



To: Upper Charles Trail Committee  
Town of Hopkinton  
18 Main Street  
Hopkinton, MA 01748

Date: September 20, 2016  
Revised January 27, 2022

Memorandum

Project #: 13539.00

From: VHB

Re: Hayden Rowe Bridge Crossing  
Planning/ Conceptual Design  
Hopkinton, MA

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## Introduction

This memo provides a brief desktop review of a proposed shared-use path (SUP) bicycle/ pedestrian bridge over Hayden Rowe Street (Route 85) in Hopkinton, MA. This memo was originally prepared as a draft in 2016 and has recently been updated for the Town's review. The following edits have been made in comparison to the 2016 version:

1. Memo heading format and name changes (for ease of reading);
2. Definitions of bikeway types removed (not relevant to bridge crossing);
3. Additional information and clarification on various design and permitting processes;
4. Information added to discuss an alternative crossing;
5. Construction cost estimate has its own section and provides more details on current pricing; and
6. Images and other visuals added.

The purpose of this memo is to assist inform the Town in deciding whether or not to pursue a bridge over Hayden Rowe Street. This review uses aerial photos and other online tools (GIS mapping, property maps, etc.) to help identify the following. It is noted that engineering and design will be needed to verify this planning/ conceptual design effort:

- Potential impacts to the surrounding area/ properties;
- Potential design and permitting requirements; and
- Order of magnitude construction costs.

In 2016 the proposed crossing for this evaluation would have extended over Hayden Rowe Street from address #292 to #297. At that time the anticipated construction was projected to be around \$2M and the Town decided that this was too costly to pursue. There has been a recent discussion about exploring a crossing to the south near the Hopkinton/ Milford Town Line.

## Project Area Boundaries and Land Uses

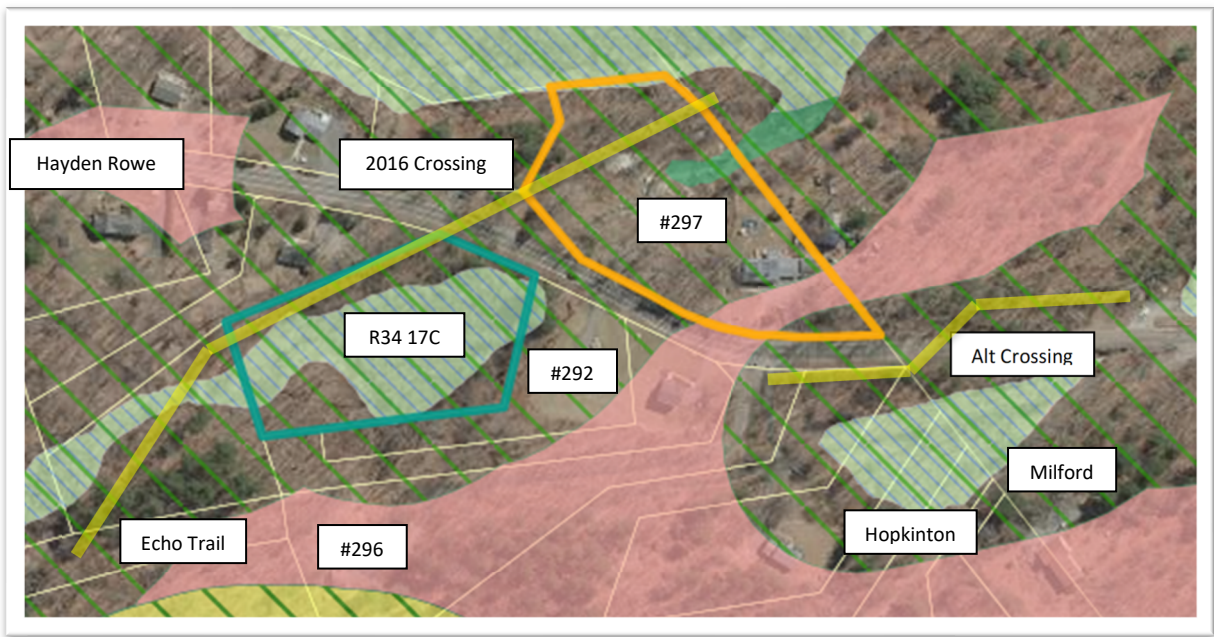
The 2016 alternative consisted of Town owned properties and two privately-owned single-family residential properties in proximity to the southeasterly side of Echo Lake. The beginning point near #296 Hayden Rowe Street appears to be the former railroad right-of-way which has been converted to residential use. Outside of grassed lawn areas surrounding the immediate area around the dwellings, the majority of the area is wooded.

The 2016 proposed bridge crossing site was located between reverse horizontal curves on Hayden Rowe and between #292 and #297. Hayden Rowe in this area is two lane roadway classified as a minor arterial. Utility poles and overhead

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utility lines are located on the easterly side of the roadway but transition to the west and then back to the easterly side again heading into Milford. The roadway is uncurbed and country/ open drainage systems.

Since 2016 #292 appears to have been subdivided and now consists of three lots. Two homes were constructed on the two new southerly parcels, now known as #294 (southerly lot) and #292 (middle lot). Property ID R34 17 C (0 Hayden Rowe Street or northerly lot) is the parcel remaining and could be considered to extend Echo Trail. It is noted that according to the online wetland mapping for this northerly parcel, around 60-percent of the parcel is a wetland, which could limit the ability to develop a path without significant wetland impacts. Wetland delineations in the field would be needed to verify the true wetland boundaries and if additional bridges/ boardwalks are needed to navigate a path alignment through the parcel. The parcel is also within a Zone A Surface Water Protection Zone, which could require additional review and stormwater treatments. The aerial image below illustrates address #297 in orange and address 0 Hayden Rowe (R34 17C) in green. The potential new path and bridge alignment from 2016 is shown in yellow, as well as an alternative crossing location at the Milford/ Hopkinton Town Line.



## Design Policy Related to Bicycle and Pedestrian Accommodations

The US Department of Transportation (USDOT) policy and the MassDOT policy is to incorporate safe and convenient walking and bicycling facilities into transportation projects. The USDOT policy states that every transportation agency, including state DOT's, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems. Because of the numerous individual and community benefits that walking and bicycling provide — including health, safety, environmental, transportation, and quality of life — transportation agencies are encouraged to go beyond minimum standards to provide safe and convenient facilities for these modes.

## Design Criteria

The project criteria has been derived based on standard engineering practice and the successful application of regulatory standards and guidelines. The primary references for the project criteria listed include:

- The American with Disabilities Act (ADA) Design Guidelines for Shared-Use Paths;
- The American Association of State Highway and Transportation Officials (AASHTO) *2012 Guide for the Development of Bicycle Facilities, 4th Edition*, (AASHTO Bike Guide);
- AASHTO *2011 A Policy on Geometric Design of Highways and Streets* (The AASHTO Green Book); and
- The *Manual on Uniform Traffic Control Devices* (MUTCD) 2009 Edition with revisions and applicable Interim Approvals.

If MassDOT or other State and Federal funding is applicable for construction, the following additional design standards and guidelines would be followed. In some cases, standards from these directives could be desirable.

- The Massachusetts Department of Transportation Massachusetts Highway Department Project Development and Design Guide, 2006;
- The Massachusetts Department of Transportation Separated Bike Lane Planning and Design Guide, 2012; and
- Other related MassDOT Engineering Directives.

## Bridge and Share Use Path (SUP) Design Guidelines

This section describes things to consider when designing a bridge over Hayden Rowe Street.

- Path approaches would be required to connect any bridge superstructure over Hayden Rowe Street.
- Acquisition of private property to construct approaches could be significant depending on the surrounding grades and the method to increasing the path profile to the bridge crossing elevation.
- Temporary easements for construction will be required to provide the contractor room for equipment and material storage, clearing and grading.
- Retaining walls will be needed for approaches leading to the main bridge superstructure, at least on the westerly side where the topography is much lower than the easterly side.
- The height of the shared use path (surface elevation) over Hayden Rowe Street will need to be a minimum of 17-feet to meet AASHTO criteria. According to AASHTO, the minimum vertical clearance over a roadway is 14-feet plus an allowance for future roadway resurfacing (typically 6-inches). AASHTO also states that bicycle and pedestrian overpasses should be 1-foot higher than a traditional bridge/ highway structure. This would require the surface of the path be 17-feet higher than the existing roadway (14-feet minimum + 6-inch resurface + 1-foot for pedestrian/ bicycle structure + an assumed 1.5-foot structure thickness/ depth). See next bullet for additional information on arterial roadways.
- Per the MassDOT design manual, the vertical clearance required for a new structure over an arterial roadway is 16.5-feet. The minimum 14-feet (+ 6-inches), referenced above, can be used if an alternate route with a 16.5-

foot clearance is provided. To meet this requirement, the structure would need to be raised an additional foot, or be 18-feet higher than the roadway. Hayden Rowe Street is a minor arterial and a state numbered route but is not under state jurisdiction.

- Several hundred feet will be required to achieve the grade change required to ramp the shared use path up to the bridge crossing elevation over Hayden Rowe. Using the maximum allowable slope to meet ADA (5%) and assuming a relatively flat slope adjacent to Hayden Rowe from the beginning to the end of the transition, approximately 340-feet of length would be required to meet the minimum 14-feet + 6" clearance requirement and 360-feet would be required to meet the 16.5-foot clearance. Raising the grade at 5% along Hayden Rowe will most likely result in several hundred feet of retaining walls on the westerly side of the roadway given the existing topography. Ledge on the easterly side will likely be encountered.
- Horizontal clearance (across Hayden Rowe Street) will need to accommodate a pavement cross section of around 34-feet plus additional clear zone width for bridge abutments. Anticipated width (or span of the bridge) under the bridge would be approximately 54-feet. To be conservative, a bridge length of 60-feet should be considered.
- Relocation of overhead utility to accommodate the bridge will also be required and could require either undergrounding of utilities or re-routing utilities around or over the structure.
- A temporary traffic management plan will be required to maintain traffic flow on Route 85 during construction and will require police details.

## Design and Permitting Considerations

This section describes things to consider when permitting a bridge over Hayden Rowe Street.

- Property/ abutter relocations do not appear to be required, however, property acquisition/ permanent easements and temporary easements will.
- Surface Water Protection Zone (Zone A) is located within this area. Coordination with the local authority (assumed to be the Milford Water District) will be required, which is due to the proximity of Echo Lake.
- Wetlands will need to be field verified (not just mapped using online sources) and their location reviewed with the local conservation commission through the Wetland Protection Act (WPA). If a path cannot be segmented to show independent utility, wetland impacts cannot exceed 5,000 SF. A shared use path is not considered a limited project where over 5,000 SF of impacts could be approved through the submission and review of a Department of Environmental Protection (DEP) Variance and an Environmental Notification Form (ENF) under the Massachusetts Environmental Policy Act (MEPA), which are both required through the WPA when wetland impacts are over 5,000 SF.
- Floodplain and riverfront impacts do not appear to be present but will need to be field verified during design.
- Natural Heritage Endangered Species Program (NHESP) will need to be reviewed for priority and estimated habitat limits. It appears that a polygon is located just to the east of Hayden Rowe. Vernal Pools also appear to be outside the project limits but will also need to be verified.

- With the construction of bridge abutment, disposal of hazardous waste or urban fill could be realized.
- Construction and visual impacts.
- Impacts to public utilities including water, sewer, drainage, and overhead utilities such as cable, electric, etc.
- Coordination with abutting communities and the ability to acquire property outside Hopkinton.
- Operations and Maintenance.

### Order of Magnitude Construction Cost

Based on other projects that follow various design and permitting processes, the follow costs are provided for planning purposes only. These costs are provided as a high-level estimate using desktop procedures and no survey or design and would extend the Echo Trail to the Milford Upper Charles Trail Parking Lot.

- Cost per linear foot for a pedestrian/ bicycle bridge with abutments (no vehicle loading and could be a prefabricated bridge): Say \$5,000 per foot or based on a 60-foot crossing \$300,000.
- Cost per linear foot for retaining walls, assuming an average of 8-feet in height. Say \$550 per linear foot for around 300-feet of wall(s) or \$165,000.
- Cost per linear foot for path approaches through woods with possible ledge removal, ADA railings, etc. Say \$350 per foot for around 660-feet or \$231,000.
- Cost per linear foot for path limits along Hayden Rowe with possible modifications to Hayden Rowe including pavement, drainage, new curbing, adjacent driveways, etc. Say \$200 per foot or \$150,000.
- Cost per linear foot for boardwalk over wetlands: Say \$1,200 per foot or \$408,000 for 340 linear feet of boardwalk crossings.

Anticipated cost could be between \$1.2M – \$2.0M for a bridge structure, path construction (approaches to bridge and other), utility relocation and traffic control.

### Bridge Alignment and Approach Visuals

The following are sample images that illustrate how the alignment could look like for a bridge crossing with retaining walls for the path approaches. Images were taken from Google Earth for the Bruce Freeman Trail located over Route 2A in Acton. While the Hayden Rowe crossing could have a smaller bridge with less impact, the alignment and wall treatments could be similar. The following is noted:

- The first alignment image shows that the bridge may need to be entirely in Milford to allow the westerly approach to meet ADA; and
- The second image shows a switchback to access the bridge from the street, which would likely not be needed to cross Hayden Rowe. Illustration provided to show how a retaining wall may look for the path approach on the westerly side of Hayden Rowe.



*Potential Path Alignment with Bridge Approaches and Crossing.*



*Potential Path Approach to Bridge.  
Switchback Approach Shown Above but  
Unlikely to be Needed on Hayden Rowe*