



## BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

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Stephanie Pollack, MassDOT Secretary and CEO and MPO Chair  
Karl H. Quackenbush, Executive Director, MPO Staff

### *TECHNICAL MEMORANDUM*

**DATE:** January 18, 2018  
**TO:** Boston Region MPO  
**FROM:** Seth Asante, Chen-Yuan Wang, and Ben Erban  
**RE:** Safety and Operations Analyses at Selected Intersections: Federal Fiscal Year 2018

#### 1 BACKGROUND

This memorandum presents the results of Task 1 (Select Study Locations) of the work program for Safety and Operations Analyses at Selected Intersections: Federal Fiscal Year (FFY) 2018.<sup>1</sup>

This study builds on recommendations generated by the Boston Region Metropolitan Planning Organization's (MPO) Congestion Management Process (CMP) to address safety and congestion problems at intersections in the MPO area. Several similar studies were completed in previous funding years and received favorable responses from municipalities, which included appreciation of the MPO's assistance with the conceptual design of low-cost improvements and the planning and implementation processes.

Previous studies examined large, complex intersections, simpler intersections, and locations that include two or more adjacent intersections. The focus for FFY 2018 is on simpler intersections. Locations that would potentially require major geometry redesigns, such as grade separation or adding travel lanes on an arterial roadway, were considered to be less suitable for this study.

As in the past, the basic requirement for a location to qualify as a study candidate is that it must be located on an arterial roadway in the Boston Region MPO where 1) it has safety and operational concerns and 2) the agencies and/or municipalities with jurisdiction over the roadway are committed to implementing recommended improvements.

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<sup>1</sup> Karl H. Quackenbush, CTPS Executive Director, memorandum of a work program to the Boston Region MPO, "Work Program for Safety and Operations Analyses at Selected Intersections," November 16, 2017.

## 2 SELECTION PROCEDURE

The study selection process consisted of the following four steps completed by the MPO:

- 1) Generate a list of potential intersection study locations then narrow it to 10 locations
- 2) Gather detailed data for each of the 10 locations
- 3) Apply specific criteria to examine potential study locations more closely
- 4) Score and rate the 10 locations, and assign low, medium, or high priority to each intersection location

### 2.1 Generating List of Potential Locations

MPO staff used the following sources to develop an initial list of nearly 50 potential study locations in the MPO area:

- FFY 2016 safety and operations list of potential candidates
- Suggested locations from Unified Planning Work Program outreach

The following exclusion criteria were developed to narrow the list of locations:

- Located in a municipality that has been selected for this study within the past three years
- Located in a subregion that has been well- or over-represented in past subregional priority corridor projects in terms of the proportion of population or Massachusetts Department of Transportation (MassDOT) top-200 high-crash locations in the region
- Studied by MPO staff or another agency; included in a Transportation Improvement Program (TIP) project with a status of “advertised” or “programmed,” or included in an active MassDOT or other agency project that is in design (at 25 percent or higher design status), in construction, or recently completed
- Considered part of a larger potential study area, such as a highway interchange or a long traffic corridor with an extensive area of congestion
- Considered not at-grade

### 2.2 Gathering Detailed Data

Staff gathered data to support the exclusion criteria and eliminated locations that were not suitable. The assembled data for 10 intersection locations in 10 municipalities in the MPO region are listed below.

- MassDOT’s 2015 Road Inventory File. To collect the following information for each major arterial segment in each intersection location: roadway jurisdiction, National Highway System (NHS) status, and annual average daily traffic (AADT)

- MassDOT's Transportation Data Management System. Recently updated AADT counts were retrieved from MassDOT's online database
- MassDOT's 2010–14 Crash Database. Identify high-crash locations and numbers of crashes
- MPO CMP Data on Arterial Congestion. Determine travel-time index (that is, travel time in the peak period divided by travel time in free-flow conditions) for each major arterial segment intersection location
- MPO Data on Bike Network Gaps and MassDOT Bike Facilities. Identify bicycle needs—including connectivity—and accommodation
- Data on Massachusetts Bay Transportation Authority (MBTA) Bus Service Performance and Passenger Load. Determine the percentage of bus trips that do not adhere to the schedule (late service) or to passenger load standards (crowding)
- Data on MBTA Subway and Commuter Rail Lines. Identify locations serving MBTA stations
- Data from the following sources were also included:
  - Data selected from MassDOT's project-information and roadway safety audit databases
  - The MPO's 2016–20 TIP projects
  - MPO planning (and other) studies
  - Municipal websites (to obtain data on projects, studies, and TIP projects planned or programmed for each arterial segment)

Table 1 (at the end of this memorandum) presents the data assembled for each intersection location, community, Metropolitan Area Planning Council (MAPC) subregion, MassDOT district office, jurisdiction, equivalent property damage only crashes, total crashes, fatal crashes, injury crashes, property damage only and non-reported crashes, bicycle and pedestrian crashes, top-200 crash clusters, crash clusters that are eligible for Highway Safety Improvement Program (HSIP) funding, transit routes, a list of relevant studies or projects, and staff comments. The table also shows the results of applying the selection criteria and the priority rating, which was performed in the fourth step of this process (described below).

## 2.3 Applying Criteria

MPO staff further examined the intersection locations by applying the five criteria cited below (each item is worth one point):

- *Safety Conditions, 0–2 Points*
  - Location has an estimated crash rate that is higher than the district average
  - Location has a significant number of pedestrian and bicycle crashes per year (more than three), or has truck traffic safety concerns

- *Multimodal Significance, 0–2 Points*
  - Location needs improved transit, bicycle, or pedestrian facilities
  - Location has a high volume of truck traffic serving regional commerce
  
- *Regional Significance, 0–2 Points*
  - Location carries a significant portion of regional traffic (AADT is greater than 15,000 on at least one intersecting road)
  - Location is essential for the region’s economic, cultural, or recreational development
  
- *Regional equity, 0–2 Points*
  - Location is in an MPO subregion that is at least slightly under-represented in previous safety and operations analyses in terms of the proportion of population or number of MassDOT top-200 high-crash locations in the region
  - Location is in an MPO subregion that is very under-represented in previous safety and operations analyses in terms of the proportion of population or number of MassDOT top-200 high-crash locations in the region
  
- *Implementation Potential, 0–2 Points*
  - Location has strong potential for implementation based on the urgent need for safety improvements
  - Location is proposed or endorsed by its roadway administrative agency or agencies and has strong support from other stakeholders (for example, municipalities, MassDOT, and subregions)

In addition, no two locations in the same town would be selected.

## 2.4 Scoring and Rating

Intersection locations with a score of four or fewer points were rated low priority; those with a score of five to seven points were rated medium priority; and those with a score of eight or more points were rated high priority. Five locations were given a high-priority rating and four a medium-priority rating by MPO staff based on safety, operations, multimodal and regional significance, and support from agencies and municipalities.

Staff examined the high-priority segments more closely. Locations within the following parameters were not suitable candidates for this cycle of safety and operations analyses:

- Locations that were recently or are currently under study
- Locations that exhibited a density of closely spaced intersections that suggest that a corridor study is needed
- Locations that were selected for the FFY 2018 Subregional Priority Corridors study

### 3 SELECTED INTERSECTIONS FOR STUDY

Based on the evaluation above, staff selected two intersections for study: 1) Route 1A (Main Street) at Cherry Street, Monument Street, and Arbor Street in Wenham; and 2) Route 126 (Hartford Avenue) at Maple Street in Bellingham.

- 1) *Route 1A (Main Street) at Cherry Street, Monument Street, and Arbor Street in Wenham:* The Town of Wenham and MassDOT District 4 requested MPO staff to study three major intersections on Route 1A from Cherry Street to Arbor Street. The primary issues raised were safety and operational concerns for users of all modes, including pedestrians and bicyclists.

The three intersections are located close to each other within a short distance of 750 feet and serve a high volume of traffic on the regional arterial of Route 1A corridor. Additionally, several properties are located adjacent to these intersections, including the town hall, police department, fire department, the Maples Retirement Home, and First Church. The combination of these factors has caused safety concerns for all the users, especially for residents frequently visiting the area.

All three intersections are currently unsignalized, and preliminary traffic signal needs analyses performed by MassDOT show that they satisfy the first three warrants of Manual on Uniform Traffic Control Devices. However, the three intersections should be further examined together in a comprehensive study under the existing town center context.

- 2) *Route 126 (Hartford Avenue) at Maple Street in Bellingham:* The Town of Bellingham requested MPO's assistance in addressing the safety and operational concerns at this intersection, especially on the truck operational and safety issues.

The Town expressed that the intersection at Hartford Avenue and Maple Street carries a high proportion of truck traffic and is undersized to accommodate large commercial vehicles safely and efficiently. The intersection is just one-half mile south of the interchange of Interstate 495 and Route 126, where a number of large commercial uses exist.

Meanwhile, a significant portion of Maple Street, currently zoned industrial, houses a power plant, multiple warehouses, mulch- and lumber-producing facilities, and vacant land for future developments.

In addition, an elementary school that serves all of North Bellingham is located on Route 126, less than 100 feet north of the intersection. The traffic and pedestrian access to the school should also be considered in further study. The intersection is suitable for this study because of the issues and concerns from these different travel modes.

Staff also evaluated the pedestrian accommodation and safety improvement needs for the two locations by applying the Pedestrian Report Card Assessment that the MPO recently developed.<sup>2</sup> The two selected locations are highly qualified for pedestrian accommodation or safety improvement requirements. Appendix A contains detailed results of the assessments.

#### 4 SUMMARY

The recommended intersection locations meet the selection criteria of this study because of their potential for safety and operations improvements. The work scope for this study assumed that “as many as three” locations would be selected. Staff selected two locations that contain a total of four intersections. Appendix B contains the support letters from MassDOT and stakeholders in Wenham and Bellingham.

Staff will submit these recommendations to the MPO for discussion. If the MPO endorses the study selections, staff will meet with officials from Wenham, Bellingham, and MassDOT to discuss study specifics, conduct field visits, collect data, and perform analyses.

SA/CW/BE/sa

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<sup>2</sup> Pedestrian Level-of-Service Memorandum, Ryan Hicks and Casey-Marie Claude, Boston Region Metropolitan Organization, January 19, 2017.

**TABLE 1. FFY 2018 Safety and Operations for Selected Intersections**  
Selected locations are highlighted in green

| Location | Community   | MAPC Subregion | MassDOT District | Jurisdiction | Street 1                                   | Route 1   | Street 2   | Study, Project, or TIP Project   | EPDO Crashes 2012-14 | Total Crashes 2012-14 | Injury Crashes 2012-14 | Bike/Ped Crashes 2012-14 | Top 200 Crash Clusters 2012-14 | HSIP-eligible Crash Clusters 2012-14 | Transit Routes     | Safety Conditions | Multimodal Significance | Regional Significance | Regional Equity | Implementation Potential | Total Score | Rating | Comments  |
|----------|-------------|----------------|------------------|--------------|--|-----------|--|--|----------------------|-----------------------|------------------------|--------------------------|--------------------------------|--------------------------------------|--------------------|-------------------|-------------------------|-----------------------|-----------------|--------------------------|-------------|--------|---|
| 1        | Wenham      | NSTF           | 4                | MassDOT      | Main Street                                | Route 1A  | Cherry Street Monument Street Arbor St / Friend Ct | None   | 76                   | 36                    | 10                     | 1                        | 0                              | 0                                    | None               | 2                 | 2                       | 2                     | 2               | 2                        | 10          | High   | Wenham and MassDOT District 4 requested MPO staff to study these three major intersections on Route 1A. The primary issues raised were safety and operational concerns for users of all modes, including pedestrians and bicyclists. To fully address these issues, the three intersections should be examined together under the existing town center context.   |
| 2        | Bellingham  | SWAP           | 3                | Town         | Hartford Avenue                            | Route 126 | Maple Street                                       | #604862: Bellingham- Ramp Construction and Relocation, I-495 At Route 126 (Hartford Avenue) (half a mile south of location) (TIP project, preliminary design phase, last update 2007)<br>#605239: Bellingham- Franklin- Bridge Preservation - Hartford Ave over I-495 (half a mile south) (Complete 2012)                | 12                   | 8                     | 1                      | 0                        | 0                              | 0                                    | None               | 1                 | 2                       | 2                     | 2               | 2                        | 9           | High   | The Town of Bellingham requested MPO's assistance in addressing the safety and operational concerns at this intersection, especially on the truck operational and safety issues. A future study should also consider traffic and pedestrian safety from an elementary school adjacent to the intersection.  |
| 3        | Danvers     | NSTF           | 4                | MassDOT      | Andover Street                             | Route 114 | Garden Street                                      | Project 605383 Danvers- Peabody- Resurfacing and Related Work on Route 114 (completed in 2011)   | 97                   | 37                    | 15                     | 1                        | 1                              | 1                                    | None               | 2                 | 2                       | 2                     | 1               | 1                        | 8           | High   | This intersection was studied as part of the FFY 2011 Priority Corridors: Route 114 Study in Danvers. That study proposed improvements for addressing safety and operations at the intersection.  |
| 4        | Cambridge   | ICC            | 6                | DCR and City | Mount Auburn Street and Fresh Pond Parkway | Route 3   | Coolidge Hill Road                                 | None   | 101                  | 41                    | 15                     | 1                        | 1                              | 1                                    | MBTA 71 and 73     | 2                 | 2                       | 2                     | 2               | 0                        | 8           | High   | Comments from MPO outreach indicate pedestrian safety issues and traffic congestion and operations concerns at Mount Auburn Street/Coolidge Hill Road. DCR interest is critical for this study due to the proximity of Route 3/Fresh Pond Parkway at Mount Auburn Street.   |
| 5        | Marlborough | MetroWest      | 3                | MassDOT      | Boston Post Road West                      | Route 20  | Northboro Road East (Shopping Plaza)               | #601133: Marlborough- Roadway Reconstruction Including Signals, Route 20 (Boston Post Road) From The Northboro Ct To Felton St. (2004)<br>#608467: Marlborough- Resurfacing And Related Work On Route 20 (Unknown Location) (Planned for 2019 TIP)   | 92                   | 68                    | 6                      | 4                        | 0                              | 1                                    | MWRTA Route 7      | 2                 | 2                       | 2                     | 1               | 1                        | 8           | High   | A Route 20 study in Marlborough is recommended for the MPO FFY 2016 Subregional Priority Corridors Study. This location was not selected because of the geographic equity consideration applied in the selection study locations.   |
| 6        | Boston      | ICC            | 6                | DCR          | Jamaicaway                                 |           | Bynner Street                                      | None   | 122                  | 50                    | 18                     | 2                        | 1                              | 1                                    | None               | 1                 | 2                       | 2                     | 1               | 1                        | 7           | Medium | Potential candidate for a safety and operations study. The location is in the current list of Top 200 High-Crash Intersections. The City of Boston expressed interest, but the DCR did not indicate interest.   |
| 7        | Salem       | NSTF           | 4                | Town         | North Street                               | Route 114 | Mason Street                                       | #605332: Salem- Bridge Replacement, S-01-001, (St 114) North Street Over North River - Is just south of the intersection. (TIP project, begins 2021)<br>#608521: Salem- Bridge Maintenance, S-01-018 (32), (St 114) North Street Over (St 107) Bridge Street and MBTA - a little further down (TIP project, begins 2018) | 102                  | 45                    | 12                     | 6                        | 1                              | 1                                    | MBTA 465           | 1                 | 2                       | 2                     | 1               | 1                        | 7           | Medium | This location was not selected because the crash cluster at this location includes two signalized intersections and four unsignalized intersections in a half-mile distance. An arterial segment study is more suitable for this location. In addition, a Route 1A study involving Swampscott, Salem, and Marblehead has been recommended for the MPO FFY 2016 Subregional Priority Corridors Study, and so, because of geographic equity considerations, this location is not recommended for that reason as well. |
| 8        | Boston      | ICC            | 6                | MassDOT      | Columbia Road                              |           | Buttonwood Street                                  | #603412: Boston- Traffic Signal And Safety Improvements, Route I-93 Ramps At Columbia Road - is adjacent to intersection. (Complete 2005)  | 79                   | 27                    | 13                     | 0                        | 0                              | 1                                    | MBTA 8, 18, and 41 | 2                 | 1                       | 1                     | 2               | 1                        | 7           | Medium | Potential candidate for a safety and operations study. This unsignalized intersection is located between two busy and closely spaced signalized intersections.  |
| 9        | Newton      | ICC            | 6                | City         | Commonwealth Avenue                        | Route 30  | Washington Street                                  | None   | 22                   | 14                    | 2                      | 1                        | 0                              | 0                                    | MBTA 505           | 0                 | 2                       | 1                     | 2               | 1                        | 6           | Medium | Potential candidate for a safety and operations analysis.   |
| 10       | Sherborn    | SWAP           | 3                | Town         | Washington Street                          | Route 16  | S Main Street (Route 27)                           | None   | 46                   | 18                    | 7                      | 0                        | 0                              | 1                                    | None               | 1                 | 1                       | 1                     | 1               | 0                        | 4           | Low    | Location was studied by CTPS and VHB in 2002 and 2004. Improvements were not implemented. A UPWP comment suggested that this could be a good location for demand response signal.   |

**Acronyms and Abbreviations**  
 BAT = Brockton Area Transit Authority. CATA = Cape Ann Transit Authority. CTPS = Central Transportation Planning Staff. DCR = Department of Conservation and Recreation. EPDO = Equivalent property damage only. FFY = Federal fiscal year. HSIP = Highway Safety Improvement Program. ICC = Inner Core Committee. MAPC = Metropolitan Area Planning Council. MassDOT = Massachusetts Department of Transportation. MBTA = Massachusetts Bay Transportation Authority. MetroWest = MetroWest Regional Collaborative. MPO = Boston Region Metropolitan Planning Organization. MWRTA = MetroWest Regional Transit Authority. NSPC = North Suburban Planning Council. NSTF = North Shore Task Force. SWAP = South West Advisory Planning Committee. TIP = Transportation Improvement Program. TRIC = Three Rivers Interlocal Council. UPWP = Unified Planning Work Program.

**Selection Criteria**  
**Safety Conditions:** Intersection has a HSIP-eligible crash cluster, a top-200 high-crash location, and/or a significant number of or HSIP-eligible clusters of pedestrian or bicycle crashes.  
**Congested Conditions:** Intersection experiences delays during peak periods.  
**Multimodal Significance:** Intersection currently supports transit, bicycle or pedestrian activities, needs improved facilities for these activities, and/or has high truck traffic serving regional commerce.  
**Regional Significance:** Intersection is on the National Highway System, carries a significant proportion of regional traffic, lies within 0.5 miles of Environmental Justice transportation analysis zones, and/or is essential for the region's economic, cultural, or recreational development.  
**Regional Equity:** Intersection is underrepresented in previous safety and operations studies in terms of the proportion of population or number of top-200 high-crash locations.  
**Implementation Potential:** Intersection has strong potential for implementation based on the urgent need for safety improvements, is proposed or endorsed by its roadway administrative agency or agencies, and/or has strong support from other stakeholders.

**Notes**  
 1. Locations are in order of their ratings based on scoring from selection criteria.  
 2. EPDO Crash Rating = 10 \* Fatal Crashes + 5 \* Injury Crashes + 1 \* Other Crashes (Property Damage Only or Unknown Severity), based on MassDOT top-200 high-crash locations: 2012-14 crash data.  
 3. HSIP-eligible crash clusters are defined by MassDOT as crash clusters that rank within the top five percent of crash clusters for each Regional Planning Agency, based on the EDPO index. In the Boston region the 921 intersections in the top five percent have crash clusters with a minimum EDPO value of 42.

**Source:** Central Transportation Planning Staff.

## **APPENDIX A**

### **Pedestrian Report Card Assessment**

1. Route 1A from Cherry Street to Arbor Street/Friend Court, Wenham
2. Route 126 and Maple Street, Bellingham





**Central Transportation Planning Staff (CTPS) to the Boston Region MPO:**  
[www.ctps.org](http://www.ctps.org) | 857.702.3700 | [ctps@ctps.org](mailto:ctps@ctps.org)

**Ryan Hicks, Congestion Management Process Manager:**  
[www.ctps.org/cmp](http://www.ctps.org/cmp) | 857.702.3661 | [rhicks@ctps.org](mailto:rhicks@ctps.org)

**Casey Claude, Bicycle and Pedestrian Program Manager:**  
[www.ctps.org/livability](http://www.ctps.org/livability) | 857.702.3707 | [cclaude@ctps.org](mailto:cclaude@ctps.org)

# Pedestrian Report Card Assessment (PRCA): Roadway Segment

## Roadway Segment Location

Route 1A from Cherry St. to Arbor St./Friend Ct.

| Grading Categories               | Score | Rating |
|----------------------------------|-------|--------|
| Safety                           | 2.4   | Good   |
| System Preservation              | N/A   | Poor   |
| Capacity Management and Mobility | 2.16  | Fair   |
| Economic Vitality                | 1.5   | Poor   |

## Transportation Equity

|                        |   |
|------------------------|---|
| High Priority Area     |   |
| Moderate Priority Area |   |
| Not a Priority Area    | ✓ |

### Category Ratings

Good: Score of 2.3 or more (maximum 3.0)

Fair: Score is between 1.7 and 2.3

Poor: Score is 1.7 or less (minimum 0)

# Grading Categories: Scoring Breakdown Roadway Segment

| Capacity Management and Mobility |          |        |                |
|----------------------------------|----------|--------|----------------|
| Performance Measure              | Weight   | Rating | Weighted Score |
| Sidewalk Presence                | 3        | Fair   | 6              |
| Crossing Opportunities           | 2        | Good   | 6              |
| Walkway Width                    | 1        | Poor   | 1              |
| <b>Total</b>                     | <b>6</b> |        | <b>13</b>      |

| Economic Vitality               |          |        |                |
|---------------------------------|----------|--------|----------------|
| Performance Measure             | Weight   | Rating | Weighted Score |
| Pedestrian Volumes              | 1        | Fair   | 2              |
| Adjacent Bicycle Accommodations | 1        | Poor   | 1              |
| <b>Total</b>                    | <b>2</b> |        | <b>3</b>       |

Category rating = total rating/total weight  
 Rating Score:  
 Good = 3  
 Fair = 2  
 Poor = 1

| Safety                    |          |        |                |
|---------------------------|----------|--------|----------------|
| Performance Measure       | Weight   | Rating | Weighted Score |
| Pedestrian Crashes        | 3        | Good   | 9              |
| Pedestrian-Vehicle Buffer | 1        | Poor   | 1              |
| Vehicle Travel Speed      | 1        | Fair   | 2              |
| <b>Total</b>              | <b>5</b> |        | <b>12</b>      |

| System Preservation |             |
|---------------------|-------------|
| Performance Measure | Rating      |
| Sidewalk Condition  | <b>Poor</b> |

| Transportation Equity Priority                      |        |
|---|--------|
| Area Condition                                      | Yes/No |
| Environmental Justice zone?                         | No     |
| School or college within one-quarter mile?          | Yes    |
| More than 8.9% of population older than 75 years?   | No     |
| More than 27.5% of households do not own a vehicle? | No     |

Category Ratings  
 Good: Score of 2.3 or more (maximum 3.0)  
 Fair: Score is between 1.7 and 2.3  
 Poor: Score is 1.7 or less (minimum 0)

# Detailed Performance Measure Information: Roadway Segment

| Goal                       | Performance Measure             | Features of Analyzed Locations                             |
|----------------------------|---------------------------------|--|
| <b>Mobility</b>            | Sidewalk Presence               | Sidewalk is present on one side of the street              |
|                            | Crossing Opportunities          | 2 crossing opportunities/0.2 miles =10 crosswalks per mile |
|                            | Walkway Width                   | 4-foot wide sidewalks                                      |
| <b>Economic Vitality</b>   | Pedestrian Volumes              | 15 pedestrians per hour                                    |
| <b>Safety</b>              | Adjacent Bicycle Accommodations | none   |
|                            | Pedestrian Crashes              | Not in HSIP cluster  |
|                            | Pedestrian-Vehicle Buffer       | 3 feet buffers   |
|                            | Vehicle Travel Speed            | 32 mph   |
| <b>System Preservation</b> | Sidewalk Condition              | Sidewalks are in poor condition                            |



**Central Transportation Planning Staff (CTPS) to the Boston Region MPO:**  
[www.ctps.org](http://www.ctps.org) | 857.702.3700 | [ctps@ctps.org](mailto:ctps@ctps.org)

**Ryan Hicks, Congestion Management Process Manager:**  
[www.ctps.org/cmp](http://www.ctps.org/cmp) | 857.702.3661 | [rhicks@ctps.org](mailto:rhicks@ctps.org)

**Casey Claude, Bicycle and Pedestrian Program Manager:**  
[www.ctps.org/livability](http://www.ctps.org/livability) | 857.702.3707 | [cclaude@ctps.org](mailto:cclaude@ctps.org)

# Pedestrian Report Card Assessment (PRCA):

## Intersection

| Intersection Location   |
|-------------------------|
| Route 126 and Maple St. |

| Grading Categories               | Score | Rating |
|----------------------------------|-------|--------|
| Safety                           | 1.87  | Fair   |
| System Preservation              | N/A   | Poor   |
| Capacity Management and Mobility | 1.57  | Poor   |
| Economic Vitality                | N/A   | Fair   |

| Transportation Equity  |   |
|------------------------|---|
| High Priority Area     |   |
| Moderate Priority Area |   |
| Not a Priority Area    | ✓ |

Category Ratings  
 Good: Score of 2.3 or more (maximum 3.0)  
 Fair: Score is between 1.7 and 2.3  
 Poor: Score is 1.7 or less (minimum 0)

# Grading Categories: Scoring Breakdown Intersection

| Capacity Management and Mobility |          |        |                |
|----------------------------------|----------|--------|----------------|
| Performance Measure              | Weight   | Rating | Weighted Score |
| Pedestrian Delay                 | 3        | Poor   | 3              |
| Sidewalk Presence                | 2        | Fair   | 4              |
| Curb Ramps                       | 1        | Fair   | 2              |
| Crossing Opportunities           | 1        | Fair   | 2              |
| <b>Total</b>                     | <b>7</b> |        | <b>11</b>      |

| Economic Vitality   |        |
|---------------------|--------|
| Performance Measure | Rating |
| Pedestrian Volumes  | Fair   |

Category rating = total rating/total weight  
 Rating Score:  
 Good = 3  
 Fair = 2  
 Poor = 1

| Safety                           |          |        |                |
|----------------------------------|----------|--------|----------------|
| Performance Measure              | Weight   | Rating | Weighted Score |
| Sufficient Crossing Time (Index) | 3        | Poor   | 3              |
| Pedestrian Crashes               | 3        | Good   | 9              |
| Pedestrian Signal Presence       | 1        | Poor   | 1              |
| Vehicle Travel Speed             | 1        | Fair   | 2              |
| <b>Total</b>                     | <b>8</b> |        | <b>15</b>      |

| System Preservation |        |
|---------------------|--------|
| Performance Measure | Rating |
| Sidewalk Condition  | Poor   |

| Transportation Equity Priority                      |        |
|---|--------|
| Area Condition                                      | Yes/No |
| Environmental Justice zone?                         | No     |
| School or college within a one-quarter mile?        | Yes    |
| More than 8.9% of population older than 75 years?   | No     |
| More than 27.5% of households do not own a vehicle? | No     |

Category Ratings  
 Good: Score of 2.3 or more (maximum 3.0)  
 Fair: Score is between 1.7 and 2.3  
 Poor: Score is 1.7 or less (minimum 0)

## Detailed Performance Measure Information: Intersection

| Goal                       | Performance Measure              | Features of Analyzed Locations  |
|----------------------------|----------------------------------|---|
| <b>Mobility</b>            | Pedestrian Delay                 | Estimated cycle length = 150 seconds<br>Estimated pedestrian walk/flashing don't walk time = 12 seconds<br>Estimated pedestrian delay = 63.48 seconds |
|                            | Sidewalk Presence                | Sidewalks present on all approaches   |
|                            | Curb Ramps                       | Curb ramps are present on 2 of 3 approaches   |
|                            | Crossing Opportunities           | Crosswalks at 2 of 3 approaches   |
| <b>Economic Vitality</b>   | Pedestrian Volumes               | Estimated 5 to 6 pedestrians per hour   |
| <b>Safety</b>              | Sufficient Crossing Time (Index) | 50 feet crossing; 12 seconds allowed; 15 seconds needed   |
|                            | Pedestrian Crashes               | Not in HSIP cluster   |
|                            | Pedestrian Signal Presence       | Pedestrian signals are present on one approach.<br>Concurrent pedestrian signal, right turn on red permitted  |
|                            | Vehicle Travel Speed             | 31 mph  |
| <b>System Preservation</b> | Sidewalk Condition               | Sidewalks are in poor condition   |

**APPENDIX 6**

**Support Letters from MassDOT, Wenham, and Bellingham**

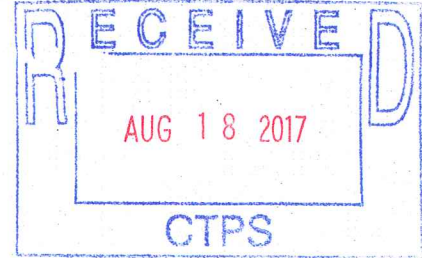


Charles D. Baker, Governor  
Karyn E. Polito, Lieutenant Governor  
Stephanie Pollack, Secretary & CEO  
Jonathan L. Gulliver, Acting Highway Administrator



August 10, 2017

Mark Abbott, Manager  
Traffic Analysis and Design Group  
Central Transportation Planning Staff  
Boston Region Metropolitan Planning Organization  
10 Park Plaza, Suite 2150  
Boston, MA 02116-3968



Dear Mr. Abbott:

I am writing on behalf of MassDOT District 4 to express our support for further traffic analysis of three intersections on Main Street (Route 1A) in Wenham. These intersections are located at Cherry Street, Monument Street and Arbor Street/Friend Court.

The District's Traffic Operations Section had recently worked with the Town on a traffic signal warrant analysis of the three intersections. It was determined that MUTCD Warrants 1, 2 and 3 (volume-related warrants) were met. Since Warrants 1A and 1B, Eight-Hour Vehicular Volume, were satisfied for each of the locations, any of them would be solid candidates for a traffic signal.

To determine the true feasibility of such a project, further study in the form of a Functional Design Report (FDR) is needed. I understand that an FDR may be eligible for funding through a FY18 UPWP study entitled "Safety and Operations at Selected Locations" being conducted by your group. The Town is committed to improving safety in this area of Route 1A and is willing to complete 25% design for a project, if selected for the study. MassDOT District 4, therefore, believes that further study of the locations should be funded and completed.

Thank you for your consideration. If you have any further questions on this matter, please contact me at (781)641-8322.

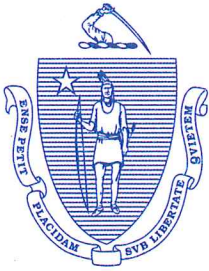
Sincerely,

Paul D. Stedman  
District Highway Director

JEG/gb

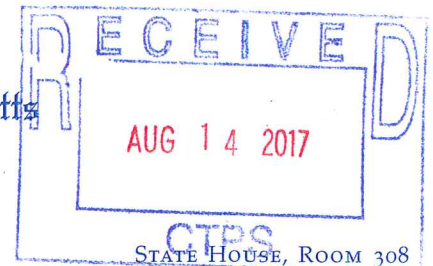
cc: Peter Lombardi, Wenham Town Administrator  
Traffic File





The Commonwealth of Massachusetts

MASSACHUSETTS SENATE  
OFFICE OF THE MINORITY LEADER



STATE HOUSE, ROOM 308  
BOSTON, MA 02133-1053  
TEL. (617) 722-1600  
FAX: (617) 722-1310

SENATOR BRUCE E. TARR  
MINORITY LEADER

*First Essex and Middlesex*

August 1, 2017

BRUCE.TARR@MASENATE.GOV  
WWW.MASENATE.GOV

Mark Abbott, Manager  
Traffic Analysis and Design Group  
Central Transportation Planning Staff  
Boston Region Metropolitan Planning Organization  
Ten Park Plaza, Suite 2150  
Boston, MA 02116-3968

Dear Mr. Abbott,

I would like to take this opportunity to express my strong support for the Town of Wenham. In particular, the Board of Selectmen's recent funding request for further traffic analysis regarding three intersections on Main Street in downtown Wenham, located at Cherry Street, Monument Street, and Arbor Street / Friend Court.

Given that the Main Street corridor (Route 1A) is a state road, the town worked with MassDOT District 4 Traffic Operations to complete a traffic signal warrant analysis earlier this year, which resulted in positive findings. With that, I note that all three intersections on Main Street meet the MUTCD Signal Warrants 1, 2, and 3. Noting such, I believe the relative data sufficiently satisfies Warrant 1A and 1B for Eight-Hour Vehicular traffic, with any of these locations satisfying the requirements for signal installation.

Considering such, the town is in need of assistance in determining project feasibility, specifically a Functional Design Report (FDR), which may be funded through a FY18 UPWP Study (Safety and Operations at Selected Locations). When considering the town's demonstrated commitment to addressing public safety concerns related to traffic volume, together with the number of motor vehicle crash incidents in these locations on Route 1A, I firmly believe a comprehensive operational and safety analysis of these three intersections can/should be funded and completed.

I further note, if your office is able to support/fund conducting an FDR, the town agrees to be responsible for completing a 25% design to continue to move forward with this project. This, together with the town's ongoing efforts is just another example of their demonstrated and genuine commitment to public safety.

Accordingly, I seek your careful consideration of the Town of Wenham's request for FDR funding. Thank you for such, and please don't hesitate to contact me directly should you have any questions.

Sincerely,

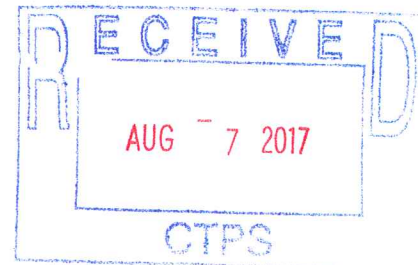
Bruce E. Tarr  
State Senator  
Minority Leader



# Town of Wenham

Town Hall  
138 Main Street  
Wenham, MA 01984

\_\_\_\_\_  
Selectmen / Town Administrator  
TEL 978-468-5520 FAX 978-468-8014



August 1, 2017

Mark Abbott  
Manager, Traffic Analysis and Design Group  
Central Transportation Planning Staff  
Boston Region Metropolitan Planning Organization  
Ten Park Plaza, Suite 2150  
Boston, MA 02116-3968

Dear Mr. Abbott,

I am writing on behalf of the Board of Selectmen to express our strong support for further traffic analysis regarding three intersections on Main Street in downtown Wenham, located at Cherry Street, Monument Street, and Arbor Street / Friend Court. Since the Main Street corridor is also a state roadway, Route 1A, we worked with MassDOT District 4 Traffic Operations to complete a traffic signal warrant analysis earlier this year.

The attached findings from that report show that these three intersections on Main Street all meet the MUTCD Signal Warrants 1, 2, and 3. Since the data satisfies Warrant 1A and 1B for Eight-Hour Vehicular Volume, our understanding is that any of these locations would be strong candidates to have a signal installed. However, the Town now needs assistance in completing the next step to determine the feasibility of this project, a Functional Design Report (FDR).

According to our Town Administrator, this project may be eligible for funding through a FY18 UPWP study entitled "Safety and Operations at Selected Locations". Given the community's ongoing public safety concerns about traffic volume and accidents along this corridor on Route 1A, we hope that your office is able to support conducting an FDR so that a comprehensive operational and safety analysis of these three intersections can be completed. We understand that, if funded, conceptual alternatives would be included in the scope of work, but that the Town would then be responsible for completing 25% design to continue to move forward with this project.

Thank you for your consideration. Please contact our Town Administrator, Peter Lombardi, at 978-468-5520 x. 2 or [plombardi@wenhamma.gov](mailto:plombardi@wenhamma.gov) if you have any further questions.

Best regards,

Jack Wilhelm  
Chair, Wenham Board of Selectmen



## BELLINGHAM PLANNING DEPARTMENT

10 MECHANIC STREET BELLINGHAM, MASSACHUSETTS 02019  
(508) 657-2892 [Plan-zone@bellinghamma.org](mailto:Plan-zone@bellinghamma.org)

October 17, 2017

Mark Abbot  
Metropolitan Planning Organization  
Central Transportation Planning Staff  
State Transportation Building  
10 Park Plaza, Suite 2150  
Boston, MA 02116

Re: Technical Assistance Request – Roadway Intersection Redesign – Hartford Avenue and Maple Street


The Town of Bellingham respectfully requests technical assistance from the Central Transportation Planning Staff for the intersection redesign of Hartford Avenue and Maple Street.

Hartford Avenue at Exit 18 hosts a large inventory of commercial uses and, moving eastward, a dense residential area. In addition, a public elementary school, which services all of North Bellingham, and a small community center are located at the intersection of Hartford Avenue and Maple Street.


The intersection of Hartford Avenue and Maple Street operates well for standard motorized vehicles. However, it is over burdened by commercial vehicles. This cannot be avoided due to the proximity to I-495 and the Town's desire to retain significant acreage of industrial zoned parcels along Maple Street (See attached Zoning Map). Current industrial uses along Maple Street consist of a power plant, multiple warehouses exceeding 600,000 square feet of space, and large scale mulch and lumber hauling and production. These bring with them numerous trips by large tractor trailers.

Unfortunately this intersection is severally undersized to function properly for its desired use. The Town has recognized the need to upgrade Maple Street in order to sufficiently maintain industrial uses along this corridor. Through a public/private partnership, the town of Bellingham has begun the redesign process for the southern intersection of Maple Street and Route 140 and will be investing over \$2 Million dollars during the improvement and construction process. In a separate improvement project, the Town has invested over \$1 Million dollars to repave and correct drainage in a large section of Maple Street to better service the zoned uses. Improvement of the Hartford Avenue and Maple Street intersection is an important step in the improvement process to properly upgrade Maple Street to adequately service the industrial uses along this road and to allow large vehicles to access Route I-495 as quickly and safely as possible.

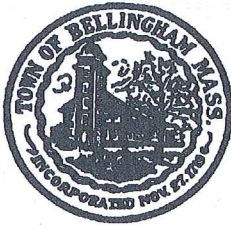
Town Officials will be available to assist and offer comments during the design process and to coordinate any public meetings that are required. Please do not hesitate to contact us if more information is necessary.



James S. Kupfer, MPA, AICP  
Town Planner/ Zoning Compliance Officer  
10 Mechanic Street  
Bellingham, MA 02019  
Phone: 508-657-2893  
[jkupfer@bellinghamma.org](mailto:jkupfer@bellinghamma.org)



Donald F. DiMartino  
DPW Director  
26 Blackstone Street  
Bellingham, MA 02019  
Phone - 508-966-5813  
[DDiMartino@bellinghamma.org](mailto:DDiMartino@bellinghamma.org)



# Town of Bellingham

## BOARD OF SELECTMEN

10 Mechanic Street

Bellingham, Massachusetts 02019

Tel: 508-966-5800 \* Fax: 508-966-4425

November 6, 2017

Mark Abbot  
Metropolitan Planning Organization  
Central Transportation Planning Staff  
State Transportation Building  
10 Park Plaza, Suite 2150  
Boston, MA 02116

Re: Technical Assistance Request – Roadway Intersection Redesign – Hartford Avenue and  
Maple Street

Dear Mr. Abbot:

The Town of Bellingham Board of Selectmen is writing to express our enthusiastic support for the Town's proposal "Roadway Intersection Redesign – Hartford Avenue and Maple Street".

This intersection is severely undersized to function properly for its desired use. The Town has recognized the need to upgrade Maple Street in order to sufficiently maintain industrial uses along this corridor as well as unlock future investment. Through a public/private partnership, the town of Bellingham has begun the redesign process for the southern intersection of Maple Street and Route 140 and will be investing over \$2 Million dollars during the improvement and construction process. In a separate improvement project, the Town has invested over \$1 Million dollars to repave and correct drainage in a large section of Maple Street to better service the zoned uses. Improvement of the Hartford Avenue and Maple Street intersection is an important step in the improvement process to properly upgrade Maple Street to adequately service the industrial uses along this road and to allow large vehicles to access Route I-495 as quickly and safely as possible.

The support of the Metropolitan Planning Organization and the Central Transportation Planning Staff will be critical to following through on this important project. Thank you in advance for considering our proposal.

Sincerely,

Michael J. Soter, Chairman  
Board of Selectmen