



MONTACHUSETT REGIONAL INTERSECTION ANALYSIS

Main Street (Route 119) at Canal
Street/West Elm Street

Townsend, MA

September 2021

Prepared in cooperation with the Massachusetts Department of Transportation and the U.S. Department of Transportation. The views and opinions of the Montachusett Regional Planning Commission expressed herein do not necessarily state or reflect those of the Massachusetts Department of Transportation or the U.S. Department of Transportation.

The Montachusett MPO and the MRPC fully complies with Title VI of the Civil Rights Act of 1964 and related statutes and regulations in all programs and activities. The Montachusett MPO operates without regard to race, color, national origin, English Proficiency, ancestry, creed, income, gender, age and/or disability. Any person who believes him/herself or any specific class of persons, to be subject to discrimination prohibited by Title VI may by him/herself or by representative file a written complaint with the MRPC or the MMPO. Complaints are to be filed no later than 180 days from the date of the alleged discrimination. Please contact Glenn Eaton at 978-345-7376 ext. 310 for more information.



MONTACHUSETT REGIONAL INTERSECTION ANALYSIS

Main Street (Route 119) at Canal Street/West Elm Street
Townsend, MA

Prepared by the
Montachusett Regional Planning Commission (MRPC)
for the
Montachusett Metropolitan Planning Organization (MMPO)

FFY 2021 Program Year

September 2021

Prepared in cooperation with the Massachusetts Department of Transportation and the U.S. Department of Transportation. The views and opinions of the Montachusett Regional Planning Commission expressed herein do not necessarily state or reflect those of the Massachusetts Department of Transportation or the U.S. Department of Transportation.

The Montachusett MPO and the MRPC fully complies with Title VI of the Civil Rights Act of 1964 and related statutes and regulations in all programs and activities. The Montachusett MPO operates without regard to race, color, national origin, English Proficiency, ancestry, creed, income, gender, age and/or disability. Any person who believes him/herself or any specific class of persons, to be subject to discrimination prohibited by Title VI may by him/herself or by representative file a written complaint with the MRPC or the MMPO. Complaints are to be filed no later than 180 days from the date of the alleged discrimination. Please contact Glenn Eaton at 978-345-7376 ext. 310 for more information.

Notice of Nondiscrimination Rights and Protections to Beneficiaries

Federal "Title VI/Nondiscrimination" Protections

The Montachusett Regional Planning Commission (MRPC) operates its programs, services, and activities in compliance with federal nondiscrimination laws including Title VI of the Civil Rights Act of 1964 (Title VI), the Civil Rights Restoration Act of 1987, and related statutes and regulations. Title VI prohibits discrimination in federally assisted programs and requires that no person in the United States of America shall, on the grounds of race, color, or national origin (including limited English proficiency), be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving federal assistance. Related federal nondiscrimination laws administered by the Federal Highway Administration, the Federal Transit Administration, or both prohibit discrimination on the basis of age, sex, and disability. These protected categories are contemplated within MRPC's Title VI Programs consistent with federal interpretation and administration. Additionally, MRPC provides meaningful access to its programs, services, and activities to individuals with limited English proficiency, in compliance with US Department of Transportation policy and guidance on federal Executive Order 13166.

State Nondiscrimination Protections

MRPC also complies with the Massachusetts Public Accommodation Law, M.G.L. c 272 §§ 92a, 98, 98a, prohibiting making any distinction, discrimination, or restriction in admission to or treatment in a place of public accommodation based on race, color, religious creed, national origin, sex, sexual orientation, disability, or ancestry. Likewise, MRPC complies with the Governor's Executive Order 526, section 4 requiring all programs, activities, and services provided, performed, licensed, chartered, funded, regulated, or contracted for by the state shall be conducted without unlawful discrimination based on race, color, age, gender, ethnicity, sexual orientation, gender identity or expression, religion, creed, ancestry, national origin, disability, veteran's status (including Vietnam-era veterans), or background.

Additional Information

To request additional information regarding Title VI and related federal and state nondiscrimination obligations, please contact:

Montachusett Metropolitan Planning Organization (MMPO)
and Montachusett Regional Planning Commission (MRPC)

Title VI Coordinator
MRPC
464 Abbott Ave.
Leominster, MA 01453
(978) 345-7376
geaton@mrpc.org

Complaint Filing

To file a complaint alleging a violation of Title VI or related federal nondiscrimination law, contact the Title VI Specialist (above) within 180 days of the alleged discriminatory conduct.

To file a complaint alleging a violation of the state's Public Accommodation Law, contact the Massachusetts Commission Against Discrimination within 300 days of the alleged discriminatory conduct at:

Massachusetts Commission Against Discrimination (MCAD)
One Ashburton Place, 6th Floor
Boston, MA 02109
617-994-6000 ~ TTY: 617-994-6196

Language Assistance

English: If this information is needed in another language, please contact the MRPC Title VI Coordinator at 978-345-7376.

Spanish: Si necesita esta información en otro idioma, por favor contacte el coordinador del MRPC del Título VI al 978-345-7376.

Portuguese: Caso esta informação seja necessária em outro idioma, favor contar o Coordenador em Título VI do MRPC pelo telefone 978-345-7376. **French:** Si cette information est nécessaire dans une autre langue, s'il vous plaît communiquer avec le coordonnateur MRPC Titre VI au 978-345-7376.

Table of Content

<i>INTRODUCTION</i>	6
<i>INTERSECTION EXISTING OFFSET GEOMETRIC LAYOUT / PEDESTRIAN & BIKE FACILITIES / SIGNAGE / PAVEMENT MARKING CONDITIONS</i>	7
<i>ENVIRONMENTAL CONSTRAINTS PROFILE, LAND USE & BUILDING FOOTPRINT PROFILE</i>	8
<i>TRAFFIC CONGESTION ANALYSIS</i>	11
<i>SAFETY PROFILE</i>	12
<i>PAVEMENT CONDITION PROFILE</i>	14
<i>RECOMMENDATIONS</i>	15
CONCEPT ALTERNATIVES FOR THE INTERSECTION	19
<i>MASSDOT PROJECT DEVELOPMENT SUMMARY</i>	26
<i>TRANSPORTATION ROLE OF THE REGIONAL PLANNING AGENCY</i>	26
Appendix 1 – Townsend Request Letter	29
Appendix 2 – Data Documents	30
Appendix 3 – MassDOT SOP HED-08-02-1-000	31
Appendix 4 – Draft Comments	32

[Page left intentionally blank]

MONTACHUSETT METROPOLITAN PLANNING ORGANIZATION SIGNATORIES

Massachusetts Department of Transportation (MassDOT) Secretary	Jamey L. Tesler
MassDOT Highway Division Administrator	Jonathan L. Gulliver
Montachusett Regional Planning Commission (MRPC) Chairman	Guy Corbosiero
Montachusett Regional Transit Authority (MART) Chairman/Mayor City of Fitchburg	Mayor Stephen DiNatale
Mayor City of Gardner	Mayor Michael J. Nicholson
Mayor City of Leominster	Mayor Dean Mazzarella
Winchendon Board of Selectmen <i>Subregion 1</i>	Barbara Anderson
Ashburnham Board of Selectmen <i>Subregion 2</i>	Rosemarie Meissner
Lunenburg Board of Selectmen <i>Subregion 3</i>	Michael-Ray Jeffreys
Lancaster Board of Selectmen <i>Subregion 4</i>	Jason Allison

MPO SUB-SIGNATORY COMMITTEE MEMBERS

David Mohler, Director OTP, MassDOT, for Secretary Jamey L. Tesler
Arthur Frost, Project Development Engineer for Administrator Jonathan L. Gulliver
Glenn Eaton, Executive Director, MRPC, for Chairman Guy Corbosiero
Bruno Fisher, Interim Administrator, MART, for Chairman Mayor Stephen DiNatale

EXOFFICIO MEMBERS

Jeffrey H. McEwen, Administrator	Federal Highway Administration
Peter Butler, Acting Administrator	Federal Transit Administration

MONTACHUSETT REGIONAL PLANNING COMMISSION (MRPC) OFFICERS

Guy Corbosiero, Chairman	Winchendon
John Telepciak, Vice Chairman	Phillipston
Laura Shifrin, Treasurer	Townsend
Roger Hoyt, Vice Treasurer	Ashburnham
Shaun Copeland, Secretary	Ayer

MONTACHUSETT JOINT TRANSPORTATION COMMITTEE (MJTC) OFFICERS

Nicolas Bosonetto, P.E., Chairman	Fitchburg
Dick Kilhart, Vice Chairman	Athol
Guy Corbosiero, Secretary	Winchendon

MONTACHUSETT REGIONAL PLANNING COMMISSION STAFF

Glenn Eaton, Executive Director	Jonathan Vos, Regional Planner
Holly Ford, Administrative Manager	Christopher McDermott, Economic Development Manager
Linda Quinlivan, Fiscal Director	Jennifer Burney, Senior Planner
Christopher McNamara, Fiscal Assistant	Jason Stanton, GIS & IT Director
Brad Harris, Transportation Project Director	Kayla Kress, GIS & IT Analyst
George Snow, Principal Transportation Planner	Blair Haney, Senior Planner
Sheri Bean, Principal Planner	Meagen Donoghue, Senior Planner
Brian Doherty, AICP, Principal Transportation Planner	Bruce Hughes, Senior Planner
Karen Chapman, Planning and Development Director	

2021-2022 APPOINTMENT LIST

MONTACHUSETT JOINT TRANSPORTATION COMMITTEE

<u>COMMUNITY</u>	<u>APPOINTED BY SELECTMEN/MAYOR</u>	<u>APPOINTED BY PLANNING BOARD</u>
Ashburnham	Rosemarie Meissner	Roger Hoyt
Ashby		Alan Pease
Athol	Dick Kilhart	
Ayer	Shaun Copeland	Mark Archambault
Clinton	Phil Duffy	
Fitchburg	Nicolas Bosonetto	Paula Caron
Gardner	Trevor Beauregard	Robert Swartz
Groton		Russell Burke
Harvard	Tim Kilhart	Stacia Donahue
Hubbardston	Travis Brown	Alice Livdahl
Lancaster		Roy Mirabito
Leominster	David DiGiovanni	Peter Latchis
Lunenburg	Todd Dwyer	Matthew Brenner
Petersham	Nancy Allen	
Phillipston	Gordon Robertson	
Royalston	Roland Hamel	
Shirley		Janet Tice
Sterling	Richard Maki	Kirsten Newman
Templeton		Charles Carroll II
Townsend	Veronica Kell	Beth Faxon
Westminster		Gregg Buckman
Winchendon	Brian Croteau	Guy Corbosiero

EXOFFICIO MEMBERS

Jeffrey H. McEwen	Office of Transportation Planning (OTP), Massachusetts Department of Transportation (MassDOT)
Peter Butler	Federal Highway Administration (FHWA), Administrator
	Federal Transit Administration (FTA), Acting Administrator
	Department of Environmental Protection (DEP)
Paula Simmons	MassDOT Highway Division - District 2
Arthur Frost	MassDOT Highway Division - District 3
	Montachusett Regional Planning Commission (MRPC)
Bruno Fisher	Montachusett Regional Transit Authority (MART)

ORGANIZATION MEMBERS

Al Futterman	Nashua River Watershed Association (NRWA)
	Amalgamated Transit Union #690 (ATU 690)
Richard Liberatore	Fitchburg Airport Commission
Roy M. Nascimento	North Central MA Chamber of Commerce
Joan Goodwin	Fitchburg Council on Aging
Jessica Strunkin	Mass Development
Peter Lowitt	Devens Enterprise Commission (DEC)
	Montachusett Opportunity Council, Inc.
Joshua Preville	The ARC of Opportunity

DISCLAIMER: The information depicted on all maps or figures in this study is for planning purposes only. All data are representational and are not adequate for boundary definition, regulatory interpretation, or parcel-based analysis.

DATA SOURCE: MassGIS, MRPC

Map Preparation: MRPC

INTRODUCTION

The Montachusett Regional Planning Commission (MRPC) received an official request from the Town of Townsend (Town) to conduct a traffic analysis (Study) of the Main Street (Route 119) at Canal Street / West Elm Street intersection (Intersection).

The Town's official request letter stated the following:

- *Vehicles turning onto / or off of / or crossing over, Route 119 encounter dangerous circumstances due to the layout of the Intersection;*
- *This is a light commercial district and improvements to both vehicular and pedestrian traffic as a result of a study would well serve the citizens;*

See the **Appendix** for the Town's study request letter.

This Study will consider the following Existing Conditions of the Intersection: the offset geometric alignment (or layout); pedestrian and bike facilities; signage; pavement markings; land use; traffic congestion; safety; environmental constraints, and

pavement condition. This Study will also provide improvement alternatives for consideration by the Town.

Figure 1 shows the Intersection. The full Study Area falls within a 1,250' radius of the Intersection. See the ***Environmental Constraints Profile, Land Use & Building Footprints Profile*** section below for the full discussion on the Study Area.

Townsend Complete Streets Policy

The Town completed a Complete Streets Policy in 2017 followed by a Prioritization Plan in 2018. The Intersection is listed in the Prioritization Plan as the 25th ranked project.

The *Complete Street Needs* listed in the Prioritization Plan include Safety, ADA Accessibility, and Pedestrian Mobility.

Figure 1: Intersection

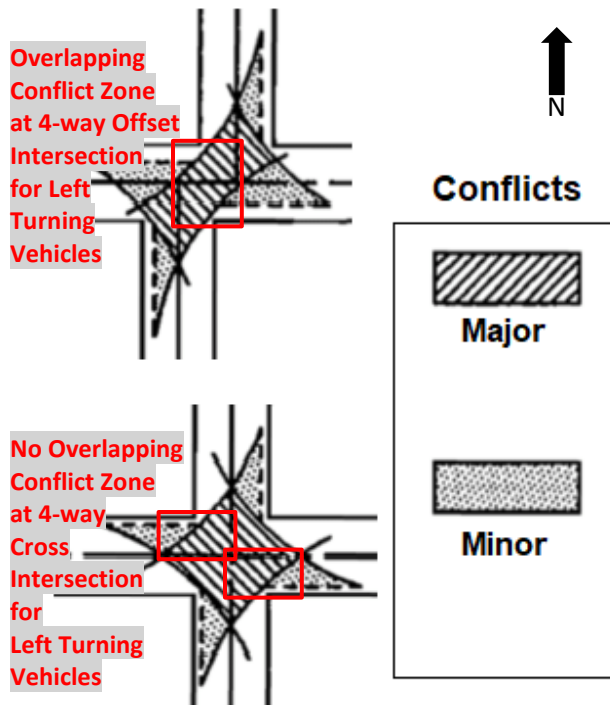


INTERSECTION EXISTING OFFSET GEOMETRIC LAYOUT / PEDESTRIAN & BIKE FACILITIES / SIGNAGE / PAVEMENT MARKING CONDITIONS

Figure 1 above shows the existing conditions of the Intersection. Main Street (Route 119) and West Elm/Canal Streets are Federal Aid Eligible Roads (Fed Aid Rds). Main Street is under MassDOT jurisdiction while West Elm Street and Canal Street are under Town jurisdiction.

Intersection Offset Geometric Alignment

This is a four approach Intersection where the north and south approaches to Main Street are geometrically offset approximately 65' to 70'. An offset of this proximity often results in overlapping left turn movements that creates the potential for driver confusion and additional conflict points that may result in significant interference between simultaneous left-turning vehicles. The overlapping conflict zone of this type of 4-way offset intersection and the typical conflict zone of a 4-way cross intersection are depicted below.



This type of offset intersection generally operates well only at low-volume intersections as the low traffic volume allows vehicles to flow freely through the intersection and make left turn movements with little interference.

Other Geometric Conditions

- Large and extensive corner radii exist on all Intersection corners;
- All approaches are two-lane/two-way roads, and all movements are permitted;
- The eastbound (EB) and westbound (WB) Main Street approaches are the major street approaches;
- The northbound (NB) West Elm Street and southbound (SB) Canal Street approaches are the minor street approaches;
- West Elm Street is slightly skewed to the northeast;

Pedestrian & Bike Facilities

Designated bike lanes do not exist on any of the approaches to the Intersection. Sidewalks connect/disconnect at the Intersection as follows:

- To the west on Main St, sidewalks run on both sides of the street starting at the First Baptist Church / West Townsend Fire Station (a distance of approximately 950' from the Intersection), but terminate and resume as follows:
 - On the north side of Main St:
 - Terminates at 451 Main St and resumes at 441 Main St (at the crosswalk) (a distance of approximately 350') then terminates at the Intersection (a distance of approximately 80');
 - On the south side of Main St:
 - Terminates at 444 Main St where it turns into a parking lot from there to the crosswalk at the Intersection (a distance of approximately 118');
- To the east on Main St;
 - A sidewalk runs on the north side of the street starting at 401 Main St (a distance of approximately 1,690' from the Intersection) and terminates at the Intersection;
 - A sidewalk runs on the south side of Main St starting at 422 Main St (a distance of approximately 450' from the Intersection) but terminates approximately 45' from the Intersection;
- Sidewalks do not exist on the West Elm Street and Canal Street approaches;
- A single crosswalk exists on the West Main St EB approach to the Intersection;

Signage

- Minor streets are STOP controlled by single STOP signs located on the right side of the approaches;
- Speed limit signs exist at 409 Main Street - 35 mph eastbound, 40 mph westbound;
- Fire station ahead warning exist at 451 Main Street;
- Ped crossing signs exist at the crosswalk; a ped crossing ahead warning sign exist at 446 Main St;

Pavement Markings

- There is an existing STOP bar at the West Elm Street approach but none at the Canal Street approach;
- There are existing edge lines on the Main Street approaches but none on the West Elm Street and Canal Street approaches;
- There are existing double yellow lines on the Main Street approaches but none on the West Elm Street and Canal Street approaches;
- An existing crosswalk marking on the West Main St EB approach to the Intersection. No crosswalk markings exist on the other approaches;

ENVIRONMENTAL CONSTRAINTS PROFILE, LAND USE & BUILDING FOOTPRINT PROFILE

Environmental Constraints Profile

Environmental constraints are natural features, natural resources, or natural land characteristics within the natural environment that are sensitive to development that often require preventing or severely limiting development, conservation measures, remediation measures, or creative development techniques to prevent environmental degradation.

This Environmental Constraints Profile attempts to document any and all known features, resources, or land characteristics within the natural environment that fall within the Study Area which is the area within a 1,250' radius of the Intersection. The reason for this radius is that improvement alternatives presented in the ***Recommendations*** section below fall within that radius of the Intersection.

Environmental Constraints in the Study Area

There are nine (9) environmental constraint areas (Constraint Areas) within the Study Area. The Constraint Areas include:

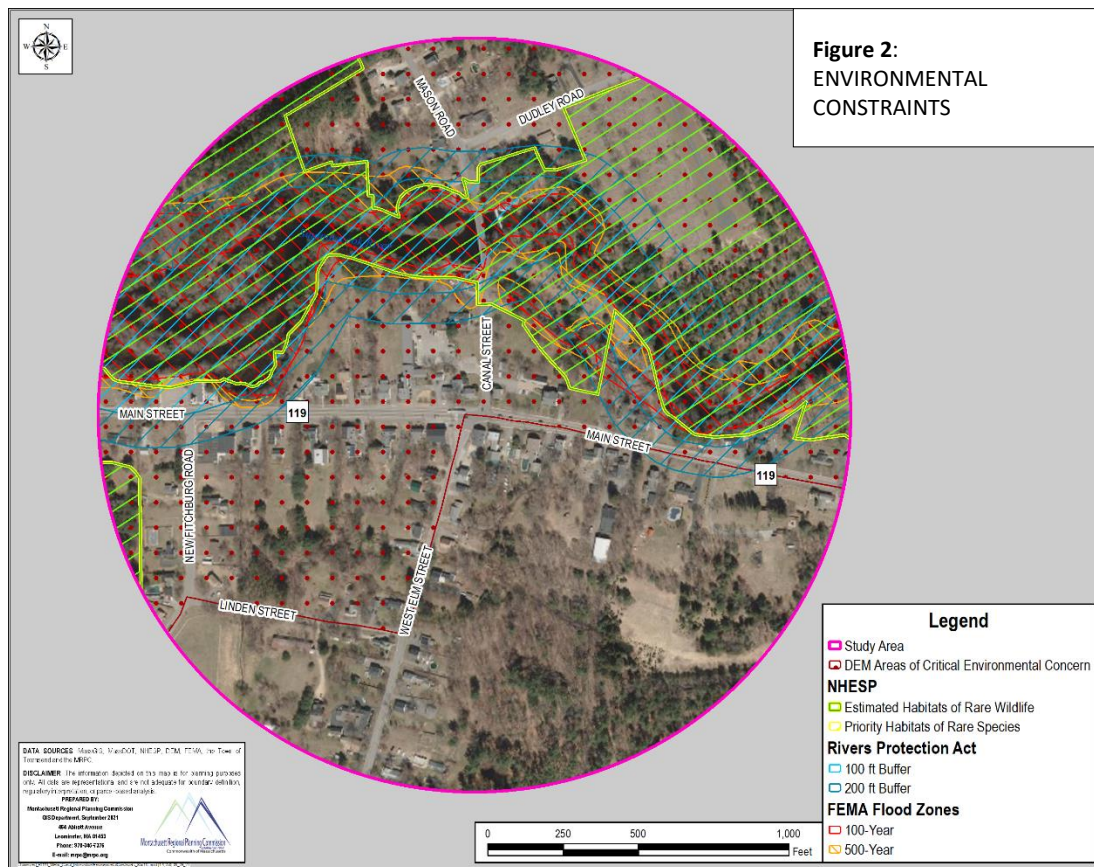
- Areas of Critical Environmental Concern (ACEC);
- Natural Heritage & Endangered Species Program (NHESP) Estimated Habitats of Rare Wildlife;
- NHESP Priority Habitats of Rare Species;
- Rivers Protection Act Buffers:
 - 100' Buffer and 200' Buffer;
- FEMA National Flood Hazard Layer:
 - 100 Year and 500 Year;
- Townsend's Wetlands Bylaw:
 - 35' no disturb buffer around wetlands;
 - 50' no build buffer around wetlands;

Figure 2 below depicts the Constraint Areas:

- The ACEC covers nearly the whole Study Area with the exception of the area east of West Elm Street and south of Main Street;
- The NHESP Estimated Habitats of Rare Wildlife (EHRW) and NHESP Priority Habitats of Rare Species (PHRS) cover most of the area east of Canal Street and north of Main Street, and also west of Canal Street and further north of Main Street;
- The Rivers Protection Act Buffers (RPAB) cover much of the same area that the NHESP areas cover but extend into the area just south of Main Street east of West Elm Street;
- The FEMA National Flood Hazard Layer (NFHL) hugs the Squannacook River;
- Not depicted on **Figure 2** is Townsend's wetlands bylaw which is a 35' no disturb buffer around wetlands and a 50' no build buffer around wetlands;

The following links provide documentation on the Constraint Areas depicted on **Figure 2**:

- **ACEC:** [ACEC](#)
- **NHESP EHRW & PHRS:** [NHESP EHRW](#) & [NHESP PHRS](#)
- **RPAB:** [About the MA RPA](#) and [RPA Qs&As](#)
- **FEMA NFHL:** [FEMA NFHL](#)



Land Use & Building Footprints Profiles

Land Use Profile

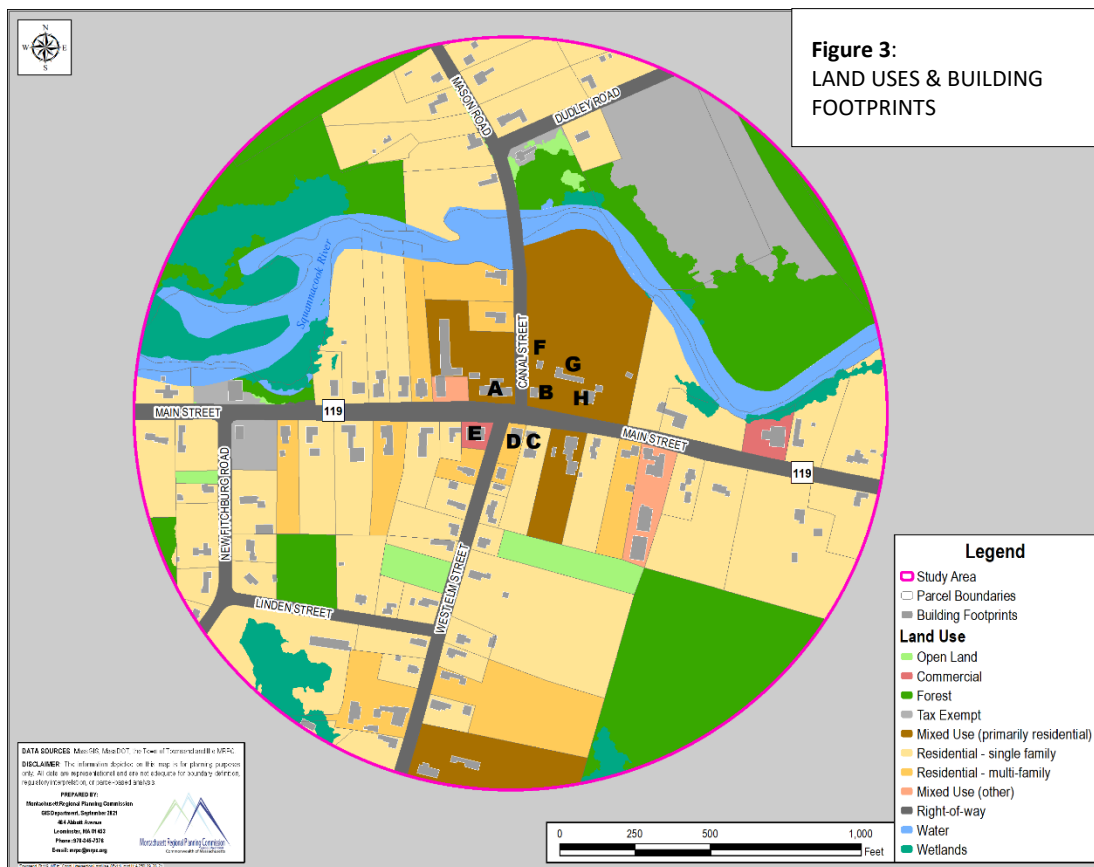
One definition of land use is that it is a function of what use humans apply to the land available to them. But land use also includes natural environment land uses such as rivers, wetlands, open land, and forests.

There are 11 land uses within the Study Area of which seven (7) are developed land uses and four (4) are natural environment land uses. **Table 1** provides the land use types, acreage, and acreage percentages and **Figure 3** below depicts the land uses. The total acreage of the Study Area is 112.69 acres.

The significant findings are:

- 67.5% (76.1 acres) are Developed land uses (**Dev** in **Table 1**) that include Residential, Mixed Use, Tax Exempt, Right-of-way, and Commercial uses;
- 32.5% (36.6 acres) are Natural environment land uses (**Nat Env** in **Table 1**) that include Forest, Water, Wetlands, and Open Land uses;

Table 1: Land Use				
Land Use Type	Acres		Percent	
	Nat Env	Dev	Nat Env	Dev
Residential - single family		41.96		37.2%
Forest	18.91		16.8%	
Mixed Use (primarily residential)		9.66		8.6%
Residential - multi-family		8.29		7.4%
Water	7.99		7.1%	
Tax Exempt (Fire station/church/cemetery)		7.60		6.7%
Wetlands	6.88		6.1%	
Right-of-way		6.77		6.0%
Open Land	2.83		2.5%	
Mixed Use (other)		1.16		1.0%
Commercial		0.63		0.6%
Totals	36.6	76.1	32.5%	67.5%
TOTAL ACRES	112.69			



- Residential – *single family* is the single highest land use at 37.2% (41.96 acres) which is more than double the percent (20.5% higher) of the second highest land use which is Forest at 16.8% (18.91 acres);
- Combined, Residential land uses (*single family / multi-family / Mixed Use (primarily residential)*) account for the highest land use at 53.2% (59.9 acres);
- Mixed Commercial land use accounts for only 0.6% (0.63 acres) of the total land use;
- Combined, Open Land, Water, and Wetlands land uses account for 15.7% (17.7 acres) of the total land use:
 - Water - 7.1% (7.99 acres);
 - Wetlands - 6.1% (6.88 acres);
 - Open Land - 2.5% (2.83 acres)
- Combined, Tax Exempt and Right-of-way land uses account for 12.8% (14.38 acres):
 - Tax Exempt - 6.7% (7.6 acres);
 - Right-of-way - 6.0% (6.77 acres);

The following link provides documentation on the land use types depicted on **Figure 3**:

- Land Use: [2016 Land Use](#)

Building Footprints in Proximity of the Intersection Right-of-way

There are five (5) buildings in proximity to, or clustered very closely to, the Intersection right-of-way (ROW). These distances will be critical for developing improvement alternatives (*NOTE: All distances provided below are approximate*). The Main Street ROW is 62' wide; the Canal Street ROW is 39' wide; the West Elm Street ROW is 47' wide at the Intersection.

The key distances between the ROW and the buildings are:

- The southeast corner of building **A** is 11' west of Canal Street;
- The southwest corner of building **B** is 10' east of Canal Street;
- The front of building **C** is 17' south of Main Street;
- The northwest corner of building **D** is 14' south of Main Street and 13' east of West Elm Street;
- The northeast corner of building **E** is 18' south of Main Street. Although the corner is 25' west of

West Elm Street, the distance narrows to 12' at the southeast corner of the building;

TRAFFIC CONGESTION ANALYSIS

Overview of Traffic Congestion Analysis Methods

The following analysis methods are used to evaluate traffic congestion at an intersection.

Traffic Volume Counts and Peak Hour Determination

MRPC staff conducts 24-hour (minimum) traffic counts (TCs) at the approaches to an intersection. The TC data are then analyzed to determine AM and PM peak hours. Once the AM and PM peak hours are determined, peak hour intersection turning movement traffic counts (TMCs) are completed at an intersection.

Intersection Peak Hour Level-of-Service (LOS) Analysis

The Level of Service (LOS) of a roadway traffic facility represents the quality of traffic flow and is used to assess the operation of that traffic facility during peak hours. LOS analyses are based on the methods in the *Highway Capacity Manual* (2000) (HCM). LOS is defined differently for each type of traffic facility, such as an unsignalized intersection, signalized intersection, two-lane road, or multi-lane road.

LOS criteria are defined by the average amount of delay experienced by a vehicle at the intersection due to the traffic controls (i.e., signs or signals). For unsignalized intersections each approach is assessed independently, since the LOS of the major and minor approaches may differ greatly. LOS 'E' and 'F' indicate unacceptable intersection operational delays. The table below summarizes the LOS average control delay criteria for intersections controlled by STOP signs and those controlled by a traffic signal. Contact the MRPC for LOS description.

LOS	Average Control Delay (seconds per vehicle)	
	Stop Controlled	Signalized
A	<10.0	<10.0
B	10.1 – 15.0	10.1 – 20.0
C	15.1 – 25.0	20.1 – 35.0
D	25.1 – 35.0	35.1 – 55.0
E	35.1 – 50.0	55.1 – 80.0
F	>50.0	>80.0

Signal Warrants Analysis

The *Manual of Uniform Traffic Control Devices* (MUTCD) contains nine warrants for the possible installation of a traffic signal which are:

Traffic Signal Warrants	
1	Eight-Hour Vehicular Volume
2	Four-Hour Vehicular Volume
3	Peak Hour
4	Pedestrian Volume
5	School Crossing
6	Coordinated Signal System
7	Crash Experience
8	Roadway Network
9	Intersection Near a Grade Crossing

If an intersection meets the criteria of at least one of the warrants, installation of a signal may be appropriate. As a project moves forward for a study location, engineering judgment should also be used when applying the warrants. These warrants include criteria such as minimum volumes, peak hour delay, and crashes. Recent data are compared to the warrants to assess the appropriateness of a traffic signal under current conditions. Contact the MRPC for signal warrants description.

Intersection Existing Daily Total Traffic Volume

As of 9/14/2021, the PM TMC has been completed however, the 24-hour traffic counts needed to conduct a signal warrant analysis have not been completed. See the **Appendix** for the TMC.

Intersection Level of Service (LOS)

LOS analysis was conducted for the PM peak hours based upon the TMC traffic volumes to determine the operational conditions of the Intersection. **Table 2** below provides the results of this analysis for the non-signalized Intersection. The Intersection PM peak total volume was 1,052 vehicles.

Table 2: 2021 TMC & Intersection LOS Summary			
	PM Peak (4:45-5:45)		
Major Streets	Volume	LOS	Delay
Main St (Rt 119) WB	562	A	0.6
Main St (Rt 119) EB	237	A	1.1
Minor Streets			
Canal St SB	122	D	30.6
West Elm St NB	131	D	25.0

The following observation can be made from **Table 2**: The unsignalized Intersection minor street approaches operate at a LOS of 'D' during PM peak hour period indicating moderate delays and operational issues currently exist on the minor street approaches. The LOS worksheet can be found in the **Appendix**.

Future Traffic Volume Growth

Future traffic volume growth was calculated for this Intersection due to the results of the Intersection LOS analysis above that indicates moderate operational problems currently exist on the minor street approaches.

It is safe to assume that if traffic volume increases and the existing conditions remain the same, the PM LOS of the Intersection minor street approaches will drop to 'E' or 'F' indicating unacceptable intersection operational delays.

Future traffic volume was calculated using the current MRPC traffic growth rate of 2% that was applied to a 10-year period until 2031. **Table 3** below provides the results of this analysis. 2031 Intersection PM peak total volume is projected to reach 1,281 vehicles.

Table 3: 2031 TMC & Intersection LOS Summary			
	PM Peak (4:45-5:45)		
Major Streets	Volume	LOS	Delay
Main St (Rt 119) WB	685	A	0.8
Main St (Rt 119) EB	289	A	1.2
Minor Streets			
Canal St SB	148	F	>50.0
West Elm St NB	159	F	>50.0

The following observation can be made from **Table 3**:

If traffic growth occurs as projected above, 2031 unsignalized Intersection minor street approaches may very well operate at a LOS of "F" during PM peak hour period. This indicates that unacceptable intersection operational delays will most likely exist on the minor street approaches. The LOS worksheet can be found in the **Appendix**.

Signal Warrants Analysis

A complete signal warrant analysis could not be conducted due to the problems discussed previously. However, based upon prior signal warrant analyses

conducted at other location in the Region, it is the judgement of the MRPC that this location would not satisfy any of the eight warrants. This would be due to the high volume of entering traffic needed for the minor approach legs of this crossing, i.e., Canal Street and West Elm Street. If the Town does decide to pursue improvements at this location, the design engineer procured for this project can revisit the signal warrant issue for the Town.

SAFETY PROFILE

Safety Profile Overview

Improving roadway safety is a top priority for those seeking to improve a roadway facility. Traffic crashes are more often than not avoidable events as historically, up to 90% of crashes are the result of driver error. However, driver error can be magnified by poor roadway or intersection design or by inadequate traffic control measures. When crashes occur in high numbers at a particular location on a roadway there is most likely a common reason for the crashes that is related to the design; signage; pavement markings; sight distance; and road condition. These crashes can be predictable and the conditions that increase the chances for crashes are often correctable. A detailed study of the crash reports for a particular location can identify the conditions and lead to design improvements that will work to reduce the numbers and severity of future crashes.

A key safety related question to be answered about a location (or locations) under study is:

*Does a location (Do the locations) under study meet or exceed at least one of the thresholds of a set of established criteria that would reveal a potential safety issue at the location (locations) which will create the necessity to conduct a **Road Safety Audit (RSA)** that will recommend safety improvements?*

The MassDOT document titled **HSIP¹ Project Selection Criteria** (link: [MassDOT HSIP Project Selection Criteria](#) or contact the MRPC for more information) is the official document that provides criteria for revealing potential safety issues at locations that will create the necessity to conduct an RSA² (which includes a detailed study of crash reports) that may lead to an HSIP funded

¹ HSIP = Highway Safety Improvement Program

² See RSA description below

project. The purpose of conducting this Safety Profile is to reveal any potential safety issues at the Intersection.

The locations found in the **HSIP Project Selection Criteria** document, and the three (3) source documents listed below are based on MassDOT crash cluster data. Basically, MassDOT defines a crash cluster as a location that experiences the occurrence of a minimum of two (2) crashes within a distance of 82 feet of each other during a 3-year period. As of June 1st, 2021, the latest crash cluster data MassDOT had developed was for the 3-year period of 2015 to 2017. A total of 875 crash clusters occurred in the region during the 3-year period.

Source Documents

The following three (3) source documents utilize the **HSIP Project Selection Criteria** as their source and are referenced in this Safety Profile. Each document is derived from the criteria for revealing potential safety issues at a location.

- **2017 Top Crash Locations Report** (MassDOT; September 2020) This is a statewide report that includes the following information:
 - *Top 200 Intersection Locations 2015-2017*
 - *Top Pedestrian Locations 2008-2017;*
 - *Top Bicycle Locations 2008-2017;*
 Link to report: [2017 Top Crash Locations Report](#)
- **MRPC Region Top 5% Crash Locations Table 2015 - 2017:** the Top 5% table equates to the top 43 locations that occurred in the region. MassDOT developed the Top 5% table for the region and added content to the locations. MRPC staff then added further content that pertained to the region to the locations in the table (July 2020);
- **MRPC Region Top 100 High Crash Locations Table 2015 - 2017:** The top 100 table equates to the top 100 locations that occurred in the region. The table includes the 43 locations in the Top 5% table and adds the next 57 highest ranked locations that occurred in the region. MRPC staff then added content that pertained to the region to the locations in the table (April 2021);

If a location is listed in at least one of the three (3) documents, it is revealed as having potential safety issues.

Crash Profile of the Intersection

For the 3-year period of 2015 to 2017, a crash cluster occurred at the Intersection. A total of six (6) crashes occurred at the Intersection of which two (2) were Injury Crashes and four (4) were Property Damage Only (PDO) Crashes.

The **2017 Top Crash Locations Report** will reveal locations in the region that have potential intersection; pedestrian, and bicycle safety issues if the locations are listed in the statewide report.

FINDING: The Intersection **IS NOT LISTED** in this table therefore a potential safety issue does not exist based on this finding.

The **MRPC Region Top 5% Crash Locations Table** will reveal locations in the region that have potential safety issues if the locations are listed in this table.

FINDING: The Intersection **IS NOT LISTED** in this table therefore a potential safety issue does not exist based on this finding.

The **MRPC Region Top 100 High Crash Locations Table** will reveal locations in the region that have potential safety issues if the locations are listed in this table.

FINDING: The Intersection **IS NOT LISTED** in this table therefore a potential safety issue does not exist based on this finding.

2018 - 2019 Intersection Crash Experience

For the 2-year period of 2018 - 2019, a total of seven (7) crashes have occurred. **Table 4** is a list of the crashes.

Table 4: 2018-2019 Crashes				
Date	Severity	Manner	Vehicle Travel Direction	
			Major Road	Minor Road
4/23/18	PDO	Angle	WB	SB
7/16/18	PDO	Angle	WB	NB
9/19/18	PDO			SB
10/25/18	PDO	Angle	EB	SB
1/10/2019	PDO	Single Vehicle Crash		NB
7/31/2019	PDO	Angle		NB / SB
8/25/2019	Injury	Angle	EB	NB

Of the crash total, only one (1) was an Injury Crash. The remaining six (6) crashes were PDO Crashes. No crashes

involved a pedestrian or a bicycle. Five (5) of the seven (7) crashes were Angle Crashes.

The 9/19/18 crash occurred just south of the Intersection while the 1/10/19 crash occurred just north of the Intersection. Both crashes appear to have occurred at an approximate distance of between 85 to 100-feet beyond the Intersection.

NOTE: Please let the MRPC know if the Town has further insight into the crash experience of the Intersection which may result in a potential safety issue.

What is an RSA?

It is a formal safety performance examination of an existing or future transportation facility (roadway, intersection, etc.) by an ***independent, multidisciplinary audit team*** that studies the facility from a variety of perspectives. The final RSA provides qualitative estimates and reports on potential road safety issues and also identifies opportunities for improvements in safety for all road users.

Benefits

- Helps to contribute to designs that reduce the number and severity of crashes;
- Helps to reduce costs by identifying safety issues and correcting them by using safe design practices before a project is built.

Potential RSA Team Members

A team should consist of up to 5 members who represent a variety of expertise and accompanied with experience in disciplines such as:

- Roadway design
- Road safety
- Traffic operations
- Road maintenance and construction
- Law Enforcement (safety officer)
- Local officials
- First responders
- Pedestrian and bicycle issues
- OTHER: another key member would be an individual who is not involved in any of these disciplines but who is extremely familiar with the safety issues of the facility.

PAVEMENT CONDITION PROFILE

The pavement conditions (PC) of the Fed Aid Rds in the area of the Intersection have been determined by MassDOT and MRPC pavement surveys. The PCs are assigned a PC Index (PCI) number from 0-100 which is an overall rating of the PC of the roadway segments. PC categories are expressed as **Excellent**, **Good**, **Fair**, and **Poor**. The table below shows a general correlation between **PCI**, **PC**, **Associated Repair Strategies**, and **Associated Repair Cost** categories which reflects the estimated relative cost it will take to bring the PC to 'Excellent'. Please note that material and other repair costs regularly change therefore dollar figures are not provided. Historically, **Reconstruction** has represented the **Highest Repair Cost** category and **Routine Maintenance** has represented the **Lowest Repair Cost** category.

PCI, PC, Repair Strategies & Costs

PCI	PC	Associated Repair Strategy	Associated Repair Cost
0 - 64	Poor	Reconstruction	Highest
65 - 84	Fair	Rehabilitation (Mill/Overlay)	Second Highest
85 - 94	Good	Preventative Maintenance	Third Highest
95 - 100	Excellent	Routine Maintenance	Lowest

The four (4) Associated Repair Strategies are described below.

Associated Repair Strategies & Descriptions

Associated Repair Strategy	Associated Repair Strategy Description
Reconstruction	Poor pavement condition in need of base improvement. Typical repairs are reclamation or full depth reconstruction
Rehabilitation (Mill/Overlay)	Pavement surface structure in need of improved strength for existing traffic. Typical repairs are overlay with or without milling
Preventative Maintenance	Pavement surface may need high amount of crack sealing or surface sealing, minor localized repair or full depth patch
Routine Maintenance	Pavement surface may need localized crack sealing

Fed Aid Rds are comprised of all functionally classified Interstate, Urban and Rural Arterial, Urban Collector and Rural Major Collector roads. These roads include all roads that are State maintained (State Jurisdiction) as well as a select number of roads that are maintained by Municipalities (Local Jurisdiction). **Figure 4** shows the Fed Aid Rds and their **PC** at the Intersection.

Please note that due to the time frame between data collection and report preparation, the **PC** of the roadways may change. Therefore, the information depicted in **Figure 4** should be viewed in general terms regarding needs and condition.

Figure 4: Intersection Pavement Condition



The **PC** of the Intersection on the minor approaches are '**Poor**'. This indicates that full **Reconstruction** of the pavement is needed and indicates the **Highest Repair Cost** category is needed on both minor approaches.

The **PC** of the Intersection on the Main Street major approaches are '**Fair**'. This indicates that **Rehabilitation** (mill & overlay) is needed and indicates the **Second Highest Repair Cost** category is needed.

RECOMMENDATIONS

The existing offset geometry, pavement condition, pavement markings condition, signage condition, inadequate pedestrian and bike facilities, and the potential future traffic growth of the Intersection during the PM peak hour should be the priorities for improving the Intersection if the Town so chooses. The MRPC recommends that the Town consider Complete Street

Concept solutions to address these priorities for the Intersection.

Based on the **Safety Profile** results, safety conditions at the Intersection do not appear to warrant further study to develop specific safety improvement alternatives. The MRPC recommends that the Town monitor the crash situation at the Intersection for at least the upcoming three-year period.

The Town and the MassDOT Project Development Process

As mentioned in the Introduction, the Town completed a Complete Streets Policy in 2017 and a Prioritization Plan in 2018 which includes the Intersection. The Town may choose to consider developing a Complete Street project for the Intersection through MassDOT. The MassDOT project development process begins by completing a Project Need Form (PNF). The Town may choose to contact the MRPC with any questions or assistance with completing the PNF. But even before starting a PNF, the MRPC recommends the Town seek project development guidance from MassDOT District 3. For more, see the **MASSDOT PROJECT DEVELOPMENT SUMMARY** section below.

Complete Street Projects and the MassDOT Healthy Transportation Policy Directive

The possible development of a Complete Street project at the Intersection is based on the **MassDOT Healthy Transportation Policy Directive** (HTPD). The HTPD formalizes MassDOT's commitment to the completion of a transportation network that serves all mode choices based on GreenDOT's Mode Shift Goal (Goal) (for more see below) that began in 2012. The Goal seeks to increase walking, bicycling, and transit transportation modes.

The HTPD was issued to ensure that MassDOT projects are designed and constructed to provide safe and healthy transportation choices that accommodate all users. Please contact the MRPC for the complete HTPD.

Review of Complete Street Concepts

Complete Street Concepts (Concepts) for all future transportation projects should be considered whether they are funded through the Montachusett Metropolitan Planning Organization (MMPO)

Transportation Improvement Program (TIP) or through other funding sources.

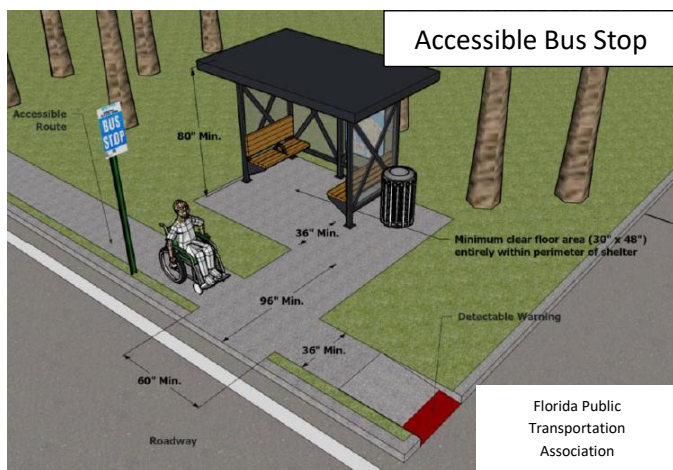
The Concepts provide the Town with strategies to implement the HTPD. The Concepts provide for healthy, safe, and accessible options for all travel modes. The modes include foot, bike, transit, and automobile. The Concepts include the idea that people of all ages and abilities, including people with disabilities, should have access to the roadway.

The Concepts seeks to increase the role of non-motorized and transit modes by providing continuous sidewalks, public transit options, bicycle lanes or wide shoulders to create a safe, accessible environment throughout the transportation network. The MassDOT Project Development and Design Guide follows this approach to roadway design and provides guidance on how to implement the Concepts.

Transit

Transit options need to be perceived as affordable, timely, **accessible**, provide convenient access to key locations, and be within walking distance. The basic elements for an **accessible bus stop** are depicted below.

One of the potential benefits that public transit options provide is that they often can be operating well in advance of the other Concepts.



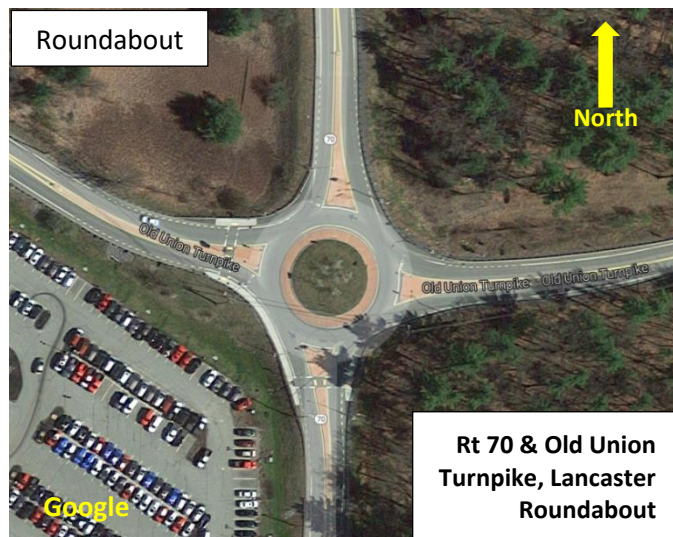
Intersection

The Concepts provide the Town with the ability to improve the Intersection which lacks adequate facilities for all users to an intersection that provides a safe and organized environment with guidance for all users.



Concepts for intersections include accessible crosswalks, curb ramps, and sidewalks, signs - including advanced warning signs and wayfinding signs, bike lanes, and pavement markings that provide a safe and organized environment.

The roundabout is another Concept for the Intersection the Town may want to consider. The simplest description of a roundabout is that it is a circular intersection where traffic flows around a center island in a one-way direction.



The benefits of a smartly designed roundabout are basically two-fold. At intersections where they have been constructed, safety and traffic flow have improved significantly as a result of a design that:

- Slows traffic which decreases the number and severity of crashes;
- Decreases the wait time that occurs at a traffic signal or STOP sign especially when there is no conflicting traffic;

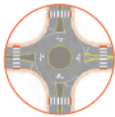
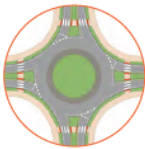
The safety performance record of roundabouts has resulted in them becoming widely accepted as a safety improvement alternative. Based on studies completed by the MRPC, safety has significantly improved since the completion of roundabouts at the:

- Fitchburg ***Ashby State Road (Route 31) at John Fitch Highway*** intersection;
- Lancaster ***Lunenburg Road (Route 70) at Old Union Turnpike*** intersection (depicted above);

Roundabouts are also safer for pedestrians. Splitter islands provide pedestrian refuge and slow traffic which allows pedestrians to cross one travel lane direction at a time.

Roundabout types and design elements are depicted in **Figure 5** and **Figure 6** respectively, below.

Figure 5:
Roundabout Types

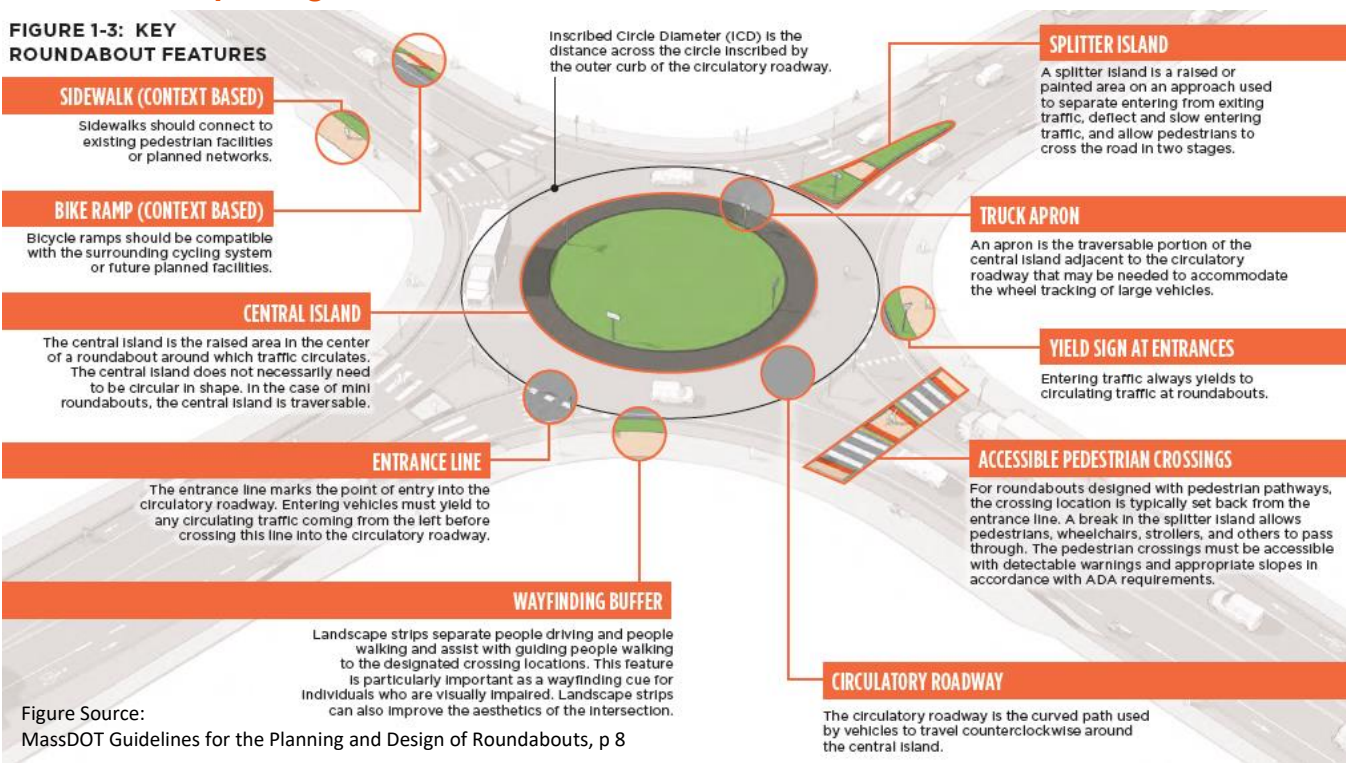


DESIGN ELEMENT	MINI-ROUNDABOUT	SINGLE-LANE ROUNDABOUT	MIXED LANES ROUNDABOUT	MULTILANE ROUNDABOUT
Maximum number of circulating lanes	1	1	2*	2*
Typical Inscribed circle diameter	45 to 90 feet	90 to 150 feet	120 to 180 feet	135 to 300 feet
Central Island treatment	Traversable	Raised with traversable truck apron	Raised with traversable truck apron	Raised with traversable truck apron
Typical daily service volumes on four-leg roundabout	Up to approximately 15,000	Up to approximately 25,000	Up to approximately 35,000 for a two-lane road intersecting a four-lane road	Up to approximately 45,000 for a four-lane intersecting a four-lane road
Desirable entry speed range	15 to 20 MPH	20 to 25 MPH	20 to 30 MPH	25 to 30 MPH

Figure (table) Source: MassDOT

Guidelines for the Planning and Design of Roundabouts, p 11. *roundabouts can be configured with more than two circulating lanes based on detailed traffic analysis approved by MassDOT

Figure 6:
Roundabout Key Design Elements



Roadway

The Concepts provide the Town with the ability to improve a street that is a disorganized environment and lacks adequate facilities for all users to a roadway that provides an organized environment with guidance for all users.



As depicted above, the most complete roadway Concepts include separate accommodations for each transportation mode: travel lanes for motorized vehicles, bike lanes for bicycles, accessible curb ramps, sidewalks, traffic island pedestrian refuge where road width is available. Stormwater runoff is also properly engineered and managed to protect the environment.

Off-road Bike and Pedestrian Paths

Off-road paths add bike and pedestrian links (depicted below) that will connect key locations and points of



interest both within a community and between communities as well.

CONCEPT ALTERNATIVES FOR THE INTERSECTION

Alternative 1:

2018 Prioritization Plan

The following is the Project Description from the 2018 Town Prioritization Plan:

Stripe a crosswalk along W Elm St and Canal St and Main Street. Construct ADA-compliant curb ramps with detectable warning panels to serve these crosswalks. Signs would be provided as appropriate. (Note; Main Street is under MassDOT jurisdiction)

The Project Description fulfills many of the types of intersection Concepts described above, minus the sidewalks and bike lanes that will most likely be included in a MassDOT project.

Add Improvement Alternatives to those of the 2018 Town Prioritization Plan

These improvement alternatives keep the existing offset geometry while adding to the Concepts of the 2018 Town Prioritization Plan. These improvements should be considered short term improvements as they do not address potential future traffic growth.

To prepare vehicle drivers of the upcoming Intersection offset geometry, place offset intersection advanced warning signs (Manual on Uniform Traffic Control Devices (MUTCD) W2-7 signs depicted below) in advance of the Intersection on all the approaches.



To eliminate the overlapping conflict zone between left-turning vehicles, add a regulatory DO NOT BLOCK INTERSECTION pavement marking and signs to the Intersection.



Figure 7 below provides a concept of how the pavement marking and signs may be implemented at the Intersection. The concept modifies the pavement marking depicted in the image above. The pavement marking would cover most of the area on Main Street that abuts the two (2) offset approaches and the signs would be placed on the right side of all four (4) approaches. Crosswalk pavement markings (only one depicted) would be located just outside the DO NOT BLOCK INTERSECTION pavement marking.

The first concern with this alternative is that stopped northbound and southbound vehicles at the West Elm St and Canal St approaches will experience further delay. Left turns from Main St onto Canal St and West Elm St will also experience further delay.

The second concern with this alternative is that vehicle operators may not observe the regulatory pavement marking and signs. This may require the Townsend Police Department to assign a Police Officer detail to enforce the regulation.

Sidewalks: Beyond replacing the existing sidewalks with accessible sidewalks, the Town may want to consider adding sidewalks at the Intersection as follows (*NOTE: All lengths provided below are approximate*):

- On the north side of Main St from 451 Main St to 441 Main St (at the crosswalk), a length of 350’;
- On the south side of Main St from 444 Main St to the crosswalk at Intersection, a length of 118’;
- On the south side of Main St in front of 436 and 438 Main St to the intersection, a length of 45’;
- Sidewalks on the West Elm St and Canal St approaches;

The sidewalk design should consider squaring off the large and extensive corner radii that exists on all Intersection corners.



Alternative 2A: To eliminate the overlapping conflict zone between left-turning vehicles at the Canal St approach and to address potential future traffic growth, add an alternate northbound road that would intersect with Main St approximately 350' east of the Intersection and intersect with Canal St at one of two (2) proposed locations. The two (2) proposed locations for the Canal St at the alternate northbound road intersection are depicted in **Figure 8** below (*NOTE: All distances provided below are approximate*):

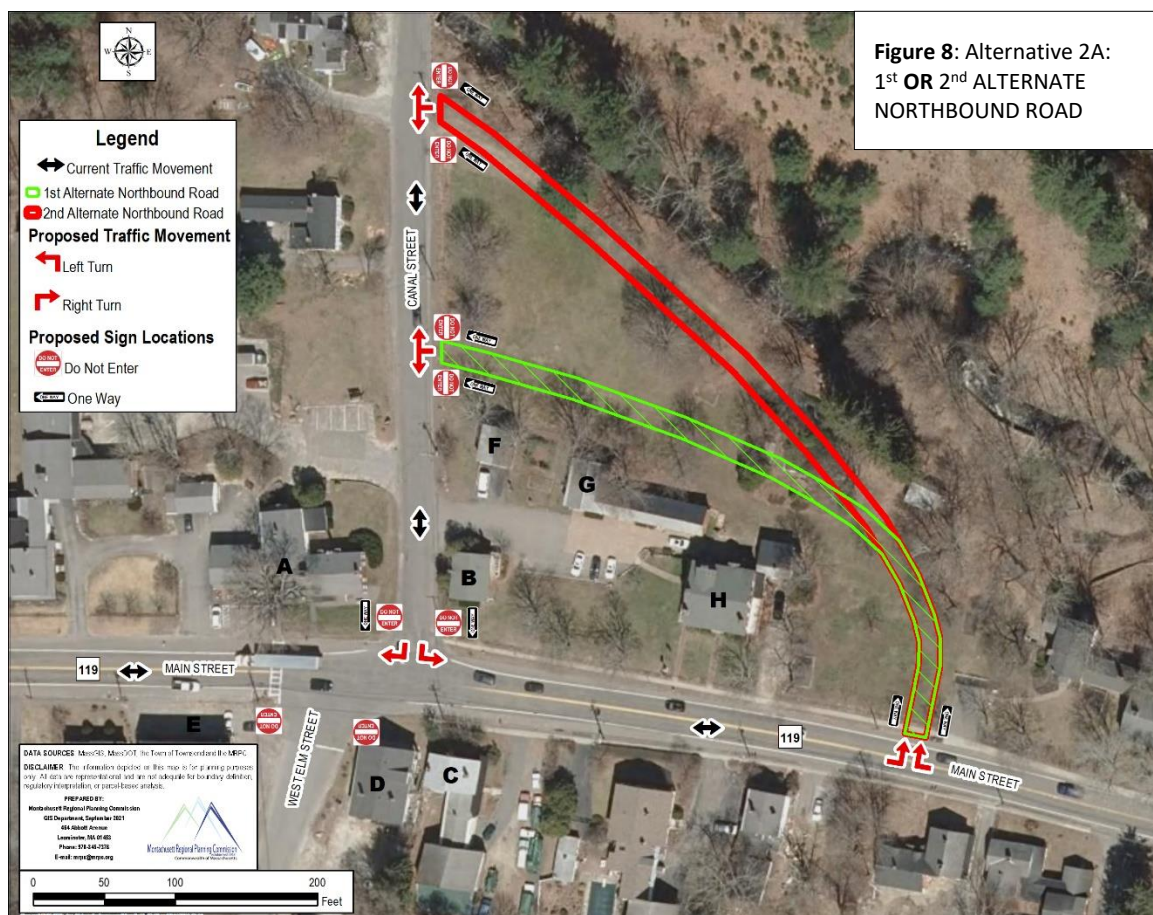
- 1st alternate northbound road intersection would intersect with Canal St approximately 230' north of Main St and would be located 32' north of buildings F, G, H;
- 2nd alternate northbound road intersection would intersect with Canal St 400' north of Main St;
- Each alternate northbound road would be a northbound one-lane / one-way road therefore the road width would accommodate one (1) lane;

Thru, left, and right turn movements would change / continue as is / or be added as follows:

- Main St left and right turn movements onto Canal St northbound WOULD NOT be permitted;
- Main St eastbound and westbound thru movements would continue;
- Canal St southbound left and right turn movements onto Main St would continue;
- The Left and right turn movements onto Canal St would be permitted at the preferred alternate northbound road intersection;

The following regulatory signs would be added:

- DO NOT ENTER regulatory signs would be placed on the Canal St approach to the Intersection and the Canal St and preferred alternate northbound road intersection;
- ONE-WAY regulatory signs would be placed on the Main St and alternate northbound road intersection and the Canal St and preferred alternate northbound road intersection;



Alternative 2A Qualitative Impact Analysis of Environmental Constraints and Other Concerns:

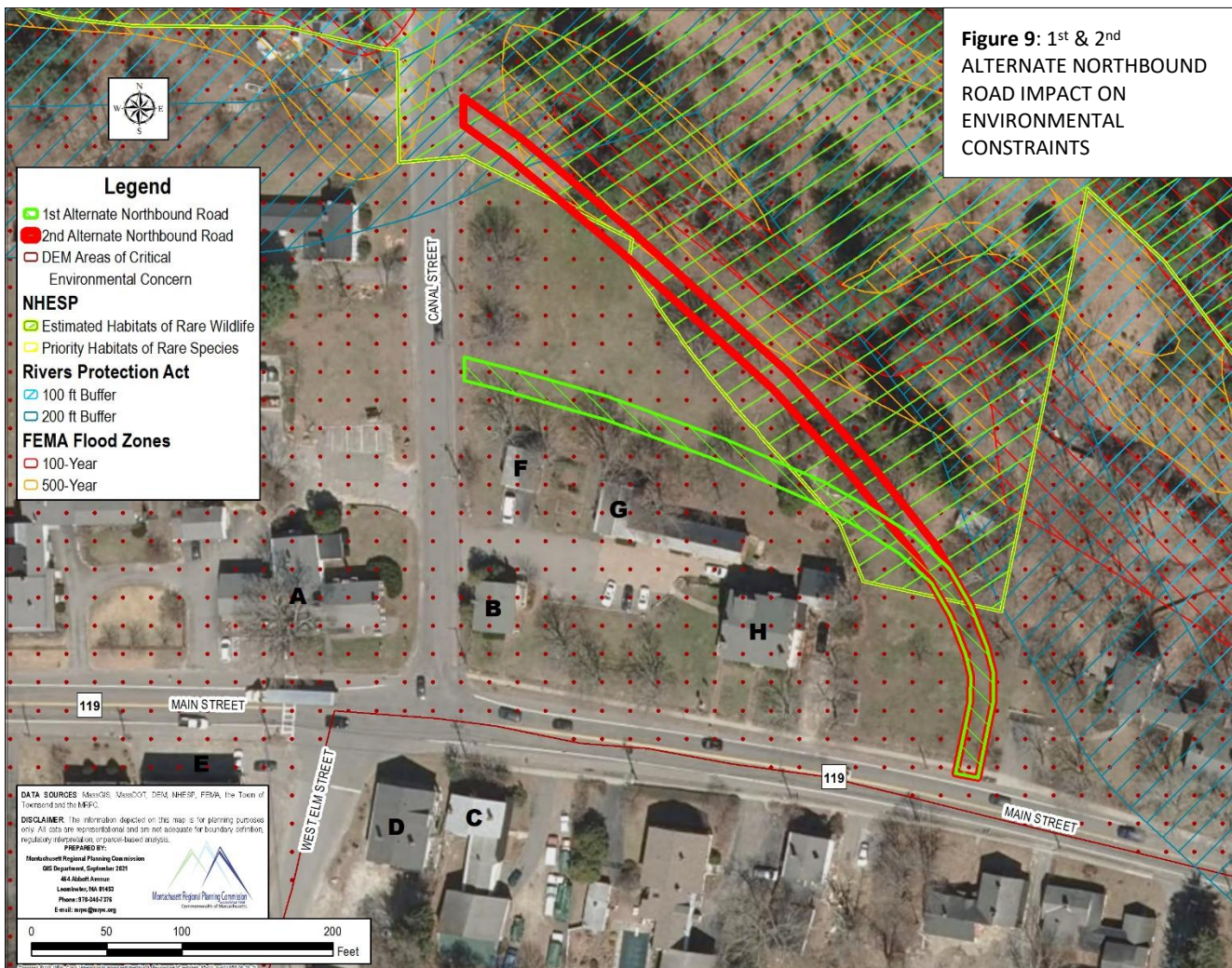
The qualitative impacts are depicted in **Figure 9** below:

- The full length of the 1st alternate northbound road would directly impact the ACEC;
- A section of the 1st alternate northbound road curve would directly impact the southern section of the NHESP Estimated Habitats of Rare Wildlife and Priority Habitats of Rare Species area;
- The full length of the 2nd alternate northbound road would directly impact the ACEC; the NHESP Estimated Habitats of Rare Wildlife and Priority Habitats of Rare Species area;
- A section of the 2nd alternate northbound road would directly impact the Rivers Protection Act Buffers in the area of its intersection with Canal Street;

- The northern half of the 2nd alternate northbound road borders the FEMA National 500 Year Flood Hazard Layer;
- Further analysis is needed to determine if the 2nd alternate northbound road impacts Townsend's wetlands bylaw;

Based on this qualitative analysis, the 1st alternate northbound road would have the least direct impact on environmental constraints therefore would be the better choice between the two (2).

However, another concern with this alternative is that it would involve an extensive taking of the private property parcel where buildings **B**, **F**, **G**, and **H** are located.



Alternative 2B: To eliminate the overlapping conflict zone between left-turning vehicles at the West Elm Street approach and address potential future traffic growth, add an alternate southbound route west of the Intersection. The proposed route for the alternate southbound route is depicted in **Figure 10** below. Thru, left, and right turn movements would change / be added as follows:

- Main Street left and right turn movements onto West Elm Street southbound WOULD NOT be permitted;
- The Main Street eastbound and westbound thru movements would continue;

Westbound vehicles desiring to travel southbound would take the following route (*NOTE: All distances provided below are approximate*):

- Travel west 920' to New Fitchburg Road;
- Turn left on New Fitchburg Road and travel south 610' to Linden Street;
- Turn right on Linden Street and travel east 720' to West Elm Street;

- Turn right on West Elm Street to continue to travel south;

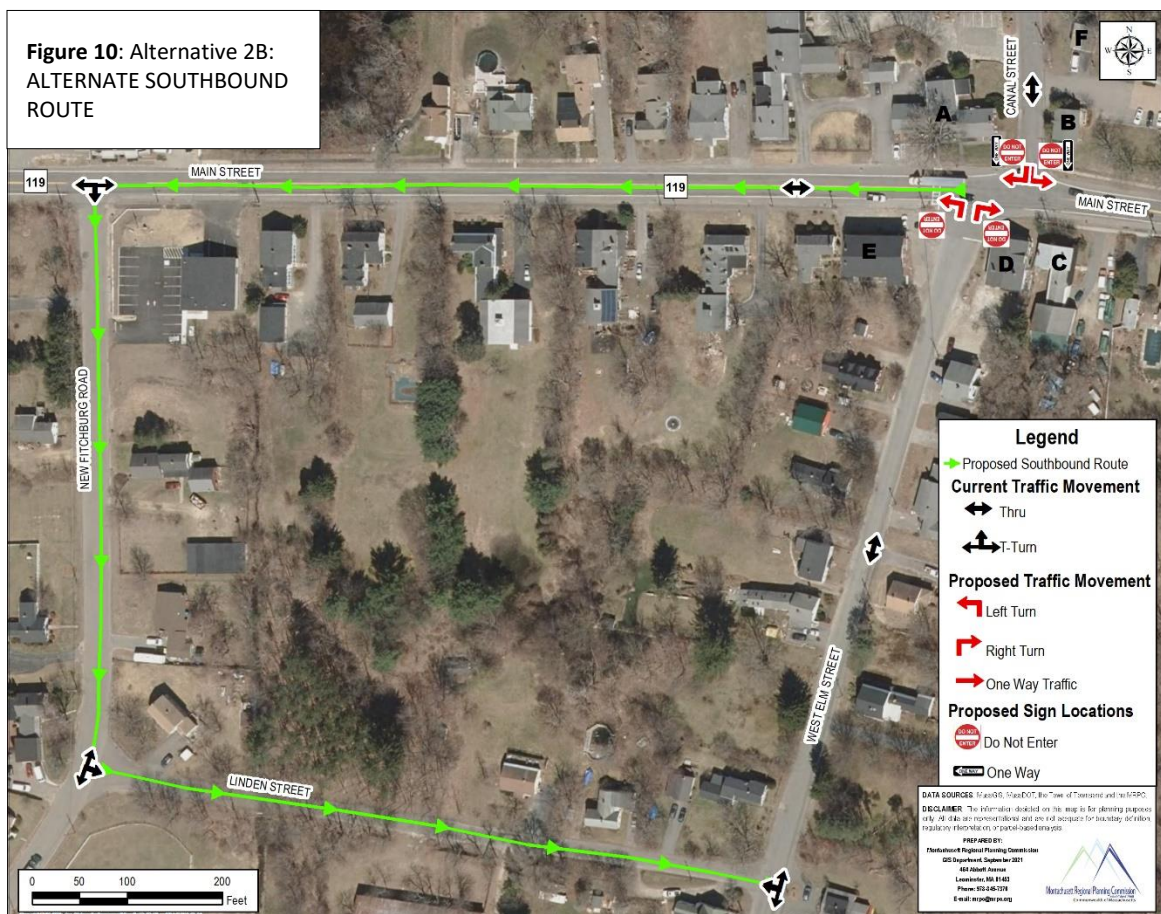
The first concern with this alternate southbound route is a net travel distance of 1,490' is added to the southbound vehicles journey calculated below:

- ❖ 2,250' (the total alternate southbound route travel distance) MINUS 760' (the travel distance from Main Street to Linden Street);

The second concern is that two (2) additional stops will be required of the southbound vehicles:

- Vehicles must stop at the New Fitchburg Road at Linden Street intersection to take a left turn on Linden Street;
- Vehicles must stop at the West Elm Street at Linden Street intersection to take a right turn on West Elm Street;

The two (2) concerns will combine to increase travel time and thus vehicle emissions from, the southbound vehicles. DO NOT ENTER regulatory signs would be placed on the West Elm St northbound approach.



Alternative 3: To eliminate the overlapping conflict zone between left-turning vehicles at both the West Elm Street approach and the Canal Street approaches and address potential future traffic growth, construct a single-lane roundabout at the Intersection. The outer Circulatory Roadway (OCR), Raised Truck Apron, and Center Island of the proposed roundabout are depicted in **Figure 11** below. The OCR would be 90' in diameter and located several feet west of the center of the West Elm Street approach (*NOTE: All distances provided below are approximate*).

This location may provide 15' of clearance between the proposed roundabout and buildings **A**, **D** and **E** as follows :

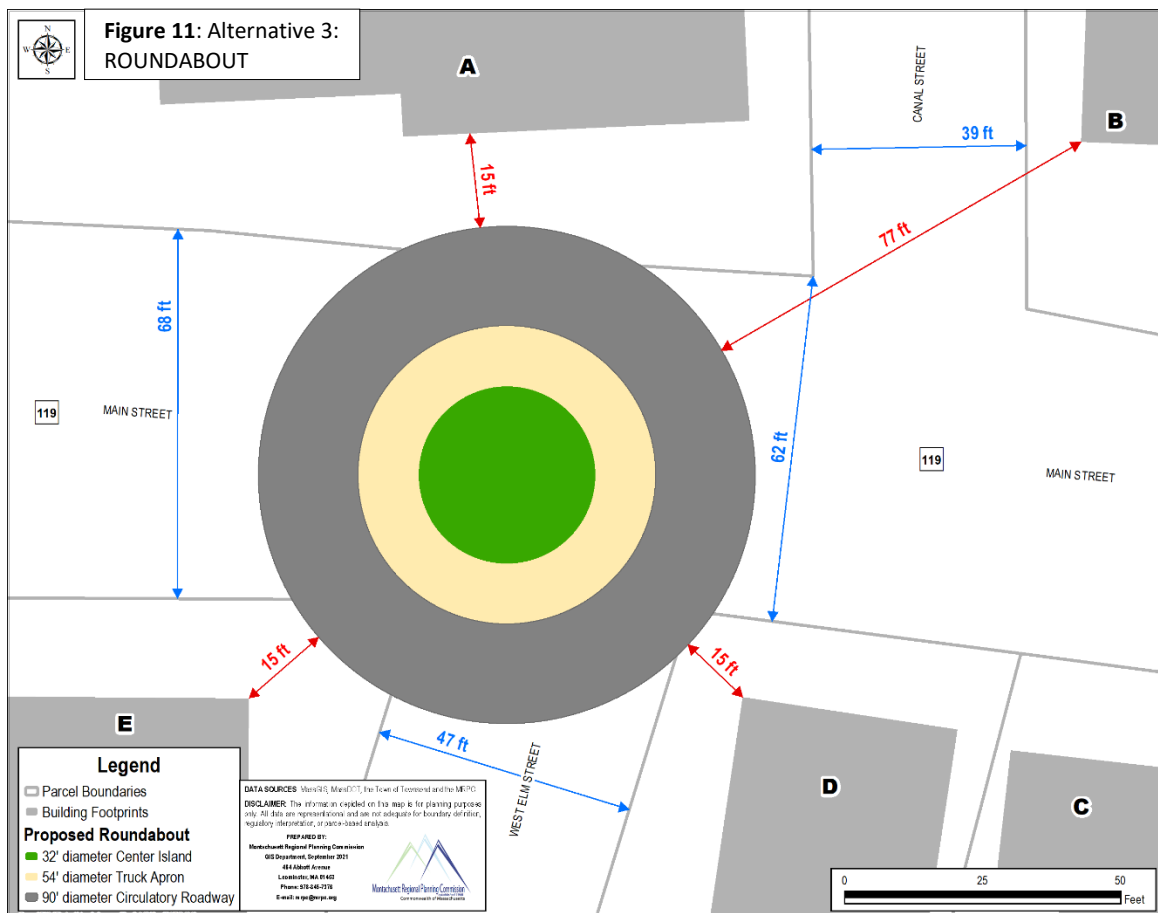
- In front of building **A**
- From the northwest corner of building **D**;
- From the northeast corner of building **E**;

The 15' clearance would provide sufficient width for sidewalks and other contextual elements. This location would disperse any private property taking the most evenly among and have the least impact on the three (3) parcels.

A good example of a roundabout that will be installed at an offset intersection in Massachusetts with similar conditions as the Intersection is the mini roundabout that Nantucket will be constructing at the “Four Corners” intersection. The OCR diameter of the mini roundabout will be 70' (see [Nantucket Four Corners Intersection](#) for further information).

Offset intersection geometry may provide the room needed to add a channelized right turn to the design of a roundabout (see Alt. 3 of the [Four Corners Conceptual Plans](#)). The benefit of adding a channelized right turn to an intersection is found in the increase in vehicles per day (Vpd) capacity. The 77' clearance between the proposed roundabout and the southwest corner of building **B** depicted below may provide an area of sufficient size for a channelized right turn to be added to the roundabout design of the Intersection.

MassDOT roundabout design guidelines (see **Figure 5** above or click [Roundabout Design](#)) state that Vpd capacity of a four-approach single-lane roundabout is up to 25,000 Vpd.



Current Intersection Vpd is estimated to be 10,520 vehicles (peak hour volume of 1,052 vehicles estimated to be 10% of Vpd). This estimate leaves projected Vpd growth for the proposed roundabout with the 14,480 Vpd. The Intersection is projected to reach that total in 2036 (in 15 years). This Vpd projection does not include the increased Vpd capacity of adding a channelized right turn.

The concern that needs to be addressed with the proposed roundabout is the off-street parking in front of building A as the facilities would be in proximity to each other. There are significant number of design options that can be applied when designing a roundabout, especially in constrained locations such as the location of the Intersection. See the MassDOT [Roundabout Design](#) guidelines for further information.

Although the roundabout below is not located in the United States (location: Waikato, New Zealand at the intersection of State Highways 1 and 26), it provides a good example of how off-street parking in proximity to a roundabout can be accommodated. The off-street parking is not only in proximity to the roundabout as it's access points directly intersect with a left turn slip lane at the roundabout.



Also, the Vpd at this roundabout must be in the range of 45,000 vehicles given the number of lanes in and on its approaches and the facility still accommodates off-street parking.

Much closer to the Town, the roundabout below located at Friend Street and Renfrew Street in Adams, Massachusetts also shows another option of how off-street parking in proximity to a roundabout can be accommodated. The access point is on the northeast bound approach to the roundabout.



MASSDOT PROJECT DEVELOPMENT SUMMARY

Project Development is the process that takes a transportation improvement from concept through construction.

Every year the region receives federal and state funds for projects to improve the transportation network in local communities. These funds and projects are prioritized through the MMPO, a regional advisory group that annually develops the Montachusett TIP.

For a community to receive funds, the project must follow a multi-step review and approval process required by the MassDOT Highway Division. This process is summarized in Standard Operating Procedure (SOP) No. HED-08-02-1-00 Project Initiation Process for Highway Division Projects. A copy of this SOP is provided in the **Appendix** of this report.

Project proponents are required to follow this process whenever MassDOT Highway Division is involved in the decision-making process. The project development procedures are, therefore, applicable to any of the following situations:

- When MassDOT is the proponent; or
- When MassDOT is responsible for project funding (state or federal-aid projects); or
- When MassDOT controls the infrastructure (projects on state highways).

Projects with local jurisdiction and local funding sources are not required to go through this review process unless the project is located on the National Highway or Federal-Aid Systems.

The project development process is designed to progressively narrow the projects focus in order to develop a project that addresses identified needs at that location. There should be opportunities for public participation throughout.

The steps described in the SOP are also available online at: <https://www.mass.gov/doc/standard-operating-procedure-project-initiation-process-for-highway-division-projects/download>

The MMPO and Project Development

Decisions related to project development, prioritization, funding, and scheduling are made through the

metropolitan planning process of the MMPO and the MRPC serves as staff to the MMPO. Through continued and active involvement in the planning process via the MRPC, the Montachusett Joint Transportation Committee (MJTC) and the MMPO, issues and projects important to the community can be discussed, heard, and acted upon with their input and knowledge. MRPC staff can work with the community in creating and implementing a project and provide technical assistance.

TRANSPORTATION ROLE OF THE REGIONAL PLANNING AGENCY

Note: This section includes key MassDOT Policies and Documents.

The MRPC acts as staff to the MMPO that has the responsibility of prioritizing transportation projects within the region. This presents municipalities with greater chances for input in setting local priorities. This shift in priority setting is intended to give municipalities a stronger role in planning transportation improvements that directly affect them. It is important to note that transportation projects and plans must be included in a regional transportation plan in order to receive federal funding for implementation. Key transportation documents include:

MRPC: Regional Transportation Plan (RTP)

The RTP outlines the transportation priority needs and policies for the region. Before projects receive federal funding, they must be identified and incorporated into the policy goals and visions of the RTP. The RTP is developed through studies, discussions with local officials, boards and commissions and public comment. Each MPO in the Commonwealth of Massachusetts develops a RTP to provide guidance to local and state officials in deciding how to spend federal and state transportation funds. The RTP for the region identifies both short- and long-range projects for local roads, highways, bridges, rail, transit, bike and pedestrian trails, freight, and airports as well as priorities, goals, visions, and strategies. Click on [2020 RTP](#) for the current RTP that was endorsed on July 17, 2019. After an RTP is endorsed, the MMPO can incorporate changes to the RTP through an amendment.

MRPC: Transportation Improvement Program

For the Transportation Improvement Program (TIP) see the **FUNDING** section below.

MRPC: Unified Planning Work Program (UPWP)

The Unified Planning Work Program (UPWP) for the MMPO is a financial programming tool developed annually as part of the federally certified transportation planning process. This document contains task descriptions of the transportation planning program of the MMPO, with associated budget information and funding sources for the current program year. The purpose of the UPWP is to ensure a comprehensive, cooperative, and continuing (3C) transportation planning process in the Leominster-Fitchburg Urbanized Area and the region. In addition, this document provides for the coordination of planning efforts between communities in the region.

MRPC: Public Participation Procedures

Public participation continues to be a vital element of the transportation planning process. Community representatives of the Montachusett Joint Transportation Committee (MJTC) meet every month on the third Wednesday to discuss transportation projects and issues of regional importance. Over the last few years, the MRPC has expanded its outreach efforts to more diverse populations, groups, and agencies as the involvement of private sector participation is a major effort of this committee. In order to guide the MMPO in this outreach effort, a Public Participation Program (PPP) was developed to solicit input to the various tasks undertaken. The PPP will continue to be reviewed and refined as necessary to ensure compliance with federal regulations and improve the public input process.

MRPC: Title VI

The issue of Environmental Justice and how it relates to the MRPC will continue to be reviewed. As part of this effort, the regulations, and requirements of Title VI of the Civil Rights Act of 1964 will continuously be examined. Prior efforts have led to the development and adoption of a Limited English Proficiency (LEP) Access Plan for the MMPO as well as submittal of annual reports indicating the work done to meet state and federal regulations. In addition, the MRPC

substantially revised its web page at www.mrpc.org in order to be more informative and easier to use. The site will continue to be used to post information in order to provide an additional outlet for public awareness.

MassDOT: GreenDOT

GreenDOT is the Massachusetts Department of Transportation sustainability initiative. It is designed to support the implementation of the following state laws.

- Climate Protection and Green Economy Act (Mass. Gen. L. c. 21N)
- Green Communities Act (Chapter 169 of the Acts of 2008)
- Healthy Transportation Compact (section 33 of Chapter 25 of the Acts of 2009)
- Leading by Example (Executive Order of Governor Patrick, no. 488)
- MassDOT's weMove Massachusetts planning initiative
- The "Complete Streets" (see below) design standards of the 2006 MassDOT Highway Division Project Development and Design Guide, as amended

The GreenDOT initiative incorporates three main goals:

1. Reduce greenhouse gas (GHG) emissions
2. Promote the healthy transportation modes of walking, bicycling, and public transit
3. Support smart growth development

Through the GreenDOT policy, MassDOT will promote sustainable economic development, protect the natural environment, and enhance the quality of life for all the Commonwealth's residents and visitors through the full range of our activities, from strategic planning to construction and system operations.

GreenDOT was designed in response to several existing state laws, Executive Orders, and MassDOT policies. These include the 2009 Transportation Reform Law that created MassDOT and established the Healthy Transportation Compact that promotes improved public health through active transportation; the Global Warming Solutions Act, which calls for measurable and enforceable economy-wide greenhouse gas reductions; and MassDOT's Complete Streets design approach that calls for appropriate accommodation of all

transportation system users. MassDOT GreenDOT can be found at: [MassDOT Greendot](#)

As part of the implementation plan for GreenDOT:

- “Secretary and CEO Richard Davey in October 2012 announced MassDOTs mode shift goal to triple the distance traveled by our customers through bicycling, transit and walking. That goal now joins other goals incorporated into MassDOT's GreenDOT Implementation Plan with tasks and indicators.
- MassDOT established the goal to build a more efficient transportation system where fewer of our customers depend on driving alone to get where they are going. We want to reduce greenhouse gas emissions from the transportation system and support better public health outcomes by working to give our customers more and other healthy travel options.
- MassDOT will measure our progress on this ambitious mode shift goal using Personal Miles Traveled (PMT) - distances traveled by all our customers for bicycling, driving, transit and walking in a one-year period. It also measures all the trips taken by our customers, not just work trips which are often the focus in transportation planning. Measuring the distance traveled by each mode allows MassDOT to see strategic opportunities to improve the travel options for our customers, strengthen the relationship between land use and transportation planning, and draw a link to greenhouse gas emissions.
- Goal numbers are listed in the table below.”

Year	Bicycling PMT	Transit PMT	Walking PMT	Total
2010 (baseline)	150.4m	1.83b	101.1m	2.08b
2020 (benchmark)	330.0m	3.99b	223.9m	4.55b
2030 (goal year)	516.m	5.93b	333.6m	6.78b

Source: [MassDOTs Mode Shift Goal](#)

The policies and goals of the Commonwealth, such as GreenDOT and Mode Shift, will be reviewed, considered, and incorporated in all relevant MRPC planning studies. Recommendations derived from these studies will be consistent with state policies.

MassDOT: Complete Streets

The concept of Complete Streets is that all users of the road should be accommodated. Automobiles, bicyclists, public transportation vehicles and riders, and pedestrians of all ages and abilities should have equal access to roadway use. Instituting a Complete Streets policy ensures that transportation planners and engineers consistently design and operate the entire roadway with all users in mind. MRPC considers the Complete Streets as an important part of our planning process.

Appendix 1 – Townsend Request Letter



Office of the
BOARD OF SELECTMEN
272 Main Street -Townsend, Massachusetts 01469

Wayne Miller, *Chairman*
James M. Kreidler, Jr.,
Town Administrator

Don Klein, *Vice-Chairman*
Office (978) 597-1701
Fax (978) 597-1719

January 22, 2020

Sheri Bean
Montachusett Regional Planning Commission
464 Abott Avenue
Leominster, Ma 01453

RE: Town of Townsend 2020-2021 Unified Planning Work Program (UPWP) Request

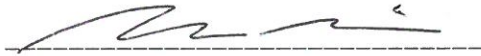
The Town of Townsend requests consideration for funding for a transportation planning process study under the 2020-2021 Unified Planning Work Program (UPWP) program in response to a project solicitation memo received from MRPC.

Townsend respectfully requests the following projects;

1. **Walkability and/or bikeability analysis of Route 13 from the Lunenburg town boundary to the New Hampshire border.**
 - The feasibility of a bike route or side walk along this section of roadway and connection to the rail trail which is currently under development.
 - Connectivity to the rail trail will ensure comprehensive, cooperative, and continuing transportation routes and byways.
2. **Walkability and/or bikeability, parking, and wayfaring study for the Town of Townsend.**
 - Townsend commons, Harbor Mall/North Middlesex Regional High School area of Rt. 119, Spaulding St. and South St. intersection, and other significant areas where points of interest are concentrated.
3. **Intersection analysis of Elm Street (Rt. 13) and Main Street (Route 119) and School Street (Rt. 13) at Townsend commons.**
 - This intersection is often congested and difficult to navigate for heavy vehicles.
 - Intersection modification as a result of analysis would benefitting public safety in a well traversed area of community gathering.
4. **Intersection analysis of Canal Street, Elm St. West and Main Street (Route 119).**
 - Vehicles turning onto or off of, or crossing over, Route 119 encounter dangerous circumstances due to the layout of the intersection.

- This is a light commercial district and improvements to both vehicular and pedestrian traffic as a result of a study would well serve the citizens.

Sincerely Yours,

A stylized, handwritten signature in dark ink, consisting of several fluid, connected strokes.

Wayne Miller, Chairman

A handwritten signature in dark ink that reads "Donald Klein" in a cursive script.

Don Klein, Vice-Chairman

Appendix 2 – Data Documents

Montachusett Regional Planning Commission

464 Abbott Ave., Leominster, MA 01453

978-345-7376

www.mrpc.org

Community: Townsend

Street: Main St (Rt. 119)

Location: At Canal & W. Elm Street

Time: 4-6 PM

File Name : 299-2021-4532 PM

Site Code : 00004532

Start Date : 8/31/2021

Page No : 1

Groups Printed- Vehicles

	Canal St From North				Main St (Rt. 119) From East				W. Elm St From South				Main St (Rt. 119) From West				
Start Time	Right Turn	Straight	Left Turn	App. Total	Right Turn	Straight	Left Turn	App. Total	Right Turn	Straight	Left Turn	App. Total	Right Turn	Straight	Left Turn	App. Total	Int. Total
04:00 PM	6	10	17	33	40	81	8	129	12	23	9	44	5	39	4	48	254
04:15 PM	10	7	19	36	40	89	6	135	11	15	2	28	4	41	5	50	249
04:30 PM	5	9	24	38	37	98	4	139	3	18	8	29	2	45	2	49	255
04:45 PM	4	8	16	28	48	83	5	136	9	20	7	36	6	49	5	60	260
Total	25	34	76	135	165	351	23	539	35	76	26	137	17	174	16	207	1018
05:00 PM	10	9	18	37	52	95	7	154	6	19	4	29	6	44	3	53	273
05:15 PM	4	7	14	25	35	85	8	128	4	28	5	37	3	51	9	63	253
05:30 PM	6	9	17	32	37	98	9	144	5	21	3	29	6	49	6	61	266
05:45 PM	7	9	17	33	34	53	4	91	5	18	1	24	3	37	4	44	192
Total	27	34	66	127	158	331	28	517	20	86	13	119	18	181	22	221	984
Grand Total	52	68	142	262	323	682	51	1056	55	162	39	256	35	355	38	428	2002
Apprch %	19.8	26	54.2		30.6	64.6	4.8		21.5	63.3	15.2		8.2	82.9	8.9		
Total %	2.6	3.4	7.1	13.1	16.1	34.1	2.5	52.7	2.7	8.1	1.9	12.8	1.7	17.7	1.9	21.4	

Montachusett Regional Planning Commission

464 Abbott Ave., Leominster, MA 01453

978-345-7376

www.mrpc.org

Community: Townsend

Street: Main St (Rt. 119)

Location: At Canal & W. Elm Street

Time: 4-6 PM

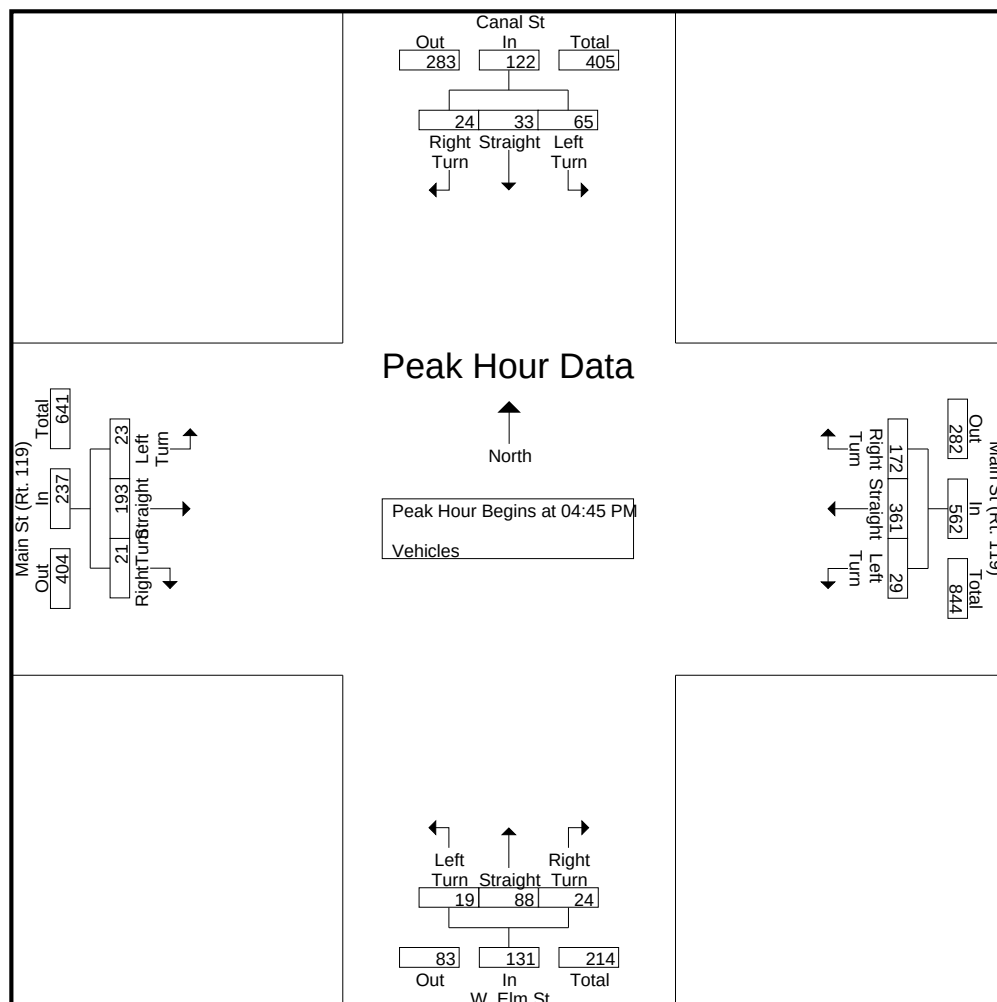
File Name : 299-2021-4532 PM

Site Code : 00004532

Start Date : 8/31/2021

Page No : 2

	Canal St From North				Main St (Rt. 119) From East				W. Elm St From South				Main St (Rt. 119) From West				
Start Time	Right Turn	Straight	Left Turn	App. Total	Right Turn	Straight	Left Turn	App. Total	Right Turn	Straight	Left Turn	App. Total	Right Turn	Straight	Left Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	4	8	16	28	48	83	5	136	9	20	7	36	6	49	5	60	260
05:00 PM	10	9	18	37	52	95	7	154	6	19	4	29	6	44	3	53	273
05:15 PM	4	7	14	25	35	85	8	128	4	28	5	37	3	51	9	63	253
05:30 PM	6	9	17	32	37	98	9	144	5	21	3	29	6	49	6	61	266
Total Volume	24	33	65	122	172	361	29	562	24	88	19	131	21	193	23	237	1052
% App. Total	19.7	27	53.3		30.6	64.2	5.2		18.3	67.2	14.5		8.9	81.4	9.7		
PHF	.600	.917	.903	.824	.827	.921	.806	.912	.667	.786	.679	.885	.875	.946	.639	.940	.963



Montachusett Regional Planning Commission

464 Abbott Ave., Leominster, MA 01453

978-345-7376

www.mrpc.org

Community: Townsend

Street: Main St (Rt. 119)

Location: At Canal & W. Elm Street

Time: 4-6 PM

File Name : 299-2021-4532 PM

Site Code : 00004532

Start Date : 8/31/2021

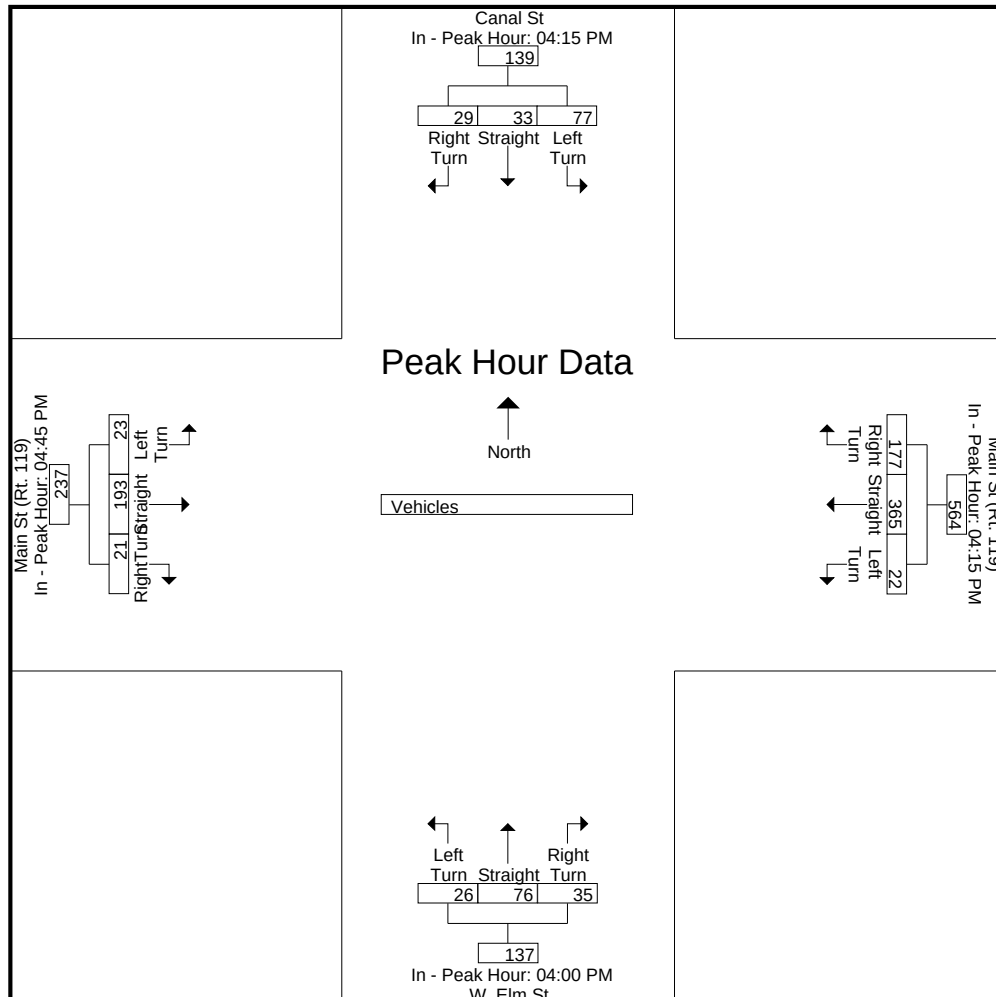
Page No : 3

	Canal St From North				Main St (Rt. 119) From East				W. Elm St From South				Main St (Rt. 119) From West				
Start Time	Right Turn	Straight	Left Turn	App. Total	Right Turn	Straight	Left Turn	App. Total	Right Turn	Straight	Left Turn	App. Total	Right Turn	Straight	Left Turn	App. Total	Int. Total

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:15 PM				04:15 PM				04:00 PM				04:45 PM			
+0 mins.	10	7	19	36	40	89	6	135	12	23	9	44	6	49	5	60
+15 mins.	5	9	24	38	37	98	4	139	11	15	2	28	6	44	3	53
+30 mins.	4	8	16	28	48	83	5	136	3	18	8	29	3	51	9	63
+45 mins.	10	9	18	37	52	95	7	154	9	20	7	36	6	49	6	61
Total Volume	29	33	77	139	177	365	22	564	35	76	26	137	21	193	23	237
% App. Total	20.9	23.7	55.4		31.4	64.7	3.9		25.5	55.5	19		8.9	81.4	9.7	
PHF	.725	.917	.802	.914	.851	.931	.786	.916	.729	.826	.722	.778	.875	.946	.639	.940



HCS7 Two-Way Stop-Control Report

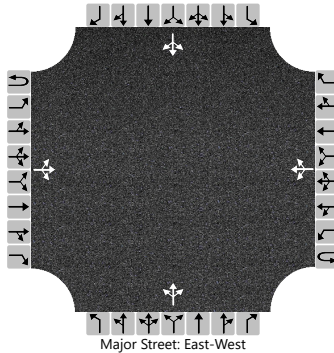
General Information

Analyst	George Snow
Agency/Co.	MRPC
Date Performed	9/9/2021
Analysis Year	2021
Time Analyzed	4:45 - 5:45 PM
Intersection Orientation	East-West
Project Description	Intersection Analysis

Site Information

Intersection	Main St at Canal/W Elm St
Jurisdiction	Townsend
East/West Street	Main St (Rt 119)
North/South Street	Canal / W Elm St
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		23	193	21		29	361	172		19	88	24		65	33	24
Percent Heavy Vehicles (%)		3				3				3	3	3		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		24				30					136				127	
Capacity, c (veh/h)		1010				1340					313				264	
v/c Ratio		0.02				0.02					0.44				0.48	
95% Queue Length, Q ₉₅ (veh)		0.1				0.1					2.1				2.4	
Control Delay (s/veh)		8.7				7.7					25.0				30.6	
Level of Service (LOS)		A				A					D				D	
Approach Delay (s/veh)	1.1				0.6				25.0				30.6			
Approach LOS									D				D			

HCS7 Two-Way Stop-Control Report

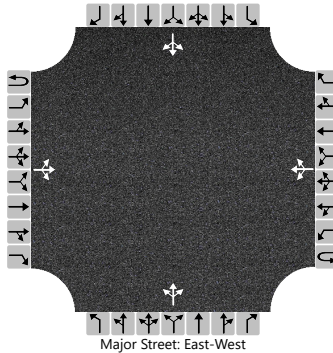
General Information

Analyst	George Snow
Agency/Co.	MRPC
Date Performed	9/9/2021
Analysis Year	2031
Time Analyzed	4:45 - 5:45 PM
Intersection Orientation	East-West
Project Description	Intersection Analysis

Site Information

Intersection	Main St at Canal/W Elm St
Jurisdiction	Townsend
East/West Street	Main St (Rt 119)
North/South Street	Canal / W Elm St
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		28	235	26		35	440	210		23	107	29		79	40	29
Percent Heavy Vehicles (%)		3				3				3	3	3		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		29				36					166				154	
Capacity, c (veh/h)		910				1286					233				160	
v/c Ratio		0.03				0.03					0.71				0.97	
95% Queue Length, Q ₉₅ (veh)		0.1				0.1					4.7				7.3	
Control Delay (s/veh)		9.1				7.9					50.9				119.3	
Level of Service (LOS)		A				A					F				F	
Approach Delay (s/veh)	1.2				0.8				50.9				119.3			
Approach LOS									F				F			

Appendix 3 – MassDOT SOP HED-08-02-1-000

Project Initiation Process for Highway Division Projects

Massachusetts Department of Transportation Highway Division Standard Operating Procedures			S.O.P. No.: HED-08-02-1-000 Page 1 of 12
Subject: Project Initiation Process for Highway Division Projects			Distribution:
Effective: 12/11/20	Issued: 12/11/20	Supersedes all pages of: HED-08-02-1-000 dated 09/22/08	Authorized: Jonathan L. Gulliver (Signature on original)

Purpose and Applicability

This Standard Operating Procedure (SOP) summarizes the activities associated with initiating a project at the MassDOT Highway Division, from definition of project need through approval by the Project Review Committee (PRC). This SOP is designed to be consistent with the first three steps of the project development process as described in Chapter 2 of the Project Development and Design Guide (Sections 2.1, 2.2, and 2.3, pages 2-5 through 2-33):

Step 1: Problem/Need/Opportunity Identification

Step 2: Planning

Step 3: Project Initiation

This SOP applies to all projects, that is, activities that may result in the initial construction, maintenance, preservation, rehabilitation, or reconstruction of infrastructure or other facilities. It also applies to vertical construction projects. It is not intended to apply to activities such as maintenance equipment purchases or other procurements.

Definitions and Resources

MaPIT: All projects must be initiated through the Massachusetts Project Intake Tool (MaPIT), a web-based application designed to help both state and municipal proponents map, create, and initiate transportation projects, while screening against all relevant in-house GIS resources. The website is accessible at this address: <https://gis.massdot.state.ma.us/mapit/>

A username and password are required to use the website. Log in credentials are provided to designated staff at MassDOT or other state agencies, official staff representing each city or town, and consulting firm personnel working on behalf of a city or town. Eligible staff includes those in charge of creating new projects within MassDOT or within municipalities. Training sessions are held periodically by the MassDOT Highway Division and training videos should be made available on mass.gov at the following address: <https://www.mass.gov/info-details/massdot-highway-initiating-a-project>

Project Initiation Form (PIF): The new PIF combines the superseded forms that were previously used during project initiation, the Project Need Form (PNF) and old PIF. The PIF is divided into three parts:

Part I – Facility Location, Project Purpose and Need, and General Information

Part II – Project Description

Part III – Project Costs and Responsibilities

Massachusetts Department of Transportation Highway Division Standard Operating Procedures			S.O.P. No.: HED-08-02-1-000 Page 2 of 12
Subject: Project Initiation Process for Highway Division Projects			Distribution:
Effective: 12/11/20	Issued: 12/11/20	Supersedes all pages of: HED-08-02-1-000 dated 09/22/08	Authorized: Jonathan L. Gulliver (Signature on original)

Project Scoring: The MaPIT application uses the information provided from the PIF to establish an overall score based on a set of criteria related to system preservation, mobility, safety, economic impacts, environmental effects, social equity, policy support, and cost effectiveness. The criteria and project score are used by MassDOT staff to assess the relative value of each proposed project and to help allocate limited state and federal funds to transportation assets.

Project Scoping Checklist: The MassDOT Highway Division has created separate project scoping checklists for roadway and bridge projects to ensure that the design services include all necessary work tasks for successful completion of the project's design. The checklist is completed after project creation and includes information derived from MaPIT and the PIF.

Pre-25% Design Scoping Procedure: The MassDOT Highway Division has created a Pre-25% Project Scoping Procedure to refine the scope of a project and establish a basis for the 25% design submission. It is intended to help build consensus on design approach, design elements such as cross-section and design speed, and identify potential project risks.

Project Proponents

A MassDOT Highway project may be initiated by three general types of users: MassDOT Highway Division staff; another state agency staff, such as the Department of Conservation and Recreation; and official staff of a city or town in Massachusetts or their designated representative.

MassDOT Highway Division Project Types

The project types initiated by MassDOT Highway Division Headquarters staff generally originate from the asset management systems operated by the Division to ensure proper maintenance and repair of the Commonwealth's roadway assets or address a known issue. Highway Division proponents are typically managers of a specific class of infrastructure asset (e.g. bridges, pavement, etc.), a policy focus area (safety, traffic, etc.), or general funding programs (interstate maintenance, NHS preservation, etc.).

Project types initiated by MassDOT Highway Division District staff generally originate from a specific need that is required to ensure proper maintenance and repair of the Commonwealth's roadway assets or address a known issue. These needs can be from any policy focus area and cover the full breadth of transportation projects, including but not limited to: safety improvements, bicycle and pedestrian accommodations, streetscape improvements, roadway repair and/or repaving, construction of new roadways, and interstate ramp modifications. To ensure proper accountability with internally initiated projects, District staff must coordinate with the responsible program or asset manager(s) prior to initiating a project.

Massachusetts Department of Transportation Highway Division Standard Operating Procedures			S.O.P. No.: HED-08-02-1-000 Page 3 of 12
Subject: Project Initiation Process for Highway Division Projects			Distribution:
Effective: 12/11/20	Issued: 12/11/20	Supersedes all pages of: HED-08-02-1-000 dated 09/22/08	Authorized: Jonathan L. Gulliver (Signature on original)

Non-MassDOT State Agency Project Types

The project types initiated by staff of other state agencies other than MassDOT vary but are limited only to those that require use of state or federal funds for maintenance, repair, and/or modification of roadway infrastructure under the jurisdiction of that agency.

Municipal Project Types

The project types initiated for municipalities consist of a wide variety, covering the full breadth of transportation projects, including but not limited to: safety improvements, bicycle and pedestrian accommodations, streetscape improvements, roadway repair and/or repaving, construction of new roadways, traffic signal upgrades, and intersection reconstruction. Projects initiated by city or town staff require more in-depth review to ensure their adherence with statewide policies and compliance with the Project Development and Design Guide. Within the MassDOT Highway Division, the local District Office has the primary responsibility for conducting this review and assisting the community through the project initiation process outlined below.

Step 1: Project Request

- A. Proponent Identifies Problem/Need/Opportunity in MaPIT: The project proponent creates a polygon within the MaPIT tool that indicates the area where a transportation problem, need, and/or opportunity has been identified. Using the tool's geoprocessing screen and question prompts, the project proponent provides all the information available at the time on the existing facility, the condition of assets, mobility issues, bicycle and pedestrian accommodations, safety issues, economic development importance, social equity interest, and environmental constraints. This information is then summarized in Part I of the Project Initiation Form (PIF) that is autogenerated by MaPIT. Once complete, the proponent must submit the form for acceptance by the appropriate MassDOT Highway Division District Office; an e-mail notification of this submittal is automatically sent by MaPIT to personnel engaged in the project development process. Note that during this review period, the proponent will not be able to edit the PIF further until the review is complete. In cases where the MassDOT Highway Division District is the project proponent, notification of this submittal will automatically be sent by MaPIT to the responsible asset or program manager(s). MassDOT staff will then conduct an initial review to clarify any issues and/or questions and to fill in any incomplete information (During this review period, the proponent will not be able to edit the PIF further until the review is complete).

See the MaPIT Guide for more assistance in creating a project.

Massachusetts Department of Transportation Highway Division Standard Operating Procedures			S.O.P. No.: HED-08-02-1-000 Page 4 of 12
Subject: Project Initiation Process for Highway Division Projects			Distribution:
Effective: 12/11/20	Issued: 12/11/20	Supersedes all pages of: HED-08-02-1-000 dated 09/22/08	Authorized: Jonathan L. Gulliver (Signature on original)

B. Communication by District: Once Part I of the PIF has been completed, District staff must communicate with the proponent to discuss the problems, needs, and/or opportunities they have identified. For municipality-initiated projects, a meeting and site visit with the proponent shall be scheduled to discuss the project in detail. The site visit with the proponent should include the following discussion items:

- **Overview of Existing Conditions** – Discussion should include a review of general asset condition, congestion levels during peak and non-peak hours, pedestrian and bicycle accommodations, transit routes and schedules, the area’s context within the overall transportation system, crashes and other safety issues, and environmental conditions.
- **Discussion of Local Context** – The proponent should describe all related background information, including: the potential economic effects, compatibility of a potential project with city/town plans – including the complete streets policy, the level of support from elected officials, and the public outreach to date along with any feedback received from interested parties.
- **Compatibility with Regional and Statewide Policies** – District staff should review how the identified problem/need/opportunity aligns with all relevant regional and statewide policies, including: the respective statewide modal plans, MPO/RPA studies and/or UPWP tasks, MassDOT requirements for roadway cross section, ADA requirements, Healthy Transportation Policy considerations, climate resiliency, affordable housing, and any potential impacts on Environmental Justice and Title VI communities.
- **Scope of Potential Improvement Projects** – This discussion should identify the preliminary goals and objectives for any improvement project. It should include a review of the common types of improvements used to address the identified problem/need/opportunity, including any options that the proponent has considered. It should also include the defined limits of the project, and if the proposed limits seem logical or should be extended or reduced prior to project initiation. District staff should outline basic project requirements that will need to be included in the project. This should include how pedestrians, bicyclists and transit users will be accommodated, the design justification workbook process for controlling criteria and healthy transportation requirements.
- **Discussion of Potential Risk Factors** – The District staff should review common risk factors that transportation projects encounter, including: lack of adequate right-of-way, utility impacts, stormwater mitigation, wetlands restrictions, potential wildlife impacts, potential impacts on historic properties and districts, and the need to preserve designated parkland.
- **Funding** – District staff should make sure that the proponent understands the elements of the federal funding process (such as the Transportation Improvement Program process) in

Massachusetts Department of Transportation Highway Division Standard Operating Procedures			S.O.P. No.: HED-08-02-1-000 Page 5 of 12
Subject: Project Initiation Process for Highway Division Projects			Distribution:
Effective: 12/11/20	Issued: 12/11/20	Supersedes all pages of: HED-08-02-1-000 dated 09/22/08	Authorized: Jonathan L. Gulliver (Signature on original)

their respective region and the MassDOT prioritization and scoring process. District staff may also want to highlight alternatives to federal funding such as Chapter 90 aid and state grant programs like MassWorks and MassTrails.

- **Project Approval and Project Review** – District staff should discuss how the project approval process works, and what will be required if their project gets approved. This discussion should include required submittals outlined in the MassDOT Project review Committee (PRC) approvals letter, and the need to submit the project back to PRC for approval if there is a request to extend the limits of the project or if there is an increase in the project cost.

For projects initiated by MassDOT Highway Division staff or another non-MassDOT State Agency, District reviewing staff must communicate with the proponent to discuss the problems, needs, and/or opportunities they have identified.

- C. Determination of Project Need: Following the meeting and/or site visit with the proponent, District staff will determine if the project need is suitable for initiation of a new project. If the need for a project is determined and there is a logical, low-risk solution that meets those needs, the District staff should approve the proposed project for advancement. If there is no demonstrated need or the potential project is not well defined as a MassDOT Highway Division Project, the District staff should reject the initial request for a project. In both cases, an automated email notification will be sent to all personnel engaged with the project development process.

Part I of the PIF is amended following coordination with District staff

In the case where the need for a project is determined but there is no clear, low-risk solution, or there are multiple ways to address the identified problem/need/opportunity, then the District staff should recommend that the proponent complete a project planning report before approval. Following completion of a project planning report, the proponent should make all necessary changes to Part I of the PIF and resubmit through MaPIT. Separately, the proponent should submit the planning report and all relevant documentation to the District. District staff will then review the revised submission and related materials and approve the advancement of the potential project if it is determined that there is consensus on the project definition.

Massachusetts Department of Transportation Highway Division Standard Operating Procedures			S.O.P. No.: HED-08-02-1-000 Page 6 of 12
Subject: Project Initiation Process for Highway Division Projects			Distribution:
Effective: 12/11/20	Issued: 12/11/20	Supersedes all pages of: HED-08-02-1-000 dated 09/22/08	Authorized: Jonathan L. Gulliver (Signature on original)

Step 2: Project Proposal

- A. Proponent Outlines Improvements in MaPIT: Following the approval to advance the proposed project, the proponent will gain access to Part II and Part III of the PIF through MaPIT. The question prompts in Part II define the project that will address the problem/need/opportunity identified in Part I, and Part III addresses the proposed project cost. The proponent will provide a project scope of work and estimated costs for construction and design. Once complete, the proponent must submit the PIF for acceptance by the appropriate MassDOT Highway Division District Office; an e-mail notification of this submittal is automatically sent by MaPIT to all personnel engaged with the project development process (during this review period, the proponent will not be able to edit the PIF further until the review is complete.) Separately, the proponent should submit all supplemental documentation to the District, including any project planning report, new traffic counts, or concept plans.
- B. District Review of PIF: The District staff will conduct a review of the PIF to clarify any issues and/or questions and to fill in any incomplete information. District staff will determine if the proposed project improvements in Part II meet the needs outlined in Part I and if they are suitable for advancement. If the proposed improvements for a project are determined to be appropriate and there is a logical, low-risk solution that meets those needs, the District staff should accept the completed PIF. If the proposed improvements do not meet the needs, the District staff should reject the PIF. In the case the PIF is rejected, the proponent will regain the ability to edit the form and resubmit if further justification or information is needed. In the case of either acceptance or rejection, an automated e-mail notification will be sent to all personnel engaged with the project development process.

A project should not be initiated unless the proponent expects to begin design of the project within two years of approval

In the case where the need for a project is determined appropriate but there is no clear, low-risk solution, or there are multiple ways to address the identified problem/need/opportunity, then the District staff should recommend that the town complete a project planning report before approval of the completed PIF. Following completion of a project planning report, the proponent should make all necessary changes to the PIF. Separately, the proponent should submit the planning report and all relevant documentation to the District. District staff will then

A project planning report may be needed if the proponent cannot identify a single, clear low-risk, solution

Massachusetts Department of Transportation Highway Division Standard Operating Procedures			S.O.P. No.: HED-08-02-1-000 Page 7 of 12
Subject: Project Initiation Process for Highway Division Projects			Distribution:
Effective: 12/11/20	Issued: 12/11/20	Supersedes all pages of: HED-08-02-1-000 dated 09/22/08	Authorized: Jonathan L. Gulliver (Signature on original)

review the revised PIF submission and related materials and approve the advancement of the potential project if it is determined that there is consensus on the project definition.

Step 3: Project Creation

- A. Update Project Info: The District staff will then submit the project to Project Info through a MaPIT push that occurs after the PIF is approved. Following the push of information initiated via MaPIT, Project Info will be populated with the relevant information to the fullest extent. An automated e-mail alert will be sent to all personnel engaged with the project development process notifying them of the project's acceptance including the official project name and project number. The district staff should also send the proponent a PDF printout generated by MaPIT which includes all three parts of the completed PIF along with the geoprocessing results from the application. After Project Info has been populated the District staff must edit Project Info to address any alerts, assign a readiness date, fill out the Contract Advertising and Planning Estimator (CAPE) and to submit the project to PRC for review. The District staff should be sure to include the following key data: primary funding source(s), police/flaggers, trainees, utilities, and the design contingency amounts when filling out the CAPE. At this point, the District staff should also fill out the Roadway, Bridge, or other asset Project Checklist which can be populated using MaPIT and PIF data. The remaining fields in the checklist should be filled out as accurately as possible.

*Providing more detailed
and thorough information
on the project leads to a
more accurate score*

Massachusetts Department of Transportation Highway Division Standard Operating Procedures			S.O.P. No.: HED-08-02-1-000 Page 8 of 12
Subject: Project Initiation Process for Highway Division Projects			Distribution:
Effective: 12/11/20	Issued: 12/11/20	Supersedes all pages of: HED-08-02-1-000 dated 09/22/08	Authorized: Jonathan L. Gulliver (Signature on original)

- B. Draft Project Score: The MassDOT District staff will review all pertinent information from the PIF to understand the draft project score assigned by MaPIT. The draft score for the project is based on the Highway Division's vetted criteria derived directly from the Project Selection Advisory Committee. The draft score will be used by the Project Evaluation Working Group (also known as the Pre-PRC) to ensure the scoring is consistent between projects. All draft Project Scoresheets, including the Project Alerts sheet, and maps of the project extents should be sent to MassDOT Highway Division Highway Design, Environmental Services, and other appropriate sections by the Wednesday preceding the Project Evaluation Working Group meeting so it can be included on the agenda for the triannual meeting.
- C. Conduct Project Evaluation Working Group Meeting: The Working Group will meet two weeks before the PRC meeting to review and modify the draft PIFs and Project Scoresheets prepared by the District staff. The Working Group is chaired by the Highway Design Engineer, and includes but is not limited to representatives from all six District offices, Environmental, Highway Design, Asset Management, Traffic Engineering, Pavement Management, Right-of-Way, Federal Aid Program Reimbursement Office (FAPRO), Office of Diversity and Civil Rights (ODCR), Federal Highway Administration (FHWA), and the Office of Transportation Planning. Following all modifications approved by the Working Group to the Project Scoresheet, the final project score will then be entered into Project Info by the Friday before the PRC meeting.

Massachusetts Department of Transportation Highway Division Standard Operating Procedures			S.O.P. No.: HED-08-02-1-000 Page 9 of 12
Subject: Project Initiation Process for Highway Division Projects			Distribution:
Effective: 12/11/20	Issued: 12/11/20	Supersedes all pages of: HED-08-02-1-000 dated 09/22/08	Authorized: Jonathan L. Gulliver (Signature on original)

- D. Prepare Revised Project Forms and PRC meeting material: District staff will make any modifications necessary to create the final version of the PIF and Project Scoresheet for each project and will store them on Project Info in the PRC folder using the standard file naming conventions. Staff will also manually enter the final project score into the Project Review tab in Project Info for display on the PRC agenda. The PRC Secretary will then prepare the final agenda for all submitted projects on an excel spreadsheet that includes the project score and other pertinent data about the project such as the description, project number, estimated costs, design responsibility, and anticipated readiness date. The final agenda will then be sent out to the PRC committee the Monday before the meeting. Prior to the PRC meeting, the chair of the Project Evaluation Working Group, the PRC Secretary, and other necessary staff should conduct a pre-meeting to discuss details of the agenda in preparation for the upcoming meeting.

Timeline for Project Review Prior to PRC Meeting

<i>Weeks Before PRC Meeting</i>	Monday	Tuesday	Wednesday	Thursday	Friday
3	Draft PRC Meeting Agenda distributed				
2			Draft Project Scoresheets and maps of Project Extents Due	Pre-PRC Meeting	
1					Final Project Score entered into Project Info and revised project forms submitted to PRC Secretary
0	PRC Meeting Agenda distributed to attendees			PRC Meeting	

Massachusetts Department of Transportation Highway Division Standard Operating Procedures			S.O.P. No.: HED-08-02-1-000 Page 10 of 12
Subject: Project Initiation Process for Highway Division Projects			Distribution:
Effective: 12/11/20	Issued: 12/11/20	Supersedes all pages of: HED-08-02-1-000 dated 09/22/08	Authorized: Jonathan L. Gulliver (Signature on original)

- E. Conduct Project Review Committee (PRC) Meeting: The PRC meets three times a year (or more as determined by the Chief Engineer) and is chaired by the Chief Engineer. The PRC is comprised of the Deputy Chief Engineer of Project Development, District Project Development Engineers, PRC Secretary, and representatives from Asset Management, Project Management, Environmental, Right-of-Way, Bridges and Structures, Traffic Engineering, Highway Maintenance, Highway Operations, FAPRO, Federal Highway Administration (FHWA), and the Office of Transportation Planning. The PRC will review the Project Forms and take one of the following actions:

APPROVE:	The project moves forward into design and programming review by the metropolitan planning organization (MPO).
TABLE:	No action is taken on the project and it is kept on the agenda for the next meeting; or
DENY:	The project is removed from consideration for design and programming review by the MPO. It should be noted that projects are often denied at this stage because it is determined by the PRC that funding processes outside the Transportation Improvement Program are more appropriate and afford a more streamlined implementation.

For approved projects, the PRC will assign:

- A MassDOT Highway Division Project Manager, and
- An estimated advertising date for a project that has been programmed in the State Transportation Improvement Program (STIP) or Capital Investment Plan (CIP). Otherwise an advertising date will be assigned outside the 5-year STIP/CIP cycle until the project is programmed.

Once assigned, the Project Manager should evaluate and make changes to the Project Scoping checklist and PIF if necessary. The PRC Secretary will prepare a meeting summary memorandum and send it to the PRC meeting members.

- F. Notify External Proponents (including Municipalities): The MassDOT District Office will prepare a letter to any external proponent describing the PRC action with copies to the District Project Development Engineers, Highway Administrator, Chief Engineer, Regional Planning Organization, upload the letter to the Project Info Repository, and send an email notification of approval to the Office of Transportation Planning; and when the proponent is a municipality the Director of Project Management. The District Offices will notify each MPO via copy of each

Massachusetts Department of Transportation Highway Division Standard Operating Procedures			S.O.P. No.: HED-08-02-1-000 Page 11 of 12
Subject: Project Initiation Process for Highway Division Projects			Distribution:
Effective: 12/11/20	Issued: 12/11/20	Supersedes all pages of: HED-08-02-1-000 dated 09/22/08	Authorized: Jonathan L. Gulliver (Signature on original)

letter for the projects approved in their respective region(s) with specific steps that the proponents need to take within 2 years to demonstrate sufficient progress. The District will expect the letter to be signed and returned as acknowledgment of the municipality's responsibilities. The District Office shall also notify municipalities of MassDOT projects within their communities. Templates for these notification letters are located at:
S:\MassHighway\PRC\Sample Approval Letters.

- G. Update Project Info: The PRC Secretary will update the Project Management Tab with the Project Manager identified by the PRC, project PRC status, and any other information necessary from the PRC Meeting. The Advertising Program Manager will then update advertising dates and any pertinent information necessary.
- H. Request PARS Number: The assigned Project Manager will request a PARS number for payroll and project development costs related to the project using information from the completed PIF.

Project Deactivation

The list of projects approved by the Project Review Committee will be regularly reviewed to ensure that it consists only of projects actively in development that continue to meet the project need outlined at their initiation. Projects that meet the criteria listed in the steps below for both municipalities and state agencies will be removed from that list.

PROCEDURE FOR MUNICIPAL PROJECTS

- 1) STATE REQUEST FOR DEACTIVATION
 - a) After one year without activity, municipality receives email notification from the District reminding them of requirements in PRC letter.
 - b) After two years without activity, municipality receives email from the District that project is going to be deactivated unless they respond within thirty (30) days. Email will also direct municipality to resubmit to PRC (as a new project through MaPIT) if they wish to restart the project once it has been deactivated.
 - c) After thirty (30) days without a response, the District then emails this communication to the Advertising Program Manager requesting deactivation.
 - d) Advertising Program Manager marks the project as inactive in Project Info and notifies the Project Manager and section director.
 - e) Advertising Program Manager adds the project to the next Project Review Committee meeting agenda under the Deactivated section.
 - f) Project Manager archives all project documentation including:
 - i) Emails

Massachusetts Department of Transportation Highway Division Standard Operating Procedures			S.O.P. No.: HED-08-02-1-000 Page 12 of 12
Subject: Project Initiation Process for Highway Division Projects			Distribution:
Effective: 12/11/20	Issued: 12/11/20	Supersedes all pages of: HED-08-02-1-000 dated 09/22/08	Authorized: Jonathan L. Gulliver (Signature on original)

- ii) Written correspondence
- iii) Project submittals
- g) Project Manager submits PARS Number deactivation request to FAPRO.

2) MUNICIPAL REQUEST FOR DEACTIVATION

- a) Municipality requests deactivation in writing to the DHD with a copy sent to the assigned Project Manager.
- b) The District emails this communication to the Advertising Program Manager.
- c) Advertising Program Manager marks the project as inactive in Project Info and notifies the Project Manager and section director.
- d) Advertising Program Manager adds the project to the next Project Review Committee meeting agenda under the Deactivated section.
- e) Project Manager archives all project documentation including:
 - i) Emails
 - ii) Written correspondence
 - iii) Project submittals
- f) Project Manager submits PARS Number deactivation request to FAPRO.

PROCEDURE FOR STATE PROJECTS

- 3) Once the Department identifies a project for deactivation, then:
 - a) DHD emails the Advertising Program Manager requesting deactivation.
 - b) Advertising Program Manager marks the project as inactive in Project Info and notifies the Project Manager and section director.
 - c) Advertising Program Manager adds the project to the next Project Review Committee meeting agenda under the Deactivated section.
 - d) DHD submits letter to affected municipalities, if needed.
 - e) Project Manager archives all project documentation including:
 - i) Emails
 - ii) Written correspondence
 - iii) Project submittals
 - f) Project Manager submits PARS Number deactivation request to FAPRO.

Appendix 4 – Draft Comments

Townsend BOS and Highway Department Review & Comment

Comment

From: Beth Faxon <bfaxon@townsendma.gov>

Sent: Monday, November 8, 2021 11:37 AM

To: George Snow <gsnow@mrpc.org>

Subject: FW: Townsend UPWP grant work Walkability & Bikeability study and intersection studies

I received some feedback from Jim Smith, Townsend Highway Superintendent regarding the MRPC Townsend W. Elm, Canal, Rt. 119 Intersection study. Please see comment in email below.

Thank you for your support!

Beth Faxon

Planning Board and Zoning Board of Appeals Admin.

Land Use Department

Town of Townsend

A Designated Municipal Vulnerability Preparedness (MVP) Community

272 Main St., Townsend, MA 01469

978-597-1722

From: Jim Smith <jsmith@townsendma.gov>

Sent: Monday, November 01, 2021 11:57 AM

To: Beth Faxon <bfaxon@townsendma.gov>

Subject: RE: Townsend UPWP grant work Walkability & Bikeability study and intersection studies

Good morning.

I had a chance to review the Canal St intersection Study. The study looks to have been extensive and thoroughly considered. My only comment would be that we have since repaved Canal St and striped the road with a centerline and fog edge lines. We will be painting a stop line on canal St at RT13 in the near future as well.....

Thank you.

James Smith

Townsend Highway Superintendent

177 Main Street, Townsend MA 01469

(978) 597-1712

Response

Comment noted in final document.