3

Future Conditions, Issues and Opportunities

This chapter provides an assessment of Future Conditions within the study area and the issues and opportunities identified through the data collection and analysis process. The future conditions described in this chapter assume that the transportation improvements currently under construction or programmed have occurred. Programmed improvements include projects programmed on the Transportation Improvement Program (TIP) or currently being initiated by municipalities.

Sections of this chapter present the land use forecasts, planned infrastructure improvements, future traffic demand forecasts, and future traffic operations. Subsequent chapters present the range of alternatives considered, provide an evaluation of these alternatives, and packaged/phased recommendations to address the short, medium, and long-term transportation needs in the study area.

Travel Demand Forecasts

An important component of this study involved forecasting travel demands and land use changes through the year 2040 to ensure that alternatives studied and that the recommended transportation infrastructure investments anticipate future needs and provide long-term benefits for the area. The forecast year is consistent with the Boston Region Metropolitan Planning Organization (MPO)'s Regional Transportation Plan (RTP) and the regional travel demand model (the CTPS model) maintained by the Central Transportation Planning Staff (CTPS) – the technical staff for the Boston Region.

The CTPS model forecasts transit and vehicular conditions in eastern Massachusetts and was used to understand peak period travel demands under the existing conditions and under a future 2040 condition in the Arsenal Street Corridor Study Area. The

model is implemented in the EMME/2[22] software package and is based on the four-step transportation planning process of trip generation, trip distribution, mode choice, and trip assignment. The model estimates existing and future transit ridership and highway traffic volumes, primarily on the basis of forecasts of study area demography and projected highway and transit improvements.

In a regional travel demand model, traffic volumes and transit demands are forecasted through the interaction of supply and demand. Traffic Analysis Zones (TAZs) are defined to encompass areas of development that represent the demand. Figure 3-1 represents the TAZ for the project study area. The CTPS model assumes detailed TAZ-level socioeconomic and land use projections to the year 2040 developed by the Metropolitan Area Planning Council (MAPC). Within Watertown, the number of households are projected to increase by 18 percent by 2040. Employment levels are projected to remain comparable to existing conditions with one percent growth projected from 2010 to 2040. However, a conversion of employment from basic (such as manufacturing and warehousing jobs) to service employment (such as office, educational, and health services jobs) is projected.

The road network and transit system represent the supply. The CTPS model includes highway and transit infrastructure projects included on the Boston Region Metropolitan Planning Organization's Long-Range Transportation Plan (LRTP).

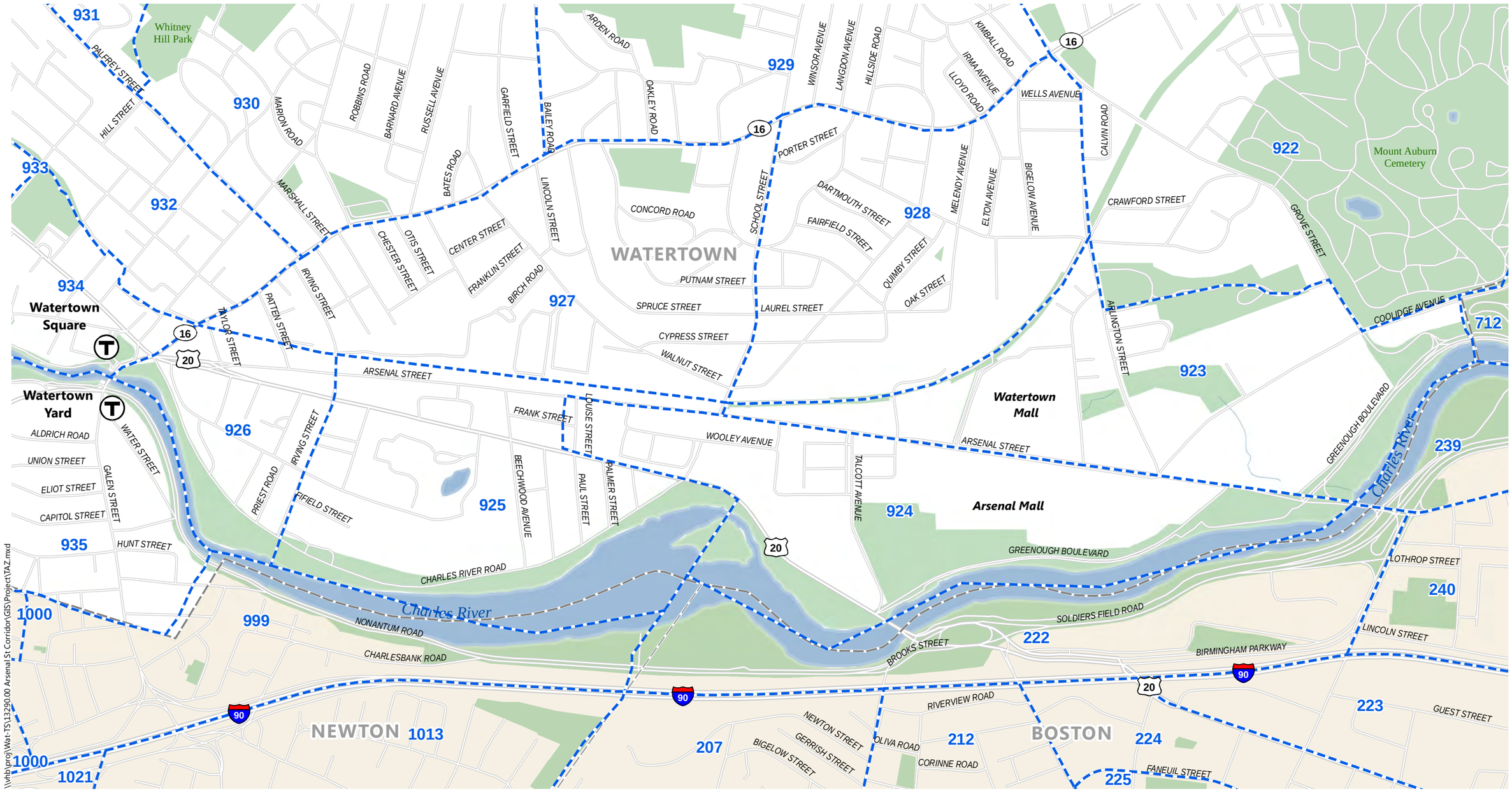
Resulting Forecasts

CTPS supplied estimates from the regional travel demand model for growth in ridership on the Route 70 and 70A buses. Daily ridership is projected to increase by approximately 22 percent between the 2015 base year and the 2040 condition. Approximately 20 percent growth is projected during the weekday morning peak period (6:00 to 9:00 AM) and 16 percent growth is projected during the weekday evening peak period (3:00 to 6:00 PM). The methodology to develop 2040 transit ridership projections for use in this study is discussed in the *Future Transit Conditions* section of this chapter.

CTPS also supplied estimates for traffic volume growth along roadways and at intersections in Watertown. Based on a review of the data, it was determined that town-level data was most appropriate to estimate traffic volume growth within the study area. Approximately six percent growth is projected during the weekday morning peak period (6:00 to 9:00 AM) and four percent growth is projected during the weekday evening peak period (3:00 to 6:00 PM). An average background growth

[22] Commercial software package used by CTPS to run their 4-step travel demand model. The software package is used for urban, regional and national transportation forecasting.

Apr 03, 2017 | **FIGURE 3-1**



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0 200 400 800 Feet

Traffic Analysis Zone (TAZ)

Arsenal Street Corridor Study | Watertown, Massachusetts

Traffic Analysis Zone Map

Source: MassGIS

rate of five percent was utilized for both the morning and evening peak hours. The specific methodology to develop 2040 future traffic volumes for the purposes of this study is discussed in the *Future Vehicular Traffic Conditions* section of this chapter.

In addition to growth in transit ridership and traffic demands on facilities within the study area, CTPS also provided growth in trip ends by mode for Watertown TAZs (i.e. trips with an origin or destination within a given TAZ). Growth in transit trip ends for TAZs encompassing the Arsenal Street Corridor Study Area is generally consistent with projections for the entire Route 70 and Route 70A with 17 percent growth in the weekday morning peak period and 11 percent growth in the weekday evening peak period. Growth in vehicle trip ends for the study area TAZs is also comparable to the projected traffic volume growth on Watertown roadways; vehicle trip ends are project to grow by five percent during the weekday morning peak period and three percent during the weekday evening peak period within the study area TAZs. In addition to motorized trips, the CTPS model also projects growth in non-motorized (i.e. walk/bike) trips. Based on the CTPS model output, walk/bike trips are projected to increase by 35 percent during the weekday morning peak period and 28 percent during the weekday evening peak period within the study area TAZs. Non-motorized trips are most likely projected to increase at a higher rate than motorized trips due to the projected future mix of land uses within the study area which will induce shorter trips and provide an opportunity for mode choice.

Future Transit Conditions

The following sections summarize the assumptions, methodology, and results of the transit analysis for 2040 Future Year No Build conditions.

Planned Services

The MBTA Service Planning Department typically reviews the performance and usage of transit services every two years in order to inform recommended service changes. In the absence of any specific changes proposed to the existing services and/or new services currently planned by the MBTA along the Corridor, the 2040 Future Year No Build analysis assumes the existing configuration and characteristics of the Route 70 and 70A bus services along the Arsenal Street Corridor.

Forecasted Ridership

Outputs from the CTPS regional travel demand model include projected transit boardings by route by time period. Projected ridership for the 70 and 70A routes, for each route variant, is summarized in Table 3-1 below for the 2040 Future Year. Due to the availability of more current and robust ridership data from Fall 2015, the Future Year analysis was based on and compared to a 2015 Base Year as opposed to the

2014 existing conditions presented in Chapter 2 of this report. Average weekday ridership is projected to increase by 22 percent on the 70/70A lines between 2015 and 2040, the equivalent of approximately 1,640 additional boardings along the entire route. In the AM Period (6:00 a.m. – 8:59 a.m.), ridership is projected to increase by 20 percent between 2015 and 2040. In the PM Period (3:00 p.m. – 5:59 p.m.), ridership is projected to increase by 16 percent between 2015 and 2040.

Table 3-1 Route 70/70A Projected Ridership (Boardings)

Route Variant	Base Year (2015)					Future Year Forecasts (2040)				
	AM (06:00-08:59)	Midday (09:00-14:59)	PM (15:00-17:59)	Nightime (18:00-05:59)	AWDT	AM (06:00-08:59)	Midday (09:00-14:59)	PM (15:00-17:59)	Nightime (18:00-05:59)	AWDT
70.1 IB (70A) [a]	265	225	0	0	490	306	296	0	0	601
70.1 OB (70A) [b]	0	258	258	42	558	0	326	300	53	680
70.2 OB [c]	0	0	0	6	6	0	0	0	9	9
70.3 IB [d]	0	0	0	50	50	0	0	0	63	63
70.3 OB [d]	209	0	0	0	209	265	0	0	0	265
70.4 IB (70A) [e]	0	109	298	99	507	0	139	337	125	601
70.4 OB (70A) [e]	333	186	0	0	519	417	236	0	0	653
70.5 IB [f]	487	635	404	658	2,184	525	781	488	923	2,717
70.5 OB [f]	506	795	371	523	2,194	653	889	426	674	2,642
70.8 IB [g]	172	0	244	0	416	199	0	276	0	474
70.8 OB [g]	0	134	221	63	418	0	155	255	81	490
Total	1,972	2,341	1,797	1,441	7,551	2,364	2,822	2,082	1,927	9,195
Percent Increase From 2015 Base Year						*19.9%*	*20.5%*	*15.9%*	*33.7%*	*21.8%*

Source: CPTS Ridership Projections for Arsenal Street Corridor Study.

[a] Route serves Smith Street and Trapelo Road in the morning, and Totten Pond Road and Wyman Street in the afternoon and evening.

[b] Route serves Totten Pond Road and Wyman Street in the morning, and Smith Street and Trapelo Road in the afternoon and evening.

[c] Route operates between Central Square in Cambridge and Watertown Square.

[d] Route operates between Waltham Station in Waltham and Green Street at Magazine Street in Cambridge.

[e] Route operates between Lincoln Street at/opposite Silver Hill Lane in Waltham and Central Square in Cambridge.

[f] Route operates between Weston Street at Cedarwood Avenue in Waltham and Central Square in Cambridge.

[g] Route operates between Waltham Station in Waltham and Franklin Street at Sidney Street in Cambridge.

The CTPS 2040 ridership growth projections were compared against historic growth rates, which were determined using MBTA load profile data from Spring 2000 and Fall 2015. Between Spring 2000 and Fall 2015, overall weekday ridership on the Route 70/70A increased by an average of 0.64 percent per year. In comparison, the CTPS ridership forecasts estimate that ridership will increase by an average of 0.79 percent per year between the model base year of 2015 and the future horizon year of 2040. Although the CTPS forecast estimates ridership growth at a slightly higher rate than the historic 15-year average, this higher rate is reasonable given the anticipated development along the 70/70A corridor.

Operations

The impacts to transit operations along the Arsenal Street Corridor resulting from the forecasted growth in transit ridership and forecasted traffic increases (including vehicle loading and service reliability impacts) were analyzed using the following metrics:

- Frequency of individual trips with high/exceeded passenger loading; and
- Impacts (in minutes) to bus run time through the Corridor.

These operational metrics were developed with input from the Study's Working Group.

Vehicle Loading

The MBTA's *Service Delivery Policy* defines the levels of crowding that are acceptable by time period and mode of transportation. For MBTA bus service, the acceptable ratio of passengers to seats during the Early AM, AM Peak, Midday School, and PM Peak periods is 140 percent. For all other periods, the acceptable ratio is 100 percent. For buses along the Arsenal Street Corridor which have a seated capacity of 39 passengers, the maximum acceptable load equals 54 passengers during the peak periods and 39 passengers during off-peak periods.

Vehicle loading in 2040 was determined for an average weekday using CTPS-projected ridership increases along the full length of the 70 and 70A routes. First, the percentage ridership growth was calculated for each time period in the CTPS model (AM Period, Midday Period, PM Period, and Nighttime Period), as summarized previously in Table 3-1. Once growth percentages were established, individual bus trips from Fall 2015 loading data provided by the MBTA, the most current data available at the time of the future conditions analysis, were categorized according to the CTPS model time period definitions, using departure times from the first stop of the route. The CTPS model time period definitions do not correspond directly to the time period definitions outlined in the MBTA's *Service Delivery Policy*. The differences between the CTPS and MBTA time period definitions are outlined in Table 3-2 below for comparison.

Table 3-2 CTPS and MBTA Time Period Definition Comparison

MBTA Service Delivery Policy Time Periods [HH:MM]	Early AM	AM Peak	Midday Base	Midday School	PM Peak	Evening	Late Evening	Night/ Sunrise
	06:00-06:59	07:00-08:59	09:00-13:29	13:30-15:59	16:00-18:29	18:30-21:59	22:00-23:59	00:00-05:59
CTPS Travel Demand Model Time Periods [HH:MM]	AM		MD (Midday)		PM	NT (Nighttime)		
	06:00-08:59		09:00-14:59		15:00-17:59	18:00-05:59		

Once individual bus trips were categorized under the CTPS time periods, the projected growth rates by time period were applied uniformly across the entire trip.[23] The result of the calculations described above provides an anticipated passenger load profile for each bus trip under 2040 conditions. The Future Year loads for each trip were then compared to the *Service Delivery Policy* load standard to determine how many trips in each time period are projected to exceed the maximum load standard. For each trip where the load standard was exceeded at one or more locations, the percentage of stops exceeding the standard was calculated to quantify the extent of crowded conditions along the line.

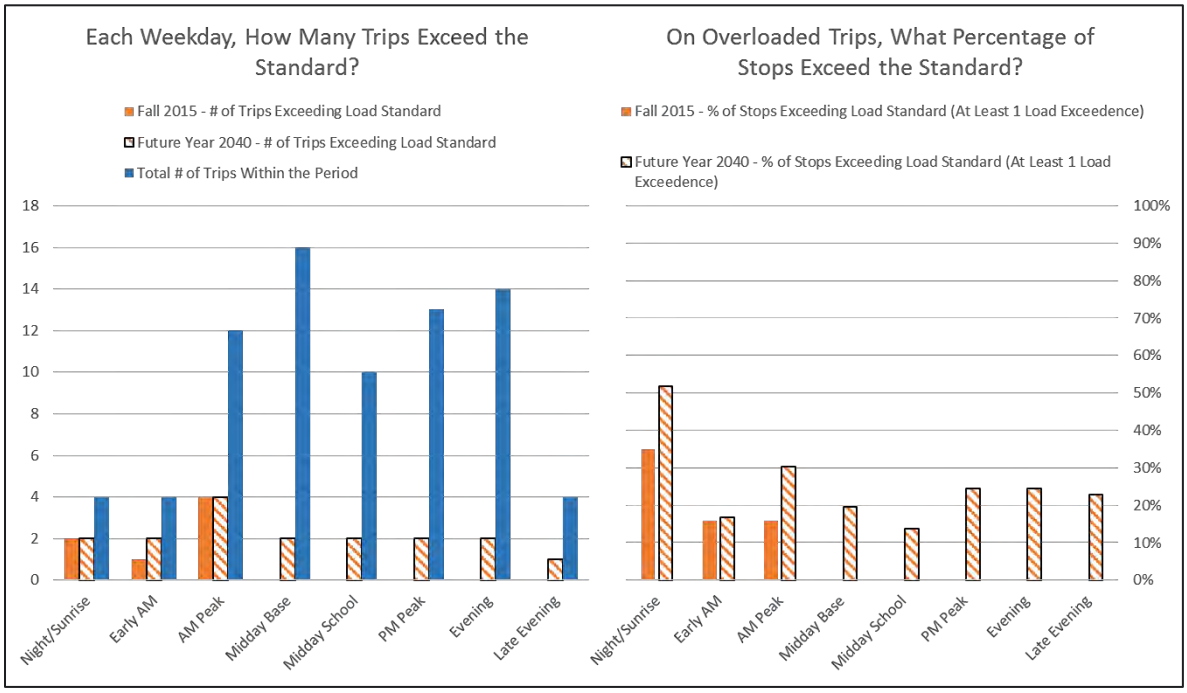
Figures 3-2 and 3-3 illustrate the number of inbound trips and the percentage of stops that exceed the MBTA's *Service Delivery Policy* load standard considering both the entire length of the Route 70/70A and the segment of the Route 70/70A on the Arsenal Street Corridor, respectively. Figures 3-4 and 3-5 illustrate the results for the outbound direction, considering both the entire length of the Route 70/70A and the segment of the Route 70/70A on the Arsenal Street Corridor, respectively.

In both the inbound and outbound directions, more trips are projected to experience overcrowding in 2040 when compared to existing conditions. Under existing conditions, five trips a day experience crowding that exceeds the load standards defined in MBTA's *Service Delivery Policy* somewhere on the Arsenal Street Corridor. By 2040, without improvements the number of trips exceeding the load standard within the Arsenal Street Corridor is expected to increase to 29 trips per day out of 155 total daily trips.

On the Arsenal Street Corridor alone, it is projected that at least one to two inbound trips per time period will experience crowding that exceeds the load standard in the 2040 Future Year. On overloaded inbound trips, the percentage of stops projected to exceed the standard along the Arsenal Street Corridor ranges from 11 percent of stops in the Late Evening Period and Early AM Period to 94 percent of stops in the AM Peak Period and 100 percent of stops in the Night/Sunrise Period (consistent with the observed crowding during the Night/Sunrise Period under existing conditions). In the outbound direction, on the Arsenal Street Corridor alone, it is projected that at least one or more trips will exceed the load standard in all time periods except during the Night/Sunrise and Early AM Periods. On overloaded outbound trips, the percentage of stops projected to exceed the standard along the Arsenal Street Corridor ranges from 20 percent of stops in the Midday Base Period to 100 percent of stops in the Midday School and Late Evening Periods.

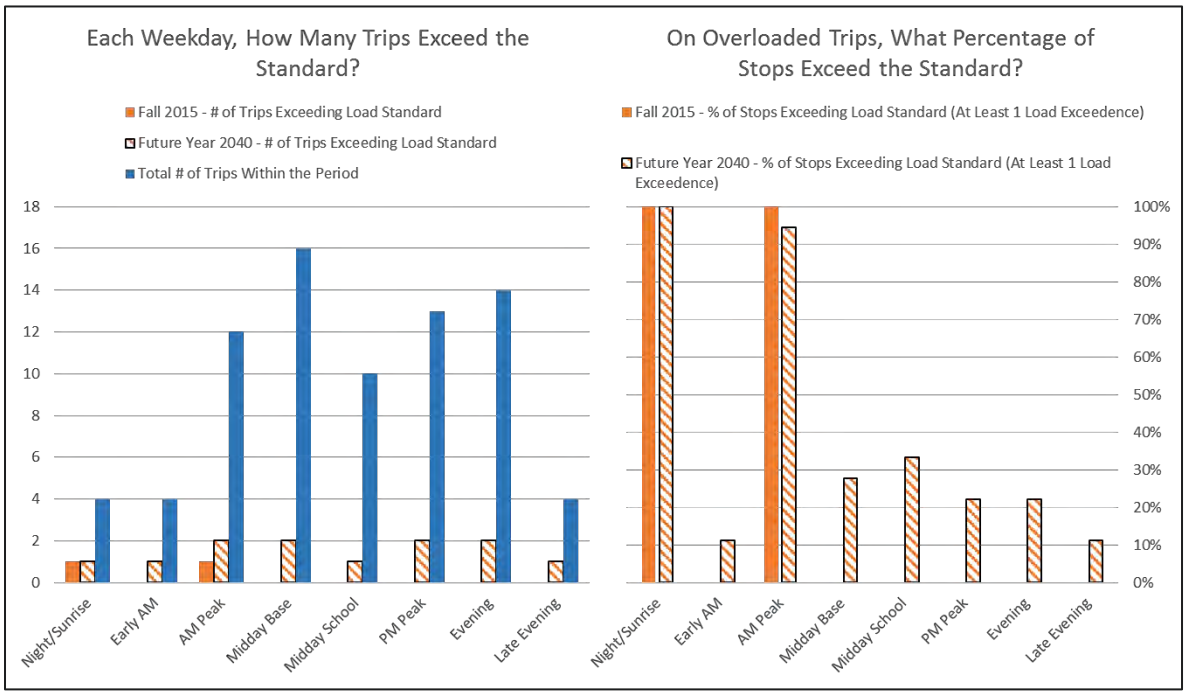
[23] Although it is likely that growth will be concentrated over specific segments of the line, the assumption of uniform growth is reasonable for this level of analysis absent more detailed stop-level ridership projections.

Figure 3-2 Passenger Loading on Entire Route 70/70A – Inbound Direction



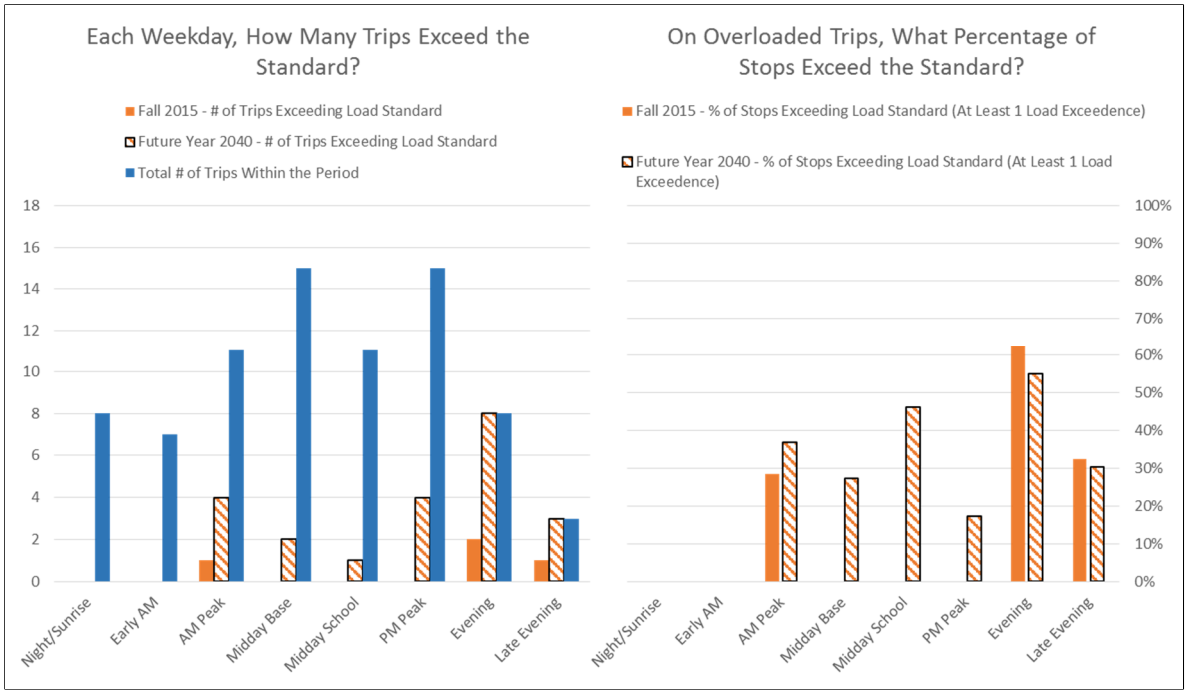
Note: Loading Standard is equal to 54 passengers during peak periods and 39 passengers during off-peak periods.

Figure 3-3 Passenger Loading on Arsenal Street Corridor – Inbound Direction



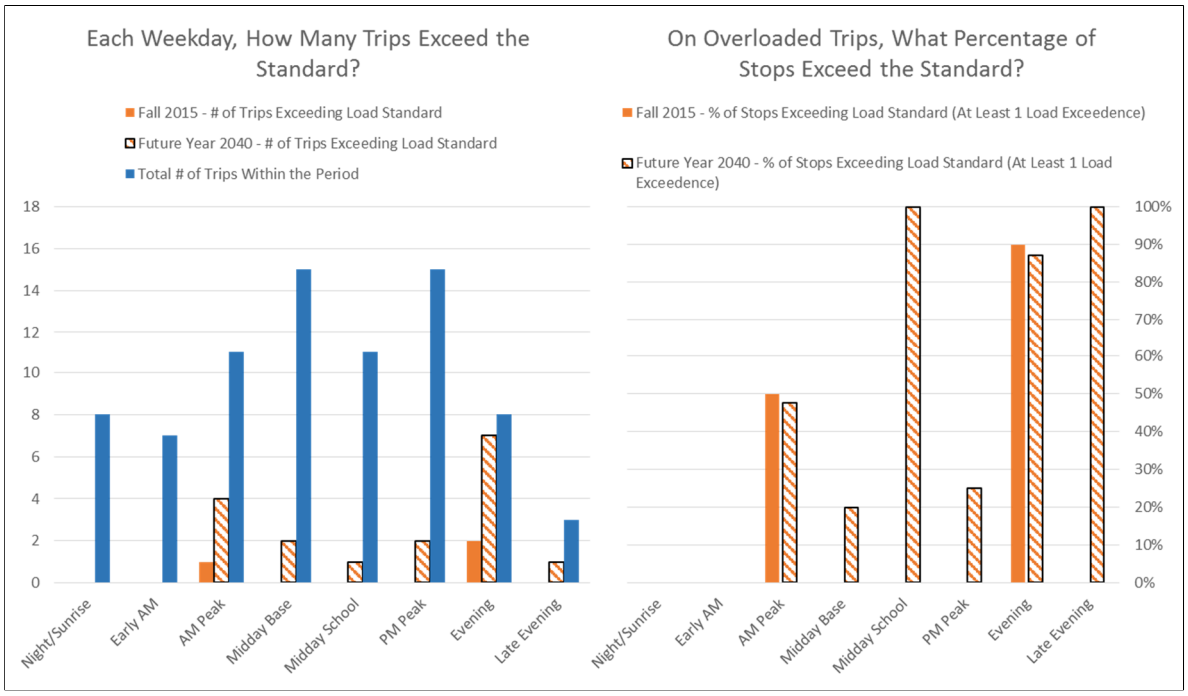
Note: Loading Standard is equal to 54 passengers during peak periods and 39 passengers during off-peak periods.

Figure 3-4 Passenger Loading on Entire Route 70/70A – Outbound Direction



Note: Loading Standard is equal to 54 passengers during peak periods and 39 passengers during off-peak periods.

Figure 3-5 Passenger Loading on Arsenal Street Corridor – Outbound Direction



Note: Loading Standard is equal to 54 passengers during peak periods and 39 passengers during off-peak periods.

Service Reliability

In order to quantify impacts to the anticipated 2040 service reliability, the increase to bus run time (in minutes) through the Corridor was analyzed. The total travel time along the Corridor is a function of both the run time between stops, and the dwell time spent at each stop loading and unloading passengers. Projections for dwell time in the future year will not only depend on changes in ridership, but also on the MBTA's policy for fare collection and validation. Alternative fare payment/validation strategies that would allow for all-door boarding have the potential to significantly decrease dwell times per passenger in the future, and are the subject of a separate MBTA initiative currently underway. As such, this analysis focuses solely on quantifying the potential impacts to corridor run time.

Future run times were simulated using the VISSIM microsimulation model developed for the Local Study Area (see discussion in Chapter 2). The modeled run times were compared with existing conditions data provided by the MBTA in order to find the difference in run time along the Arsenal Street Corridor due to the anticipated increase in traffic under the 2040 No Build condition. Run times from October 2015 were calculated from MBTA-provided data by averaging the observed run times between the Watertown Square and Mackin Street @ Western Avenue timepoints.[24] All buses with a corridor entry or exit time during the AM Peak Hour and PM Peak Hour were counted[25].

A comparison of corridor run times between existing and future year conditions is shown in Table 3-3 and illustrated in Figure 3-6. The magnitude of the increase in corridor run time is projected to range from approximately two additional minutes in the Outbound direction during the AM Peak Hour to approximately 11 additional minutes in the Inbound direction during the PM Peak Hour. The substantial increase in the Inbound PM Peak Hour run time is primarily due to projected traffic congestion at the Watertown Mall/Arsenal Mall vicinity intersections.

Table 3-3 Route 70/70A Projected Run Times

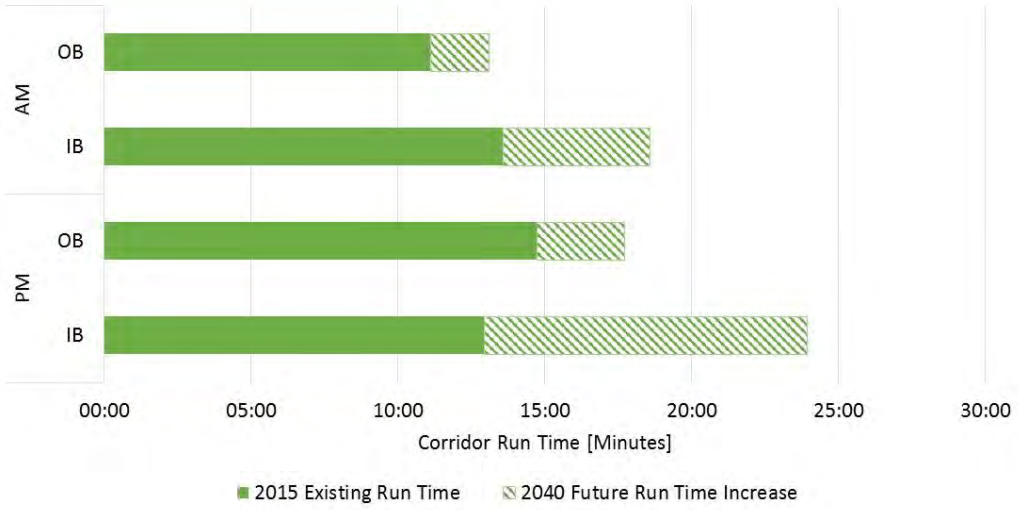
	Base Year (October 2015)		Future Year (2040)	
Analysis Time	Inbound Run Time (Minutes)	Outbound Run Time (Minutes)	Inbound Run Time (Minutes)	Outbound Run Time (Minutes)
AM Peak Hour (8:00 a.m. – 9:00 a.m.)	13.6	11.1	18.6	13.1
PM Peak Hour (5:15 p.m. – 6:15 p.m.)	12.9	14.7	23.9	17.7

Source: MBTA Running Time Reports for October 2015 (provided by MBTA). VISSIM model outputs developed by VHB.

[24] Run times do not include the dwell time spent at intermediate stops.

[25] It should be noted that the VISSIM model is not specifically calibrated to bus operations and that model boundaries vary slightly from the location of the MBTA timepoints that calculate existing run times. This may result in minor discrepancies in projected travel time across the corridor.

Figure 3-6 Projected Run Time Increase Between Watertown Square and Mackin Street at Western Avenue



Future Vehicular Traffic Conditions

The next step in the study process was to evaluate the projected future operations of the study area roadway system and compare them to the existing conditions. The traffic analysis was conducted using 2040 weekday morning and weekday evening peak hour traffic volumes and the future geometric design conditions as they currently are anticipated to exist at or near the study area intersections.

Planned Infrastructure Improvements

The following currently programed infrastructure changes were assumed:

- Narrowing travel lanes between Louise Street and Irving Street to accommodate a two-way multi-use path on the north side of Arsenal Street.
- A two-way multi-use path along the north side of Arsenal Street from School Street to Irving Street.
- Installation of a new traffic signal on Arsenal Street between Beacon Park and Beechwood Avenue.
- Reconstruction of the existing traffic signal at the intersection of Arsenal Street and Beechwood Avenue to include a fourth leg.
- Installation of a new traffic signal at the intersection of Arsenal Street at Wooley Avenue.

- Traffic signal timing optimization throughout the corridor.

Forecasted Traffic Demands

As discussed in the *Travel Demand Forecasts* section of this chapter, output from the CTPS regional travel demand model was used to develop an average background growth rate of five percent for both the morning and evening peak hours. This growth rate accounts for growth in regional traffic volumes to the year 2040.

Given the current level of redevelopment along Arsenal Street corridor, traffic generated by specific planned major developments were also considered. Based on communications with Watertown staff, it was determined that there are five specific projects that have the potential to add traffic to the study area roadways:

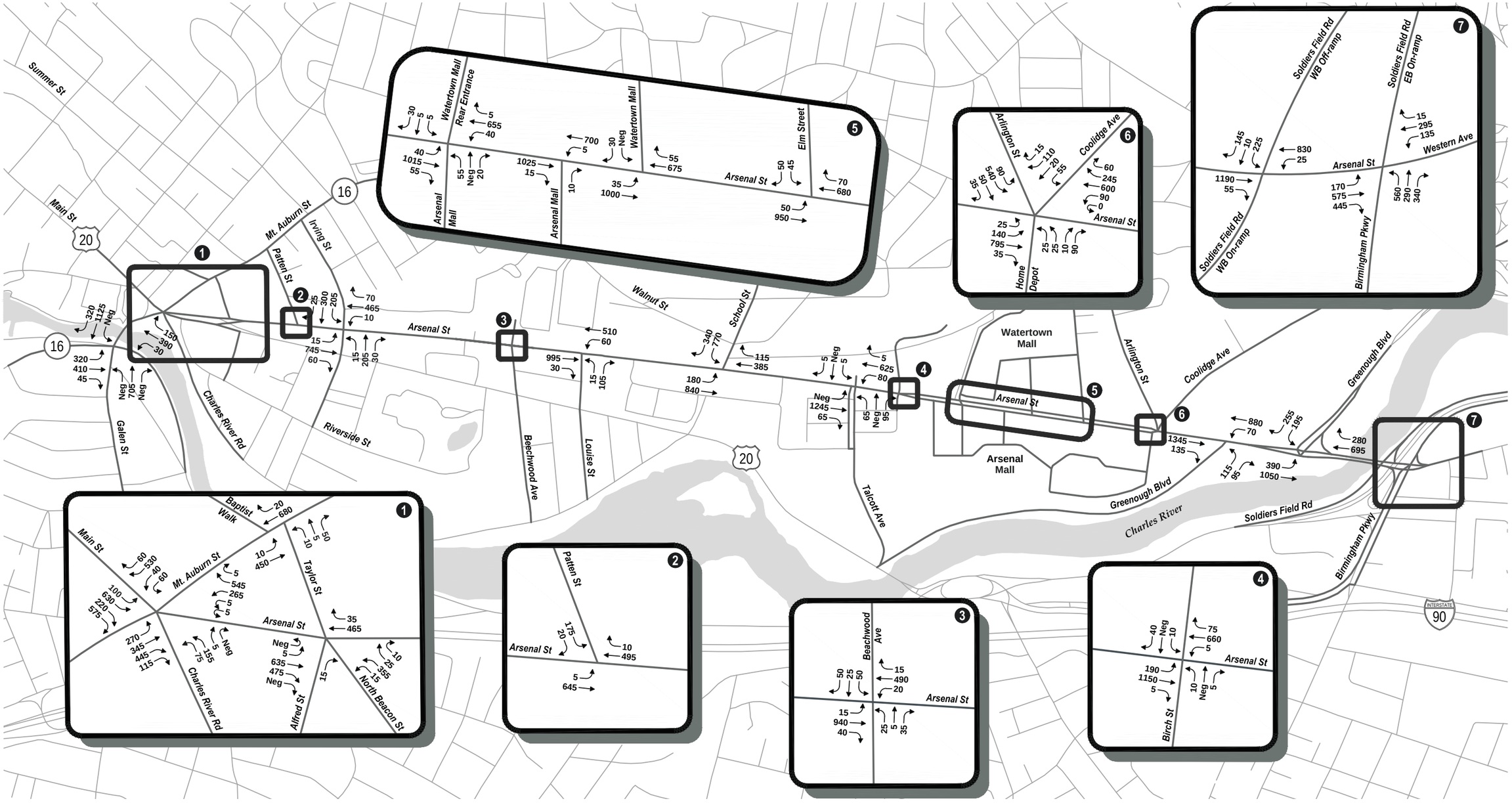
- Marriott Residence Inn Hotel
- The Arsenal on the Charles (athenahealth)
- 480 Arsenal Street (Office Development)
- Hanover Company (Mixed Use Development)
- Elan Union Market

Site-generated traffic volume layers from their respective traffic studies were used. These background project site-generated layers are provided in the Appendix.

The 2040 traffic volumes were developed by applying the five percent growth rate to the 2015 Existing Conditions traffic volumes and adding the traffic volumes associated with the site-specific background projects. Figures 3-7 and 3-8 show the resulting 2040 peak hour traffic volumes.

2040 Traffic Operations

Morning and evening peak hour VISSIM results for the signalized intersections in the study area are presented in Table 3-4 and Table 3-5, respectively. Unsignalized intersection VISSIM results for the morning and evening peak hours are presented in Table 3-6 and Table 3-7, respectively. Figure 3-9 shows the future traffic operations results. All results are included in the Appendix and key results are discussed below.

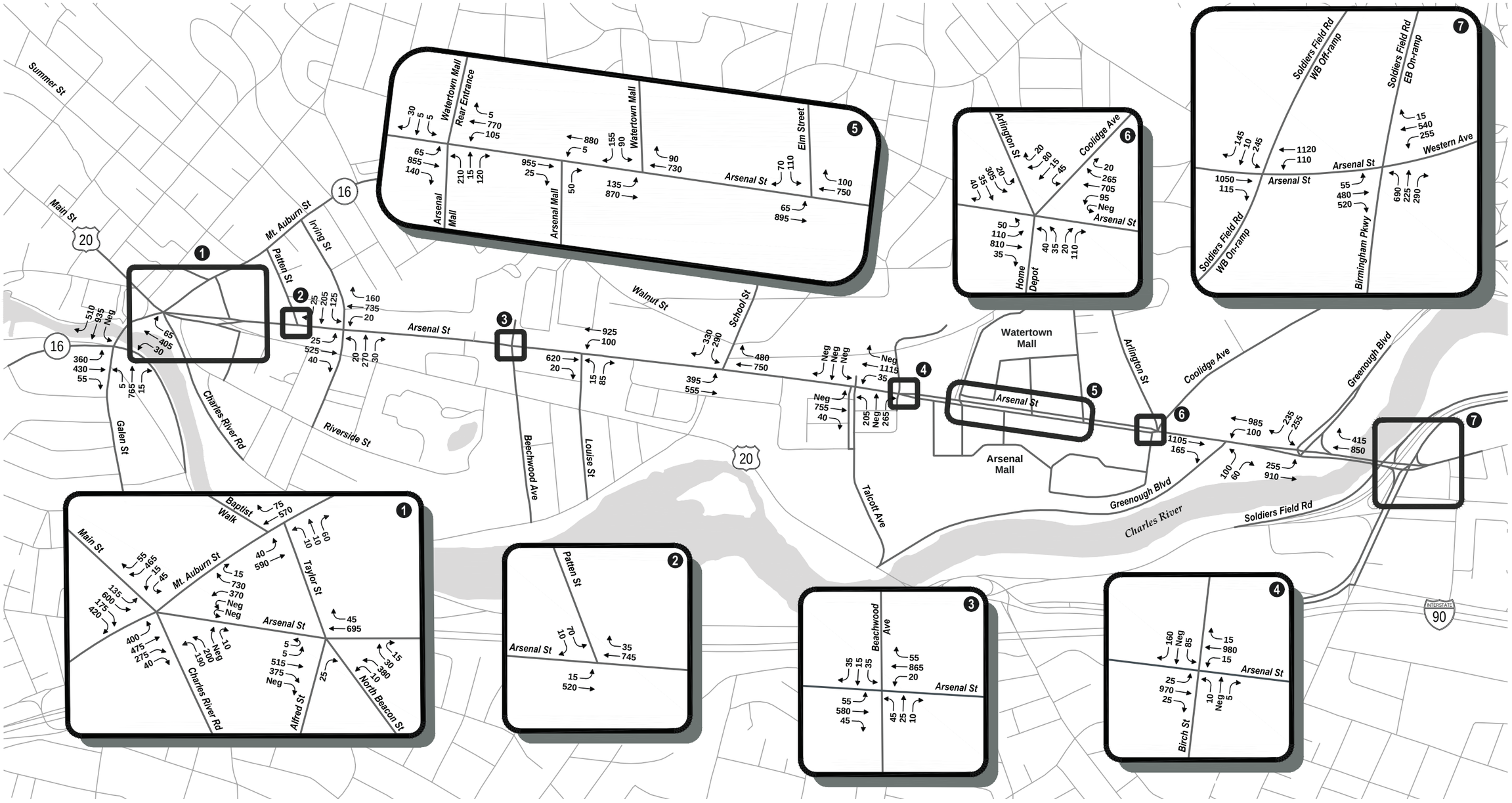


Not to scale

Arsenal Street Corridor Study | Watertown, Massachusetts

Future Conditions
Weekday Morning Peak Hour
Traffic Volume

Source: MassGIS



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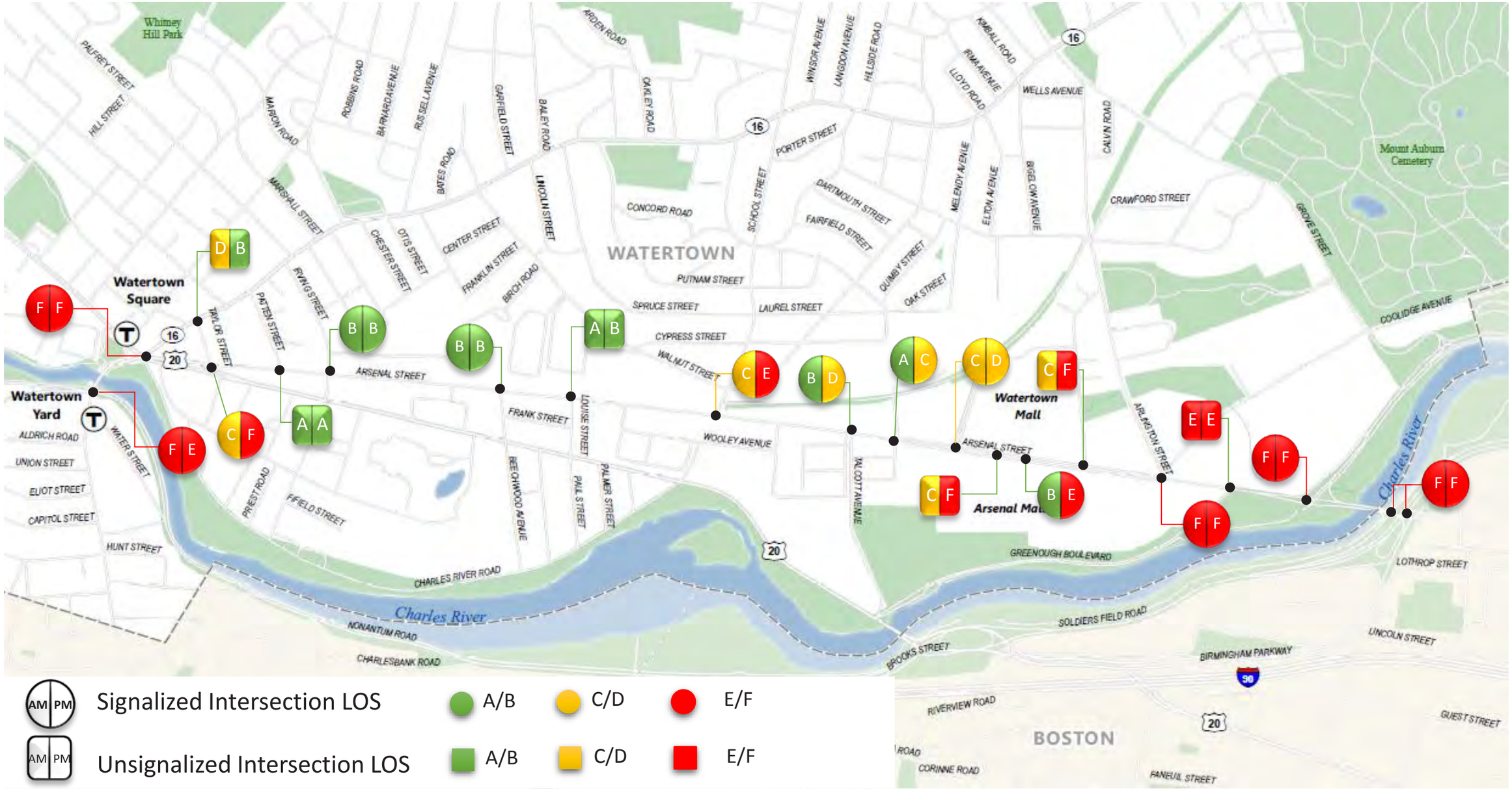
Arsenal Street Corridor Study | Watertown, Massachusetts

Future Conditions
Weekday Evening Peak Hour
Traffic Volume

Source: MassGIS



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Arsenal Street Corridor Study | Watertown, Massachusetts

Future Traffic Operation Results

Source: MassGIS

Signalized Intersections

All five of the intersections projected to operate at or over capacity in the morning and/or evening peak hours under 2015 conditions would continue to operate poorly under 2040 conditions:

- Galen Street at Watertown Street/Nonantum Road
- Arsenal Street/Main Street at Galen Street/North Beacon Street/Charles River Road/ Mount Auburn Street
- Arsenal Street at Arlington Street/ Coolidge Ave/ Home Depot Driveway
- Arsenal Street at Greenough Boulevard (North)
- Arsenal Street/Western Avenue at Soldiers Field Road/ Birmingham Parkway

It should be noted that two of these intersections operate at LOS E/F during only the morning peak hour in 2015 and are projected to operate at or over capacity during both peak hours in 2040.

Under existing conditions, the morning peak hour was noted to have a higher number of locations with operational deficiencies. Given the types of land uses planned along the corridor, under 2040 conditions it is anticipated that the evening peak hour would experience a higher number of locations with operational issues. In addition to the five intersections discussed above, four additional locations are projected to degrade to LOS E/F during the weekday evening peak hour in the future:

- Arsenal Street at North Beacon Street
- Arsenal Street at School Street
- Arsenal Street at Talcott Street/ Roma Tile Driveway
- Arsenal Street at Birch Street/ Arsenal Court

Unsignalized Intersections

During the morning peak hour, all intersections are projected to continue to operate at overall LOS D or better. Select movements at three intersections are projected to operate at LOS E/F under 2040 future conditions, as shown in Table 3-6.

During the evening peak hour, overall intersection operations at three locations are projected to degrade to LOS E/F:

- North Beacon Street at Alfred Street
- Arsenal Street at Elm Street
- Arsenal Street at Greenough Boulevard (South)

Select movements at one additional intersection are projected to operate at LOS E/F under 2040 future conditions, as shown in Table 3-7.

It should be noted that the VISSIM model used for this analysis considers the impacts of queuing from downstream intersections rather than free flow conditions along the mainline at unsignalized intersections (typically assumed as per HCM methodology). As such, the delay, LOS, and queue results presented may vary from HCM calculations and be slightly overstated.

Table 3-4 Signalized Intersection Capacity Analysis Summary (Morning Peak Hour)

		2015 Existing Conditions				2040 Future Conditions			
Movement		Delay[1]	LOS[2]	Avg Q[3]	Max Q[4]	Delay	LOS	Avg Q	Max Q
Galen Street at Watertown Street/Nonantum Road									
Watertown Street	EB LT	58	E	75	267	84	F	111	380
Watertown Street	EB TH/RT	31	C	75	267	31	C	111	380
Nonantum Road	WB LT-TH/TH-RT	106	F	152	367	>120	F	344	567
Galen Street	NB LT/TH-TH/RT	>120	F	347	864	>120	F	1,245	1,678
Galen Street	SB LT/TH-TH	41	D	146	405	42	D	166	443
Galen Street	SB RT	16	B	18	210	16	B	19	244
	Overall	82	F			>120	F		
Arsenal Street/Main Street at Galen Street/North Beacon Street/Charles River Road/ Mount Auburn Street									
Main Street	EB LT	>120	F	29	149	>120	F	198	445
Main Street	EB TH-TH/RT	>120	F	895	1,486	>120	F	1,366	1,549
Main Street	EB RT	>120	F	919	1,507	>120	F	1,386	1,570
Arsenal Street	WB LT	66	E	85	503	90	F	199	540
Arsenal Street	WB TH/RT	44	D	62	217	48	E	134	390
Charles River Road	NWB LT/TH/RT	54	D	61	293	64	E	84	386
Galen Street	NB LT-LT	40	D	33	236	43	D	28	169
Galen Street	NB TH-TH/RT	102	F	426	542	113	F	472	549
Mount Auburn Street	SB LT	63	E	29	149	58	E	30	160
Mount Auburn Street	SB TH-TH/RT	93	F	203	398	114	F	272	425
	Overall	95	F			106	F		
Arsenal Street at North Beacon Street									
Arsenal Street	EB LT/TH-TH	8	A	15	171	17	B	32	322
Arsenal Street	WB TH-TH/RT	10	A	8	112	16	B	16	173
North Beacon Street	NWB LT/TH-TH	21	C	17	105	53	D	93	793
North Beacon Street	NWB RT	8	A	0	27	19	B	18	190
	Overall	13	B			26	C		
Arsenal Street at Irving Street									
Arsenal Street	EB LT/TH/RT	9	A	13	114	12	B	20	210
Arsenal Street	WB LT/TH/RT	8	A	8	83	9	A	13	156
Irving Street	NB LT/TH/RT	18	B	19	172	36	D	58	173
Irving Street	SB LT/TH/RT	29	C	87	543	26	C	44	211
	Overall	16	B			18	B		
Arsenal Street at Beechwood Avenue									
Arsenal Street	EB LT/TH/RT	2	A	2	84	8	A	19	284
Arsenal Street	WB LT/TH/RT	4	A	3	110	7	A	14	213
Beechwood Avenue	NB LT/TH/RT	20	B	3	66	21	C	6	77
Driveway	SB LT/TH/RT			n/a		47	D	27	139
	Overall	3	A			11	B		

Table 3-4 Signalized Intersection Capacity Analysis Summary (Morning Peak Hour) cont.

		2015 Existing Conditions				2040 Future Conditions			
Movement		Delay[1]	LOS[2]	Avg Q[3]	Max Q[4]	Delay	LOS	Avg Q	Max Q
Arsenal Street at School Street									
Arsenal Street	EB LT	18	B	22	234	20	B	28	246
Arsenal Street	EB TH	13	B	22	234	16	B	28	246
Arsenal Street	WB TH-TH/RT	23	C	26	146	22	C	31	209
School Street	SB LT	25	C	80	363	37	D	167	365
School Street	SB LT/RT	28	C	80	363	39	D	167	365
	Overall	21	C			27	C		
Arsenal Street at Talcott Street/ Roma Tile Driveway									
Arsenal Street	EB LT/TH-TH/RT	17	B	34	198	18	B	45	219
Arsenal Street	WB LT/TH-TH/RT	11	B	16	178	14	B	24	242
Talcott Street	NB LT/TH	14	B	3	65	19	B	5	66
Talcott Street	NB RT	12	B	4	84	15	B	5	94
Roma Tile Driveway	SB LT/TH/RT	0	A	0	0	1	A	0	0
	Overall	15	B			17	B		
Arsenal Street at Birch Street/ Arsenal Court									
Arsenal Street	EB LT/TH-TH/RT	3	A	5	152	4	A	8	182
Arsenal Street	WB LT/TH-TH/RT	6	A	6	137	7	A	11	245
Arsenal Court	NB LT/TH/RT	49	D	3	21	39	D	2	30
Birch Street	SB LT	38	D	2	42	31	C	1	43
Birch Street	SB TH/RT	34	C	3	41	37	D	6	81
	Overall	5	A			6	A		
Arsenal Street at Arsenal Mall/ Watertown Mall (rear) Entrance									
Arsenal Street	EB LT	30	C	5	64	31	C	5	76
Arsenal Street	EB TH-TH	13	B	25	178	15	B	33	281
Arsenal Street	EB RT	12	B	3	61	12	B	3	69
Arsenal Street	WB LT	36	D	7	92	46	D	10	92
Arsenal Street	WB TH-TH/RT	29	C	101	273	30	C	88	358
Arsenal Mall Driveway	NB LT/TH	31	C	9	88	34	C	7	85
Arsenal Mall Driveway	NB RT	19	B	1	68	20	C	1	47
Watertown Mall (Rear Entrance)	SB LT/TH/RT	21	C	3	88	29	C	5	80
	Overall	20	C			22	C		
Arsenal Street at Arsenal Mall/ Watertown Mall									
Arsenal Street	EB LT	8	A	0	0	12	B	0	0
Arsenal Street	EB TH-TH	1	A	1	131	16	B	9	201
Arsenal Street	WB TH-TH	6	A	5	111	6	A	3	139
Arsenal Street	WB RT	4	A	1	45	2	A	0	40
Watertown Mall Driveway	SB LT	0	A	1	42	0	A	3	55
Watertown Mall Driveway	SB RT	17	B	1	42	24	C	3	55
	Overall	3	A			12	B		

Table 3-4 Signalized Intersection Capacity Analysis Summary (Morning Peak Hour) cont.

		2015 Existing Conditions				2040 Future Conditions			
Movement		Delay[1]	LOS[2]	Avg Q[3]	Max Q[4]	Delay	LOS	Avg Q	Max Q
Arsenal Street at Arlington Street/ Coolidge Ave/ Home Depot Driveway									
Arsenal Street	EB LT	63	E	51	327	77	E	56	256
Arsenal Street	EB TH-TH/RT	91	F	83	329	>120	F	307	587
Arsenal Street	WB LT	54	D	25	135	72	E	40	340
Arsenal Street	WB TH-TH/RT	39	D	72	281	45	D	109	679
Home Depot Driveway	NB LT/TH	27	C	21	127	46	D	42	185
Home Depot Driveway	NB RT	86	F	21	127	>120	F	42	185
Coolidge Avenue	SWB LT/TH-TH/RT	56	E	31	157	73	E	37	180
Arlington Street	SEB LT/TH-TH/RT	>120	F	842	1,658	>120	F	1,476	1,674
	Overall	86	F			>120	F		
Arsenal Street at Greenough Boulevard (North)									
Arsenal Street	EB LT	98	F	686	810	100	F	508	808
Arsenal Street	EB TH-TH	>120	F	749	814	>120	F	759	813
Arsenal Street	WB TH-TH	33	C	36	191	42	D	61	389
Arsenal Street	WB RT	1	A	0	0	4	A	0	9
Greenough Boulevard	SB LT-LT/RT	>120	F	23	120	>120	F	35	178
Greenough Boulevard	SB RT	39	D	31	256	44	D	46	378
	Overall	>120	F			>120	F		
Arsenal Street/Western Avenue at Soldiers Field Road/ Birmingham Parkway									
Arsenal Street	EB LT/TH-TH/RT	62	E	587	744	65	E	630	738
Western Avenue	WB LT/TH-TH/RT	80	F	142	462	>120	F	797	1,450
Birmingham Parkway	NB LT-LT	46	D	68	295	54	D	91	351
Birmingham Parkway	NB TH	51	D	84	341	54	D	90	372
Birmingham Parkway	NB RT	56	E	111	379	111	F	289	394
Soldiers Field Road WB Off-Ramp	SB LT/TH	70	E	51	280	54	D	39	223
Soldiers Field Road WB Off-Ramp	SB TH/RT	58	E	24	216	57	E	27	195
	Overall	61	E			81	F		

Source: VHB, Inc. using VISSIM Software
1 – Average Delay, in seconds per vehicle
2 – Level of Service
3 – Average queue length estimate, in feet
4 – Maximum queue length estimate, in feet
EB = Eastbound, WB = Westbound; NB = Northbound; SB = Southbound; NWB= Northwestbound; SEB = Southeastbound; SWB = Southwestbound
LT = Left-turn; TH = Through; RT = Right-turn

Table 3-5 Signalized Intersection Capacity Analysis Summary (Evening Peak Hour)

		2015 Existing Conditions				2040 Future Conditions			
Movement		Delay[1]	LOS[2]	Avg Q[3]	Max Q[4]	Delay	LOS	Avg Q	Max Q
Galen Street at Watertown Street/Nonantum Road									
Watertown Street	EB LT	47	D	84	322	73	E	120	471
Watertown Street	EB TH/RT	36	D	84	322	35	D	120	471
Nonantum Road	WB LT-TH/TH-RT	65	E	72	254	80	F	91	253
Galen Street	NB LT/TH-TH/RT	27	C	55	349	>120	F	604	1,250
Galen Street	SB LT/TH-TH	34	C	98	424	35	D	108	395
Galen Street	SB RT	17	B	41	400	15	B	38	379
	Overall	36	D			72	E		
Arsenal Street/Main Street at Galen Street/North Beacon Street/Charles River Road/ Mount Auburn Street									
Main Street	EB LT	51	D	33	215	83	F	78	559
Main Street	EB TH-TH/RT	53	D	90	408	106	F	381	1,311
Main Street	EB RT	28	C	58	429	68	E	262	1,332
Arsenal Street	WB LT	68	E	140	532	108	F	435	554
Arsenal Street	WB TH/RT	44	D	80	304	59	E	268	533
Charles River Road	NWB LT/TH/RT	55	D	67	390	>120	F	379	470
Galen Street	NB LT-LT	55	E	148	492	71	E	107	444
Galen Street	NB TH-TH/RT	>120	F	380	482	101	F	417	544
Mount Auburn Street	SB LT	46	D	12	84	67	E	21	144
Mount Auburn Street	SB TH-TH/RT	66	E	134	344	90	F	200	409
	Overall	59	E			90	F		
Arsenal Street at North Beacon Street									
Arsenal Street	EB LT/TH-TH	12	B	20	433	50	D	144	50
Arsenal Street	WB TH-TH/RT	12	B	14	142	77	E	182	570
North Beacon Street	NWB LT/TH-TH	43	D	69	848	>120	F	866	926
North Beacon Street	NWB RT	9	A	0	28	>120	F	100	420
	Overall	22	C			82	F		
Arsenal Street at Irving Street									
Arsenal Street	EB LT/TH/RT	10	B	12	137	17	B	70	362
Arsenal Street	WB LT/TH/RT	10	B	17	245	13	B	34	244
Irving Street	NB LT/TH/RT	16	B	22	170	27	C	48	173
Irving Street	SB LT/TH/RT	19	B	22	190	23	C	30	168
	Overall	13	B			18	B		
Arsenal Street at Beechwood Avenue									
Arsenal Street	EB LT/TH/RT	1	A	0	36	9	A	12	201
Arsenal Street	WB LT/TH/RT	2	A	3	131	12	B	42	529
Beechwood Avenue	NB LT/TH/RT	18	B	1	22	24	C	8	89
Driveway	SB LT/TH/RT			n/a		66	E	28	126
	Overall	2	A			14	B		

Table 3-5 Signalized Intersection Capacity Analysis Summary (Evening Peak Hour) cont.

		2015 Existing Conditions				2040 Future Conditions			
Movement		Delay[1]	LOS[2]	Avg Q[3]	Max Q[4]	Delay	LOS	Avg Q	Max Q
Arsenal Street at School Street									
Arsenal Street	EB LT	19	B	25	175	23	C	33	240
Arsenal Street	EB TH	14	B	25	175	15	B	33	240
Arsenal Street	WB TH-TH/RT	25	C	54	246	>120	F	956	1,124
School Street	SB LT	20	C	39	192	22	C	51	335
School Street	SB LT/RT	23	C	39	192	27	C	51	335
	Overall	21	C			74	E		
Arsenal Street at Talcott Street/ Roma Tile Driveway									
Arsenal Street	EB LT/TH-TH/RT	17	B	24	152	16	B	25	221
Arsenal Street	WB LT/TH-TH/RT	13	B	8	83	96	F	265	402
Talcott Street	NB LT/TH	11	B	22	227	>120	F	209	309
Talcott Street	NB RT	13	B	9	105	80	E	102	303
Roma Tile Driveway	SB LT/TH/RT	0	A	0	0	0	A	0	0
	Overall	13	B			71	E		
Arsenal Street at Birch Street/ Arsenal Court									
Arsenal Street	EB LT/TH-TH/RT	3	A	5	164	6	A	11	163
Arsenal Street	WB LT/TH-TH/RT	7	A	12	229	74	E	260	556
Arsenal Court	NB LT/TH/RT	39	D	5	44	46	D	3	43
Birch Street	SB LT	41	D	11	67	>120	F	51	242
Birch Street	SB TH/RT	41	D	13	84	>120	F	213	242
	Overall	8	A			56	E		
Arsenal Street at Arsenal Mall/ Watertown Mall (rear) Entrance									
Arsenal Street	EB LT	36	D	9	85	33	C	9	74
Arsenal Street	EB TH-TH	15	B	22	196	20	B	34	206
Arsenal Street	EB RT	15	B	9	199	16	B	9	138
Arsenal Street	WB LT	40	D	21	159	49	D	24	176
Arsenal Street	WB TH-TH/RT	32	C	111	291	86	F	99	386
Arsenal Mall Driveway	NB LT/TH	33	C	40	236	102	F	69	237
Arsenal Mall Driveway	NB RT	27	C	14	124	41	D	28	203
Watertown Mall (Rear Entrance)	SB LT/TH/RT	30	C	5	60	76	E	7	64
	Overall	25	C			54	D		
Arsenal Street at Arsenal Mall/ Watertown Mall									
Arsenal Street	EB LT	17	B	0	43	29	C	0	44
Arsenal Street	EB TH-TH	5	A	7	196	44	D	34	417
Arsenal Street	WB TH-TH	10	A	9	130	14	B	13	246
Arsenal Street	WB RT	6	A	2	84	7	A	1	82
Watertown Mall Driveway	SB LT	16	B	14	156	59	E	21	145
Watertown Mall Driveway	SB RT	20	B	14	156	26	C	21	145
	Overall	10	A			30	C		

Table 3-5 Signalized Intersection Capacity Analysis Summary (Evening Peak Hour) cont.

		2015 Existing Conditions				2040 Future Conditions			
Movement		Delay[1]	LOS[2]	Avg Q[3]	Max Q[4]	Delay	LOS	Avg Q	Max Q
Arsenal Street at Arlington Street/ Coolidge Ave/ Home Depot Driveway									
Arsenal Street	EB LT	55	D	40	215	>120	F	60	389
Arsenal Street	EB TH-TH/RT	48	D	75	297	>120	F	703	814
Arsenal Street	WB LT	59	E	33	263	69	E	40	393
Arsenal Street	WB TH-TH/RT	44	D	85	346	45	D	108	608
Home Depot Driveway	NB LT/TH	36	D	28	152	98	F	98	233
Home Depot Driveway	NB RT	40	D	28	152	>120	F	98	233
Coolidge Avenue	SWB LT/TH-TH/RT	38	D	17	111	80	F	23	100
Arlington Street	SEB LT/TH-TH/RT	35	C	39	181	>120	F	1,291	1,665
	Overall	44	D			>120	F		
Arsenal Street at Greenough Boulevard (North)									
Arsenal Street	EB LT	53	D	14	205	>120	F	399	806
Arsenal Street	EB TH-TH	>120	F	277	708	>120	F	765	812
Arsenal Street	WB TH-TH	45	D	57	326	55	E	90	531
Arsenal Street	WB RT	3	A	0	0	7	A	5	199
Greenough Boulevard	SB LT-LT/RT	>120	F	53	201	>120	F	71	251
Greenough Boulevard	SB RT	33	C	42	211	43	D	60	326
	Overall	>120	F			>120	F		
Arsenal Street/Western Avenue at Soldiers Field Road/ Birmingham Parkway									
Arsenal Street	EB LT/TH-TH/RT	70	E	684	728	71	E	677	727
Western Avenue	WB LT/TH-TH/RT	>120	F	534	1,172	>120	F	1,265	1,676
Birmingham Parkway	NB LT-LT	51	D	90	340	89	F	202	389
Birmingham Parkway	NB TH	47	D	57	319	49	D	58	304
Birmingham Parkway	NB RT	54	D	84	359	57	E	106	348
Soldiers Field Road WB Off-Ramp	SB LT/TH	73	E	57	341	67	E	50	333
Soldiers Field Road WB Off-Ramp	SB TH/RT	59	E	26	341	60	E	31	333
	Overall	111	F			>120	F		

Source: VHB, Inc. using VISSIM Software
1 – Average Delay, in seconds per vehicle
2 – Level of Service
3 – Average queue length estimate, in feet
4 – Maximum queue length estimate, in feet
EB = Eastbound, WB = Westbound; NB = Northbound; SB = Southbound; NWB= Northwestbound; SEB = Southeastbound; SWB = Southwestbound
LT = Left-turn; TH = Through; RT = Right-turn

Table 3-6 Unsignalized Intersection Capacity Analysis Summary (Morning Peak Hour)

		2015 Existing Conditions				2040 Future Conditions			
Movement		Delay[1]	LOS[2]	Avg Q[3]	Max Q[4]	Delay	LOS	Avg Q	Max Q
North Beacon Street at Alfred Street									
North Beacon Street	EB TH/RT	0	A	0	0	0	A	0	0
North Beacon Street	WB LT/TH	2	A	0	20	14	B	62	695
Alfred Street	NB LT/ RT	6	A	1	57	6	A	1	61
	Overall	5	A			10	B		
Mount Auburn Street at Taylor Street									
Mount Auburn Street	EB LT/TH-TH	1	A	0	48	1	A	0	28
Mount Auburn Street	WB TH-TH/RT	6	A	11	184	40	E	107	500
Taylor Street	NB LT/TH/RT	11	B	1	48	15	B	2	69
	Overall	4	A			26	D		
Arsenal Street at Patten Street									
Arsenal Street	EB LT/TH	1	A	0	47	2	A	5	62
Arsenal Street	WB TH/RT	0	A	0	0	1	A	0	0
Patten Street	SB LT/RT	14	B	9	97	20	C	19	197
	Overall	3	A			5	A		
Arsenal Street at Louise Street									
Arsenal Street	EB TH/RT	1	A	1	101	2	A	2	2
Arsenal Street	WB LT/TH	9	A	40	202	3	A	3	211
Louise Street	NB LT/RT	25	C	4	76	16	C	6	92
	Overall	6	A			3	A		
Arsenal Street at Arsenal Mall/ Watertown Mall									
Arsenal Street	EB RT	0	A	0	0	0	A	0	0
Arsenal Mall Driveway	NB RT	9	A	0	24	27	D	0	36
	Overall	-	-			-	-		
Arsenal Street at Elm Street									
Arsenal Street	EB LT	0	A	0	0	6	A	1	54
Arsenal Street	EB TH-TH	1	A	0	0	29	D	29	87
Arsenal Street	WB TH-TH/RT	0	A	0	0	1	A	1	85
Elm Street	SB LT/RT	10	A	2	48	>120	F	43	142
	Overall	1	A			22	C		
Arsenal Street at Greenough Boulevard (South)									
Arsenal Street	EB TH-TH/RT	84	F	353	660	92	F	504	670
Arsenal Street	WB LT/TH-TH	5	A	11	165	8	A	14	338
Greenough Boulevard	NB LT/RT	34	D	26	186	43	E	44	261
	Overall	53	D			54	D		

Source: VHB, Inc. using VISSIM Software
1 – Average Delay, in seconds per vehicle
2 – Level of Service
3 – Average queue length estimate, in feet
4 – Maximum queue length estimate, in feet
EB = Eastbound, WB = Westbound; NB = Northbound; SB = Southbound;
LT = Left-turn; TH = Through; RT = Right-turn

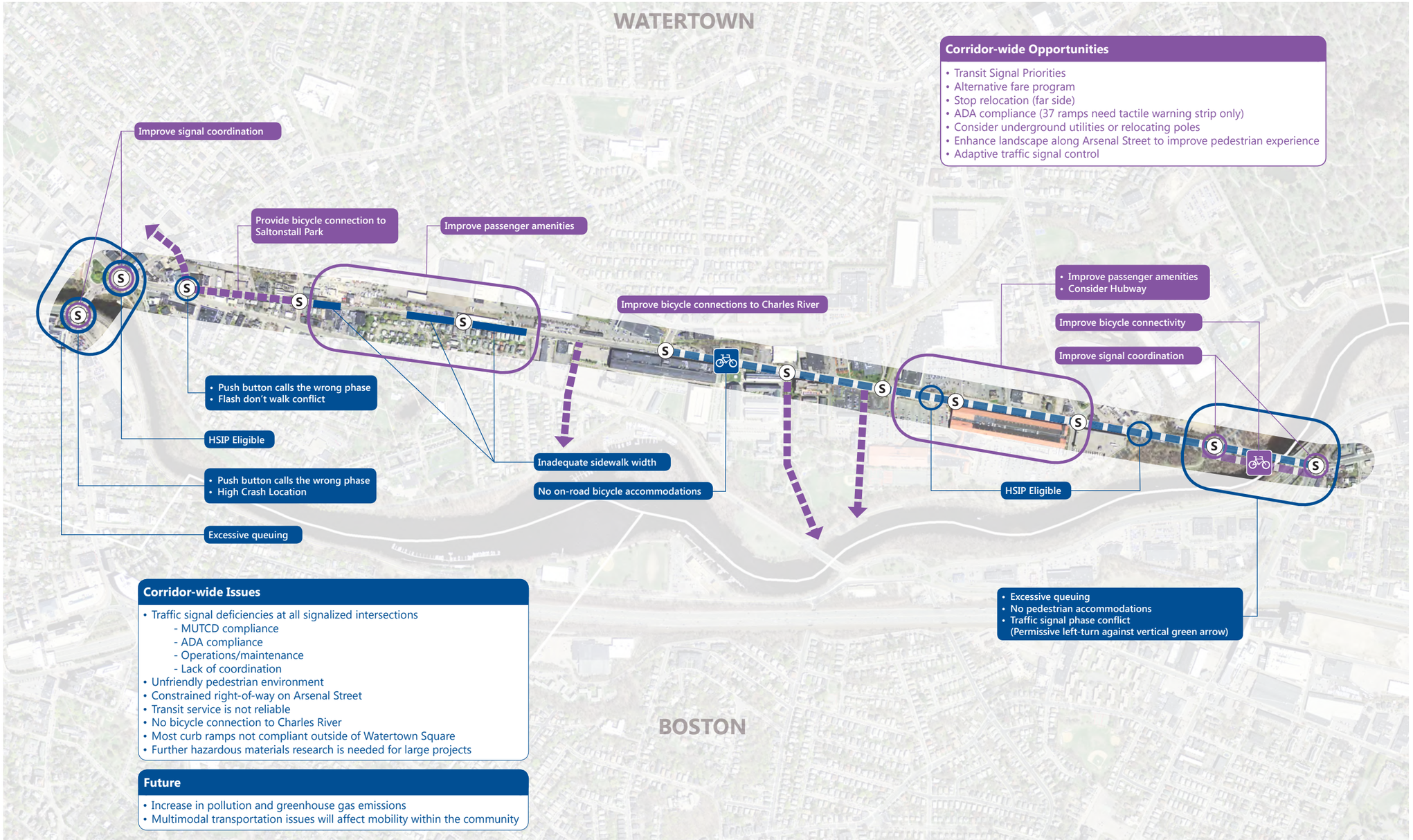
Table 3-7 Unsignalized Intersection Capacity Analysis Summary (Evening Peak Hour)

		2015 Existing Conditions				2040 Future Conditions			
Movement		Delay[1]	LOS[2]	Avg Q[3]	Max Q[4]	Delay	LOS	Avg Q	Max Q
North Beacon Street at Alfred Street									
North Beacon Street	EB TH/RT	0	A	0	0	0	A	0	0
North Beacon Street	WB LT/TH	8	A	44	764	>120	F	782	842
Alfred Street	NB LT/ RT	10	A	1	54	10	A	1	64
	Overall	9	A			41	E		
Mount Auburn Street at Taylor Street									
Mount Auburn Street	EB LT/TH-TH	1	A	0	76	1	A	0	22
Mount Auburn Street	WB TH-TH/RT	1	A	0	73	21	C	51	340
Taylor Street	NB LT/TH/RT	11	B	1	50	24	C	8	191
	Overall	1	A			13	B		
Arsenal Street at Patten Street									
Arsenal Street	EB LT/TH	1	A	5	71	6	A	55	374
Arsenal Street	WB TH/RT	0	A	0	0	7	A	8	208
Patten Street	SB LT/RT	11	B	3	65	16	C	19	182
	Overall	1	A			7	A		
Arsenal Street at Louise Street									
Arsenal Street	EB TH/RT	1	A	0	64	8	A	1	147
Arsenal Street	WB LT/TH	6	A	18	126	19	C	39	621
Louise Street	NB LT/RT	10	A	3	54	14	B	4	75
	Overall	4	A			15	B		
Arsenal Street at Arsenal Mall/ Watertown Mall									
Arsenal Street	EB RT	0	A	0	0	1	A	0	9
Arsenal Mall Driveway	NB RT	15	B	1	47	45	E	1	55
	Overall	-	-			-	-		
Arsenal Street at Elm Street									
Arsenal Street	EB LT	3	A	0	47	11	B	0	48
Arsenal Street	EB TH-TH	0	A	0	0	127	F	87	279
Arsenal Street	WB TH-TH/RT	1	A	0	91	3	A	3	271
Elm Street	SB LT/RT	11	B	5	99	>120	F	236	253
	Overall	2	A			88	F		
Arsenal Street at Greenough Boulevard (South)									
Arsenal Street	EB TH-TH/RT	4	A	0	72	110	F	542	651
Arsenal Street	WB LT/TH-TH	5	A	3	236	11	B	27	396
Greenough Boulevard	NB LT/RT	15	B	8	119	32	D	22	162
	Overall	5	A			61	E		

Source: VHB, Inc. using VISSIM Software
1 – Average Delay, in seconds per vehicle
2 – Level of Service
3 – Average queue length estimate, in feet
4 – Maximum queue length estimate, in feet
EB = Eastbound, WB = Westbound; NB = Northbound; SB = Southbound;
LT = Left-turn; TH = Through; RT = Right-turn

Issues, Opportunities, and Constraints

The framing of study area transportation issues, opportunities, and constraints evolved from a thorough review of data and the compilation of concerns and desired outcomes identified through the public outreach process. Table 3-8 and Figure 3-10 organize and present these issues, opportunities, and constraints. A more detailed discussion is provided in the Appendix.



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Issues, Opportunities, and Constraints

Source: MassGIS, CTPS Regional Travel Demand Model

Table 3-8 Study Areas Issues, Opportunities, and Constraints

		Issues	Opportunities	Constraints
Transit	Transit Capacity and Reliability The current transit system fails to provide reliable and consistent service along the Arsenal Street corridor. Additionally, an increased reliance on transit, both today and in the future, taxes a regional system that is nearing capacity.	• Crowding on buses results in uncomfortable conditions or a potential missed trip for MBTA passengers. • Bus services along the corridor are scheduled services (as opposed to high-frequency walk-up service), but do not operate with high reliability. • Bus schedules along the corridor consist of uneven service headways.	• Implement Route 70/70A service modifications to support improved reliability. • Implement Transit Signal Priority (TSP) along the Study Corridor. • Consider alternative fare payment/validation strategies that allow for all-door boarding.	• Fleet and support facility constraints limit the ability to increase peak period service on the corridor.
	Transit Amenities Existing amenities along the Arsenal Street Corridor detract from a high-quality experience for transit riders.	• Limited transit passenger facilities exist on the Arsenal Street Corridor.	• Add passenger amenities to corridor stops.	• The limited right-of-way along the Arsenal Street Corridor presents a physical constraint to potential transit stop improvements.
Vehicle	Capacity Constraints at Corridor Gateways The Watertown Square and Soldiers Field Road intersections serve as gateways to the Arsenal Street corridor from the regional transportation network. These locations are at or nearing capacity during both peak hours today and are limited by the capacity of the Charles River crossings.	• The Watertown Square and Soldiers Field Road gateways are constrained.	• Improve operations at the Watertown Square gateway. • Improve operations at the Soldiers Field Road gateway.	• Limited right-of-way presents a physical constraint to potential gateway improvements. • Capacity is limited by the Charles River crossings at both the east and west gateways.
	Vehicular Operations and Progression As development potential along the corridor and in the region is realized, intersection capacity along Arsenal Street will be constrained during both peak hours at many locations.	• Vehicle operations along the corridor will be constrained at many locations in the future. • Traffic progression along the Arsenal Street corridor is poor. • During inventories of the traffic signal equipment, issues were noted at all 14 existing signalized intersections.	• Investigate the feasibility of coordinating Arsenal Street signals, potentially with a fully Adaptive Signal Control (ASC) system. • Incrementally improve signals to address non-compliance issues.	• High level of traffic signalization along the corridor requires careful coordination and maintenance of traffic signal equipment. • Balancing multimodal transportation needs in a constrained corridor limits the ability to make wholesale operational changes.
Bicycle	Bicycle Connectivity Completing the Arsenal Street bicycle network and providing connections between the corridor and the region's expanding bicycle network will facilitate both through trips and those with destinations along the corridor.	• Gaps in bicycle network east of School Street limit mobility. • Connections between Arsenal Street and the regional bicycle network are limited.	• Complete the Arsenal Street bicycle network. • Provide bicycle connections between Arsenal Street and points west. • Connect Arsenal Street to the Charles River. • Continue bicycle accommodations to Western Avenue. • Investigate the feasibility of expanding Hubway into Watertown.	• Limited right-of-way presents a physical constraint to providing bicycle accommodations. • Constrained right-of-way and heavy vehicular traffic in Watertown Square and at the Soldiers Field Road gateways. • Property between Arsenal Street and the Charles River are privately owned.
	Bicycle Amenities Improving amenities along the corridor will encourage and support bicycle travel.	• A lack of amenities within the corridor discourage bicycle travel.	• Incorporate improved bicycle amenities into development mitigation commitments.	• Mitigation for many of the developments along Arsenal Street has already been approved.
Pedestrian	Pedestrian Mobility Significant growth is anticipated in walk trips as the corridor transitions to a live-work-play district. While sidewalks are provided throughout, the general quality of the pedestrian network along Arsenal Street is inconsistent, impacted by construction activity and obstructed by physical barriers in some locations.	• The existing pedestrian environment is inconsistent and unfriendly in locations. • Most curb ramps outside of Watertown Square at not compliant with current standards. • Construction activities impact pedestrian mobility.	• Work with developers along Arsenal Street to improve pedestrian accommodations and maintain mobility during construction activities. • Address non-compliant curb ramps.	• Limited right-of-way presents a physical constraint to widening the sidewalk in many locations. • Guidance on accessibility is frequently updated, making it difficult to plan for, construct, and maintain a fully accessible corridor. • Mitigation for many of the developments along Arsenal Street has already been approved.
Safety	Address Safety Deficiencies There are a series of noted safety deficiencies at study area intersections. Many locations are eligible for FHWA and MassDOT funds to improve identified safety issues.	• The intersection of Galen Street at Nonantum Road/ Watertown Street is ranked 178 in the 2011-2013 Statewide Top 200 Intersection Crash List. • There are several HSIP-eligible intersection clusters within the study area. • Out of the 20 study area intersections, five locations have crash rates that exceed the District 6 average crash rate. • A review of traffic signal equipment throughout the corridor identified three locations where small changes to location or equipment are necessary.	• Through MassDOT, all HSIP candidate locations require a Road Safety Audit (RSA). • Address safety deficiencies through other planned or future improvement projects.	• Achieving consensus and implementing improvement strategies at multiple locations in a timely manner.