23	166	22	4	24	19	5	0	41	57	7	0	638	2401
5:15 - 5:30	14	160	44	3	18	175	25	3	23	14	12	3	42	56	9	1	592	2428
5:30 - 5:45	8	169	37	1	33	170	8	2	21	13	10	2	25	37	8	3	539	2376
5:45 - 6:00	4	174	32	2	26	154	19	1	25	17	5	1	11	35	2	0	504	2273
TOTAL	96	1437	339	28	171	1281	159	22	179	144	69	15	245	413	72	14	4605	
		EBPct	40.2			**WBPct**	33.9			**NBPct**	7.9			**SBPct**	17.9			
Peak Sums:	**53**	**735**	**188**	**13**	**77**	**668**	**79**	**13**	**94**	**66**	**33**	**5**	**151**	**243**	**41**	**7**	**2428**	
Total Trucks	38					**TrkPct**	1.57			**PHF**	0.95							

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Aug 29, 2013	Area Type	Other
Jurisdiction	Worcester	Time Period	7:45 - 8:45 AM	PHF	0.95
Urban Street	Madison Streeet	Analysis Year	2013	Analysis Period	1> 7:45
Intersection	Madison St/Southbridge St	File Name	13_Southbridge St & Madison St_AM-BAL.xus		
Project Description	Balanced				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	43	579	65	97	696	144	143	203	18	57	50	35

Signal Information			
Cycle, s	65.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	2.0	34.0	14.0	0.0	0.0	0.0	5	6	7	8
Yellow	4.0	4.0	4.0	0.0	0.0	0.0				
Red	1.0	1.0	1.0	0.0	0.0	0.0				

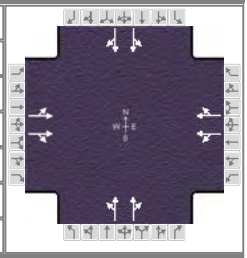
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		4
Case Number	0.0	14.0		8.3		8.0		8.0
Phase Duration, s	7.0	46.0		39.0		19.0		19.0
Change Period, ($Y+R_c$), s	5.0	5.0		5.0		5.0		5.0
Max Allow Headway (*MAH*), s	0.0	3.3		3.3		3.2		3.2
Queue Clearance Time (g_s), s		25.5		16.3		12.8		11.5
Green Extension Time (g_e), s	0.0	3.4		4.1		0.2		0.3
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.32		0.10		1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	357		361	477		500	198		182	65		70
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1350		1620	1480		1582	1195		1637	653		1573
Queue Service Time (g_s), s	2.0		6.9	6.3		14.3	8.4		6.4	3.1		2.4
Cycle Queue Clearance Time (g_c), s	23.5		6.9	13.0		14.3	10.8		6.4	9.5		2.4
Green Ratio (*g/C*)	0.63		0.63	0.52		0.52	0.22		0.22	0.22		0.22
Capacity (*c*), veh/h	914		1022	841		827	355		353	247		339
Volume-to-Capacity Ratio (*X*)	0.390		0.354	0.567		0.605	0.558		0.516	0.263		0.206
Available Capacity (c_a), veh/h	914		1022	841		827	355		353	247		339
Back of Queue (*Q*), veh/ln (50 th percentile)	1.6		1.7	3.7		4.2	2.8		2.3	0.9		0.8
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00		0.00	0.00		0.00	0.00		0.00	0.00		0.00
Uniform Delay (d_1), s/veh	6.0		5.7	10.2		10.8	25.1		22.5	26.1		20.9
Incremental Delay (d_2), s/veh	0.1		0.1	0.6		0.9	1.2		0.6	0.2		0.1
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Control Delay (*d*), s/veh	6.1		5.8	10.8		11.7	26.3		23.1	26.3		21.0
Level of Service (LOS)	A		A	B		B	C		C	C		C
Approach Delay, s/veh / LOS	5.9	A		11.2	B		24.8	C		23.6	C	
Intersection Delay, s/veh / LOS	12.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.6	B	2.7	B	2.7	B	2.7	B
Bicycle LOS Score / LOS	1.1	A	1.3	A	0.8	A	0.6	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Aug 29, 2013	Area Type	Other
Jurisdiction	Worcester	Time Period	4:30 - 5:30 PM	PHF	0.95
Urban Street	Madison Streeet	Analysis Year	2013	Analysis Period	1> 4:30
Intersection	Madison St/Southbridge St	File Name	13_Southbridge St & Madison St_PM-BAL.xus		
Project Description	Balanced				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	54	750	192	79	681	81	96	67	34	154	248	42

Signal Information			
Cycle, s	62.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	2.0	31.0	14.0	0.0	0.0	0.0	5	6	7	8
Yellow	4.0	4.0	4.0	0.0	0.0	0.0				
Red	1.0	1.0	1.0	0.0	0.0	0.0				

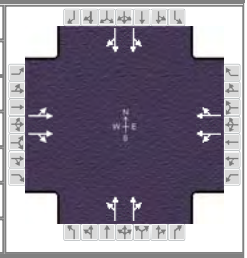
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		4
Case Number	0.0	14.0		8.3		8.0		8.0
Phase Duration, s	7.0	43.0		36.0		19.0		19.0
Change Period, ($Y+R_c$), s	5.0	5.0		5.0		5.0		5.0
Max Allow Headway (*MAH*), s	0.0	3.3		3.3		3.2		3.2
Queue Clearance Time (g_s), s		23.5		14.3		15.4		14.8
Green Extension Time (g_e), s	0.0	3.9		4.8		0.0		0.0
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.46		0.18		1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	534		502	413		466	101		96	237		225
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1510		1595	1424		1645	491		1618	1153		1644
Queue Service Time (g_s), s	2.0		11.0	1.9		12.3	5.8		3.0	9.8		7.6
Cycle Queue Clearance Time (g_c), s	21.5		11.0	9.6		12.3	13.4		3.0	12.8		7.6
Green Ratio (*g/C*)	0.61		0.61	0.50		0.50	0.23		0.23	0.23		0.23
Capacity (*c*), veh/h	990		978	782		822	227		365	358		371
Volume-to-Capacity Ratio (*X*)	0.540		0.514	0.528		0.567	0.445		0.262	0.662		0.606
Available Capacity (c_a), veh/h	990		978	782		822	227		365	358		371
Back of Queue (*Q*), veh/ln (50 th percentile)	2.7		2.7	3.0		3.7	1.4		1.1	3.5		2.9
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00		0.00	0.00		0.00	0.00		0.00	0.00		0.00
Uniform Delay (d_1), s/veh	6.7		6.8	10.0		10.8	27.5		19.7	24.8		21.5
Incremental Delay (d_2), s/veh	0.3		0.2	0.3		0.6	0.5		0.1	3.6		2.0
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Control Delay (*d*), s/veh	7.1		7.0	10.3		11.4	28.0		19.9	28.4		23.6
Level of Service (LOS)	A		A	B		B	C		B	C		C
Approach Delay, s/veh / LOS	7.0	A		10.9	B		24.1	C		26.1	C	
Intersection Delay, s/veh / LOS	13.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.7	B	2.7	B	2.7	B	2.7	B
Bicycle LOS Score / LOS	1.3	A	1.2	A	0.6	A	0.9	A

HCS 2010 Signalized Intersection Results Summary

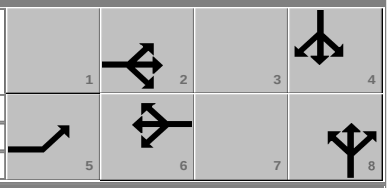
General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Aug 29, 2013	Area Type	Other
Jurisdiction	Worcester	Time Period	7:45 - 8:45 AM	PHF	0.95
Urban Street	Madison Streeet	Analysis Year	2013	Analysis Period	1> 7:45
Intersection	Madison St/Southbridge St	File Name	13_Southbridge St & Madison St_AM-Projected.xus		
Project Description	Projected 2025				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	47	640	72	107	769	159	158	224	20	63	55	39

Signal Information			
Cycle, s	65.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	2.0	34.0	14.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	1.0	1.0	1.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		4
Case Number	0.0	14.0		8.3		8.0		8.0
Phase Duration, s	7.0	46.0		39.0		19.0		19.0
Change Period, ($Y+R_c$), s	5.0	5.0		5.0		5.0		5.0
Max Allow Headway (*MAH*), s	0.0	3.3		3.3		3.2		3.2
Queue Clearance Time (g_s), s		29.6		19.0		14.7		12.9
Green Extension Time (g_e), s	0.0	3.0		4.5		0.0		0.2
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.66		0.22		1.00		1.00

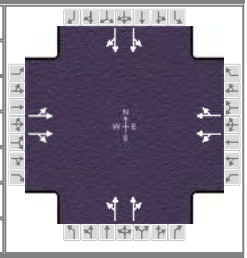
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	391		402	519		561	217		203	71		80
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1241		1619	1435		1582	1112		1637	564		1569
Queue Service Time (g_s), s	2.0		7.9	10.1		17.0	10.0		7.2	3.7		2.7
Cycle Queue Clearance Time (g_c), s	27.6		7.9	16.0		17.0	12.7		7.2	10.9		2.7
Green Ratio (*g/C*)	0.63		0.63	0.52		0.52	0.22		0.22	0.22		0.22
Capacity (*c*), veh/h	845		1021	818		828	337		352	229		338
Volume-to-Capacity Ratio (*X*)	0.463		0.394	0.635		0.677	0.642		0.577	0.310		0.235
Available Capacity (c_a), veh/h	845		1021	818		828	337		352	229		338
Back of Queue (*Q*), veh/ln (50 th percentile)	1.8		1.9	4.5		5.2	3.3		2.7	1.0		0.9
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00		0.00	0.00		0.00	0.00		0.00	0.00		0.00
Uniform Delay (d_1), s/veh	6.6		5.9	10.8		11.4	26.3		22.8	27.2		21.1
Incremental Delay (d_2), s/veh	0.1		0.1	1.2		1.8	3.2		1.5	0.3		0.1
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Control Delay (*d*), s/veh	6.7		6.0	12.0		13.3	29.5		24.4	27.5		21.2
Level of Service (LOS)	A		A	B		B	C		C	C		C
Approach Delay, s/veh / LOS	6.4	A		12.7	B		27.0	C		24.2	C	
Intersection Delay, s/veh / LOS	13.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.6	B	2.7	B	2.7	B	2.7	B
Bicycle LOS Score / LOS	1.1	A	1.4	A	0.8	A	0.6	A

 HCS 2010™ Streets Version 6.70 Generated: 10/8/2015 10:57:26 AM

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Aug 29, 2013	Area Type	Other
Jurisdiction	Worcester	Time Period	4:30 - 5:30 PM	PHF	0.95
Urban Street	Madison Streeet	Analysis Year	2013	Analysis Period	1> 4:30
Intersection	Madison St/Southbridge St	File Name	13_Southbridge St & Madison St_PM-Projected.xus		
Project Description	Projected 2025				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	60	828	212	87	752	89	106	74	38	170	274	46

Signal Information			
Cycle, s	62.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	2.0	31.0	14.0	0.0	0.0	0.0	5	6	7	8
Yellow	4.0	4.0	4.0	0.0	0.0	0.0				
Red	1.0	1.0	1.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		4
Case Number	0.0	14.0		8.3		8.0		8.0
Phase Duration, s	7.0	43.0		36.0		19.0		19.0
Change Period, ($Y+R_c$), s	5.0	5.0		5.0		5.0		5.0
Max Allow Headway (*MAH*), s	0.0	3.4		3.4		3.3		3.3
Queue Clearance Time (g_s), s		28.1		16.5		16.0		16.0
Green Extension Time (g_e), s	0.0	2.8		5.4		0.0		0.0
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.85		0.32		1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	585		562	445		526	112		107	260		251
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1358		1596	1364		1646	400		1615	1073		1644
Queue Service Time (g_s), s	2.0		13.0	4.8		14.5	5.4		3.4	10.6		8.6
Cycle Queue Clearance Time (g_c), s	26.1		13.0	11.9		14.5	14.0		3.4	14.0		8.6
Green Ratio (*g/C*)	0.61		0.61	0.50		0.50	0.23		0.23	0.23		0.23
Capacity (*c*), veh/h	897		978	752		823	206		365	340		371
Volume-to-Capacity Ratio (*X*)	0.652		0.574	0.592		0.639	0.540		0.294	0.764		0.675
Available Capacity (c_a), veh/h	897		978	752		823	206		365	340		371
Back of Queue (*Q*), veh/ln (50 th percentile)	3.3		3.3	3.4		4.5	1.7		1.2	4.4		3.4
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00		0.00	0.00		0.00	0.00		0.00	0.00		0.00
Uniform Delay (d_1), s/veh	7.5		7.2	10.3		11.4	28.8		19.9	26.1		21.9
Incremental Delay (d_2), s/veh	1.3		0.5	0.9		1.3	1.6		0.2	8.9		3.9
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Control Delay (*d*), s/veh	8.8		7.7	11.2		12.7	30.4		20.1	35.0		25.9
Level of Service (LOS)	A		A	B		B	C		C	C		C
Approach Delay, s/veh / LOS	8.3	A		12.0	B		25.3	C		30.5	C	
Intersection Delay, s/veh / LOS	14.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.7	B	2.7	B	2.7	B	2.7	B
Bicycle LOS Score / LOS	1.4	A	1.3	A	0.7	A	0.9	A

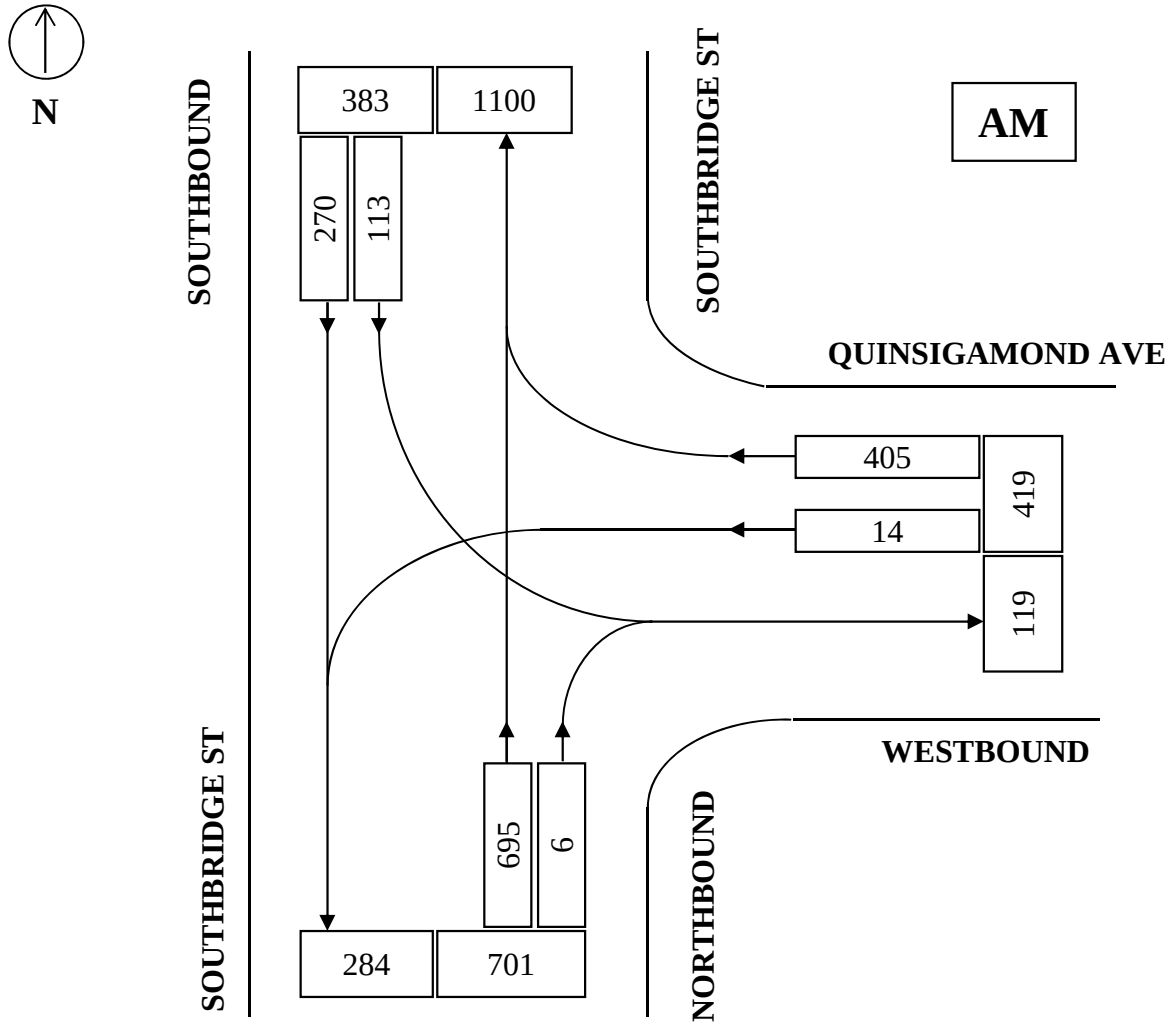
 HCS 2010™ Streets Version 6.70 Generated: 10/8/2015 11:01:09 AM

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Worcester **DATE:** 6/26/2014 **DAY OF WEEK:** Thursday

INTERSECTION: Southbridge Street / Quinsigamond Avenue



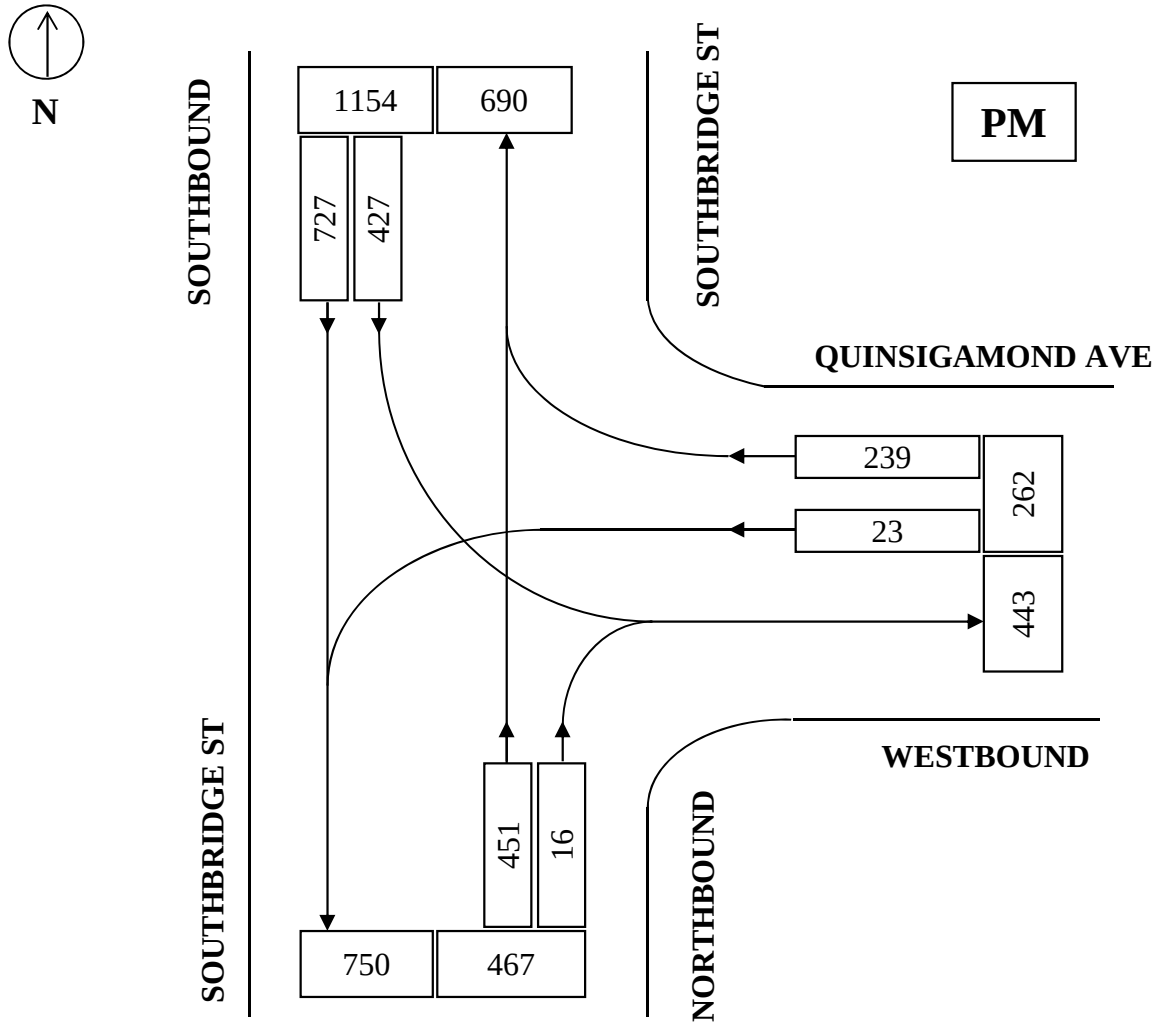
STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			7:30 - 8:30 AM
Quinsigamond Ave WB	419	27.9%	
			PHF = .93
Southbridge St NB	701	46.6%	
			VEHICLES COUNTED
Southhbridge St SB	383	25.5%	
			ALL VEHICLES: 1503
TOTAL	1503	100.00%	**TRUCKS:** 61
			PERCENT TRUCKS: 4.06%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Worcester **DATE:** 6/26/2014 **DAY OF WEEK:** Thursday

INTERSECTION: Southbridge Street / Quinsigamond Avenue



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			4:30 - 5:30 PM
Quinsigamond Ave WB	262	13.9%	
			PHF = .98
Southbridge St NB	467	24.8%	
			VEHICLES COUNTED
Southbridge St SB	1154	61.3%	
			ALL VEHICLES: 1883
TOTAL	1883	100.00%	**TRUCKS:** 19
			PERCENT TRUCKS: 1.01%

TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: City of Worcester

DATE: 6/26/2014

LOCATION: Southbridge Street / Quinsigamond Avenue

DAY OF WEEK: Thursday

WEATHER: AM: Cloudy PM: Cloudy

TECHNICIAN: RJ

Time Period					Quinsigamond Ave WB				Southbridge St NB				Southbridge St SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15					1	0	50	2	0	119	2	4	17	45	0	5	234	
7:15 - 7:30					0	0	69	5	0	125	0	4	26	53	0	7	273	
7:30 - 7:45					1	0	94	4	0	171	1	7	21	58	0	3	346	
7:45 - 8:00					4	0	90	5	0	182	3	8	30	58	0	2	367	1220
8:00 - 8:15					6	0	113	7	0	166	0	3	27	72	0	9	384	1370
8:15 - 8:30					3	0	108	4	0	176	2	1	35	82	0	8	406	1503
8:30 - 8:45					4	0	88	3	0	141	1	9	25	75	0	8	334	1491
8:45 - 9:00					6	0	98	1	0	118	4	7	32	92	0	5	350	1474
TOTAL	0	0	0	0	25	0	710	31	0	1198	13	43	213	535	0	47	2694	
		EBPct	0.0			**WBPct**	27.9			**NBPct**	46.6			**SBPct**	25.5			
Peak Sums:	**0**	**0**	**0**	**0**	**14**	**0**	**405**	**20**	**0**	**695**	**6**	**19**	**113**	**270**	**0**	**22**	**1503**	
Total Trucks	61					**TrkPct**	4.06			**PHF**	0.93							

Time Period					Quinsigamond Ave WB				Southbridge St NB				Southbridge St SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15					4	0	61	0	0	89	3	3	72	178	0	7	407	
4:15 - 4:30					10	0	46	1	0	121	2	5	95	168	0	5	442	
4:30 - 4:45					2	0	70	0	0	116	4	2	97	189	0	2	478	
4:45 - 5:00					11	0	54	0	0	111	4	3	120	174	0	3	474	1801
5:00 - 5:15					9	0	56	1	0	106	4	0	103	188	0	3	466	1860
5:15 - 5:30					1	0	59	1	0	118	4	1	107	176	0	3	465	1883
5:30 - 5:45					5	0	50	2	0	85	2	2	94	168	0	3	404	1809
5:45 - 6:00					11	0	63	0	0	85	5	1	71	157	0	3	392	1727
TOTAL	0	0	0	0	53	0	459	5	0	831	28	17	759	1398	0	29	3528	
		EBPct	0.0			**WBPct**	13.9			**NBPct**	24.8			**SBPct**	61.3			
Peak Sums:	**0**	**0**	**0**	**0**	**23**	**0**	**239**	**2**	**0**	**451**	**16**	**6**	**427**	**727**	**0**	**11**	**1883**	
Total Trucks	19					**TrkPct**	1.01			**PHF**	0.98							

HCS 2010 TWSC Text Report

This TWSC text report was created on 09/28/2015 13:27:26

HCS 2010 Two Way Stop Intersections Release 6.70

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	14_Southbridge St & Quinsigamond Ave_AM
Analyst:	KK
Agency/Co.:	CMRPC
Date Performed:	7/1/2014
Time Analyzed:	7:30 - 8:30 AM
Jurisdiction:	Worcester
Analysis Year:	2014
Project Description:	Balanced
Units:	U.S. Customary
Intersection Name:	Southbridge St/Quinsiagmond Av
Major Street Direction:	North-South
East/West Street Name:	Quinsigamond Ave
North/South Street Name:	Southbridge St
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach	NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume			1022	6		114	273	
Peak Hour Factor, PHF				0.93				
Hourly Flow Rate, HFR			1099	6		123	294	
Percent Heavy Vehicles						4		
Number of Lanes	0	0	1	0	0	0	1	0
Lane Configuration				TR		LT		
Median Type				Undivided				
Median Storage								
RT channelized?				No				No
Left-Turn Lane Storage								
Upstream Signal?				Not Present				

Minor street:

Approach	WestBound				EastBound		
Movement	7	8	9		10	11	12
	L	T	R		L	T	R
Volume	14		409				
Peak Hour Factor, PHF				0.93			
Hourly Flow Rate, HFR	15		440				
Percent Heavy Vehicles	4		4				
Number of Lanes	0	0	0		0	0	0
Lane Configuration		LR					
RT channelized?			No				No
Flared Approach/Storage	No	/			No	/	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f(pb)				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Config.				LT		LR				
Flow Rate				417		455				
Lane Capacity				639		245				
v/c				0.65		1.86				
95% Queue Leng.				0.7		31.7				
Control Delay				12.0		436.5				
LOS				B		F				
Approach Delay				5.5		436.5				
Approach LOS				A		F				
Intersct. Delay	101.6									

Step 1: MOVEMENT PRIORITIES

HCS 2010 TWSC Text Report

This TWSC text report was created on 09/28/2015 13:30:19

HCS 2010 Two Way Stop Intersections Release 6.70

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	14_Southbridge St & Quinsigamond Ave_PM
Analyst:	KK
Agency/Co.:	CMRPC
Date Performed:	7/1/2014
Time Analyzed:	4:30 - 5:30 PM
Jurisdiction:	Worcester
Analysis Year:	2014
Project Description:	Balanced
Units:	U.S. Customary
Intersection Name:	Southbridge St/Quinsiagmond Av
Major Street Direction:	North-South
East/West Street Name:	Quinsigamond Ave
North/South Street Name:	Southbridge St
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach	NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume			456	16		431	794	
Peak Hour Factor, PHF				0.98				
Hourly Flow Rate, HFR			465	16		440	810	
Percent Heavy Vehicles						1		
Number of Lanes	0	0	1	0	0	0	1	0
Lane Configuration				TR		LT		
Median Type				Undivided				
Median Storage								
RT channelized?				No				No
Left-Turn Lane Storage								
Upstream Signal?				Not Present				

Minor street:

Approach	WestBound				EastBound		
Movement	7	8	9		10	11	12
	L	T	R		L	T	R
Volume	23		241				
Peak Hour Factor, PHF				0.98			
Hourly Flow Rate, HFR	23		246				
Percent Heavy Vehicles	1		1				
Number of Lanes	0	0	0		0	0	0
Lane Configuration		LR					
RT channelized?			No				No
Flared Approach/Storage	No	/			No	/	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f(pb)				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Config.				LT		LR				
Flow Rate				1250		269				
Lane Capacity				1092		235				
v/c				1.14		1.14				
95% Queue Leng.				2.0		12.4				
Control Delay				10.5		147.2				
LOS				B		F				
Approach Delay				8.9		147.2				
Approach LOS				A		F				
Intersct. Delay	25.4									

Step 1: MOVEMENT PRIORITIES

HCS 2010 TWSC Text Report

This TWSC text report was created on 10/08/2015 11:26:31

HCS 2010 Two Way Stop Intersections Release 6.70

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	14_Southbridge St & Quinsigamond Ave_AM-BAL
Analyst:	KK
Agency/Co.:	CMRPC
Date Performed:	7/1/2014
Time Analyzed:	7:30 - 8:30 AM
Jurisdiction:	Worcester
Analysis Year:	2014
Project Description:	Projected 2025
Units:	U.S. Customary
Intersection Name:	Southbridge St/Quinsiagmond Av
Major Street Direction:	North-South
East/West Street Name:	Quinsigamond Ave
North/South Street Name:	Southbridge St
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:									
Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	4U	4	5	6	
	U	L	T	R	U	L	T	R	
Volume			1129	7		126	302		
Peak Hour Factor, PHF				0.93					
Hourly Flow Rate, HFR			1214	8		135	325		
Percent Heavy Vehicles						4			
Number of Lanes	0	0	1	0	0	0	1	0	
Lane Configuration				TR		LT			
Median Type				Undivided					
Median Storage									
RT channelized?				No				No	
Left-Turn Lane Storage									
Upstream Signal?				Not Present					

Minor street:							
Approach	WestBound				EastBound		
Movement	7	8	9		10	11	12
	L	T	R		L	T	R
Volume	15		452				
Peak Hour Factor, PHF			0.93				
Hourly Flow Rate, HFR	16		486				
Percent Heavy Vehicles	4		4				
Number of Lanes	0	0	0		0	0	0
Lane Configuration		LR					
RT channelized?			No				No
Flared Approach/Storage	No	/			No	/	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f(pb)				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Config.				LT		LR				
Flow Rate				460		502				
Lane Capacity				578		207				
v/c				0.80		2.43				
95% Queue Leng.				0.9		41.4				
Control Delay				13.1		692.1				
LOS				B		F				
Approach Delay				6.5		692.1				
Approach LOS				A		F				
Intersct. Delay	160.5									

Step 1: MOVEMENT PRIORITIES

HCS 2010 TWSC Text Report

This TWSC text report was created on 10/08/2015 11:29:12

HCS 2010 Two Way Stop Intersections Release 6.70

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	14_Southbridge St & Quinsigamond Ave_PM-BAL
Analyst:	KK
Agency/Co.:	CMRPC
Date Performed:	7/1/2014
Time Analyzed:	4:30 - 5:30 PM
Jurisdiction:	Worcester
Analysis Year:	2014
Project Description:	Projected 2025
Units:	U.S. Customary
Intersection Name:	Southbridge St/Quinsiagmond Av
Major Street Direction:	North-South
East/West Street Name:	Quinsigamond Ave
North/South Street Name:	Southbridge St
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:									
Approach		NorthBound				SouthBound			
Movement	1U	1	2	3	4U	4	5	6	
	U	L	T	R	U	L	T	R	
Volume			504	18		476	877		
Peak Hour Factor, PHF				0.98					
Hourly Flow Rate, HFR			514	18		486	895		
Percent Heavy Vehicles						1			
Number of Lanes	0	0	1	0	0	0	1	0	
Lane Configuration				TR		LT			
Median Type				Undivided					
Median Storage									
RT channelized?				No				No	
Left-Turn Lane Storage									
Upstream Signal?				Not Present					

Minor street:							
Approach	WestBound				EastBound		
Movement	7	8	9		10	11	12
	L	T	R		L	T	R
Volume	25		266				
Peak Hour Factor, PHF			0.98				
Hourly Flow Rate, HFR	26		271				
Percent Heavy Vehicles	1		1				
Number of Lanes	0	0	0		0	0	0
Lane Configuration		LR					
RT channelized?			No				No
Flared Approach/Storage	No	/			No	/	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f(pb)				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Config.				LT		LR				
Flow Rate				1381		297				
Lane Capacity				1046		168				
v/c				1.32		1.77				
95% Queue Leng.				2.5		21.4				
Control Delay				11.4		416.2				
LOS				B		F				
Approach Delay				11.3		416.2				
Approach LOS				B		F				
Intersct. Delay	63.0									

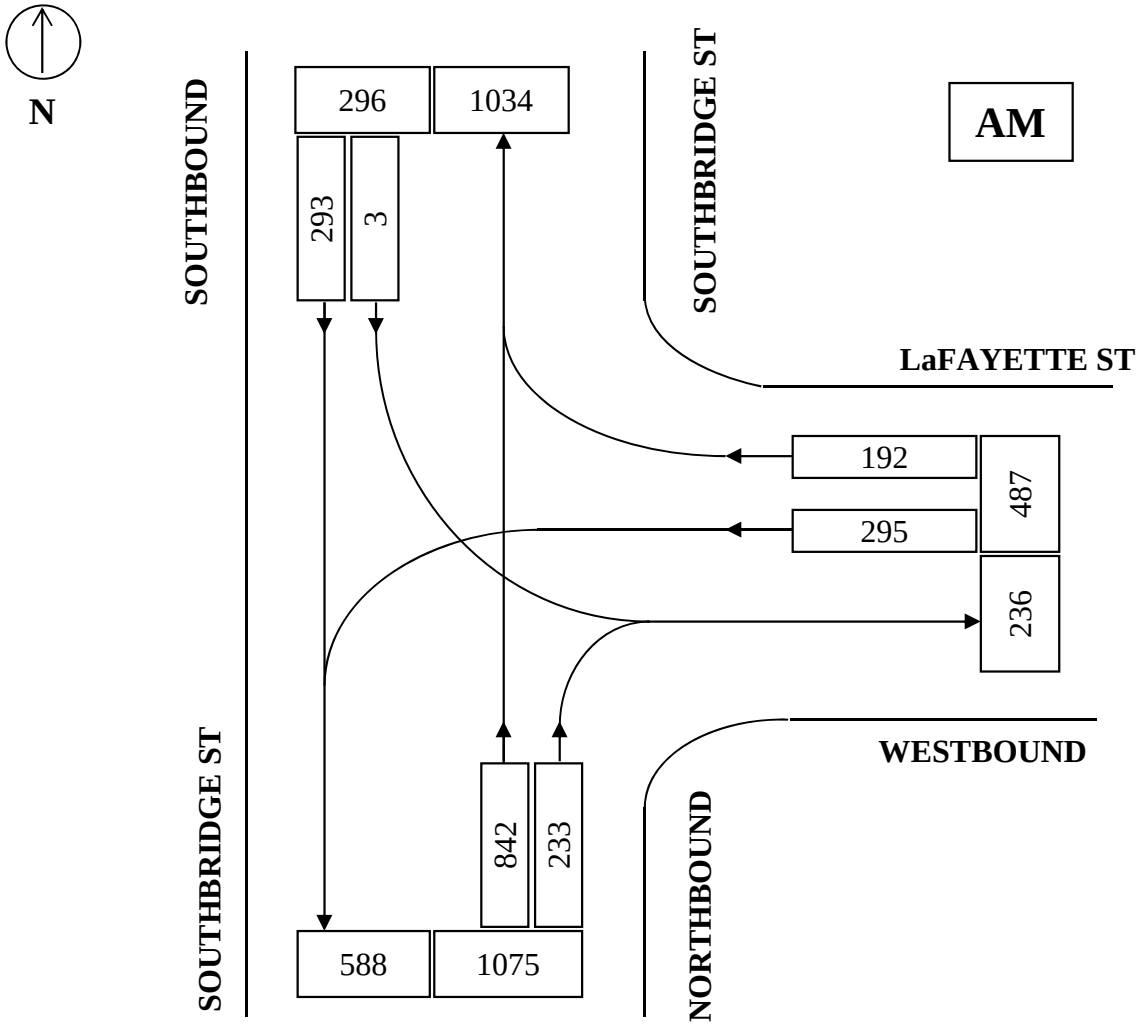
Step 1: MOVEMENT PRIORITIES

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Worcester **DATE:** 6/5/2014 **DAY OF WEEK:** Thursday

INTERSECTION: Southbridge Street / LaFayette Street



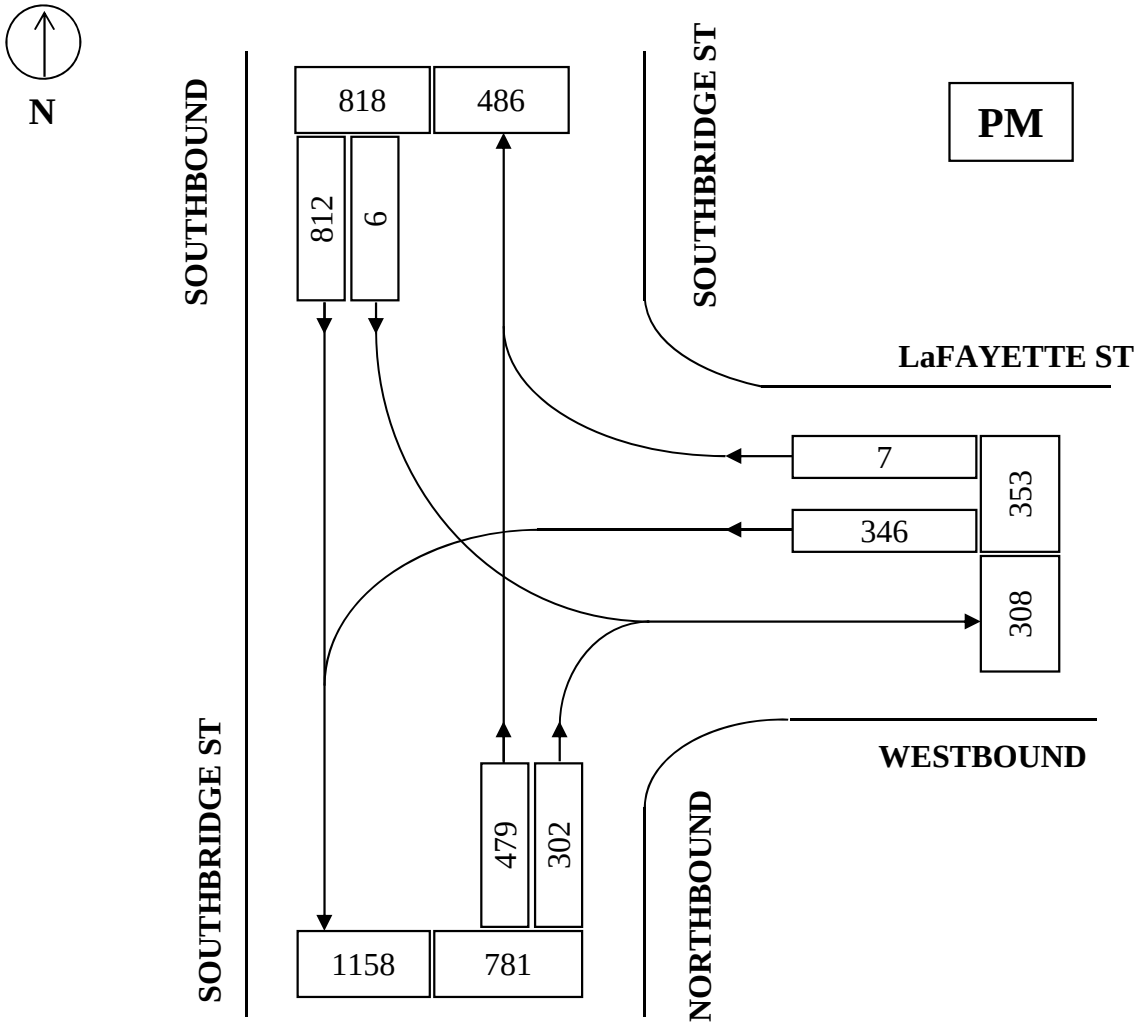
STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			7:30 - 8:30 AM
LaFayette St WB	487	26.2%	
			PHF = .91
Southbridge St NB	1075	57.9%	
			VEHICLES COUNTED
Southhbridge St SB	296	15.9%	
			ALL VEHICLES: 1858
TOTAL	1858	100.00%	**TRUCKS:** 81
			PERCENT TRUCKS: 4.36%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Worcester **DATE:** 6/5/2014 **DAY OF WEEK:** Thursday

INTERSECTION: Southbridge Street / LaFayette Street



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			4:30 - 5:30 PM
Lafayette St WB	353	18.1%	
			PHF = .97
Southbridge St NB	781	40.0%	
			VEHICLES COUNTED
Southbridge St SB	818	41.9%	
			ALL VEHICLES: 1952
TOTAL	1952	100.00%	**TRUCKS:** 37
			PERCENT TRUCKS: 1.90%

TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: City of Worcester

DATE: 6/5/2014

LOCATION: Southbridge Street / LaFayette Street

DAY OF WEEK: Thursday

WEATHER: AM: Rain PM: Cloudy/Rain

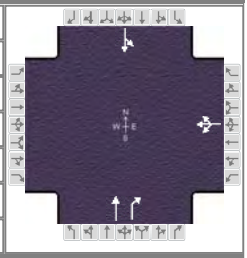
TECHNICIAN: RJ

Time Period					LaFayette St WB				Southbridge St NB				Southbridge St SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15					41	0	0	2	0	117	51	7	1	44	0	3	254	
7:15 - 7:30					60	0	9	2	0	163	48	6	0	68	0	3	348	
7:30 - 7:45					77	0	27	5	0	198	69	13	0	81	0	7	452	
7:45 - 8:00					71	0	70	4	0	218	64	8	1	85	0	6	509	1563
8:00 - 8:15					60	0	58	1	0	226	59	10	0	79	0	4	482	1791
8:15 - 8:30					87	0	37	8	0	200	41	10	2	48	0	5	415	1858
8:30 - 8:45					81	0	17	4	0	186	56	8	2	91	0	7	433	1839
8:45 - 9:00					93	0	7	4	0	177	59	9	0	111	1	10	448	1778
TOTAL	0	0	0	0	570	0	225	30	0	1485	447	71	6	607	1	45	3341	
		EBPct	0.0			**WBPct**	26.2			**NBPct**	57.9			**SBPct**	15.9			
Peak Sums:	**0**	**0**	**0**	**0**	**295**	**0**	**192**	**18**	**0**	**842**	**233**	**41**	**3**	**293**	**0**	**22**	**1858**	
Total Trucks	81					**TrkPct**	4.36			**PHF**	0.91							

Time Period					LaFayette St WB				Southbridge St NB				Southbridge St SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15					88	0	5	1	0	126	69	5	2	169	0	9	459	
4:15 - 4:30					60	0	2	1	0	131	64	2	2	174	0	4	433	
4:30 - 4:45					102	0	1	6	0	129	63	4	2	190	0	4	487	
4:45 - 5:00					83	0	1	3	0	127	84	5	0	207	0	1	502	1881
5:00 - 5:15					73	0	1	2	0	113	87	1	3	190	0	3	467	1889
5:15 - 5:30					88	0	4	2	0	110	68	4	1	225	0	2	496	1952
5:30 - 5:45					86	0	2	2	0	98	80	3	0	160	0	2	426	1891
5:45 - 6:00					92	0	3	1	0	103	48	3	1	172	0	3	419	1808
TOTAL	0	0	0	0	672	0	19	18	0	937	563	27	11	1487	0	28	3689	
		EBPct	0.0			**WBPct**	18.1			**NBPct**	40.0			**SBPct**	41.9			
Peak Sums:	**0**	**0**	**0**	**0**	**346**	**0**	**7**	**13**	**0**	**479**	**302**	**14**	**6**	**812**	**0**	**10**	**1952**	
Total Trucks	37					**TrkPct**	1.90			**PHF**	0.97							

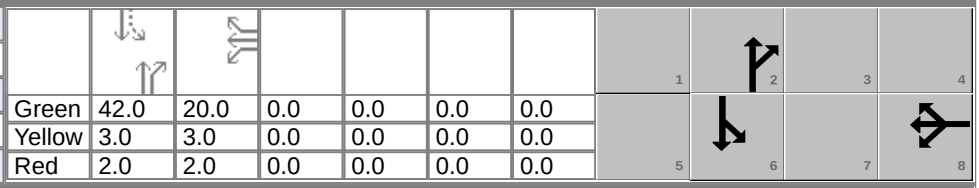
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Jun 12, 2014	Area Type	Other
Jurisdiction	Worcester	Time Period	7:30 - 8:30 AM	PHF	0.91
Urban Street	Southbridge St	Analysis Year	2014	Analysis Period	1> 7:30
Intersection	Southbridge St/LaFayett…	File Name	14_Southbridge St & LaFayette St_AM-BAL.xus		
Project Description	Balanced				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				298	0	194		850	235	3	296	

Signal Information			
Cycle, s	72.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	42.0	20.0	0.0	0.0	0.0	0.0						
Yellow	3.0	3.0	0.0	0.0	0.0	0.0						
Red	2.0	2.0	0.0	0.0	0.0	0.0						

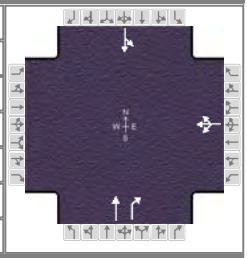
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2		6
Case Number				12.0		7.0		8.0
Phase Duration, s				25.0		47.0		47.0
Change Period, ($Y+R_c$), s				5.0		5.0		5.0
Max Allow Headway (*MAH*), s				3.2		3.1		3.1
Queue Clearance Time (g_s), s				22.0		33.4		8.3
Green Extension Time (g_e), s				0.0		2.7		3.7
Phase Call Probability				1.00		1.00		1.00
Max Out Probability				1.00		0.34		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8	18		2	12	1	6	
Adjusted Flow Rate (*v*), veh/h					519			934	246		329	
Adjusted Saturation Flow Rate (*s*), veh/h/ln					1731			1827	1548		1892	
Queue Service Time (g_s), s					20.0			31.4	5.7		0.0	
Cycle Queue Clearance Time (g_c), s					20.0			31.4	5.7		6.3	
Green Ratio (*g/C*)					0.28			0.58	0.58		0.58	
Capacity (*c*), veh/h					481			1066	903		1154	
Volume-to-Capacity Ratio (*X*)					1.079			0.876	0.273		0.285	
Available Capacity (c_a), veh/h					481			1066	903		1154	
Back of Queue (*Q*), veh/ln (50 th percentile)					16.1			12.4	1.5		2.1	
Queue Storage Ratio (*RQ*) (50 th percentile)					0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh					26.0			12.8	7.4		7.6	
Incremental Delay (d_2), s/veh					64.0			8.1	0.1		0.0	
Initial Queue Delay (d_3), s/veh					0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh					90.0			20.9	7.5		7.6	
Level of Service (LOS)					F			C	A		A	
Approach Delay, s/veh / LOS	0.0			90.0		F	18.1		B	7.6		A
Intersection Delay, s/veh / LOS	34.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.1	B	1.9	A
Bicycle LOS Score / LOS			1.3	A	2.4	B	1.0	A

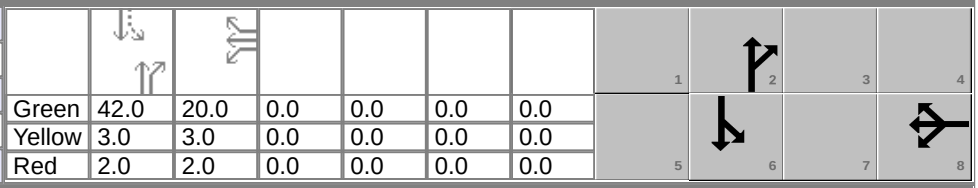
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Jun 12, 2014	Area Type	Other
Jurisdiction	Worcester	Time Period	4:30 - 5:30 PM	PHF	0.97
Urban Street	Southbridge St	Analysis Year	2014	Analysis Period	1> 4:30
Intersection	Southbridge St/LaFayett…	File Name	14_Southbridge St & LaFayette St_PM-BAL.xus		
Project Description	Balanced				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				349	0	7		484	305	6	820	

Signal Information			
Cycle, s	72.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	42.0	20.0	0.0	0.0	0.0	0.0						
Yellow	3.0	3.0	0.0	0.0	0.0	0.0						
Red	2.0	2.0	0.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2		6
Case Number				12.0		7.0		8.0
Phase Duration, s				25.0		47.0		47.0
Change Period, ($Y+R_c$), s				5.0		5.0		5.0
Max Allow Headway (*MAH*), s				3.1		3.1		3.1
Queue Clearance Time (g_s), s				15.2		13.0		25.5
Green Extension Time (g_e), s				0.4		3.9		3.7
Phase Call Probability				1.00		1.00		1.00
Max Out Probability				0.30		0.01		0.09

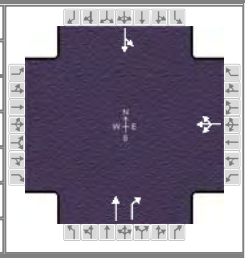
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8	18		2	12	1	6	
Adjusted Flow Rate (*v*), veh/h					366			499	295		852	
Adjusted Saturation Flow Rate (*s*), veh/h/ln					1806			1863	1579		1933	
Queue Service Time (g_s), s					13.2			11.0	6.9		0.0	
Cycle Queue Clearance Time (g_c), s					13.2			11.0	6.9		23.5	
Green Ratio (*g/C*)					0.28			0.58	0.58		0.58	
Capacity (*c*), veh/h					502			1087	921		1178	
Volume-to-Capacity Ratio (*X*)					0.730			0.459	0.320		0.723	
Available Capacity (c_a), veh/h					502			1087	921		1178	
Back of Queue (*Q*), veh/ln (50 th percentile)					5.8			3.6	1.9		8.6	
Queue Storage Ratio (*RQ*) (50 th percentile)					0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh					23.6			8.5	7.7		11.2	
Incremental Delay (d_2), s/veh					4.7			0.1	0.1		1.9	
Initial Queue Delay (d_3), s/veh					0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh					28.2			8.6	7.8		13.1	
Level of Service (LOS)					C			A	A		B	
Approach Delay, s/veh / LOS	0.0			28.2		C	8.3		A	13.1		B
Intersection Delay, s/veh / LOS	14.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.1	B	1.9	A
Bicycle LOS Score / LOS			1.1	A	1.8	A	1.9	A

 HCS 2010™ Streets Version 6.70 Generated: 9/28/2015 1:23:41 PM

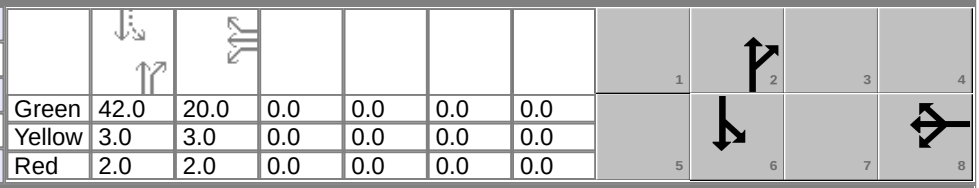
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Jun 12, 2014	Area Type	Other
Jurisdiction	Worcester	Time Period	7:30 - 8:30 AM	PHF	0.91
Urban Street	Southbridge St	Analysis Year	2014	Analysis Period	1> 7:30
Intersection	Southbridge St/LaFayett…	File Name	14_Southbridge St & LaFayette St_AM-Projected.…		
Project Description	Projected 2025				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				329	0	214		939	260	3	327	

Signal Information			
Cycle, s	72.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	42.0	20.0	0.0	0.0	0.0	0.0						
Yellow	3.0	3.0	0.0	0.0	0.0	0.0						
Red	2.0	2.0	0.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2		6
Case Number				12.0		7.0		8.0
Phase Duration, s				25.0		47.0		47.0
Change Period, ($Y+R_c$), s				5.0		5.0		5.0
Max Allow Headway (*MAH*), s				3.2		3.1		3.1
Queue Clearance Time (g_s), s				22.0		40.9		42.1
Green Extension Time (g_e), s				0.0		0.6		0.0
Phase Call Probability				1.00		1.00		1.00
Max Out Probability				1.00		1.00		1.00

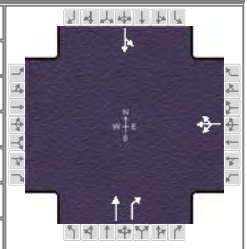
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8	18		2	12	1	6	
Adjusted Flow Rate (*v*), veh/h					575			1032	274		363	
Adjusted Saturation Flow Rate (*s*), veh/h/ln					1730			1827	1548		1672	
Queue Service Time (g_s), s					20.0			38.9	6.4		1.2	
Cycle Queue Clearance Time (g_c), s					20.0			38.9	6.4		40.1	
Green Ratio (*g/C*)					0.28			0.58	0.58		0.58	
Capacity (*c*), veh/h					481			1066	903		1026	
Volume-to-Capacity Ratio (*X*)					1.196			0.968	0.303		0.354	
Available Capacity (c_a), veh/h					481			1066	903		1026	
Back of Queue (*Q*), veh/ln (50 th percentile)					21.8			18.3	1.8		2.4	
Queue Storage Ratio (*RQ*) (50 th percentile)					0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh					26.0			14.4	7.6		7.9	
Incremental Delay (d_2), s/veh					107.0			20.1	0.1		0.1	
Initial Queue Delay (d_3), s/veh					0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh					133.0			34.5	7.7		8.0	
Level of Service (LOS)					F			C	A		A	
Approach Delay, s/veh / LOS	0.0			133.0		F	28.9		C	8.0		A
Intersection Delay, s/veh / LOS	52.2						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.1	B	1.9	A
Bicycle LOS Score / LOS			1.4	A	2.6	B	1.1	A

 HCS 2010™ Streets Version 6.70 Generated: 10/8/2015 11:03:33 AM

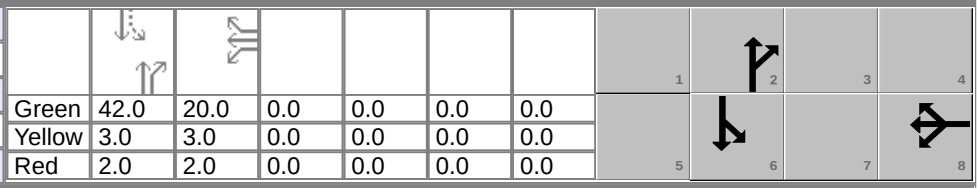
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Jun 12, 2014	Area Type	Other
Jurisdiction	Worcester	Time Period	4:30 - 5:30 PM	PHF	0.97
Urban Street	Southbridge St	Analysis Year	2014	Analysis Period	1> 4:30
Intersection	Southbridge St/LaFayett…	File Name	14_Southbridge St & LaFayette St_PM-Projected.…		
Project Description	Projected 2025				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				386	0	8		535	337	7	906	

Signal Information			
Cycle, s	72.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	42.0	20.0	0.0	0.0	0.0	0.0						
Yellow	3.0	3.0	0.0	0.0	0.0	0.0						
Red	2.0	2.0	0.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2		6
Case Number				12.0		7.0		8.0
Phase Duration, s				25.0		47.0		47.0
Change Period, ($Y+R_c$), s				5.0		5.0		5.0
Max Allow Headway (*MAH*), s				3.1		3.1		3.1
Queue Clearance Time (g_s), s				17.0		14.6		30.4
Green Extension Time (g_e), s				0.3		4.6		3.8
Phase Call Probability				1.00		1.00		1.00
Max Out Probability				1.00		0.03		0.28

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8	18		2	12	1	6	
Adjusted Flow Rate (*v*), veh/h					405			552	328		941	
Adjusted Saturation Flow Rate (*s*), veh/h/ln					1806			1863	1579		1933	
Queue Service Time (g_s), s					15.0			12.6	7.9		0.0	
Cycle Queue Clearance Time (g_c), s					15.0			12.6	7.9		28.4	
Green Ratio (*g/C*)					0.28			0.58	0.58		0.58	
Capacity (*c*), veh/h					502			1087	921		1178	
Volume-to-Capacity Ratio (*X*)					0.808			0.508	0.356		0.799	
Available Capacity (c_a), veh/h					502			1087	921		1178	
Back of Queue (*Q*), veh/ln (50 th percentile)					7.2			4.1	2.2		10.7	
Queue Storage Ratio (*RQ*) (50 th percentile)					0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh					24.2			8.9	7.9		12.2	
Incremental Delay (d_2), s/veh					8.8			0.2	0.1		3.7	
Initial Queue Delay (d_3), s/veh					0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh					33.1			9.0	8.0		15.8	
Level of Service (LOS)					C			A	A		B	
Approach Delay, s/veh / LOS	0.0			33.1		C	8.6		A	15.8		B
Intersection Delay, s/veh / LOS	16.1						B					

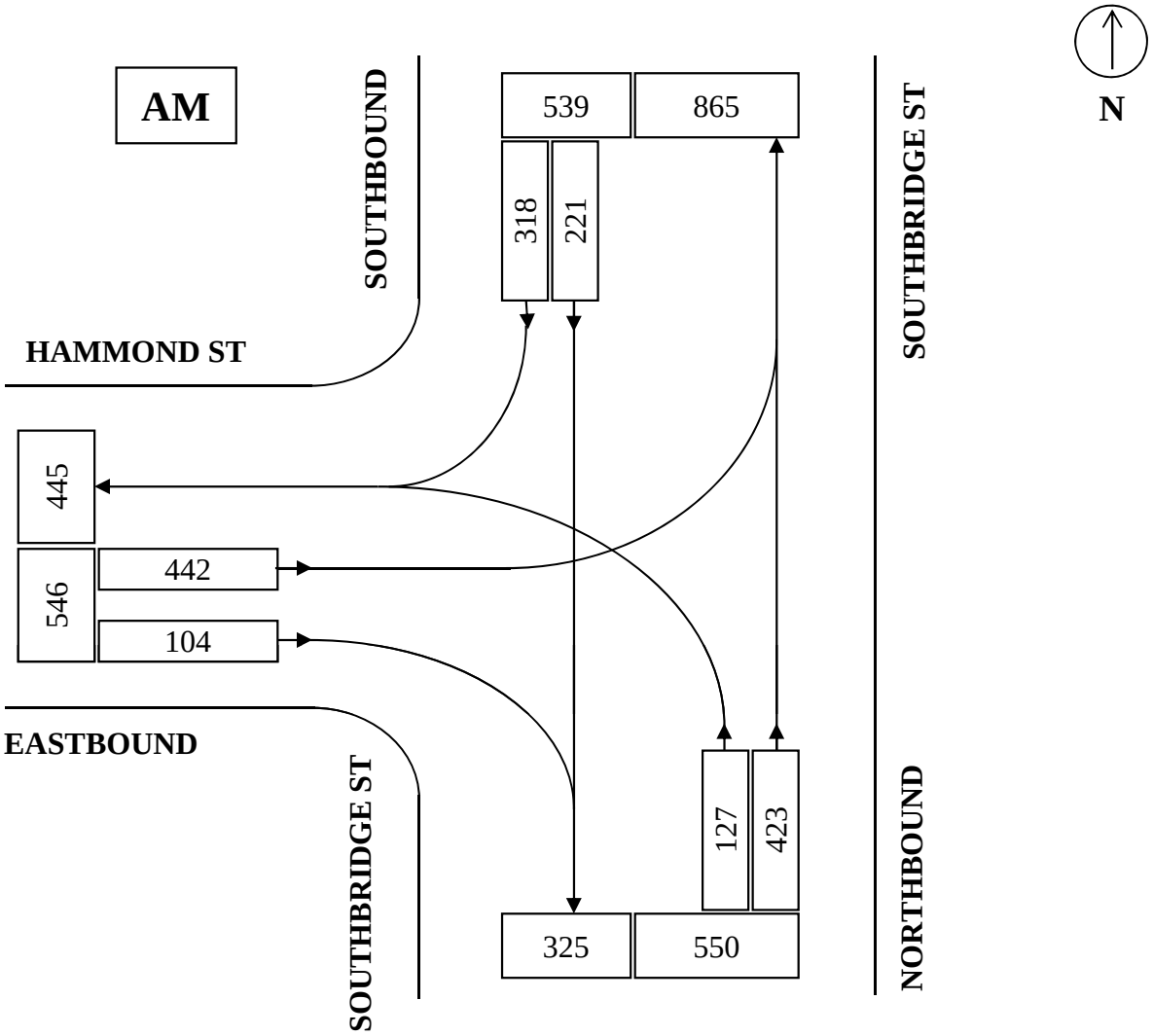
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.1	B	1.9	A
Bicycle LOS Score / LOS			1.2	A	1.9	A	2.0	B

 HCS 2010™ Streets Version 6.70 Generated: 10/8/2015 11:05:33 AM

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Worcester **DATE:** 8/8/13 **DAY OF WEEK:** Thursday
INTERSECTION: Southbridge Street / Hammond Street

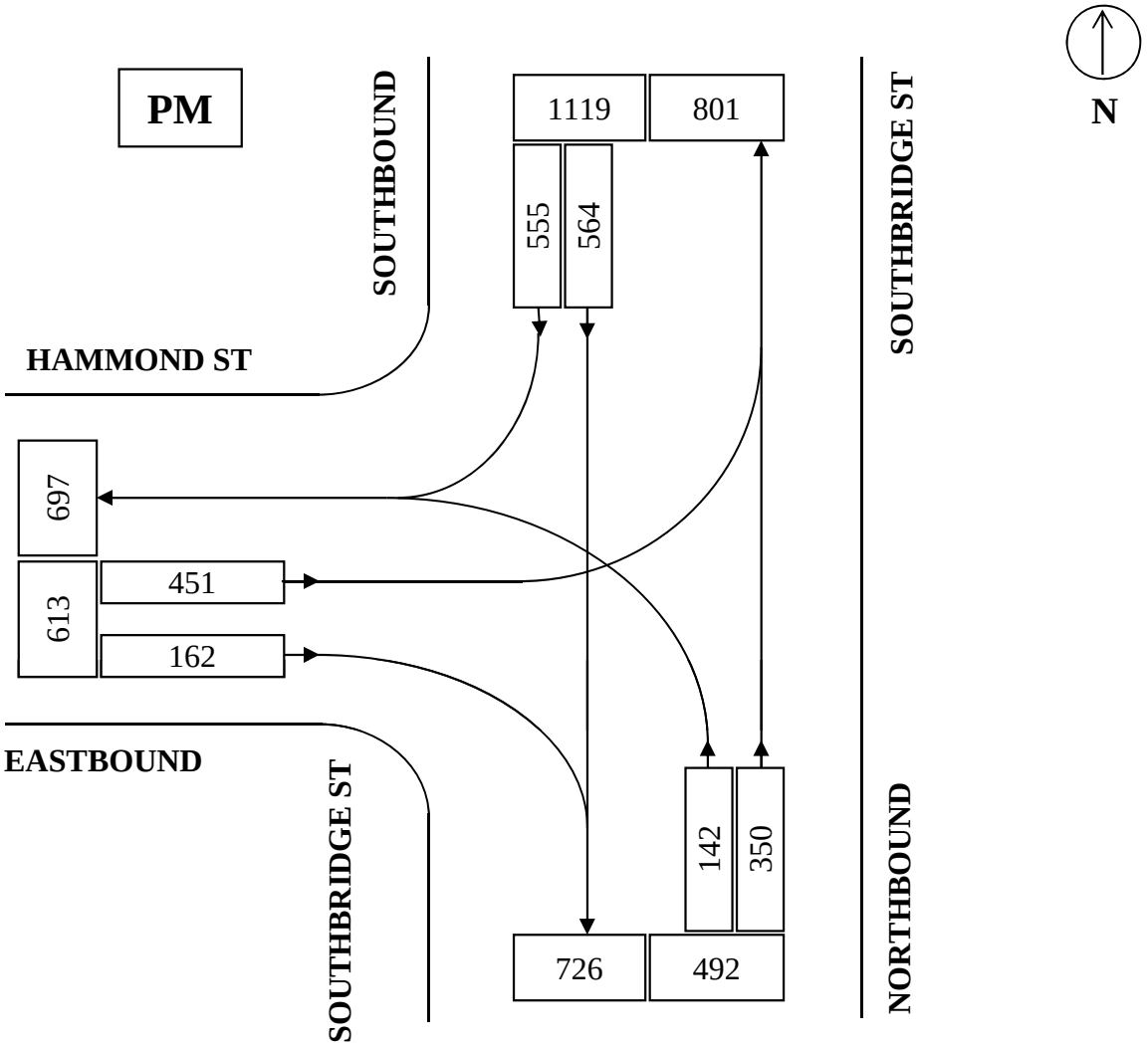


STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			7:45 - 8:45 AM
Hammond St EB	546	33.4%	
			PHF = .94
Southbridge St NB	550	33.6%	
			VEHICLES COUNTED
Southbridge St SB	539	33.0%	
			ALL VEHICLES: 1635
TOTAL	1635	100.0%	**TRUCKS:** 69
			PERCENT TRUCKS 4.22%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Worcester **DATE:** 8/8/13 **DAY OF WEEK:** Thursday
INTERSECTION: Southbridge Street / Hammond Street



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			4:30 - 5:30 PM
Hammond St EB	613	27.6%	
			PHF = .98
Southbridge St NB	492	22.1%	
			VEHICLES COUNTED
Southbridge St SB	1119	50.3%	
			ALL VEHICLES: 2224
TOTAL	2224	100.0%	**TRUCKS:** 42
			PERCENT TRUCKS 1.89%

TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: City of Worcester

DATE: 8/8/2013

LOCATION: Southbridge Street / Hammond Street

DAY OF WEEK: Thursday

WEATHER: AM: Clear PM: Clear

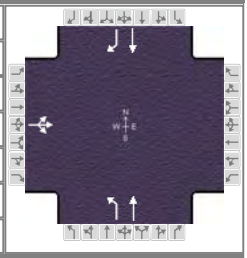
TECHNICIAN: RJ

Time Period	Hammond St EB								Southbridge St NB				Southbridge St SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15	80	0	13	3					19	49	0	1	0	29	37	2	227	
7:15 - 7:30	109	0	18	5					21	85	0	8	0	32	68	5	333	
7:30 - 7:45	112	0	18	2					25	96	0	3	0	35	64	7	350	
7:45 - 8:00	95	0	31	1					41	109	0	11	0	36	79	3	391	1301
8:00 - 8:15	124	0	29	6					22	117	0	5	0	67	76	5	435	1509
8:15 - 8:30	123	0	14	2					38	103	0	9	0	56	78	6	412	1588
8:30 - 8:45	100	0	30	4					26	94	0	11	0	62	85	6	397	1635
8:45 - 9:00	83	0	30	2					37	85	0	6	0	52	85	6	372	1616
TOTAL	826	0	183	25	0	0	0	0	229	738	0	54	0	369	572	40	2917	
		EBPct	33.4			**WBPct**	0.0			**NBPct**	33.6			**SBPct**	33.0			
Peak Sums:	**442**	**0**	**104**	**13**	**0**	**0**	**0**	**0**	**127**	**423**	**0**	**36**	**0**	**221**	**318**	**20**	**1635**	
Total Trucks	69					**TrkPct**	4.22			**PHF**	0.94							

Time Period	Hammond St EB								Southbridge St NB				Southbridge St SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15	104	0	45	5					31	83	0	5	0	132	129	9	524	
4:15 - 4:30	104	0	54	3					32	77	0	4	0	122	130	3	519	
4:30 - 4:45	125	0	35	1					33	89	0	1	0	133	150	9	565	
4:45 - 5:00	103	0	45	4					48	105	0	3	0	127	130	6	558	2166
5:00 - 5:15	127	0	43	0					28	73	0	2	0	143	140	6	554	2196
5:15 - 5:30	96	0	39	2					33	83	0	4	0	161	135	4	547	2224
5:30 - 5:45	110	0	40	2					51	72	0	2	0	113	127	2	513	2172
5:45 - 6:00	121	0	25	0					39	78	0	1	0	102	118	6	483	2097
TOTAL	890	0	326	17	0	0	0	0	295	660	0	22	0	1033	1059	45	4263	
		EBPct	27.6			**WBPct**	0.0			**NBPct**	22.1			**SBPct**	50.3			
Peak Sums:	**451**	**0**	**162**	**7**	**0**	**0**	**0**	**0**	**142**	**350**	**0**	**10**	**0**	**564**	**555**	**25**	**2224**	
Total Trucks	42					**TrkPct**	1.89			**PHF**	0.98							

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Aug 9, 2013	Area Type	Other
Jurisdiction	Worcester	Time Period	7:45 - 8:45 AM	PHF	0.94
Urban Street	Southbridge St	Analysis Year	2013	Analysis Period	1> 7:45
Intersection	Southbridge St/Hammo…	File Name	13_Southbridge St & Hammond St_AM-BAL.xus		
Project Description	Balanced				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	501	0	146				130	482			305	324

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

								1	2	3	4	
Green	30.0	30.0	0.0	0.0	0.0	0.0						
Yellow	3.0	3.0	0.0	0.0	0.0	0.0						
Red	2.0	2.0	0.0	0.0	0.0	0.0	5	6	7	8		

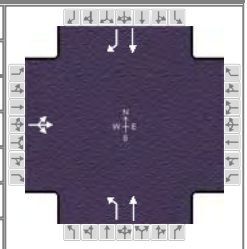
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		8				6		2
Case Number		12.0				6.0		7.0
Phase Duration, s		35.0				35.0		35.0
Change Period, ($Y+R_c$), s		5.0				5.0		5.0
Max Allow Headway (*MAH*), s		3.2				3.2		3.2
Queue Clearance Time (g_s), s		28.5				18.2		10.6
Green Extension Time (g_e), s		0.3				1.8		2.0
Phase Call Probability		1.00				1.00		1.00
Max Out Probability		1.00				0.06		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	3	8	18				1	6			2	12
Adjusted Flow Rate (*v*), veh/h		688					138	513			324	6
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1726					1031	1827			1827	1610
Queue Service Time (g_s), s		26.5					7.5	15.6			8.6	0.2
Cycle Queue Clearance Time (g_c), s		26.5					16.2	15.6			8.6	0.2
Green Ratio (*g/C*)		0.43					0.43	0.43			0.43	0.43
Capacity (*c*), veh/h		740					417	783			783	690
Volume-to-Capacity Ratio (*X*)		0.931					0.331	0.655			0.414	0.009
Available Capacity (c_a), veh/h		740					417	783			783	690
Back of Queue (*Q*), veh/ln (50 th percentile)		12.9					1.7	6.0			3.2	0.1
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00					0.00	0.00			0.00	0.00
Uniform Delay (d_1), s/veh		19.0					19.5	15.9			13.9	11.5
Incremental Delay (d_2), s/veh		18.0					0.2	1.6			0.1	0.0
Initial Queue Delay (d_3), s/veh		0.0					0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh		37.1					19.7	17.5			14.0	11.5
Level of Service (LOS)		D					B	B			B	B
Approach Delay, s/veh / LOS	37.1	D		0.0			17.9	B		14.0	B	
Intersection Delay, s/veh / LOS	25.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.8	C	1.9	A	2.1	B
Bicycle LOS Score / LOS	1.6	A			1.6	A	1.0	A

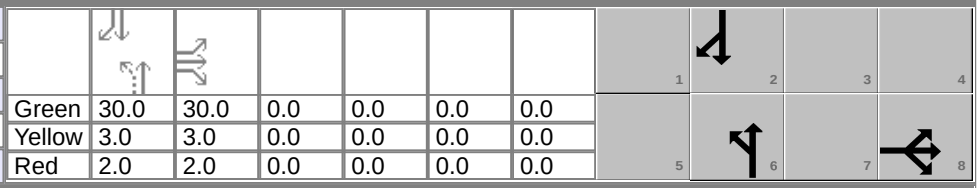
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Aug 9, 2013	Area Type	Other
Jurisdiction	Worcester	Time Period	4:30 - 5:30 PM	PHF	0.98
Urban Street	Southbridge St	Analysis Year	2013	Analysis Period	1> 4:30
Intersection	Southbridge St/Hammo…	File Name	13_Southbridge St & Hammond St_PM-BAL.xus		
Project Description	Balanced				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	460	0	165				205	477			575	566

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	30.0	30.0	0.0	0.0	0.0	0.0						
Yellow	3.0	3.0	0.0	0.0	0.0	0.0						
Red	2.0	2.0	0.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		8				6		2
Case Number		12.0				6.0		7.0
Phase Duration, s		35.0				35.0		35.0
Change Period, ($Y+R_c$), s		5.0				5.0		5.0
Max Allow Headway (*MAH*), s		3.2				3.3		3.3
Queue Clearance Time (g_s), s		25.6				32.0		20.4
Green Extension Time (g_e), s		0.8				0.0		2.6
Phase Call Probability		1.00				1.00		1.00
Max Out Probability		0.58				1.00		0.25

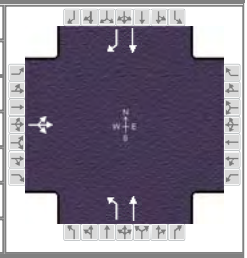
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	3	8	18				1	6			2	12
Adjusted Flow Rate (*v*), veh/h		638					209	487			587	11
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1718					826	1863			1863	1642
Queue Service Time (g_s), s		23.6					11.6	14.1			18.4	0.3
Cycle Queue Clearance Time (g_c), s		23.6					30.0	14.1			18.4	0.3
Green Ratio (*g/C*)		0.43					0.43	0.43			0.43	0.43
Capacity (*c*), veh/h		736					240	798			798	704
Volume-to-Capacity Ratio (*X*)		0.866					0.873	0.610			0.735	0.016
Available Capacity (c_a), veh/h		736					240	798			798	704
Back of Queue (*Q*), veh/ln (50 th percentile)		10.2					5.2	5.5			7.5	0.1
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00					0.00	0.00			0.00	0.00
Uniform Delay (d_1), s/veh		18.2					31.2	15.5			16.7	11.5
Incremental Delay (d_2), s/veh		10.2					26.8	1.0			3.1	0.0
Initial Queue Delay (d_3), s/veh		0.0					0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh		28.4					58.0	16.5			19.8	11.5
Level of Service (LOS)		C					E	B			B	B
Approach Delay, s/veh / LOS	28.4	C		0.0			29.0	C		19.7	B	
Intersection Delay, s/veh / LOS	25.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	3.1	C	1.9	A	2.1	B
Bicycle LOS Score / LOS	1.5	A			1.6	A	1.5	A

 HCS 2010™ Streets Version 6.70 Generated: 9/28/2015 1:20:05 PM

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Aug 9, 2013	Area Type	Other
Jurisdiction	Worcester	Time Period	7:45 - 8:45 AM	PHF	0.94
Urban Street	Southbridge St	Analysis Year	2013	Analysis Period	1> 7:45
Intersection	Southbridge St/Hammo…	File Name	13_Southbridge St & Hammond St_AM-Projected…		
Project Description	Projected 2025				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	553	0	161				144	532			337	358

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

								1	2	3	4	
Green	30.0	30.0	0.0	0.0	0.0	0.0						
Yellow	3.0	3.0	0.0	0.0	0.0	0.0						
Red	2.0	2.0	0.0	0.0	0.0	0.0	5	6	7	8		

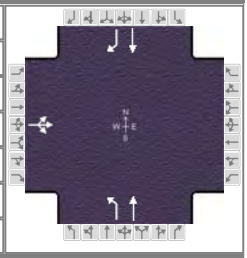
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		8				6		2
Case Number		12.0				6.0		7.0
Phase Duration, s		35.0				35.0		35.0
Change Period, ($Y+R_c$), s		5.0				5.0		5.0
Max Allow Headway (*MAH*), s		3.2				3.2		3.2
Queue Clearance Time (g_s), s		32.0				20.8		11.8
Green Extension Time (g_e), s		0.0				2.0		2.4
Phase Call Probability		1.00				1.00		1.00
Max Out Probability		1.00				0.18		0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	3	8	18				1	6			2	12
Adjusted Flow Rate (*v*), veh/h		760					153	566			359	43
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1726					999	1827			1827	1610
Queue Service Time (g_s), s		30.0					9.0	18.0			9.8	1.1
Cycle Queue Clearance Time (g_c), s		30.0					18.8	18.0			9.8	1.1
Green Ratio (*g/C*)		0.43					0.43	0.43			0.43	0.43
Capacity (*c*), veh/h		740					392	783			783	690
Volume-to-Capacity Ratio (*X*)		1.027					0.391	0.723			0.458	0.062
Available Capacity (c_a), veh/h		740					392	783			783	690
Back of Queue (*Q*), veh/ln (50 th percentile)		18.6					2.0	7.2			3.6	0.4
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00					0.00	0.00			0.00	0.00
Uniform Delay (d_1), s/veh		20.0					20.9	16.6			14.2	11.7
Incremental Delay (d_2), s/veh		40.1					0.2	2.9			0.2	0.0
Initial Queue Delay (d_3), s/veh		0.0					0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh		60.1					21.1	19.4			14.4	11.8
Level of Service (LOS)		F					C	B			B	B
Approach Delay, s/veh / LOS	60.1	E		0.0			19.8	B		14.1	B	
Intersection Delay, s/veh / LOS	34.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.8	C	1.9	A	2.1	B
Bicycle LOS Score / LOS	1.7	A			1.7	A	1.1	A

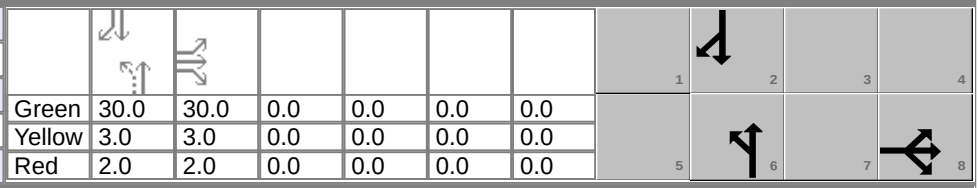
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Aug 9, 2013	Area Type	Other
Jurisdiction	Worcester	Time Period	4:30 - 5:30 PM	PHF	0.98
Urban Street	Southbridge St	Analysis Year	2013	Analysis Period	1> 4:30
Intersection	Southbridge St/Hammo…	File Name	13_Southbridge St & Hammond St_PM-Projected…		
Project Description	Projected 2025				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	508	0	182				226	527			635	625

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	30.0	30.0	0.0	0.0	0.0	0.0						
Yellow	3.0	3.0	0.0	0.0	0.0	0.0						
Red	2.0	2.0	0.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		8				6		2
Case Number		12.0				6.0		7.0
Phase Duration, s		35.0				35.0		35.0
Change Period, ($Y+R_c$), s		5.0				5.0		5.0
Max Allow Headway (*MAH*), s		3.2				3.3		3.3
Queue Clearance Time (g_s), s		29.8				32.0		23.3
Green Extension Time (g_e), s		0.1				0.0		2.5
Phase Call Probability		1.00				1.00		1.00
Max Out Probability		1.00				1.00		0.55

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	3	8	18				1	6			2	12
Adjusted Flow Rate (*v*), veh/h		704					231	538			648	71
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1718					780	1863			1863	1642
Queue Service Time (g_s), s		27.8					8.7	16.2			21.3	1.8
Cycle Queue Clearance Time (g_c), s		27.8					30.0	16.2			21.3	1.8
Green Ratio (*g/C*)		0.43					0.43	0.43			0.43	0.43
Capacity (*c*), veh/h		736					199	798			798	704
Volume-to-Capacity Ratio (*X*)		0.956					1.157	0.674			0.812	0.102
Available Capacity (c_a), veh/h		736					199	798			798	704
Back of Queue (*Q*), veh/ln (50 th percentile)		14.2					9.5	6.4			9.3	0.6
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00					0.00	0.00			0.00	0.00
Uniform Delay (d_1), s/veh		19.4					32.9	16.1			17.5	11.9
Incremental Delay (d_2), s/veh		22.8					112.3	1.8			5.9	0.0
Initial Queue Delay (d_3), s/veh		0.0					0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh		42.2					145.2	17.9			23.5	12.0
Level of Service (LOS)		D					F	B			C	B
Approach Delay, s/veh / LOS	42.2	D		0.0			56.1	E		22.3	C	
Intersection Delay, s/veh / LOS	40.5						D					

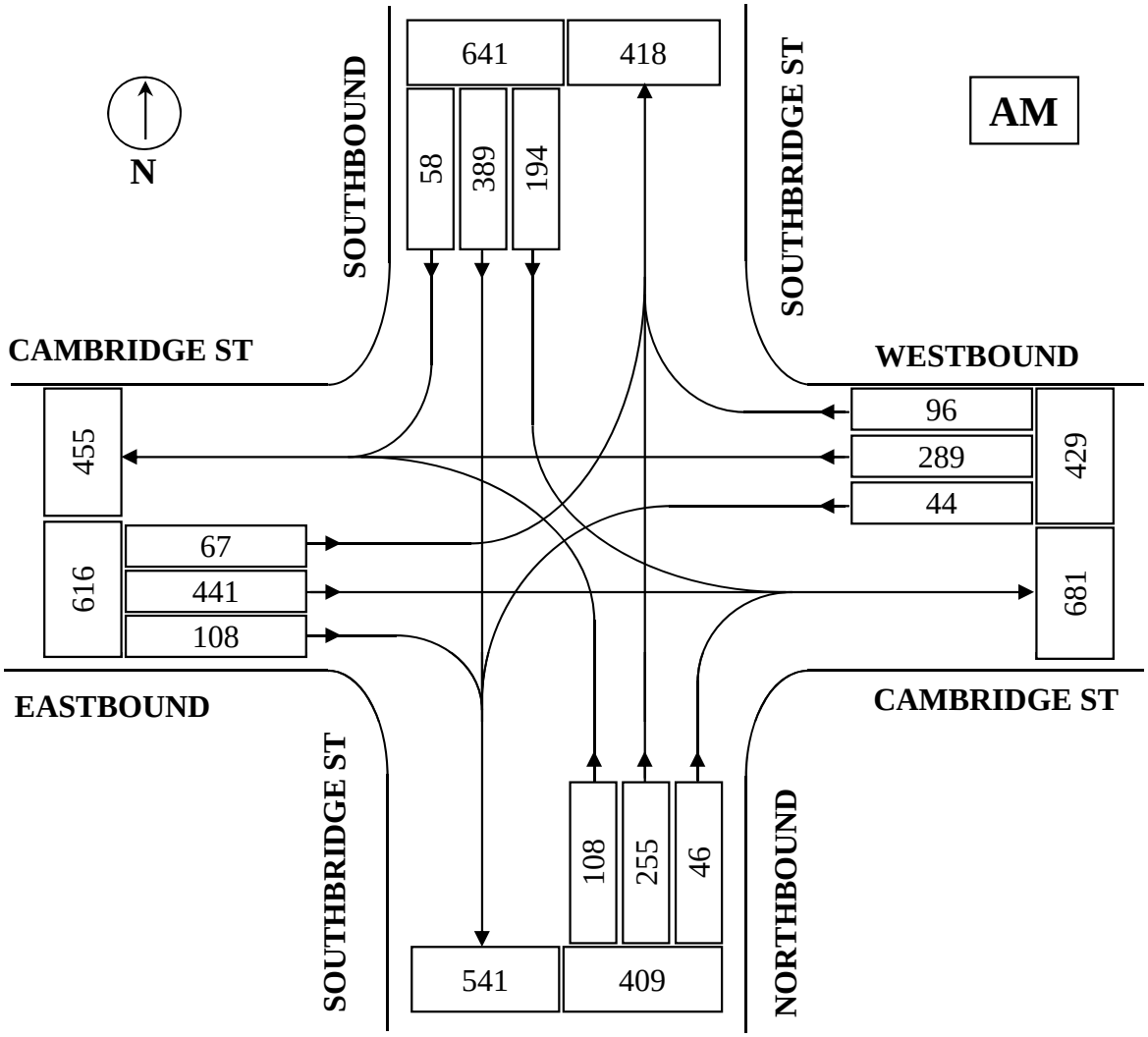
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	3.1	C	1.9	A	2.1	B
Bicycle LOS Score / LOS	1.6	A			1.8	A	1.7	A

 HCS 2010™ Streets Version 6.70 Generated: 10/8/2015 11:09:41 AM

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Worcester **DATE:** 8/25/11 **DAY OF WEEK:** Thursday
INTERSECTION: Cambridge Street / Southbridge Street

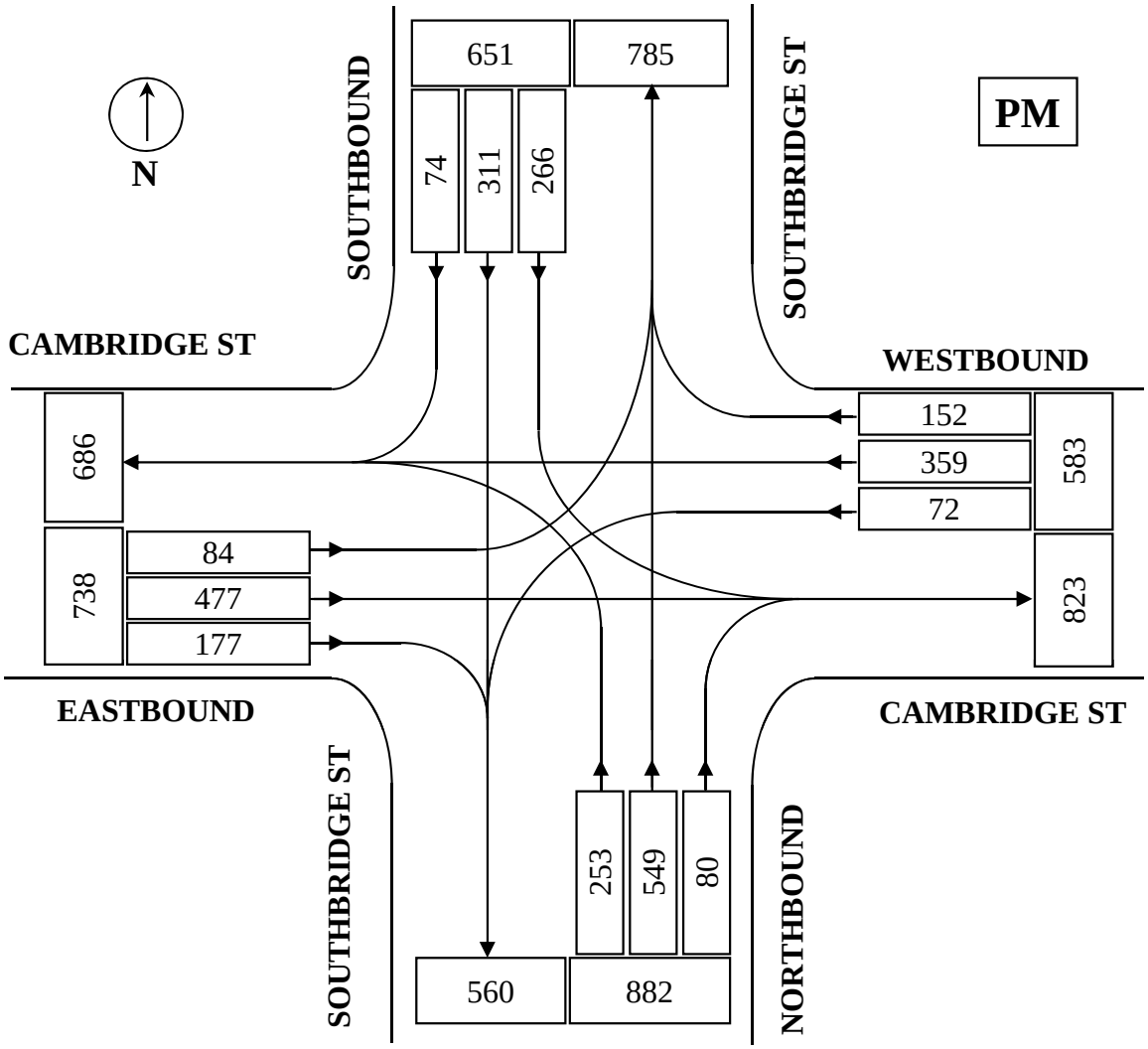


STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
Cambridge St EB	616	29.4%	8:00 - 9:00 AM
Cambridge St WB	429	20.5%	PHF = .98
Southbridge St NB	409	19.5%	**VEHICLES COUNTED**
Southbridge St SB	641	30.6%	**ALL VEHICLES:** 2095
TOTAL	2095	100.0%	**TRUCKS:** 37
			PERCENT TRUCKS: 1.77%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Worcester **DATE:** 8/25/11 **DAY OF WEEK:** Thursday
INTERSECTION: Cambridge Street / Southbridge Street



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
Cambridge St EB	738	25.9%	4:30 - 5:30 PM
Cambridge St WB	583	20.4%	PHF = .91
Southbridge St NB	882	30.9%	**VEHICLES COUNTED**
Southbridge St SB	651	22.8%	**ALL VEHICLES:** 2854
TOTAL	2854	100.0%	**TRUCKS:** 21
			PERCENT TRUCKS: 0.74%

TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: City of Worcester

DATE: 8/25/2011

LOCATION: Cambridge Street/Southbridge Street

DAY OF WEEK: Thursday

WEATHER: AM: Clear PM: Clear

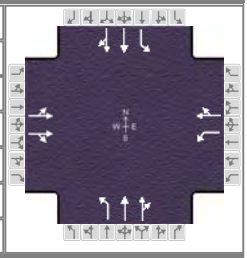
TECHNICIAN: JB

Time Period	Cambridge St EB				Cambridge St WB				Southbridge St NB				Southbridge St SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15	10	95	17	1	7	44	10	2	14	40	7	1	30	67	9	6	350	
7:15 - 7:30	16	100	23	2	4	61	13	2	14	41	12	3	28	90	17	5	419	
7:30 - 7:45	17	120	15	3	15	62	21	1	31	49	8	0	29	118	19	1	504	
7:45 - 8:00	19	112	25	3	13	61	28	3	22	36	5	0	40	119	29	8	509	1782
8:00 - 8:15	17	119	22	3	10	66	23	0	23	60	10	1	39	125	15	4	529	1961
8:15 - 8:30	20	104	28	5	10	69	22	1	31	64	13	3	56	101	15	3	533	2075
8:30 - 8:45	15	121	28	1	18	73	20	3	24	55	12	1	48	81	12	2	507	2078
8:45 - 9:00	15	97	30	4	6	81	31	3	30	76	11	0	51	82	16	3	526	2095
TOTAL	129	868	188	22	83	517	168	15	189	421	78	9	321	783	132	32	3877	
		EBPct	29.4			**WBPct**	20.5			**NBPct**	19.5			**SBPct**	30.6			
Peak Sums:	**67**	**441**	**108**	**13**	**44**	**289**	**96**	**7**	**108**	**255**	**46**	**5**	**194**	**389**	**58**	**12**	**2095**	
Total Trucks	37					**TrkPct**	1.77			**PHF**	0.98							

Time Period	Cambridge St EB				Cambridge St WB				Southbridge St NB				Southbridge St SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15	21	120	49	2	14	95	29	3	48	124	21	1	56	60	18	5	655	
4:15 - 4:30	20	120	45	3	16	101	30	0	39	137	16	1	64	62	11	3	661	
4:30 - 4:45	18	108	57	6	19	89	27	0	66	138	15	1	57	86	23	2	703	
4:45 - 5:00	16	108	51	2	13	83	41	1	54	129	21	1	70	89	15	2	690	2709
5:00 - 5:15	22	134	27	1	17	103	43	0	82	161	29	0	63	84	19	0	784	2838
5:15 - 5:30	28	127	42	2	23	84	41	1	51	121	15	1	76	52	17	1	677	2854
5:30 - 5:45	37	105	36	0	20	102	36	0	66	105	32	1	70	69	10	4	688	2839
5:45 - 6:00	20	108	30	4	13	101	44	0	41	84	21	1	61	53	13	0	589	2738
TOTAL	182	930	337	20	135	758	291	5	447	999	170	7	517	555	126	17	5447	
		EBPct	25.9			**WBPct**	20.4			**NBPct**	30.9			**SBPct**	22.8			
Peak Sums:	**84**	**477**	**177**	**11**	**72**	**359**	**152**	**2**	**253**	**549**	**80**	**3**	**266**	**311**	**74**	**5**	**2854**	
Total Trucks	21					**TrkPct**	0.74			**PHF**	0.91							

HCS7 Signalized Intersection Results Summary

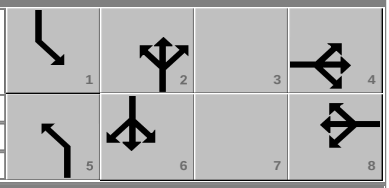
General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date		Area Type	Other
Jurisdiction	Worcester	Time Period	8:00 - 9:00 AM	PHF	0.98
Urban Street	Southbridge St	Analysis Year	2011	Analysis Period	1> 8:00
Intersection	Southbridge & Cambridge	File Name	11_Cambridge St & Southbridge St_AM-BAL.xus		
Project Description	Balanced				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	70	459	112	46	301	100	112	265	48	202	405	60

Signal Information			
Cycle, s	87.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	9.0	32.0	28.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.0	0.0	0.0	0.0



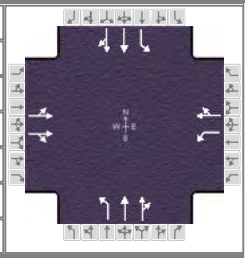
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		8.0		6.0	1.1	4.0	1.1	4.0
Phase Duration, s		34.0		34.0	15.0	38.0	15.0	38.0
Change Period, ($Y+R_c$), s		6.0		6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s		3.3		3.3	2.8	3.1	2.8	3.1
Queue Clearance Time (g_s), s		30.0		21.6	5.2	7.2	8.0	10.2
Green Extension Time (g_e), s		0.0		1.7	0.0	1.5	0.0	1.5
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		1.00		0.41	0.22	0.00	1.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	327		327	47	400		114	159	155	206	239	231
Adjusted Saturation Flow Rate (*s*), veh/h/ln	993		1601	832	1795		1781	1870	1780	1781	1870	1791
Queue Service Time (g_s), s	11.1		15.1	4.4	16.9		3.2	5.1	5.2	6.0	8.1	8.2
Cycle Queue Clearance Time (g_c), s	28.0		15.1	19.6	16.9		3.2	5.1	5.2	6.0	8.1	8.2
Green Ratio (*g/C*)	0.32		0.32	0.32	0.32		0.47	0.37	0.37	0.47	0.37	0.37
Capacity (*c*), veh/h	370		515	206	578		499	688	655	570	688	659
Volume-to-Capacity Ratio (*X*)	0.884		0.634	0.228	0.692		0.229	0.232	0.237	0.362	0.347	0.351
Back of Queue (*Q*), ft/ln (50 th percentile)	226.2		147.9	22.7	188.5		30.8	55	53.7	58.7	86.7	84.2
Back of Queue (*Q*), veh/ln (50 th percentile)	8.9		5.8	0.9	7.4		1.2	2.2	2.1	2.3	3.4	3.3
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00		0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	30.9		25.1	33.5	25.7		13.7	19.0	19.0	14.1	19.9	20.0
Incremental Delay (d_2), s/veh	20.9		2.0	0.2	3.0		0.1	0.1	0.1	0.1	0.1	0.1
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	51.7		27.1	33.7	28.7		13.8	19.1	19.1	14.3	20.0	20.1
Level of Service (LOS)	D		C	C	C		B	B	B	B	C	C
Approach Delay, s/veh / LOS	39.4	D		29.2	C		17.7	B		18.3	B	
Intersection Delay, s/veh / LOS	26.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.7	C	2.3	B
Bicycle LOS Score / LOS	1.0	A	1.2	A	0.8	A	1.0	A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Aug 15, 2017	Area Type	Other
Jurisdiction	Worcester	Time Period	4:30 - 5:30 PM	PHF	0.91
Urban Street	Southbridge St	Analysis Year	2011	Analysis Period	1> 4:30
Intersection	Southbridge & Cambridge	File Name	11_Cambridge St & Southbridge St_PM-BAL.xus		
Project Description	Balanced				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	87	496	184	75	374	158	263	571	83	277	324	77

Signal Information			
Cycle, s	74.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	14.0	20.0	22.0	0.0	0.0	0.0	5	6	7	8
Yellow	4.0	4.0	4.0	0.0	0.0	0.0				
Red	2.0	2.0	2.0	0.0	0.0	0.0				

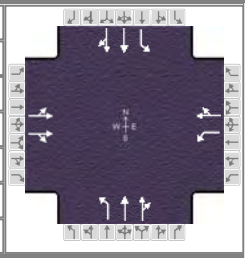
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		8.0		6.0	1.1	4.0	1.1	4.0
Phase Duration, s		28.0		28.0	20.0	26.0	20.0	26.0
Change Period, ($Y+R_c$), s		6.0		6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s		3.4		3.4	2.8	3.1	2.8	3.1
Queue Clearance Time (g_s), s		24.0		24.0	9.7	15.0	10.2	9.4
Green Extension Time (g_e), s		0.0		0.0	0.2	1.4	0.2	2.0
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		1.00		1.00	0.23	0.58	0.38	0.11

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	419		424	82	570		289	364	350	304	222	212
Adjusted Saturation Flow Rate (*s*), veh/h/ln	279		1580	720	1795		1795	1885	1805	1795	1885	1768
Queue Service Time (g_s), s	0.0		19.1	2.9	22.0		7.7	12.9	13.0	8.2	7.2	7.4
Cycle Queue Clearance Time (g_c), s	22.0		19.1	22.0	22.0		7.7	12.9	13.0	8.2	7.2	7.4
Green Ratio (*g/C*)	0.30		0.30	0.30	0.30		0.46	0.27	0.27	0.46	0.27	0.27
Capacity (*c*), veh/h	143		470	126	534		575	510	488	487	510	478
Volume-to-Capacity Ratio (*X*)	2.935		0.903	0.655	1.069		0.502	0.715	0.717	0.625	0.436	0.444
Back of Queue (*Q*), ft/ln (50 th percentile)	952.1		234.4	44.9	440.1		72.1	152.3	147.1	82.1	77.5	74.3
Back of Queue (*Q*), veh/ln (50 th percentile)	37.8		9.3	1.8	17.5		2.9	6.0	5.8	3.3	3.1	2.9
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00		0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	25.2		25.0	36.5	26.0		13.7	24.4	24.4	15.3	22.3	22.4
Incremental Delay (d_2), s/veh	889.6		20.0	9.4	58.6		0.3	4.1	4.3	1.9	0.2	0.2
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	914.7		45.0	45.9	84.6		14.0	28.5	28.8	17.2	22.5	22.6
Level of Service (LOS)	F		D	D	F		B	C	C	B	C	C
Approach Delay, s/veh / LOS	477.2		F	79.7		E	24.4		C	20.4		C
Intersection Delay, s/veh / LOS	152.5						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.7	C	2.3	B
Bicycle LOS Score / LOS	1.2	A	1.6	B	1.3	A	1.1	A

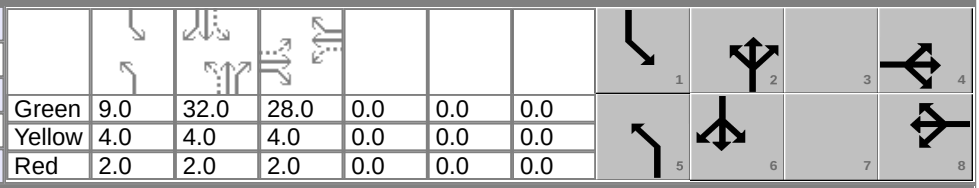
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Aug 15, 2017	Area Type	Other
Jurisdiction	Worcester	Time Period	8:00 - 9:00 AM	PHF	0.98
Urban Street	Southbridge St	Analysis Year	2011	Analysis Period	1> 8:00
Intersection	Southbridge & Cambridge	File Name	11_Cambridge St & Southbridge St_AM-Projected…		
Project Description	Projected 2025				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	77	507	124	51	332	110	124	293	53	223	447	66

Signal Information			
Cycle, s	87.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	9.0	32.0	28.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.0	0.0	0.0	0.0

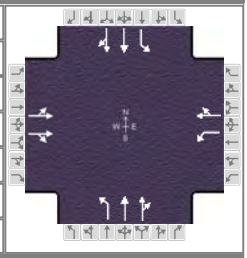
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		8.0		6.0	1.1	4.0	1.1	4.0
Phase Duration, s		34.0		34.0	15.0	38.0	15.0	38.0
Change Period, ($Y+R_c$), s		6.0		6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s		3.3		3.3	2.8	3.1	2.8	3.1
Queue Clearance Time (g_s), s		30.0		24.7	5.5	7.9	8.7	11.1
Green Extension Time (g_e), s		0.0		1.2	0.0	1.7	0.0	1.6
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		1.00		0.99	0.39	0.00	1.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	360		363	52	442		127	177	171	228	264	255
Adjusted Saturation Flow Rate (*s*), veh/h/ln	810		1601	786	1795		1781	1870	1779	1781	1870	1790
Queue Service Time (g_s), s	8.7		17.3	5.4	19.3		3.5	5.7	5.9	6.7	9.0	9.1
Cycle Queue Clearance Time (g_c), s	28.0		17.3	22.7	19.3		3.5	5.7	5.9	6.7	9.0	9.1
Green Ratio (*g/C*)	0.32		0.32	0.32	0.32		0.47	0.37	0.37	0.47	0.37	0.37
Capacity (*c*), veh/h	311		515	180	578		479	688	654	554	688	659
Volume-to-Capacity Ratio (*X*)	1.157		0.703	0.289	0.765		0.264	0.257	0.262	0.411	0.384	0.388
Back of Queue (*Q*), ft/ln (50 th percentile)	388.5		173.9	26.3	223		34.4	61.6	60	65.7	97.4	94.3
Back of Queue (*Q*), veh/ln (50 th percentile)	15.3		6.8	1.0	8.8		1.4	2.4	2.4	2.6	3.8	3.7
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00		0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	32.6		25.9	35.8	26.5		13.9	19.2	19.2	14.4	20.2	20.3
Incremental Delay (d_2), s/veh	100.4		3.7	0.3	5.5		0.1	0.1	0.1	0.2	0.1	0.1
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	133.1		29.5	36.1	32.0		14.0	19.3	19.3	14.6	20.4	20.4
Level of Service (LOS)	F		C	D	C		B	B	B	B	C	C
Approach Delay, s/veh / LOS	81.1		F	32.4		C	17.9		B	18.6		B
Intersection Delay, s/veh / LOS	39.8						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.7	C	2.3	B
Bicycle LOS Score / LOS	1.1	A	1.3	A	0.9	A	1.1	A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Aug 15, 2017	Area Type	Other
Jurisdiction	Worcester	Time Period	4:30 - 5:30 PM	PHF	0.91
Urban Street	Southbridge St	Analysis Year	2011	Analysis Period	1> 4:30
Intersection	Southbridge & Cambridge	File Name	11_Cambridge St & Southbridge St_PM-Projected…		
Project Description	Projected 2025				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	96	548	203	83	413	175	291	631	92	306	358	85

Signal Information			
Cycle, s	74.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	14.0	20.0	22.0	0.0	0.0	0.0	5	6	7	8
Yellow	4.0	4.0	4.0	0.0	0.0	0.0				
Red	2.0	2.0	2.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		8.0		6.0	1.1	4.0	1.1	4.0
Phase Duration, s		28.0		28.0	20.0	26.0	20.0	26.0
Change Period, ($Y+R_c$), s		6.0		6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s		3.4		3.4	2.8	3.1	2.8	3.1
Queue Clearance Time (g_s), s		24.0		24.0	10.7	16.7	11.2	10.3
Green Extension Time (g_e), s		0.0		0.0	0.2	1.2	0.2	2.2
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		1.00		1.00	0.62	0.97	1.00	0.18

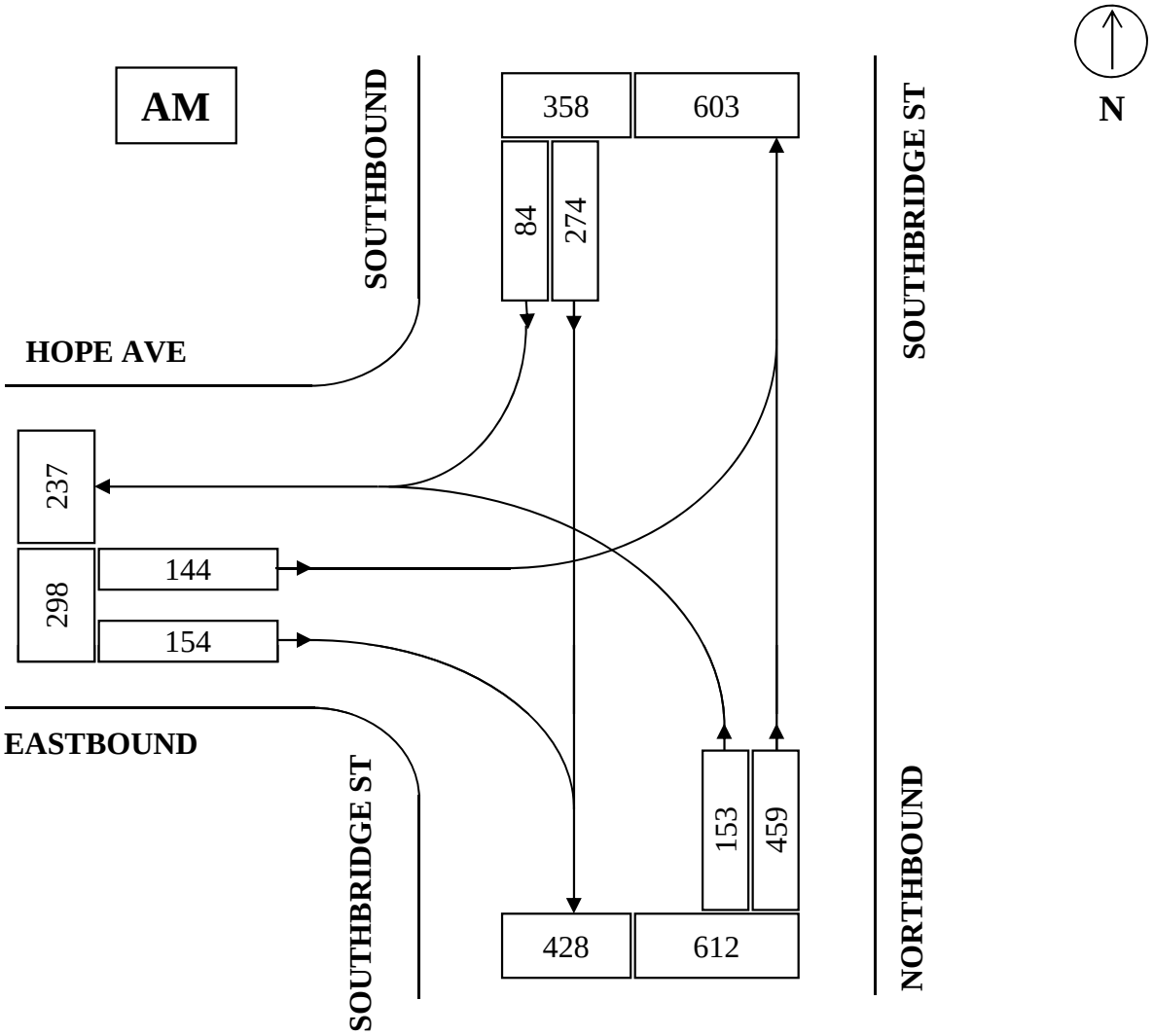
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	459		472	91	632		320	403	387	336	246	234
Adjusted Saturation Flow Rate (*s*), veh/h/ln	234		1581	669	1794		1795	1885	1804	1795	1885	1767
Queue Service Time (g_s), s	0.0		22.0	0.0	22.0		8.7	14.7	14.7	9.2	8.1	8.3
Cycle Queue Clearance Time (g_c), s	22.0		22.0	22.0	22.0		8.7	14.7	14.7	9.2	8.1	8.3
Green Ratio (*g/C*)	0.30		0.30	0.30	0.30		0.46	0.27	0.27	0.46	0.27	0.27
Capacity (*c*), veh/h	129		470	97	533		558	510	488	468	510	478
Volume-to-Capacity Ratio (*X*)	3.545		1.004	0.937	1.185		0.573	0.792	0.793	0.719	0.483	0.491
Back of Queue (*Q*), ft/ln (50 th percentile)	1112.6		334.5	88.4	597.7		83.7	183.8	177.5	100.3	87.2	83.3
Back of Queue (*Q*), veh/ln (50 th percentile)	44.2		13.3	3.5	23.7		3.3	7.3	7.0	4.0	3.5	3.3
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00		0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	25.9		26.0	37.0	26.0		14.2	25.1	25.1	15.9	22.7	22.7
Incremental Delay (d_2), s/veh	1164.2		42.5	70.2	100.9		0.9	7.7	8.1	4.6	0.3	0.3
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	1190.1		68.5	107.2	126.9		15.2	32.7	33.1	20.5	22.9	23.0
Level of Service (LOS)	F		F	F	F		B	C	C	C	C	C
Approach Delay, s/veh / LOS	621.5	F		124.4	F		27.8	C		21.9	C	
Intersection Delay, s/veh / LOS	200.3						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.7	C	2.3	B
Bicycle LOS Score / LOS	1.3	A	1.7	B	1.4	A	1.2	A

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Worcester **DATE:** 6/20/13 **DAY OF WEEK:** Thursday
INTERSECTION: Southbridge Street / Hope Avenue

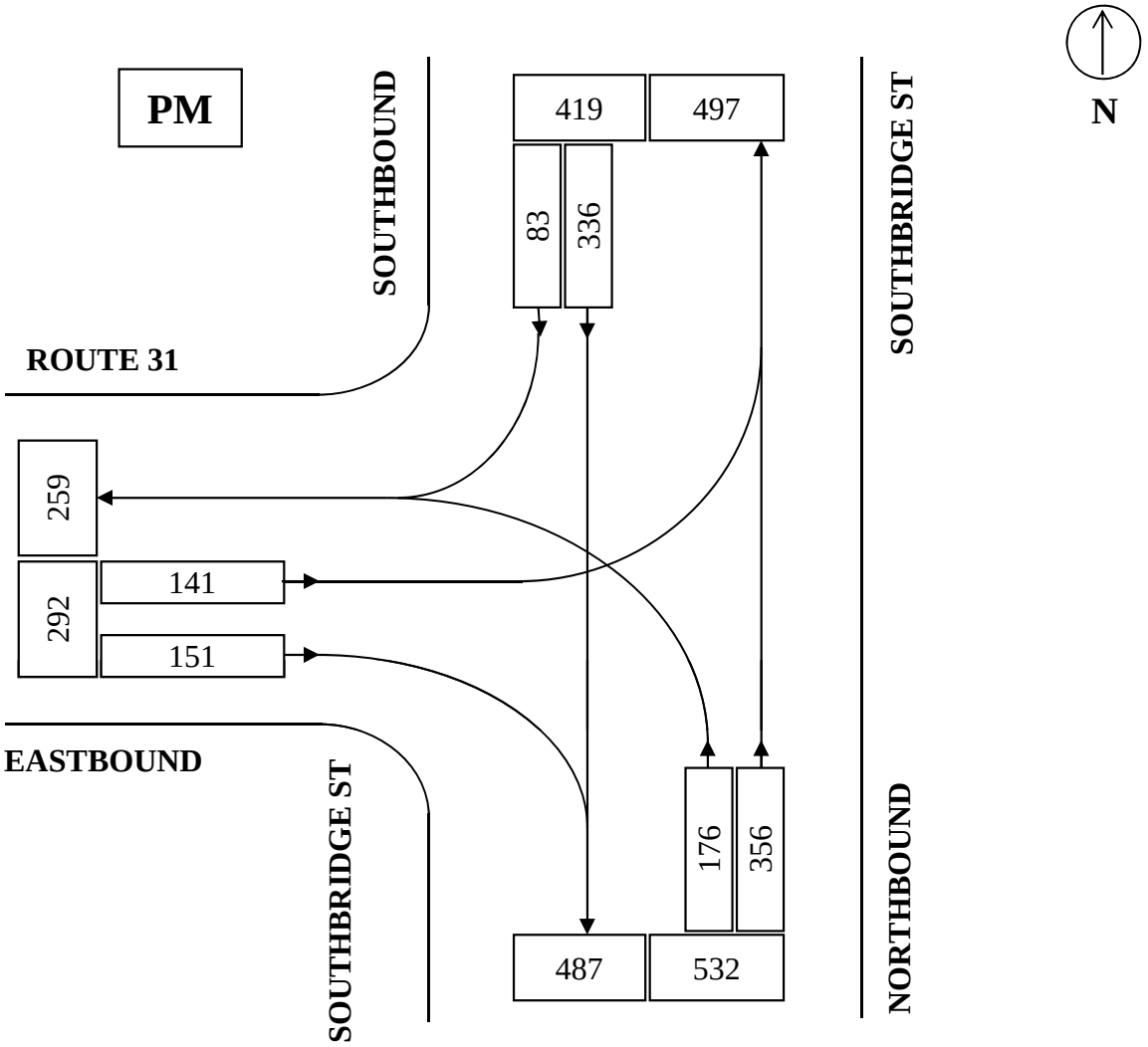


STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			7:30 - 8:30 AM
Hope Ave EB	298	23.5%	
			PHF = .88
Southbridge St NB	612	48.3%	
			VEHICLES COUNTED
Southbridge St SB	358	28.2%	
			ALL VEHICLES: 1268
TOTAL	1268	100.0%	**TRUCKS:** 108
			PERCENT TRUCKS 8.52%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Worcester **DATE:** 6/20/13 **DAY OF WEEK:** Thursday
INTERSECTION: Southbridge Street / Hope Avenue



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			4:30 - 5:30 PM
Hope Ave EB	292	23.5%	
			PHF = .90
Southbridge St NB	532	42.8%	
			VEHICLES COUNTED
Southbridge St SB	419	33.7%	
			ALL VEHICLES: 1243
TOTAL	1243	100.0%	**TRUCKS:** 57
			PERCENT TRUCKS 4.59%

TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: City of Worcester

DATE: 6/20/2013

LOCATION: Southbridge Street / Hope Avenue

DAY OF WEEK: Thursday

WEATHER: AM: Clear PM: Clear

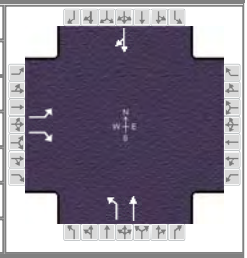
TECHNICIAN: RJ

Time Period	Hope Ave EB								Southbridge St NB				Southbridge St SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15	29	0	30	5					22	58	0	5	0	45	10	7	194	
7:15 - 7:30	37	0	33	7					30	84	0	10	0	53	25	4	262	
7:30 - 7:45	38	0	30	3					44	97	0	8	0	56	19	9	284	
7:45 - 8:00	40	0	45	5					40	112	0	14	0	97	28	15	362	1102
8:00 - 8:15	23	0	38	7					41	130	0	13	0	69	15	8	316	1224
8:15 - 8:30	43	0	41	4					28	120	0	9	0	52	22	13	306	1268
8:30 - 8:45	37	0	32	10					40	70	0	9	0	50	17	8	246	1230
8:45 - 9:00	36	0	27	5					46	49	0	9	0	62	12	9	232	1100
TOTAL	283	0	276	46	0	0	0	0	291	720	0	77	0	484	148	73	2202	
		EBPct	23.5			**WBPct**	0.0			**NBPct**	48.3			**SBPct**	28.2			
Peak Sums:	**144**	**0**	**154**	**19**	**0**	**0**	**0**	**0**	**153**	**459**	**0**	**44**	**0**	**274**	**84**	**45**	**1268**	
Total Trucks	108					**TrkPct**	8.52			**PHF**	0.88							

Time Period	Hope Ave EB								Southbridge St NB				Southbridge St SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15	30	0	44	2					57	103	0	8	0	81	27	7	342	
4:15 - 4:30	24	0	51	4					44	82	0	2	0	78	18	17	297	
4:30 - 4:45	27	0	30	5					49	73	0	4	0	87	35	10	301	
4:45 - 5:00	34	0	45	2					33	93	0	6	0	80	2	6	287	1227
5:00 - 5:15	37	0	31	5					49	107	0	1	0	96	26	9	346	1231
5:15 - 5:30	43	0	45	4					45	83	0	4	0	73	20	1	309	1243
5:30 - 5:45	32	0	44	2					44	78	0	4	0	5	15	4	218	1160
5:45 - 6:00	30	0	31	4					30	60	0	1	0	64	11	7	226	1099
TOTAL	257	0	321	28	0	0	0	0	351	679	0	30	0	564	154	61	2326	
		EBPct	23.5			**WBPct**	0.0			**NBPct**	42.8			**SBPct**	33.7			
Peak Sums:	**141**	**0**	**151**	**16**	**0**	**0**	**0**	**0**	**176**	**356**	**0**	**15**	**0**	**336**	**83**	**26**	**1243**	
Total Trucks	57					**TrkPct**	4.59			**PHF**	0.90							

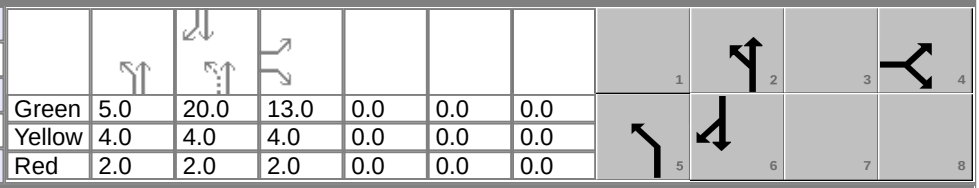
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	6/12/2014	Area Type	Other
Jurisdiction	Worcester	Time Period	7:30 - 8:30 AM	PHF	0.88
Urban Street	Southbridge St	Analysis Year	2014	Analysis Period	1> 7:00
Intersection	Southbridge St/Hope Ave	File Name	14_Southbridge St & Hope Ave_AM_BAL.xus		
Project Description	Balanced				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	148		159				158	473			282	87

Signal Information			
Cycle, s	56.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	5.0	20.0	13.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.0	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			1.0	4.0		8.3
Phase Duration, s		19.0			11.0	37.0		26.0
Change Period, ($Y+R_c$), s		6.0			6.0	6.0		6.0
Max Allow Headway (*MAH*), s		3.2			3.1	3.1		3.1
Queue Clearance Time (g_s), s		7.7			5.5	13.0		13.2
Green Extension Time (g_e), s		0.4			0.0	1.7		1.3
Phase Call Probability		1.00			1.00	1.00		1.00
Max Out Probability		0.23			1.00	0.04		0.25

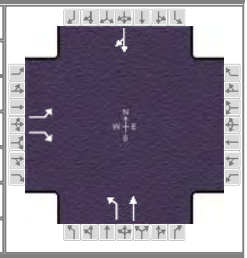
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h	168		181				180	538			402	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1740		1548				1675	1759			1697	
Queue Service Time (g_s), s	4.6		5.7				3.5	11.0			11.2	
Cycle Queue Clearance Time (g_c), s	4.6		5.7				3.5	11.0			11.2	
Green Ratio (*g/C*)	0.23		0.23				0.48	0.55			0.36	
Capacity (*c*), veh/h	404		359				424	974			606	
Volume-to-Capacity Ratio (*X*)	0.416		0.503				0.424	0.552			0.664	
Available Capacity (c_a), veh/h	404		359				424	974			606	
Back of Queue (*Q*), veh/ln (50 th percentile)	1.7		1.8				1.0	3.1			4.0	
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00		0.95				0.68	0.00			0.00	
Uniform Delay (d_1), s/veh	18.3		18.7				10.3	8.0			15.2	
Incremental Delay (d_2), s/veh	0.3		0.4				0.3	0.4			2.2	
Initial Queue Delay (d_3), s/veh	0.0		0.0				0.0	0.0			0.0	
Control Delay (*d*), s/veh	18.5		19.1				10.6	8.4			17.4	
Level of Service (LOS)	B		B				B	A			B	
Approach Delay, s/veh / LOS	18.8		B	0.0			9.0		A	17.4		B
Intersection Delay, s/veh / LOS	13.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.2	B	0.7	A	2.3	B
Bicycle LOS Score / LOS		F			1.7	A	1.2	A

 HCS 2010™ Streets Version 6.70 Generated: 9/28/2015 12:53:23 PM

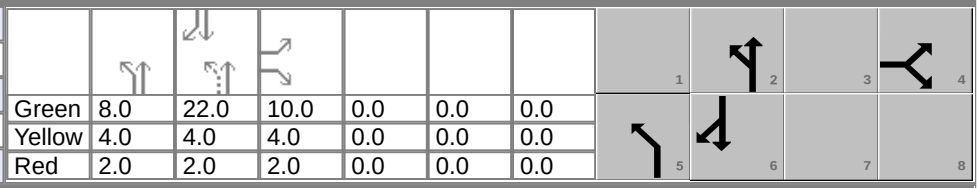
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	6/12/2014	Area Type	Other
Jurisdiction	Worcester	Time Period	4:30 - 5:30 PM	PHF	0.90
Urban Street	Southbridge St	Analysis Year	2014	Analysis Period	1> 4:30
Intersection	Southbridge St/Hope Ave	File Name	14_Southbridge St & Hope Ave_PM_BAL.xus		
Project Description	Balanced				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	145		156				181	367			346	86

Signal Information			
Cycle, s	58.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	8.0	22.0	10.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.0	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			1.0	4.0		8.3
Phase Duration, s		16.0			14.0	42.0		28.0
Change Period, ($Y+R_c$), s		6.0			6.0	6.0		6.0
Max Allow Headway (*MAH*), s		3.2			3.1	3.1		3.1
Queue Clearance Time (g_s), s		8.1			5.4	8.3		14.9
Green Extension Time (g_e), s		0.2			0.1	1.7		1.2
Phase Call Probability		1.00			1.00	1.00		1.00
Max Out Probability		1.00			1.00	0.00		0.20

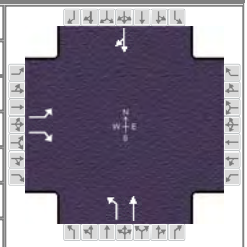
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h	161		173				201	408			467	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1740		1548				1740	1827			1771	
Queue Service Time (g_s), s	4.9		6.1				3.4	6.3			12.9	
Cycle Queue Clearance Time (g_c), s	4.9		6.1				3.4	6.3			12.9	
Green Ratio (*g/C*)	0.17		0.17				0.55	0.62			0.38	
Capacity (*c*), veh/h	300		267				506	1134			672	
Volume-to-Capacity Ratio (*X*)	0.537		0.649				0.397	0.360			0.695	
Available Capacity (c_a), veh/h	300		267				506	1134			672	
Back of Queue (*Q*), veh/ln (50 th percentile)	1.9		2.3				1.0	1.6			4.8	
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00		0.00				0.62	0.00			0.00	
Uniform Delay (d_1), s/veh	21.9		22.4				9.0	5.4			15.2	
Incremental Delay (d_2), s/veh	1.0		4.3				0.2	0.1			2.6	
Initial Queue Delay (d_3), s/veh	0.0		0.0				0.0	0.0			0.0	
Control Delay (*d*), s/veh	22.9		26.7				9.2	5.4			17.8	
Level of Service (LOS)	C		C				A	A			B	
Approach Delay, s/veh / LOS	24.9	C		0.0			6.7	A		17.8	B	
Intersection Delay, s/veh / LOS	14.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	0.7	A	2.3	B
Bicycle LOS Score / LOS		F			1.5	A	1.3	A

 HCS 2010™ Streets Version 6.70 Generated: 9/28/2015 12:56:48 PM

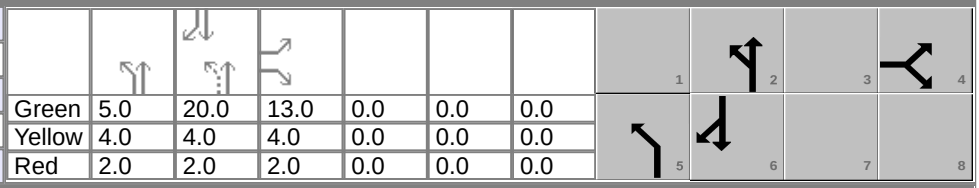
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	6/12/2014	Area Type	Other
Jurisdiction	Worcester	Time Period	7:30 - 8:30 AM	PHF	0.88
Urban Street	Southbridge St	Analysis Year	2014	Analysis Period	1> 7:00
Intersection	Southbridge St/Hope Ave	File Name	14_Southbridge St & Hope Ave_AM_Projected.xus		
Project Description	Projected 2025				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	172		185				183	549			327	101

Signal Information			
Cycle, s	56.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	5.0	20.0	13.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.0	0.0	0.0	0.0

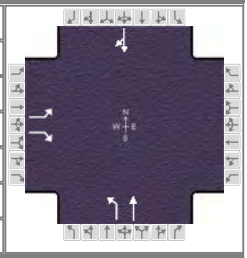
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			1.0	4.0		8.3
Phase Duration, s		19.0			11.0	37.0		26.0
Change Period, ($Y+R_c$), s		6.0			6.0	6.0		6.0
Max Allow Headway (*MAH*), s		3.2			3.1	3.1		3.1
Queue Clearance Time (g_s), s		8.8			6.1	15.7		15.8
Green Extension Time (g_e), s		0.4			0.0	1.8		1.2
Phase Call Probability		1.00			1.00	1.00		1.00
Max Out Probability		0.52			1.00	0.15		0.70

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h	195		210				208	624			469	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1740		1548				1675	1759			1696	
Queue Service Time (g_s), s	5.4		6.8				4.1	13.7			13.8	
Cycle Queue Clearance Time (g_c), s	5.4		6.8				4.1	13.7			13.8	
Green Ratio (*g/C*)	0.23		0.23				0.48	0.55			0.36	
Capacity (*c*), veh/h	404		359				375	974			606	
Volume-to-Capacity Ratio (*X*)	0.484		0.585				0.555	0.641			0.775	
Available Capacity (c_a), veh/h	404		359				375	974			606	
Back of Queue (*Q*), veh/ln (50 th percentile)	2.0		2.3				1.3	4.0			5.4	
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00		1.19				0.85	0.00			0.00	
Uniform Delay (d_1), s/veh	18.6		19.1				11.5	8.6			16.0	
Incremental Delay (d_2), s/veh	0.3		1.7				1.1	1.1			5.7	
Initial Queue Delay (d_3), s/veh	0.0		0.0				0.0	0.0			0.0	
Control Delay (*d*), s/veh	18.9		20.8				12.6	9.8			21.7	
Level of Service (LOS)	B		C				B	A			C	
Approach Delay, s/veh / LOS	19.9	B		0.0			10.5	B		21.7	C	
Intersection Delay, s/veh / LOS	15.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.2	B	0.7	A	2.3	B
Bicycle LOS Score / LOS		F			1.9	A	1.3	A

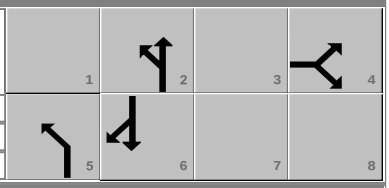
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	6/12/2014	Area Type	Other
Jurisdiction	Worcester	Time Period	4:30 - 5:30 PM	PHF	0.90
Urban Street	Southbridge St	Analysis Year	2014	Analysis Period	1> 4:30
Intersection	Southbridge St/Hope Ave	File Name	14_Southbridge St & Hope Ave_PM_Projected.xus		
Project Description	Projected 2025				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	168		181				210	426			402	100

Signal Information			
Cycle, s	58.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	8.0	22.0	10.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.0	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			1.0	4.0		8.3
Phase Duration, s		16.0			14.0	42.0		28.0
Change Period, ($Y+R_c$), s		6.0			6.0	6.0		6.0
Max Allow Headway (*MAH*), s		3.2			3.1	3.1		3.1
Queue Clearance Time (g_s), s		9.2			6.0	9.7		18.0
Green Extension Time (g_e), s		0.1			0.1	2.0		1.1
Phase Call Probability		1.00			1.00	1.00		1.00
Max Out Probability		1.00			1.00	0.00		0.73

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h	187		201				233	473			544	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1740		1548				1740	1827			1770	
Queue Service Time (g_s), s	5.8		7.2				4.0	7.7			16.0	
Cycle Queue Clearance Time (g_c), s	5.8		7.2				4.0	7.7			16.0	
Green Ratio (*g/C*)	0.17		0.17				0.55	0.62			0.38	
Capacity (*c*), veh/h	300		267				451	1134			671	
Volume-to-Capacity Ratio (*X*)	0.622		0.753				0.517	0.417			0.811	
Available Capacity (c_a), veh/h	300		267				451	1134			671	
Back of Queue (*Q*), veh/ln (50 th percentile)	2.4		3.1				1.2	2.0			6.7	
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00		0.00				0.74	0.00			0.00	
Uniform Delay (d_1), s/veh	22.2		22.8				10.6	5.6			16.1	
Incremental Delay (d_2), s/veh	3.0		10.3				0.5	0.1			6.9	
Initial Queue Delay (d_3), s/veh	0.0		0.0				0.0	0.0			0.0	
Control Delay (*d*), s/veh	25.2		33.1				11.1	5.7			23.1	
Level of Service (LOS)	C		C				B	A			C	
Approach Delay, s/veh / LOS	29.3	C		0.0			7.5	A		23.1	C	
Intersection Delay, s/veh / LOS	17.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	0.7	A	2.3	B
Bicycle LOS Score / LOS		F			1.7	A	1.4	A

Town of Auburn

- Traffic Counts

- Turning Movement Counts: Existing Balanced and Projected 2025 Level of Service Results

CMRPC
2 Washington Square, Union Station
Worcester, MA 01604-4016

City/Town: : Worcester
Street: : Southbridge St
Location: : At Auburn Town Line

Site: 2015163

Weekly Volume

Interval Start	Mon 9/14/2015		Tue 9/15/2015		Wed 9/16/2015		Thu 9/17/2015		Fri 9/18/2015		Sat 9/19/2015		Sun 9/20/2015		Mon - Fri Average		Weekly Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	-	-	37	44	28	31	-	-	-	-	-	-	-	-	32.5	37.5	32.5	37.5
1:00 AM	-	-	23	29	24	29	-	-	-	-	-	-	-	-	23.5	29.0	23.5	29.0
2:00 AM	-	-	15	18	24	26	-	-	-	-	-	-	-	-	19.5	22.0	19.5	22.0
3:00 AM	-	-	26	20	26	29	-	-	-	-	-	-	-	-	26.0	24.5	26.0	24.5
4:00 AM	-	-	50	53	43	88	-	-	-	-	-	-	-	-	46.5	70.5	46.5	70.5
5:00 AM	-	-	107	127	100	113	-	-	-	-	-	-	-	-	103.5	120.0	103.5	120.0
6:00 AM	-	-	256	208	278	166	-	-	-	-	-	-	-	-	267.0	187.0	267.0	187.0
7:00 AM	-	-	649	293	642	297	-	-	-	-	-	-	-	-	645.5	295.0	645.5	295.0
8:00 AM	-	-	615	325	581	302	-	-	-	-	-	-	-	-	598.0	313.5	598.0	313.5
9:00 AM	-	-	329	294	382	331	-	-	-	-	-	-	-	-	355.5	312.5	355.5	312.5
10:00 AM	-	-	343	280	-	-	-	-	-	-	-	-	-	-	343.0	280.0	343.0	280.0
11:00 AM	350	323	359	346	-	-	-	-	-	-	-	-	-	-	354.5	334.5	354.5	334.5
12:00 PM	387	342	396	375	-	-	-	-	-	-	-	-	-	-	391.5	358.5	391.5	358.5
1:00 PM	361	361	400	349	-	-	-	-	-	-	-	-	-	-	380.5	355.0	380.5	355.0
2:00 PM	395	399	411	446	-	-	-	-	-	-	-	-	-	-	403.0	422.5	403.0	422.5
3:00 PM	434	417	483	439	-	-	-	-	-	-	-	-	-	-	458.5	428.0	458.5	428.0
4:00 PM	475	453	464	422	-	-	-	-	-	-	-	-	-	-	469.5	437.5	469.5	437.5
5:00 PM	450	397	427	373	-	-	-	-	-	-	-	-	-	-	438.5	385.0	438.5	385.0
6:00 PM	287	266	278	381	-	-	-	-	-	-	-	-	-	-	282.5	323.5	282.5	323.5
7:00 PM	241	194	235	228	-	-	-	-	-	-	-	-	-	-	238.0	211.0	238.0	211.0
8:00 PM	185	161	196	170	-	-	-	-	-	-	-	-	-	-	190.5	165.5	190.5	165.5
9:00 PM	130	130	188	124	-	-	-	-	-	-	-	-	-	-	159.0	127.0	159.0	127.0
10:00 PM	92	90	156	86	-	-	-	-	-	-	-	-	-	-	124.0	88.0	124.0	88.0
11:00 PM	39	36	68	52	-	-	-	-	-	-	-	-	-	-	53.5	44.0	53.5	44.0
Totals	3826	3569	6511	5482	2128	1412	0	0	0	0	0	0	0	0	6404.0	5371.5	6404.0	5371.5
Combined	7395		11993		3540		0		0		0		0		11775.5		11775.5	
Split (%)	51.7	48.3	54.3	45.7	60.1	39.9	-	-	-	-	-	-	-	-	54.4	45.6	54.4	45.6

Peak Hours

12:00 AM - 12:00 PM	11:00 AM	11:00 AM	7:00 AM	11:00 AM	7:00 AM	9:00 AM	-	-	-	-	-	-	-	-	7:00 AM	11:00 AM	7:00 AM	11:00 AM
Volume	350	323	649	346	642	331	-	-	-	-	-	-	-	-	645.5	334.5	645.5	334.5
12:00 PM - 12:00 AM	4:00 PM	4:00 PM	3:00 PM	2:00 PM	-	-	-	-	-	-	-	-	-	-	4:00 PM	4:00 PM	4:00 PM	4:00 PM
Volume	475	453	483	446	-	-	-	-	-	-	-	-	-	-	469.5	437.5	469.5	437.5

CMRPC
2 Washington Square, Union Station
Worcester, MA 01604-4016

City/Town: : Auburn
Street: : Route 12
Location: : North of Auburn St

Site: 2014188

Weekly Volume

Interval Start	Mon 10/27/2014		Tue 10/28/2014		Wed 10/29/2014		Thu 10/30/2014		Fri 10/31/2014		Sat 11/1/2014		Sun 11/2/2014		Mon - Fri Average		Weekly Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	-	-	18	16	22	23	19	8	-	-	-	-	-	-	19.7	15.7	19.7	15.7
1:00 AM	-	-	8	12	11	11	11	13	-	-	-	-	-	-	10.0	12.0	10.0	12.0
2:00 AM	-	-	8	12	7	17	12	12	-	-	-	-	-	-	9.0	13.7	9.0	13.7
3:00 AM	-	-	12	17	14	19	12	17	-	-	-	-	-	-	12.7	17.7	12.7	17.7
4:00 AM	-	-	48	38	55	35	46	28	-	-	-	-	-	-	49.7	33.7	49.7	33.7
5:00 AM	-	-	96	61	89	79	95	71	-	-	-	-	-	-	93.3	70.3	93.3	70.3
6:00 AM	-	-	185	102	183	126	197	109	-	-	-	-	-	-	188.3	112.3	188.3	112.3
7:00 AM	-	-	488	254	530	257	519	247	-	-	-	-	-	-	512.3	252.7	512.3	252.7
8:00 AM	-	-	480	269	555	223	487	262	-	-	-	-	-	-	507.3	251.3	507.3	251.3
9:00 AM	-	-	311	238	300	270	296	279	-	-	-	-	-	-	302.3	262.3	302.3	262.3
10:00 AM	-	-	302	295	290	299	304	293	-	-	-	-	-	-	298.7	295.7	298.7	295.7
11:00 AM	-	-	353	350	326	396	320	335	-	-	-	-	-	-	333.0	360.3	333.0	360.3
12:00 PM	-	-	337	349	366	399	-	-	-	-	-	-	-	-	351.5	374.0	351.5	374.0
1:00 PM	-	-	372	353	369	324	-	-	-	-	-	-	-	-	370.5	338.5	370.5	338.5
2:00 PM	323	340	389	372	368	363	-	-	-	-	-	-	-	-	360.0	358.3	360.0	358.3
3:00 PM	394	416	371	425	357	451	-	-	-	-	-	-	-	-	374.0	430.7	374.0	430.7
4:00 PM	376	456	336	429	355	502	-	-	-	-	-	-	-	-	355.7	462.3	355.7	462.3
5:00 PM	340	407	331	429	354	442	-	-	-	-	-	-	-	-	341.7	426.0	341.7	426.0
6:00 PM	253	262	293	235	263	264	-	-	-	-	-	-	-	-	269.7	253.7	269.7	253.7
7:00 PM	206	135	204	166	229	168	-	-	-	-	-	-	-	-	213.0	156.3	213.0	156.3
8:00 PM	114	121	147	119	138	123	-	-	-	-	-	-	-	-	133.0	121.0	133.0	121.0
9:00 PM	98	98	87	98	96	89	-	-	-	-	-	-	-	-	93.7	95.0	93.7	95.0
10:00 PM	65	68	56	70	70	77	-	-	-	-	-	-	-	-	63.7	71.7	63.7	71.7
11:00 PM	26	39	31	36	30	37	-	-	-	-	-	-	-	-	29.0	37.3	29.0	37.3
Totals	2195	2342	5263	4745	5377	4994	2318	1674	0	0	0	0	0	0	5291.7	4822.5	5291.7	4822.5
Combined	4537		10008		10371		3992		0		0		0		10114.2		10114.2	
Split (%)	48.4	51.6	52.6	47.4	51.8	48.2	58.1	41.9	-	-	-	-	-	-	52.3	47.7	52.3	47.7

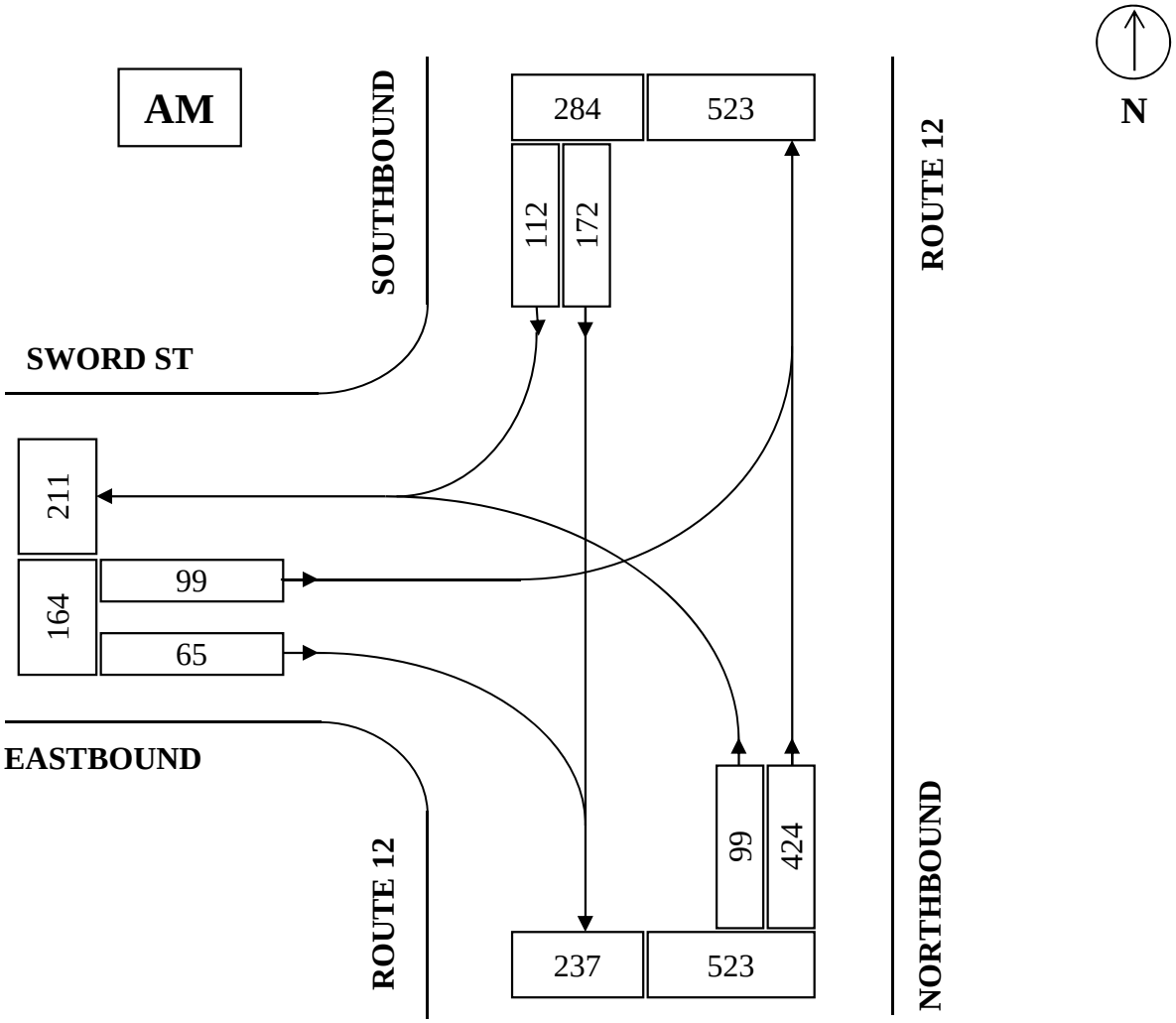
Peak Hours

12:00 AM - 12:00 PM	-	-	7:00 AM	11:00 AM	8:00 AM	11:00 AM	7:00 AM	11:00 AM	-	-	-	-	-	-	7:00 AM	11:00 AM	7:00 AM	11:00 AM
Volume	-	-	488	350	555	396	519	335	-	-	-	-	-	-	512.3	360.3	512.3	360.3
12:00 PM - 12:00 AM	3:00 PM	4:00 PM	2:00 PM	4:00 PM	1:00 PM	4:00 PM	-	-	-	-	-	-	-	-	3:00 PM	4:00 PM	3:00 PM	4:00 PM
Volume	394	456	389	429	369	502	-	-	-	-	-	-	-	-	374.0	462.3	374.0	462.3

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Auburn **DATE:** 5/22/14 **DAY OF WEEK:** Thursday
INTERSECTION: Route 12 / Sword Street

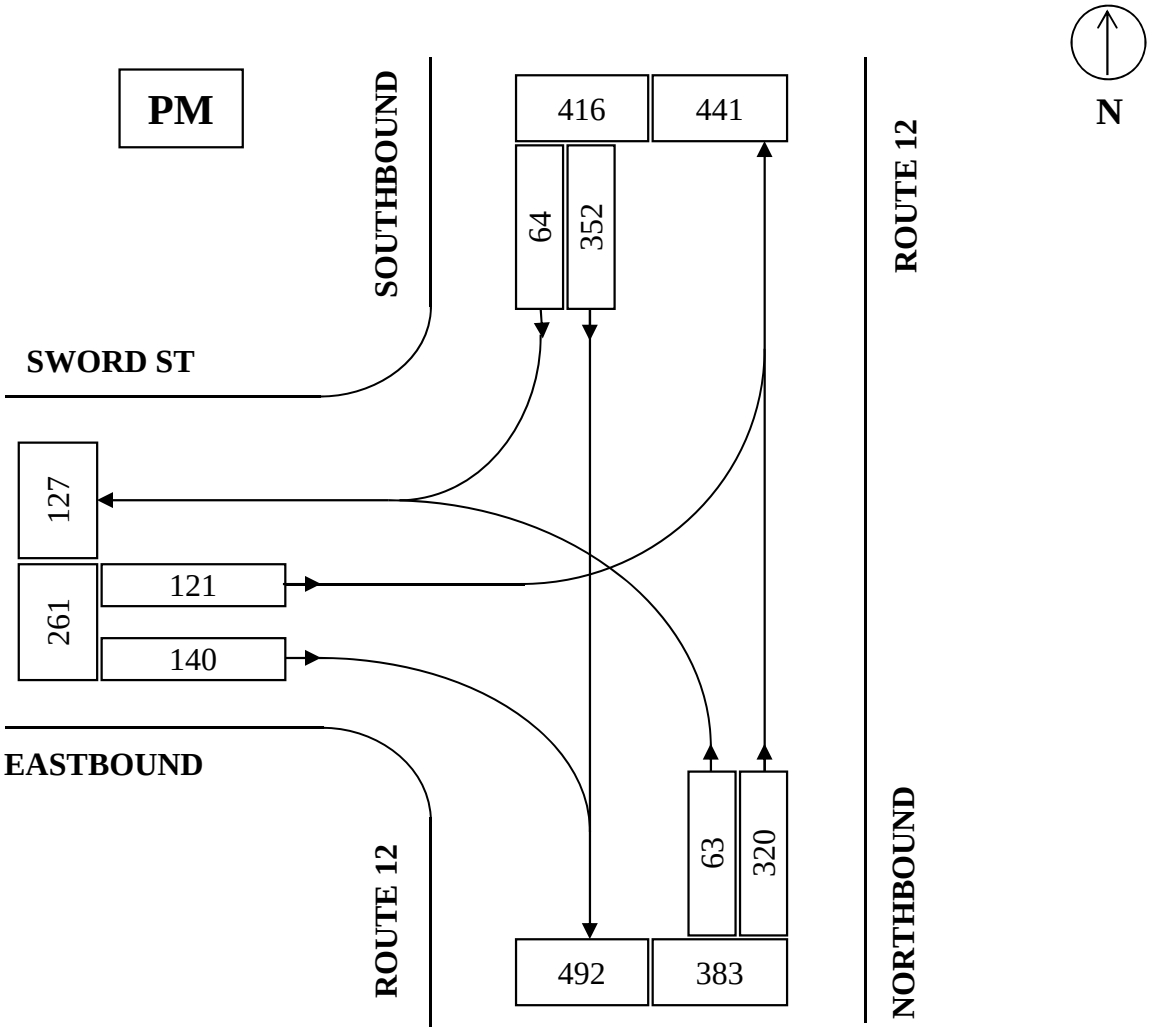


STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			7:30 - 8:30 AM
Sword St EB	164	16.9%	
			PHF = .90
Route 12 NB	523	53.9%	
			VEHICLES COUNTED
Route 12 SB	284	29.2%	
			ALL VEHICLES: 971
TOTAL	971	100.0%	**TRUCKS:** 95
			PERCENT TRUCKS 9.78%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Auburn **DATE:** 5/22/14 **DAY OF WEEK:** Thursday
INTERSECTION: Route 12 / Sword Street



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			4:30 - 5:30 PM
Sword St EB	261	24.6%	
			PHF = .83
Route 12 NB	383	36.2%	
			VEHICLES COUNTED
Route 12 SB	416	39.2%	
			ALL VEHICLES: 1060
TOTAL	1060	100.0%	**TRUCKS:** 45
			PERCENT TRUCKS 4.25%

TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: Town of Auburn

DATE: 5/22/2014

LOCATION: Route 12 / Sword Street

DAY OF WEEK: Thursday

WEATHER: AM: Clear PM: Cloudy/Rain

TECHNICIAN: JO

Time Period	Sword St EB								Route 12 NB				Route 12 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15	16	0	15	7					13	60	0	5	0	27	16	7	147	
7:15 - 7:30	21	0	13	6					17	91	0	6	0	30	16	4	188	
7:30 - 7:45	36	0	16	3					25	114	0	13	0	52	28	16	271	
7:45 - 8:00	24	0	17	4					33	117	0	11	0	46	30	15	267	873
8:00 - 8:15	17	0	20	3					26	104	0	7	0	31	29	5	227	953
8:15 - 8:30	22	0	12	5					15	89	0	7	0	43	25	6	206	971
8:30 - 8:45	16	0	14	2					21	70	0	11	0	46	19	5	186	886
8:45 - 9:00	20	0	21	3					13	63	0	3	0	46	17	13	180	799
TOTAL	172	0	128	33	0	0	0	0	163	708	0	63	0	321	180	71	1672	
		EBPct	16.9			**WBPct**	0.0			**NBPct**	53.9			**SBPct**	29.2			
Peak Sums:	**99**	**0**	**65**	**15**	**0**	**0**	**0**	**0**	**99**	**424**	**0**	**38**	**0**	**172**	**112**	**42**	**971**	
Total Trucks	95					**TrkPct**	9.78			**PHF**	0.90							

Time Period	Sword St EB								Route 12 NB				Route 12 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15	30	0	29	9					22	74	0	12	0	84	26	9	265	
4:15 - 4:30	18	0	22	2					10	78	0	10	0	72	19	8	219	
4:30 - 4:45	24	0	39	2					15	73	0	8	0	82	18	5	251	
4:45 - 5:00	31	0	24	2					20	88	0	6	0	83	14	2	260	995
5:00 - 5:15	49	0	48	5					12	88	0	3	0	111	13	3	321	1051
5:15 - 5:30	17	0	29	0					16	71	0	9	0	76	19	0	228	1060
5:30 - 5:45	14	0	18	1					11	55	0	4	0	65	11	8	174	983
5:45 - 6:00	20	0	19	1					9	71	0	5	0	72	15	5	206	929
TOTAL	203	0	228	22	0	0	0	0	115	598	0	57	0	645	135	40	1924	
		EBPct	24.6			**WBPct**	0.0			**NBPct**	36.1			**SBPct**	39.2			
Peak Sums:	**121**	**0**	**140**	**9**	**0**	**0**	**0**	**0**	**63**	**320**	**0**	**26**	**0**	**352**	**64**	**10**	**1060**	
Total Trucks	45					**TrkPct**	4.25			**PHF**	0.83							

HCS 2010 TWSC Text Report

This TWSC text report was created on 09/28/2015 12:48:45

HCS 2010 Two Way Stop Intersections Release 6.70

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	14_Rt 12 & Sword St_AM
Analyst:	KK
Agency/Co.:	CMRPC
Date Performed:	5/28/2014
Time Analyzed:	7:30 - 8:30 AM
Jurisdiction:	Auburn
Analysis Year:	2014
Project Description:	Balanced
Units:	U.S. Customary
Intersection Name:	Route 12/Sword Street
Major Street Direction:	North-South
East/West Street Name:	Sword Street
North/South Street Name:	Route 12
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach	NorthBound				SouthBound			
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume		100	475				225	139
Peak Hour Factor, PHF				0.90				
Hourly Flow Rate, HFR		111	528				250	154
Percent Heavy Vehicles		10						
Number of Lanes	0	0	1	0	0	0	1	0
Lane Configuration		LT						TR
Median Type				Undivided				
Median Storage								
RT channelized?				No				No
Left-Turn Lane Storage								
Upstream Signal?				Not Present				

Minor street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				115		66
Peak Hour Factor, PHF			0.90			
Hourly Flow Rate, HFR				128		73
Percent Heavy Vehicles				5		5
Number of Lanes	0	0	0	0	0	0
Lane Configuration					LR	
RT channelized?			No			No
Flared Approach/Storage	No	/		Yes	/	2
Percent Grade					0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f(pb)				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Config.		LT							LR	
Flow Rate		639							201	
Lane Capacity		1109							346	
v/c		0.58							0.58	
95% Queue Leng.		0.3							3.5	
Control Delay		8.6							28.9	
LOS		A							D	
Approach Delay		2.5							28.9	
Approach LOS		A								
Intersct. Delay		6.0								

Step 1: MOVEMENT PRIORITIES

HCS 2010 TWSC Text Report

This TWSC text report was created on 09/28/2015 12:51:49

HCS 2010 Two Way Stop Intersections Release 6.70

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	14_Rt 12 & Sword St_PM
Analyst:	KK
Agency/Co.:	CMRPC
Date Performed:	5/28/2014
Time Analyzed:	4:30 - 5:30 PM
Jurisdiction:	Auburn
Analysis Year:	2014
Project Description:	Balanced
Units:	U.S. Customary
Intersection Name:	Route 12/Sword Street
Major Street Direction:	North-South
East/West Street Name:	Sword Street
North/South Street Name:	Route 12
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach	NorthBound				SouthBound			
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume		64	325				357	65
Peak Hour Factor, PHF				0.83				
Hourly Flow Rate, HFR		77	392				430	78
Percent Heavy Vehicles		4						
Number of Lanes	0	0	1	0	0	0	1	0
Lane Configuration		LT						TR
Median Type				Undivided				
Median Storage								
RT channelized?				No				No
Left-Turn Lane Storage								
Upstream Signal?				Not Present				

Minor street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				123		142
Peak Hour Factor, PHF			0.83			
Hourly Flow Rate, HFR				148		171
Percent Heavy Vehicles				2		2
Number of Lanes	0	0	0	0	0	0
Lane Configuration					LR	
RT channelized?			No			No
Flared Approach/Storage	No	/		Yes	/	2
Percent Grade					0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f(pb)				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Config.		LT							LR	
Flow Rate		469							319	
Lane Capacity		1067							475	
v/c		0.44							0.67	
95% Queue Leng.		0.2							4.9	
Control Delay		8.6							26.7	
LOS		A							D	
Approach Delay		2.1							26.7	
Approach LOS		A								
Intersct. Delay		7.3								

Step 1: MOVEMENT PRIORITIES

HCS 2010 TWSC Text Report

This TWSC text report was created on 10/08/2015 11:31:22

HCS 2010 Two Way Stop Intersections Release 6.70

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	14_Rt 12 & Sword St_AM-BAL
Analyst:	KK
Agency/Co.:	CMRPC
Date Performed:	5/28/2014
Time Analyzed:	7:30 - 8:30 AM
Jurisdiction:	Auburn
Analysis Year:	2014
Project Description:	Projected 2025
Units:	U.S. Customary
Intersection Name:	Route 12/Sword Street
Major Street Direction:	North-South
East/West Street Name:	Sword Street
North/South Street Name:	Route 12
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach	NorthBound				SouthBound			
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume		116	551				261	161
Peak Hour Factor, PHF				0.90				
Hourly Flow Rate, HFR		129	612				290	179
Percent Heavy Vehicles		10						
Number of Lanes	0	0	1	0	0	0	1	0
Lane Configuration		LT						TR
Median Type				Undivided				
Median Storage								
RT channelized?				No				No
Left-Turn Lane Storage								
Upstream Signal?				Not Present				

Minor street:

Approach	WestBound				EastBound		
Movement	7	8	9		10	11	12
	L	T	R		L	T	R
Volume					133		77
Peak Hour Factor, PHF				0.90			
Hourly Flow Rate, HFR					148		86
Percent Heavy Vehicles					5		5
Number of Lanes	0	0	0		0	0	0
Lane Configuration						LR	
RT channelized?				No			No
Flared Approach/Storage	No	/			Yes	/	2
Percent Grade						0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f(pb)				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Config.		LT							LR	
Flow Rate		741							234	
Lane Capacity		1048							246	
v/c		0.71							0.95	
95% Queue Leng.		0.4							8.6	
Control Delay		8.9							88.0	
LOS		A							F	
Approach Delay		3.0							88.0	
Approach LOS		A								
Intersct. Delay		15.8								

Step 1: MOVEMENT PRIORITIES

HCS 2010 TWSC Text Report

This TWSC text report was created on 10/08/2015 11:33:13

HCS 2010 Two Way Stop Intersections Release 6.70

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	14_Rt 12 & Sword St_PM-BAL
Analyst:	KK
Agency/Co.:	CMRPC
Date Performed:	5/28/2014
Time Analyzed:	4:30 - 5:30 PM
Jurisdiction:	Auburn
Analysis Year:	2014
Project Description:	Projected 2025
Units:	U.S. Customary
Intersection Name:	Route 12/Sword Street
Major Street Direction:	North-South
East/West Street Name:	Sword Street
North/South Street Name:	Route 12
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach	NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume		74	377				414	75
Peak Hour Factor, PHF				0.83				
Hourly Flow Rate, HFR		89	454				499	90
Percent Heavy Vehicles		4						
Number of Lanes	0	0	1	0	0	0	1	0
Lane Configuration		LT						TR
Median Type				Undivided				
Median Storage								
RT channelized?				No				No
Left-Turn Lane Storage								
Upstream Signal?				Not Present				

Minor street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				143		165
Peak Hour Factor, PHF			0.83			
Hourly Flow Rate, HFR				172		199
Percent Heavy Vehicles				2		2
Number of Lanes	0	0	0	0	0	0
Lane Configuration					LR	
RT channelized?			No			No
Flared Approach/Storage	No	/		Yes	/	2
Percent Grade					0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f(pb)				

Delay, Queue Length, and Level of Service

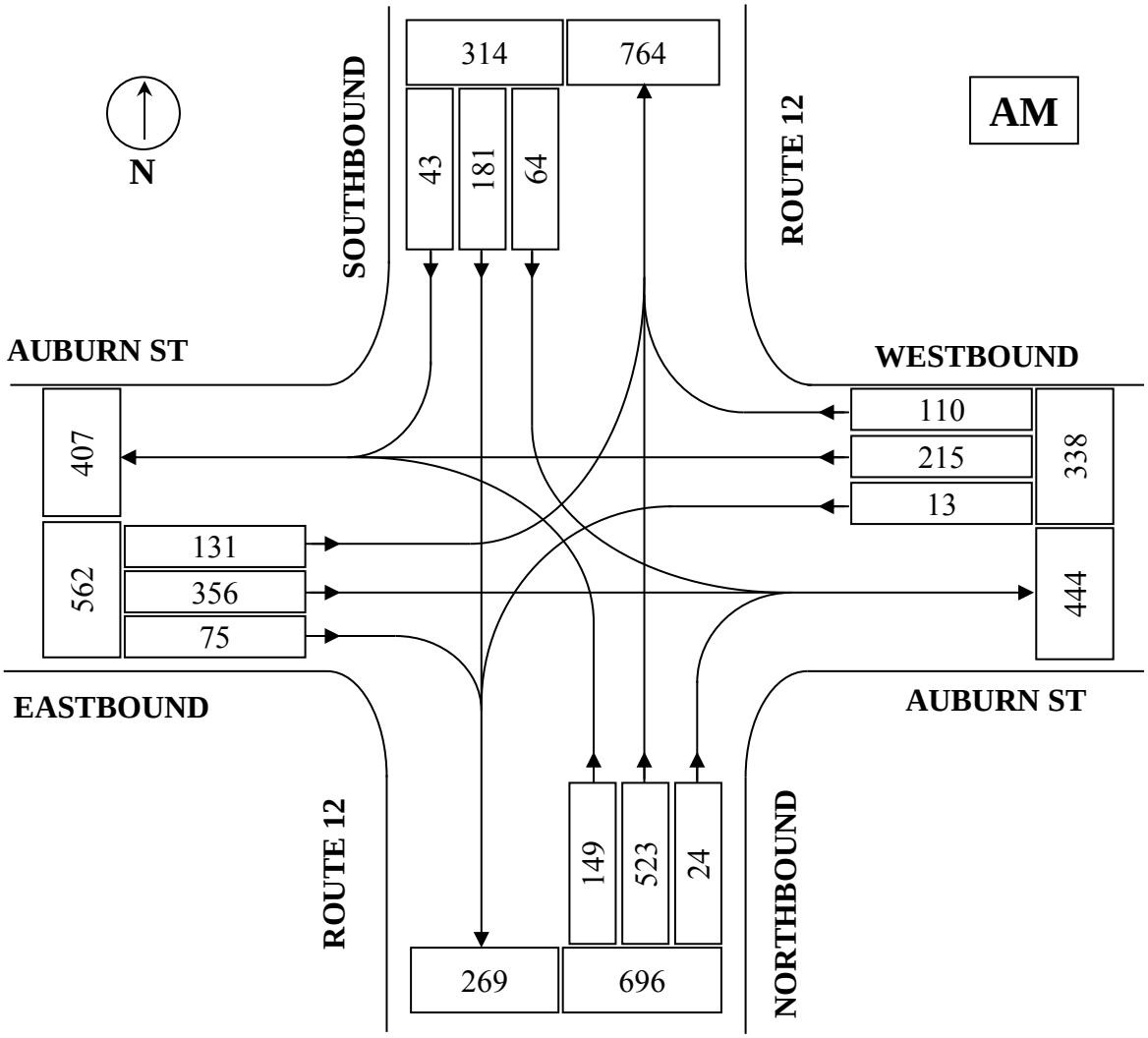
Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Config.		LT							LR	
Flow Rate		543							371	
Lane Capacity		996							346	
v/c		0.54							1.07	
95% Queue Leng.		0.3							13.5	
Control Delay		9.0							104.8	
LOS		A							F	
Approach Delay		2.4							104.8	
Approach LOS		A								
Intersct. Delay		26.7								

Step 1: MOVEMENT PRIORITIES

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Auburn **DATE:** 6/3/14 **DAY OF WEEK:** Tuesday
INTERSECTION: Route 12 / Auburn Street

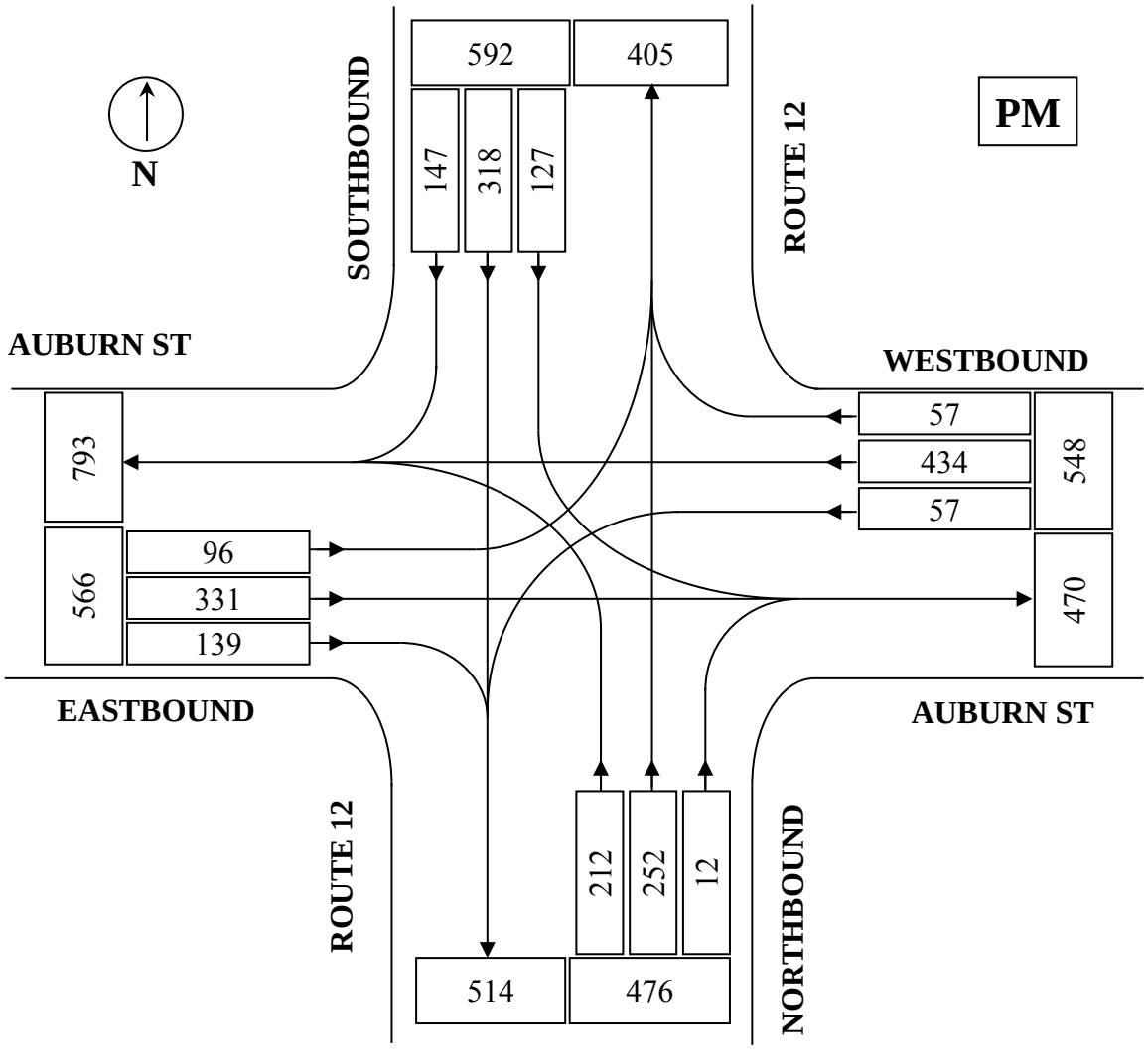


STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
Auburn St EB	562	29.4%	7:30 - 8:30 AM
Auburn St WB	338	17.7%	PHF = .93
Route 12 NB	696	36.4%	**VEHICLES COUNTED**
Route 12 SB	314	16.5%	**ALL VEHICLES:** 1910
TOTAL	1910	100.0%	**TRUCKS:** 132
			PERCENT TRUCKS: 6.91%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Auburn **DATE:** 6/3/14 **DAY OF WEEK:** Tuesday
INTERSECTION: Route 12 / Auburn Street



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
Auburn St EB	566	25.9%	4:30 - 5:30 PM
Auburn St WB	548	25.1%	PHF = .96
Route 12 NB	476	21.9%	**VEHICLES COUNTED**
Route 12 SB	592	27.1%	**ALL VEHICLES:** 2182
TOTAL	2182	100.0%	**TRUCKS:** 69
			PERCENT TRUCKS: 3.16%

TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: Town of Auburn — DATE: 6/3/2014

LOCATION: Route 12 / Auburn Street — DAY OF WEEK: Tuesday

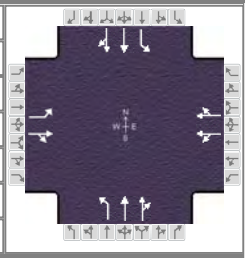
WEATHER: AM: Clear PM: Clear — TECHNICIAN: JO & RJ

Time Period	Auburn St EB				Auburn St WB				Route 12 NB				Route 12 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15	19	67	25	9	2	64	10	7	51	62	1	6	11	43	35	6	390	
7:15 - 7:30	38	70	37	6	2	58	19	5	33	107	5	5	13	25	28	12	435	
7:30 - 7:45	22	83	24	3	2	43	21	7	43	124	6	10	14	52	18	19	452	
7:45 - 8:00	39	107	13	5	5	61	40	13	32	134	5	9	15	45	14	5	510	1787
8:00 - 8:15	40	83	17	6	0	57	23	9	34	171	4	6	22	39	22	12	512	1909
8:15 - 8:30	30	83	21	4	6	54	26	10	40	94	9	7	13	45	15	7	436	1910
8:30 - 8:45	28	70	24	4	10	36	29	3	31	81	11	9	17	44	20	8	401	1859
8:45 - 9:00	20	77	26	4	6	51	24	5	33	66	4	1	14	52	26	5	399	1748
TOTAL	236	640	187	41	33	424	192	59	297	839	45	53	119	345	178	74	3535	
		EBPct	29.4			**WBPct**	17.7			**NBPct**	36.4			**SBPct**	16.4			
Peak Sums:	**131**	**356**	**75**	**18**	**13**	**215**	**110**	**39**	**149**	**523**	**24**	**32**	**64**	**181**	**69**	**43**	**1910**	
Total Trucks	132					**TrkPct**	6.91			**PHF**	0.93							

Time Period	Auburn St EB				Auburn St WB				Route 12 NB				Route 12 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15	25	59	39	3	13	103	21	5	54	65	0	8	16	76	24	3	495	
4:15 - 4:30	20	64	43	5	15	81	14	4	60	74	2	5	25	67	25	6	490	
4:30 - 4:45	21	75	37	3	15	97	12	2	54	60	3	8	33	80	43	8	530	
4:45 - 5:00	25	84	35	2	13	103	18	6	58	69	2	8	34	74	29	2	544	2059
5:00 - 5:15	29	78	31	5	18	114	15	1	49	55	5	4	40	93	40	5	567	2131
5:15 - 5:30	21	94	36	2	11	120	12	2	51	68	2	6	20	71	35	5	541	2182
5:30 - 5:45	19	80	34	3	12	99	19	6	55	76	4	5	23	78	23	3	522	2174
5:45 - 6:00	12	54	37	2	11	100	15	3	45	62	2	5	16	56	20	6	430	2060
TOTAL	172	588	292	25	108	817	126	29	426	529	20	49	207	595	239	38	4119	
		EBPct	25.9			**WBPct**	25.1			**NBPct**	21.8			**SBPct**	27.1			
Peak Sums:	**96**	**331**	**139**	**12**	**57**	**434**	**57**	**11**	**212**	**252**	**12**	**26**	**127**	**318**	**147**	**20**	**2182**	
Total Trucks	69					**TrkPct**	3.16			**PHF**	0.96							

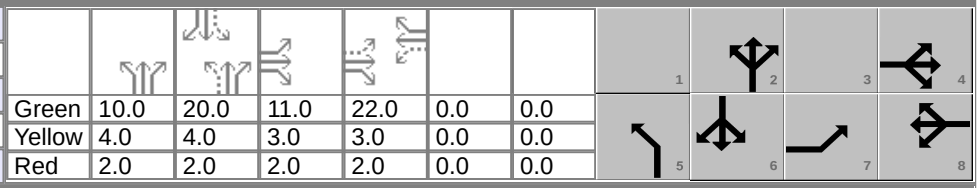
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Jun 18, 2014	Area Type	Other
Jurisdiction	Auburn	Time Period	7:30 - 8:30 AM	PHF	0.93
Urban Street	Route 12	Analysis Year	2014	Analysis Period	1> 7:30
Intersection	Route 12/Auburn St	File Name	14_Route 12 & Auburn Street_AM-BAL.xus		
Project Description	Balanced				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	133	361	76	13	218	112	151	531	24	65	184	44

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	10.0	20.0	11.0	22.0	0.0	0.0
Yellow	4.0	4.0	3.0	3.0	0.0	0.0
Red	2.0	2.0	2.0	2.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4		8	5	2		6
Case Number	1.0	4.0		8.3	1.0	4.0		6.3
Phase Duration, s	16.0	43.0		27.0	16.0	42.0		26.0
Change Period, ($Y+R_c$), s	5.0	5.0		5.0	6.0	6.0		6.0
Max Allow Headway (*MAH*), s	3.1	3.1		3.1	3.1	3.2		3.2
Queue Clearance Time (g_s), s	6.4	19.3		10.0	7.6	12.0		8.4
Green Extension Time (g_e), s	0.1	0.0		1.4	0.1	0.0		1.6
Phase Call Probability	1.00	1.00		1.00	1.00	1.00		1.00
Max Out Probability	0.19	1.00		0.03	1.00	1.00		0.05

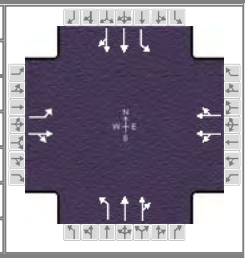
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	143	463		190		164	162	300	296	70	119	116
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1759	1725		1724		1448	1691	1776	1749	780	1776	1678
Queue Service Time (g_s), s	4.4	17.3		0.0		8.0	5.6	10.0	10.0	6.4	4.7	4.8
Cycle Queue Clearance Time (g_c), s	4.4	17.3		7.6		8.0	5.6	10.0	10.0	6.4	4.7	4.8
Green Ratio (*g/C*)	0.41	0.45		0.26		0.26	0.38	0.42	0.42	0.24	0.24	0.24
Capacity (*c*), veh/h	481	771		492		375	477	752	741	268	418	395
Volume-to-Capacity Ratio (*X*)	0.297	0.601		0.387		0.437	0.340	0.399	0.399	0.261	0.285	0.295
Available Capacity (c_a), veh/h	481	771		492		375	477	752	741	268	418	395
Back of Queue (*Q*), veh/ln (50 th percentile)	1.7	6.5		3.1		2.7	2.1	3.8	3.8	1.2	1.9	1.9
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	16.7	17.8		26.1		26.3	18.6	17.0	17.0	27.3	26.6	26.7
Incremental Delay (d_2), s/veh	0.1	0.9		0.2		0.3	0.2	0.1	0.1	0.2	0.1	0.2
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	16.8	18.7		26.3		26.6	18.8	17.1	17.1	27.5	26.8	26.9
Level of Service (LOS)	B	B		C		C	B	B	B	C	C	C
Approach Delay, s/veh / LOS	18.3	B		26.5	C		17.5	B		27.0	C	
Intersection Delay, s/veh / LOS	20.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.3	B	2.7	B
Bicycle LOS Score / LOS	1.5	A	0.8	A	1.1	A	0.7	A

 HCS 2010™ Streets Version 6.70 Generated: 9/28/2015 12:40:24 PM

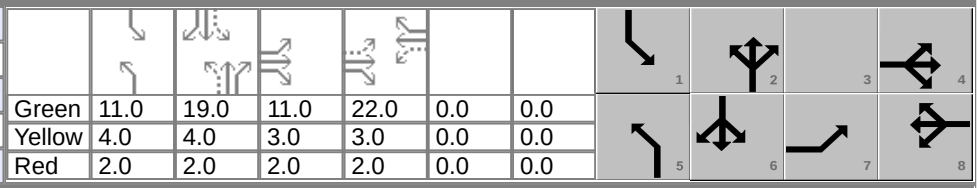
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Jun 18, 2014	Area Type	Other
Jurisdiction	Auburn	Time Period	4:30 - 5:30 PM	PHF	0.96
Urban Street	Route 12	Analysis Year	2014	Analysis Period	1> 4:30
Intersection	Route 12/Auburn St	File Name	14_Route 12 & Auburn Street_PM-BAL.xus		
Project Description	Balanced				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	97	336	141	58	441	58	215	256	12	129	323	149

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	11.0	19.0	11.0	22.0	0.0	0.0
Yellow	4.0	4.0	3.0	3.0	0.0	0.0
Red	2.0	2.0	2.0	2.0	0.0	0.0

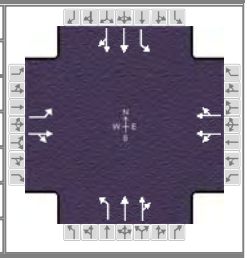
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4		8	5	2	1	6
Case Number	1.0	4.0		8.3	1.1	4.0	1.1	4.0
Phase Duration, s	16.0	43.0		27.0	17.0	25.0	17.0	25.0
Change Period, ($Y+R_c$), s	5.0	5.0		5.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	3.2		3.2	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	4.9	20.0		15.6	10.0	7.4	6.6	12.7
Green Extension Time (g_e), s	0.1	0.0		1.5	0.0	1.2	0.1	1.0
Phase Call Probability	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.02	1.00		0.37	1.00	0.02	0.21	0.23

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	101	486		291		285	224	140	139	134	250	230
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1827	1756		1589		1621	1757	1845	1818	1757	1845	1658
Queue Service Time (g_s), s	2.9	18.0		8.6		13.4	8.0	5.4	5.4	4.6	10.3	10.7
Cycle Queue Clearance Time (g_c), s	2.9	18.0		13.6		13.4	8.0	5.4	5.4	4.6	10.3	10.7
Green Ratio (*g/C*)	0.41	0.45		0.26		0.26	0.35	0.22	0.22	0.35	0.22	0.22
Capacity (*c*), veh/h	413	785		462		420	379	412	406	460	412	371
Volume-to-Capacity Ratio (*X*)	0.245	0.620		0.630		0.679	0.590	0.338	0.341	0.292	0.606	0.622
Available Capacity (c_a), veh/h	413	785		462		420	379	412	406	460	412	371
Back of Queue (*Q*), veh/ln (50 th percentile)	1.2	6.9		5.3		5.4	3.3	2.3	2.3	1.8	4.6	4.3
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	17.1	18.0		28.1		28.3	21.6	27.7	27.7	19.6	29.6	29.8
Incremental Delay (d_2), s/veh	0.1	1.1		2.1		3.6	1.7	0.2	0.2	0.1	1.8	2.4
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	17.3	19.1		30.2		32.0	23.3	27.9	27.9	19.8	31.5	32.2
Level of Service (LOS)	B	B		C		C	C	C	C	B	C	C
Approach Delay, s/veh / LOS	18.8	B		31.1	C		25.9	C		29.2	C	
Intersection Delay, s/veh / LOS	26.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.3	B	2.7	B
Bicycle LOS Score / LOS	1.5	A	1.0	A	0.9	A	1.0	A

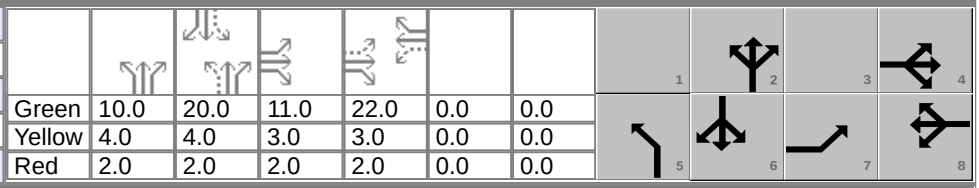
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Jun 18, 2014	Area Type	Other
Jurisdiction	Auburn	Time Period	7:30 - 8:30 AM	PHF	0.93
Urban Street	Route 12	Analysis Year	2014	Analysis Period	1> 7:30
Intersection	Route 12/Auburn St	File Name	14_Route 12 & Auburn Street_AM-Projected.xus		
Project Description	Projected 2025				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	154	419	88	15	253	130	175	616	28	75	214	51

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	10.0	20.0	11.0	22.0	0.0	0.0
Yellow	4.0	4.0	3.0	3.0	0.0	0.0
Red	2.0	2.0	2.0	2.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4		8	5	2		6
Case Number	1.0	4.0		8.3	1.0	4.0		6.3
Phase Duration, s	16.0	43.0		27.0	16.0	42.0		26.0
Change Period, ($Y+R_c$), s	5.0	5.0		5.0	6.0	6.0		6.0
Max Allow Headway (*MAH*), s	3.1	3.1		3.1	3.1	3.2		3.2
Queue Clearance Time (g_s), s	7.2	23.3		11.6	8.6	14.0		10.3
Green Extension Time (g_e), s	0.1	0.0		1.7	0.0	0.0		1.9
Phase Call Probability	1.00	1.00		1.00	1.00	1.00		1.00
Max Out Probability	0.48	1.00		0.08	1.00	1.00		0.14

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	166	539		222		191	188	348	343	81	140	136
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1759	1725		1714		1446	1691	1776	1749	714	1776	1675
Queue Service Time (g_s), s	5.2	21.3		0.0		9.6	6.6	11.9	12.0	8.3	5.5	5.7
Cycle Queue Clearance Time (g_c), s	5.2	21.3		9.0		9.6	6.6	11.9	12.0	8.3	5.5	5.7
Green Ratio (*g/C*)	0.41	0.45		0.26		0.26	0.38	0.42	0.42	0.24	0.24	0.24
Capacity (*c*), veh/h	455	771		489		374	460	752	741	253	418	394
Volume-to-Capacity Ratio (*X*)	0.364	0.699		0.454		0.510	0.410	0.463	0.463	0.319	0.334	0.344
Available Capacity (c_a), veh/h	455	771		489		374	460	752	741	253	418	394
Back of Queue (*Q*), veh/ln (50 th percentile)	2.0	8.3		3.7		3.2	2.5	4.6	4.5	1.4	2.3	2.2
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	17.2	18.9		26.7		26.9	19.0	17.6	17.6	28.0	27.0	27.0
Incremental Delay (d_2), s/veh	0.2	2.4		0.2		0.5	0.2	0.2	0.2	0.3	0.2	0.2
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	17.4	21.3		26.9		27.4	19.2	17.7	17.7	28.3	27.1	27.2
Level of Service (LOS)	B	C		C		C	B	B	B	C	C	C
Approach Delay, s/veh / LOS	20.3	C		27.1	C		18.1	B		27.4	C	
Intersection Delay, s/veh / LOS	21.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.3	B	2.7	B
Bicycle LOS Score / LOS	1.6	A	0.8	A	1.2	A	0.8	A

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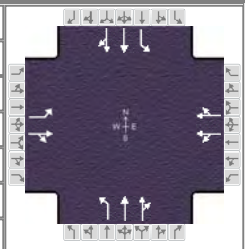
HCS 2010 Signalized Intersection Results Summary

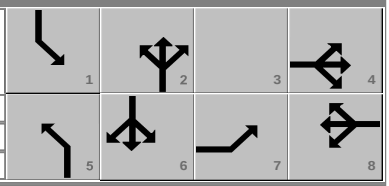
General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Jun 18, 2014	Area Type	Other
Jurisdiction	Auburn	Time Period	4:30 - 5:30 PM	PHF	0.96
Urban Street	Route 12	Analysis Year	2014	Analysis Period	1> 4:30
Intersection	Route 12/Auburn St	File Name	14_Route 12 & Auburn Street_PM-Projected.xus		
Project Description	Projected 2025				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	113	390	164	67	512	67	250	297	14	150	375	173

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	11.0	19.0	11.0	22.0	0.0	0.0
Yellow	4.0	4.0	3.0	3.0	0.0	0.0
Red	2.0	2.0	2.0	2.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4		8	5	2	1	6
Case Number	1.0	4.0		8.3	1.1	4.0	1.1	4.0
Phase Duration, s	16.0	43.0		27.0	17.0	25.0	17.0	25.0
Change Period, ($Y+R_c$), s	5.0	5.0		5.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	3.2		3.2	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	5.4	24.4		21.8	11.6	8.4	7.4	14.7
Green Extension Time (g_e), s	0.1	0.0		0.1	0.0	1.4	0.1	0.9
Phase Call Probability	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.05	1.00		1.00	1.00	0.05	0.57	0.62

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	118	567		331		338	260	162	161	156	292	267
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1827	1755		1394		1622	1757	1845	1817	1757	1845	1656
Queue Service Time (g_s), s	3.4	22.4		13.3		16.6	9.6	6.4	6.4	5.4	12.4	12.7
Cycle Queue Clearance Time (g_c), s	3.4	22.4		19.8		16.6	9.6	6.4	6.4	5.4	12.4	12.7
Green Ratio (*g/C*)	0.41	0.45		0.26		0.26	0.35	0.22	0.22	0.35	0.22	0.22
Capacity (*c*), veh/h	375	785		412		420	355	412	406	442	412	370
Volume-to-Capacity Ratio (*X*)	0.314	0.722		0.803		0.805	0.735	0.393	0.396	0.354	0.708	0.722
Available Capacity (c_a), veh/h	375	785		412		420	355	412	406	442	412	370
Back of Queue (*Q*), veh/ln (50 th percentile)	1.4	9.0		7.4		7.3	4.4	2.7	2.7	2.1	5.8	5.5
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	18.1	19.2		30.8		29.5	22.7	28.1	28.1	20.0	30.4	30.6
Incremental Delay (d_2), s/veh	0.2	2.9		10.2		10.2	6.8	0.2	0.2	0.2	4.7	5.9
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	18.3	22.0		40.9		39.7	29.5	28.3	28.3	20.2	35.2	36.4
Level of Service (LOS)	B	C		D		D	C	C	C	C	D	D
Approach Delay, s/veh / LOS	21.4	C		40.3	D		28.8	C		32.4	C	
Intersection Delay, s/veh / LOS	30.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.3	B	2.7	B
Bicycle LOS Score / LOS	1.6	A	1.0	A	1.0	A	1.1	A

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