



Memorandum

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

Date: November 11, 2016

Project #: 13539.00

From: Jack Madden, PE

Re: Center Trail Connection
Feasibility Study
Hopkinton, MA

1.1 Project Background

This Feasibility Report includes existing conditions, feasible alternatives, impacts, estimated construction costs, and anticipated permitting actions associated with the design and construction of a Shared Use Path (SUP) connecting the existing Center Trail with Hopkinton schools and the EMC Field Complex. Completion of this Feasibility Report is the initial step in moving this project through the Town's funding and procurement process. The purpose of this Feasibility Report is to help inform the Town's decision on whether or not to pursue the further design and construction of this facility.

2.1 Project Area Boundaries

The Project Area consists primarily of Town-owned property in proximity to the Hopkinton High School, Middle School and Elementary School as well across State Route 85 (SR 85) at the EMC Field Complex.

2.2 Project Area General Land Uses

A former rail bed traverses the Town-owned school property including the high school, middle school and elementary school which are accessed from SR 85 by the Loop Road. Much of the land on these parcels is under a Conservation Restriction filed by the Hopkinton Area Land Trust on January 6, 2004.

The existing Center Trail was partially constructed on this Conservation land and is considered an appropriate amenity to the existing habitats protected by the Conservation Restriction. It connects the Loop Road with Main Street in Hopkinton to the north along the former rail alignment.

This project proposes to extend the Center Trail south through the public school property to the EMC Field Complex across SR 85 where a new elementary school, currently in the design phase, will be constructed.

3.1 Design Policy Related to Bicycle and Pedestrian Accommodation

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.

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Suite 400
Providence, RI 02903-1023
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3.2 Definitions of Bikeway Types

The following types of bikeways were considered during the preparation of this memo. These bikeway definitions are taken from the *AASHTO Guide for the Development of Bicycle Facilities 2012 Fourth Edition*.



Marked Shared Lane



Paved Shoulder



Bike Lane



Shared-Use Path

- **Shared Lane Bikeway** – Shared lane bikeways are best used on minor local neighborhood streets with low speeds and low traffic volumes where bicycles can share the road without special provisions. Generally the speed differential between motorists and bicyclist is typically 15 mph or less and motor vehicle speeds of 30 mph or less. Traffic volumes on the roadway are typically less than approximately 1000 vehicles per day.
- **Marked Shared Lane Bikeway** – Marked shared-lane bikeways are best used on local collectors or minor arterials with narrow travel lanes where bike lanes are not feasible due narrow lanes, space constraints and right-of-way limitations. Traffic volumes can be variable but the motor vehicle speed limit should be 35 mph or less.
- **Paved Shoulder** – Paved shoulders are paved areas adjacent to the roadway travel lanes delineated by a longitudinal pavement marking. Paved shoulder bikeways are best used on rural roadways that connect town centers or other attractions but can be used in urban areas. Traffic volumes can be variable but the motor vehicle posted speed should be in the range of 40-55 mph. The width of the shoulder should be dependent on characteristics of the adjacent motor vehicle traffic (i.e. wider shoulders should be used on higher speed roadways) but a shoulder width of 4 feet is considered the minimum for bicycle travel.
- **Bike Lane** – A bike lane is a portion of a roadway that has been designated for preferential or exclusive use by bicyclists by pavement markings and if used, signs. Bike lanes can be used on major roads to provide quick and direct bicycle access to the same destinations as motorists. Bike lanes can also be used on collector roads or congested urban streets. Generally roadway design speeds are more than 25 mph. Traffic volumes can vary as the motor vehicle/bicycle speed differential is generally a more important factor in the decision to provide bike lanes.
- **Shared-Use Path** – A shared-use path (SUP) is a bikeway outside of the roadway traveled way and physically separated from motorized vehicular traffic by a buffer or barrier. The SUP can be either within the roadway right-of-way or on an independent alignment. SUP's are also used by pedestrians including skaters, wheelchairs users and joggers/walkers. The types of design criteria for SUP's (design speed, minimum curve radii, stopping sight distance, etc.) are of



Rail-with-Trail

similar type for design of roadways but modified based on the operating characteristics of a bicycle as a vehicle and bicyclist as a vehicle operator.

- **Rail-with-Trail** – A rail-with-trail is a SUP parallel and adjacent to a railroad.
- **Rail-to-Trail** – A rail-to-trail is a SUP constructed within the remaining bed of a former rail line. Often the rail bed had been constructed by cutting and filling the existing terrain to maintain straight alignment and gentle even grades which is compatible with ADA accessibility requirements.

3.3 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 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.
- 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.
- Related DOT Engineering Directives.

4.1 Design Criteria

The Center Trail Connection would provide a traffic-separated SUP from the terminus of the existing Center Trail to Hopkinton public schools and the EMC Field Complex. Extending the Center Trail in such a way would improve access for pedestrians and bicyclists from the Main Street commercial district to the high school, middle school, the existing and proposed elementary school locations, EMC Field complex, as well as to adjacent neighborhoods in the SR 85 corridor.

Three alternatives for the Center Trail Connection have been identified along the following alignments (**See Figure 1 and Typical Sections**):

- **Alternative 1** – Originating at the EMC Field Complex parking lot, the EMC Field access road extends west approximately 600 feet to the intersection at State Route 85. (**Segment 1**) The proposed alignment would follow the southern curblin extending the existing 5'-wide sidewalk to 10'-wide SUP by extending the existing southern edge using a Mechanically Stabilized Embankment (MSE) slope for 300 feet. (**Segment 2**) At the intersection of

SR 85, the SUP crosses the road using a High-intensity Activated cross Walk (HAWK) pedestrian signal and crosswalk signage and markings. The path would follow SR 85 in the northbound direction on a 10'-wide SUP with a grass buffer along the roadside for 550 feet. The existing widths within the roadway would be reduced to the minimal allowable by MassDOT for arterial roadways (11'-wide travel lane/4'-wide shoulder). Realignment of curbing along both sides of Route 85 would be required through this segment. **(Segment 3)** At Hopkins Road, the path would go left in a westerly direction onto the Hopkins School Loop Road. The 12'-wide SUP would replace the existing 4'-wide sidewalk along a generous grassy shoulder for 550'. Separation to the adjacent roadway would be by a 5'-wide grassy strip. **(Segment 4)** Where the loop road crosses over a drainage culvert, side slopes restrict the available width. The SUP would be reduced to 10'-wide with separation from the adjacent roadway via concrete barrier block ("Jersey" barrier) for 225 feet. Lane widths through this section would be reduced from 13'-wide to 11'-wide travel lanes, which would serve to reduce vehicle speeds through the school zone. **(Segment 5A)** The SUP continues westerly along the Loop Road where the existing shoulder allows for the 12' SUP with a 5'-wide grass buffer. After 300', the road becomes one-way and would be curbed as it crosses over a wide drainage culvert. The SUP would become 10'-wide with a 5'-wide grass buffer. The existing roadway width would be reduced from 27' to 18' including a 14'-wide travel lane with 2'-wide shoulders. A crossing with typical advance signage and pavement markings would cross to the western side of the Loop Road. **(Segment 6)** The SUP goes off the road and joins an existing railroad bed which extends in the northwesterly direction. The 10' SUP would utilize the existing alignment for 600' before shifting to the southeast along an offset alignment **(Segment 7)** for 850 feet out to the end of the existing Center Trail where it intersects the Loop Road. The crossing here would consist of a typical crosswalk configuration with advanced signage and highly visible pavement markings. Alignment 1 consists of 3,895 linear feet at an estimated cost of \$1,460,000.

- **Alternative 2** – Originating at the EMC Field Complex parking lot, the EMC Field access road extends west approximately 600 feet to the intersection at State Route 85. **(Segment 1)** The proposed alignment would follow the southern curblineline extending the existing 5' sidewalk to 10'-wide SUP by extending the existing southern edge using a Mechanically Stabilized Embankment (MSE) slope for 300 feet. **(Segment 2)** At the intersection of SR 85, the SUP crosses the road using a HAWK pedestrian signal and crosswalk signage and markings. The path would follow SR 85 in the northbound direction on a 10'-wide SUP with a grass buffer along the roadside for 550 feet. The existing widths within the roadway would be reduced to the minimal allowable by MassDOT for arterial roadways (11'-wide travel lane/4'-wide shoulder). Realignment of curbing along both sides of Route 85 would be required through this segment. **(Segment 3)** At Hopkins Road, the path would go left in a westerly direction onto the Hopkins School Loop Road. The 12'-wide SUP would replace the existing 4'-wide sidewalk along a generous grassy shoulder for 550'. Separation to the adjacent roadway would be by a 5'-wide grassy strip. **(Segment 4)** Where the loop road crosses over a drainage culvert, side slopes restrict the available width. The SUP would be reduced to 10' with separation from the adjacent roadway via concrete barrier block ("Jersey" barrier) for 225 feet. Lane widths through this section would be reduced from 13' to 11' travel lanes, which would serve to reduce vehicle speeds through the school zone. **(Segment 5B)** The SUP remains 10'-wide as it turns south, crosses the grassy shoulder and enters the forest along an existing footpath. A boardwalk structure would carry it over a wetland feature as the SUP continues a southerly direction paralleling the Loop Road to where it crosses an existing rail bed before emerging onto the loop Road at the existing Elementary School (400)'. An additional spur

trail would go west from the boardwalk to reach the Loop Road more directly (200'). A crossing with typical advance signage and pavement markings would cross to the western side of the Loop Road. **(Segment 6)** The SUP goes off the road and joins an existing railroad bed which extends in the northwesterly direction. The 10'-wide SUP would utilize the existing alignment for 600' before shifting to the southeast along an offset alignment **(Segment 7)** for 850 feet out to the end of the existing Center Trail where it intersects the Loop Road. The crossing here would consist of a typical crosswalk configuration with advanced signage and highly visible pavement markings. Alignment 2 consists of 3,915 linear feet at an estimated cost of \$1,600,000.

- **Alternative 3** – Originating at the EMC Field Complex parking lot, the EMC Field access road extends west approximately 600 feet to the intersection at State Route 85. **(Segment 1)** The proposed alignment would follow the southern curblineline extending the existing 5'-wide sidewalk to 10'-wide SUP by extending the existing southern edge using a Mechanically Stabilized Embankment (MSE) slope for 300 feet. **(Segment 2)** At the intersection of SR 85, the SUP crosses the road using a HAWK pedestrian signal and crosswalk signage and markings. **(Segment 5C)** The SUP would continue west onto parcel U22 5A, owned by the Town. The parcel is 24'-wide at the back of the existing sidewalk and extends westerly for 550' before it opens up to a forested wetland area. The wetland (450') can be crossed with a boardwalk structure at its narrowest point to minimize cost and impact before picking up an existing abandoned rail bed. The rail bed extends (550') in a northwesterly direction before intersecting with the Loop Road. At the Loop Road, a 10'-wide SUP with a 5'-wide grass strip will bring users to a crossing point where typical advance signage and pavement markings would provide a safe crossing to the western side of the Loop Road. **(Segment 6)** The SUP goes off the road and joins an existing railroad bed which extends in the northwesterly direction. The 10'-wide SUP would utilize the existing alignment for 600' before shifting to the southeast along an offset alignment **(Segment 7)** for 850 feet out to the end of the existing Center Trail where it intersects the Loop Road. The crossing here would consist of a typical crosswalk configuration with advanced signage and highly visible pavement markings. Alignment 3 consists of 3,515 linear feet at an estimated cost of \$1,560,000.

Common to all three alternatives, the Town has indicated the need to include a traffic signal at the corner of SR 85 and the Hopkins School Loop Road. This signal could be coordinated with a HAWK pedestrian signal 500 feet away at the EMC Field access road. This high-visibility crossing designed for safe, accessible crossings of busy roads is proposed in each of the three alternatives and included in the individual cost estimates. The future traffic signal at the Loop Road has been included in a separate estimate with contingency allowances. Further study will be required to determine the particular requirements for signal equipment at this intersection.

5.1 General Applicable Environmental Guidance

This Feasibility Report was developed using data provided by the Massachusetts Office of Geographic Information (MassGIS). This database is a compilation of information acquired from a broad base of public and private agencies and serves as a useful tool for the purposes of planning and assessing potential suitability of land use and development. The findings below are useful for identifying stakeholders and anticipating permitting requirements for the proposed alternatives. Further research, field verification and field survey will be needed to verify the findings of this report before proceeding to final design.

5.2 Anticipated Impacts and Criteria

This section describes the anticipated environmental impacts of the three SUP alignments and other criteria for evaluation, including:

- Relocation Impacts and Right of Way Acquisition
- Considerations Relating to Pedestrians and Bicyclists
- Air Quality Impacts
- Noise Impacts
- Impacts to Outstanding Resource Water
- Impacts to Wetlands
- Floodplain Impacts
- Impacts to Certified Vernal Pools
- Impacts to NHESP Priority and Estimated Habitats
- Impacts to Areas of Critical Environmental Concern
- Impacts to National Register Historic District and Property
- Impacts to Hazardous Waste Sites
- Construction Impacts
- Visual Impacts
- Impacts to Public Utilities
- Public Facilities Connections
- Environmental Justice Impacts
- Construction Costs
- Operations and Maintenance

5.2.1 Relocation Impacts and Right-of-Way Acquisition

The Alternative Alignments under consideration utilize property owned by the Town where possible; however, the proposed Upper Charles Trail connection will cross over SR 85 and potentially encroach on private property where it cannot be avoided.

5.2.2 Considerations Relating to Pedestrians and Bicyclists

Each of the Alternatives considered will improve the pedestrian and bicyclist's connection from the Center Trail to the Hopkinton public schools and EMC Field Complex. Each alignment was developed in order to maximize the separation of pedestrians and cyclists from vehicular traffic and to maximize safety at crossing locations.

The Alternatives were ranked based on the amount of path adjacent to a roadway.

Alternative 1 has the most length of path adjacent to a roadway. Alternative 3 has the least length of path adjacent to a roadway.

5.2.3 Air Quality Impacts

Air quality in the study area would not be substantially affected by project construction because of the temporary nature of bikeway construction and the confined right-of-way.

An air quality analysis has not been performed as part of this Alternatives evaluation report nor is it deemed to be needed.

5.2.4 Noise Impacts

Construction activities would result in a moderate but temporary noise impact to receptors at various locations adjacent to proposed construction. Noise levels would vary depending on the type and number of pieces of equipment active at any one time. Noise impacts during construction can be mitigated by limiting the construction time periods.

5.2.5 Impacts to Outstanding Resource Water

Massachusetts Department of Environmental Protection (DEP) has designated certain waters for protection based on their outstanding socio-economic, recreational, ecological and/or aesthetic values. The Outstanding Resource Water within our project limit has been identified as a Public Water Supply Watershed, specifically the watershed of Echo Lake which serves as the headwaters of the Charles River.

The preliminary impact analysis has determined that Segments 1, 3 and 5c pass through an area identified by the DEP as an Outstanding Resource Water.

Each of the Alternatives 1, 2, and 3 would require review by the DEP to determine the suitability of the improvements proposed. It is indeterminate at this level of analysis which alternative would be considered more favorable by the DEP.

5.2.6 Impacts to Wetlands

Potential impacts to wetlands falls under the jurisdiction of the DEP. The wetlands boundary information used in the Alternatives Analysis was derived from aerial infrared photography and field checked by the DEP's Wetlands Conservancy Program (WCP).

Based on the MassGIS data, there are several locations in the study area in which one or all of the proposed alignments appears to directly impact wetland areas, the 100' buffer zone, or the 200' riverbank zone.

- **Direct Impact to Freshwater Wetlands:** Alternative 1 would have the least direct impact to wetlands (1,627 SF). Alternative 2 would have the most direct impact (3,056 SF).
- **100' Buffer Area Impacts:** Alternative 3 would have the least impact within the 100' wetland buffer area (26,352 SF). Alternative 2 would have the most impact (32,103 SF).
- **200' Riverbank Impacts:** Each Alternative would have the same impact within the 200' Riverbank area.

Overall, Alternative 1 would have the least impact to wetlands, while Alternative 2 would have the most significant impact to wetlands of the three alternatives considered.

5.2.7 100 Year Floodplain Impacts

The most current National Flood Insurance Program (NFIP) data was used to determine the potential flood hazard for the area of study. The primary risk classifications used are the 1-percent-annual-chance flood event, the 0.2-percent-annual-chance flood event, and areas of minimal flood risk.

Based on the MassGIS database, the study area is not within the 100-year floodplain.

5.2.8 Certified Vernal Pools

The Natural Heritage and Endangered Species Program (NHESP) certifies vernal pools according to the Guidelines for the Certification of Vernal Pool Habitat (MA Division of Fisheries and Wildlife, 2009). Certified vernal pools are protected under the state Water Quality Certification regulations, the state Title 5 regulations, and the Forest Cutting Practices Act regulations, as well as those certified vernal pools that fall under the jurisdiction of the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00).

According to the MassGIS database, there are no certified vernal pools within the project limits; however, the Conservation Restriction recorded January 6, 2004 describes the presence of certified Vernal pools within the 68 acres of land on the school property. Further investigation will be required to confirm the presence and location of suspected certified vernal pools.

5.2.9 NHESP Priority and Estimated Habitat

The NHESP maintains a database of the habitats of State-listed rare species in Massachusetts based on observations documented in the last 25 years. Areas delineated as Priority Habitats include wetlands, uplands and marine habitats. The Estimated Habitats of Rare Species are based on occurrences of rare wetland wildlife observed within the last 25 years and entered into the NHESP database.

Based on the MassGIS database, there are no NHESP Priority and Estimated Habitats within the project limits.

5.2.10 Areas of Critical Environmental Concern

The Secretary of Energy and Environmental Affairs (EEA) has designated places in Massachusetts that receive special recognition because of the quality and significance of their natural and cultural resources. These areas, identified as Areas of Critical Environmental Concern (ACEC), require a stricter environmental review of certain kinds of proposed development administered by the Department of Conservation and Recreation (DCR) on behalf of the EEA.

Based on the MassGIS database, there are no ACEC's identified within the project limits.

5.2.11 National Register Historic Properties and Districts

The historic resources considered in this analysis are those included in the Massachusetts Cultural Resource Information System (MACRIS maintained by the Massachusetts Historical Commission (MHC). These resources include buildings, burial grounds, structures and objects as well as areas and districts recognized by the National Register of Historic Places and local historic and preservationist agencies.

While Segment 2 is in close proximity to several buildings associated with an MHC-identified historic district (Hayden Rowe Streetscape II), no buildings are officially designated. Additionally, the MassGIS database indicates there are no National Register impacts anticipated within our project limits.

5.2.12 Hazardous Materials Sites

The DEP's Bureau of Waste Site Cleanup (BWSC) maintains a database of all reported releases of oil or hazardous material into the environment. The dataset reviewed in this Alternatives Analysis includes confirmed Hazardous Material Sites with Activity and Use Limitation (AUL). The AUL is a legal document that identifies activities and uses of the property that may or may not occur and the owner's obligation and maintenance conditions that must be followed to ensure the safe use of the property.

Based on the MassGIS database, there are no known hazardous materials sites located within our project limits.

5.2.13 Construction Impacts

Construction of the project will result in temporary disruption of vehicle and pedestrian access to the work area. Traffic access to area businesses, residential areas and recreational areas will be maintained throughout construction.

A Traffic Management Plan (TMP) should be developed and included in the construction documents. It is anticipated that appropriate temporary traffic controls will be necessary along SR 85, EMC Field Access Road and the Hopkinton Schools Loop Road for each of the Alternatives using MassDOT approved methods. Access to schools, including safe pedestrian crossings and bus circulation, should be specifically considered in the TMP. The TMP should be coordinated with school officials and emergency response teams (police and fire).

5.2.14 Visual Impacts

Since the project includes little earthwork, does not propose to construct new buildings, and proposes to occupy existing roads, railroad corridor and cleared ROWs where possible, visual impacts are expected to be minimal for each of the three alternatives due to some minor tree and brush clearing.

5.2.15 Public Utilities

Utilities encountered in the project corridor include overhead pole-mounted electric transmission lines along the east side of SR 85. While Alternatives 1 and 2 may impact these overhead lines, there is no significant impact to underground utilities anticipated with the three alternatives proposed.

5.2.16 Public Facilities

Each of the three alternatives will connect the existing Center Trail with the Hopkinton Schools and the EMC Field Complex.

This extension of the Center Trail, which utilizes a former railroad bed with a stone dust path, provides better non-motorized access for residents along the SR 85 corridor into the town center of Hopkinton. It is believed that this public facility will be used for transportation and recreational purposes and will enhance the current use as wildlife habitat and environmental education center.

5.2.17 Environmental Justice

According to the MassGIS database, the project is not located within an area identified as an Environmental Justice Zone.

5.2.18 Construction Cost

Preliminary construction estimates have been calculated based on typical cross sections developed on nine unique trail segments which combine to make the three proposed alternative Upper Charles Trail alignments under consideration. Items include site clearing, excavation for and placement of new pavement structure, curbing, fencing, barrier, loam and seed, signing and striping, traffic signal placement, as well as retaining wall, boardwalk and bridge structures that may be required.

Anticipated cost for each item was researched using the most current available (9/2015-9/2016) MassDOT Weighted Bid Prices, which are based on actual competitive bid pricing on MassDOT construction contracts. Contingencies for Mobilization (3%), Construction (40%), and additional MassDOT Construction (25%) are based on empirical data and are included in the overall preliminary construction estimates.

The Alternative 1 preliminary construction estimate is the lowest (\$1,460,000), while the Alternative 2 preliminary construction estimate is the highest (\$1,600,000).

5.2.19 Maintenance & Operations

Maintenance

Basic maintenance activities include keeping the trail surface free of debris, identifying and correcting surface hazards, keeping signs and pavement markings in good condition and cutting back encroaching vegetation to maintain adequate sight distances on the bikeway and at road crossings. Having a written operations and maintenance plan and an emergency response plan will also enable town officials to determine manpower and budgets needed to implement these plans.

We recommend coordination with the Town Public Safety Officers and the Department of Public Works regarding access and maintenance so that their recommendations can be incorporated into the project design.

Operations

The project vision for this portion of the Bikeway is a continuous facility for non-motorized travel with portions suitable for use by both bicyclists and pedestrians. The alternatives presented comply with accepted industry standards and criteria for an SUP and encourages users to comply with uniform traffic operations and laws. Thus the signs, pavement markings and other amenities are designed to convey that message through the use of common standards of color, shape and graphics as used on typical roadway signs without "over-signing" the natural landscape.

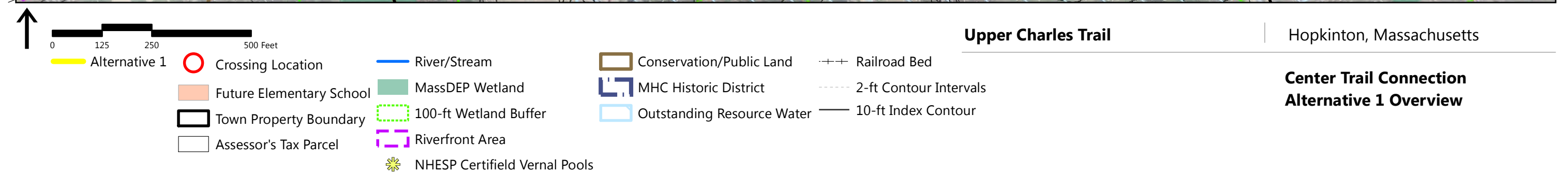
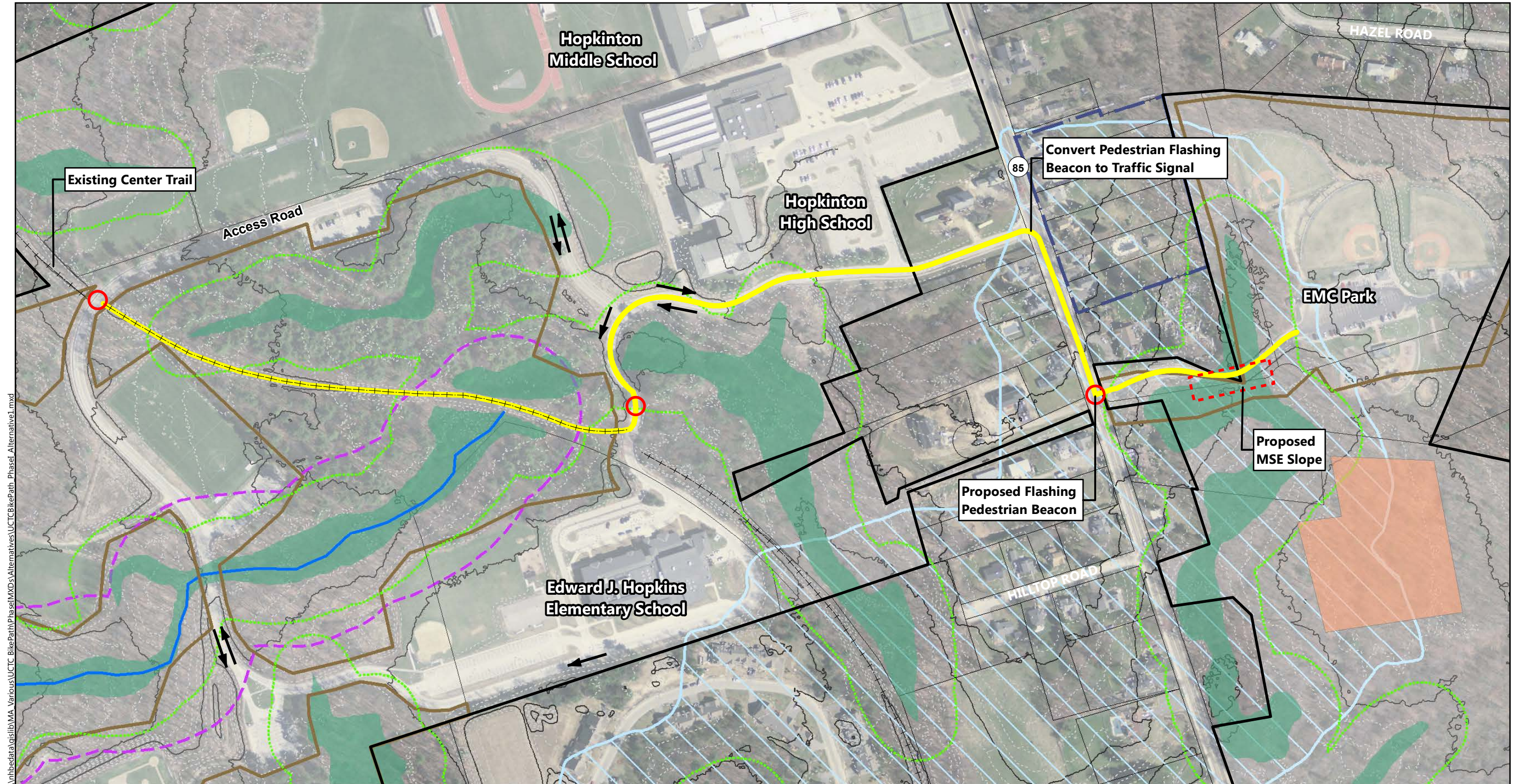
It is recommended that for the off-road SUP sections, "trail use rules" be posted at trail access points, as appropriate.

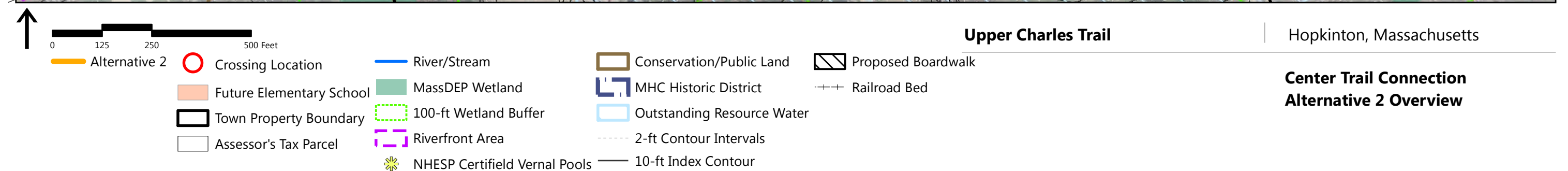
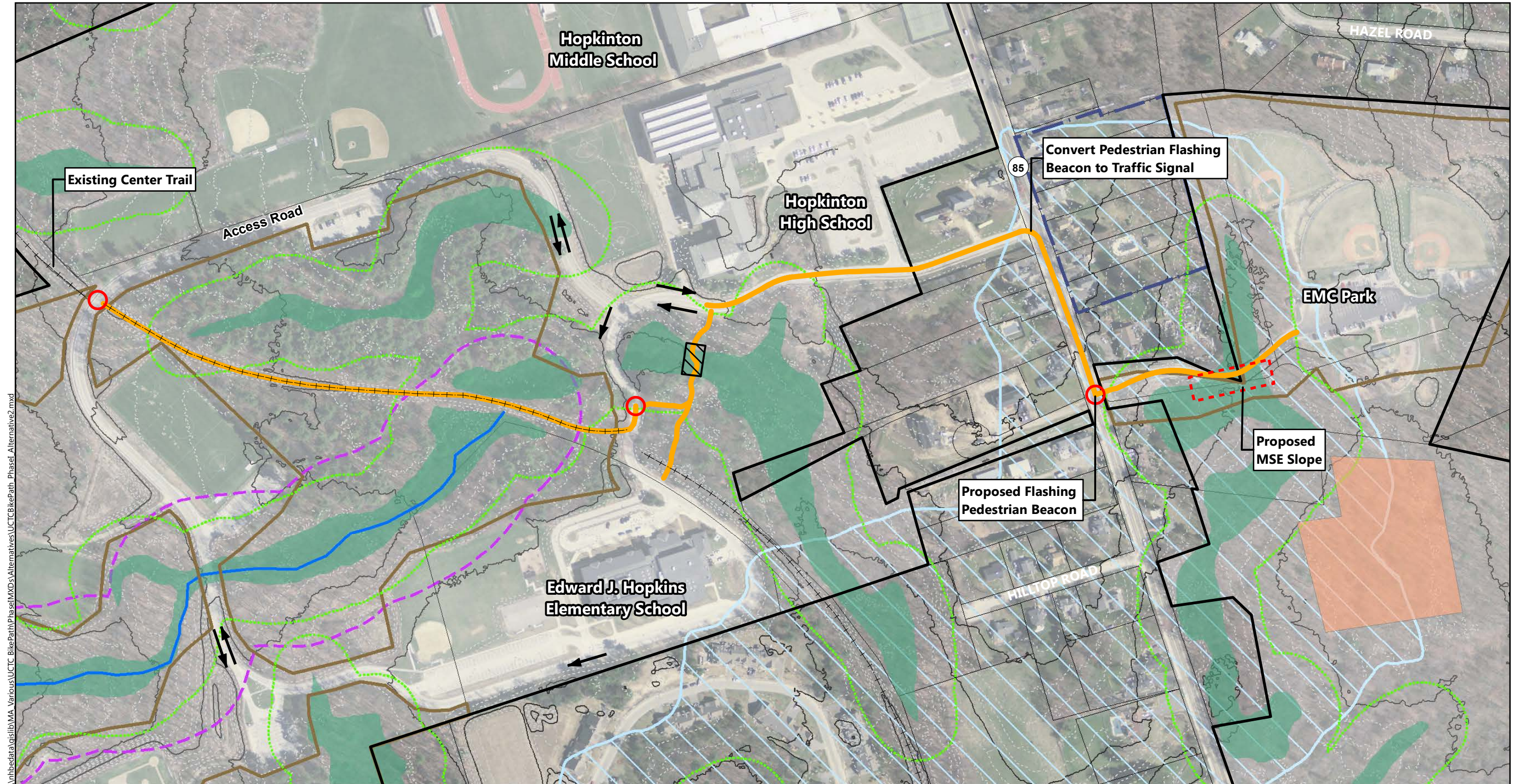
It is recommended that the Town review their existing by-laws as they relate to trails and shared-use facilities to verify if changes or additions are needed.

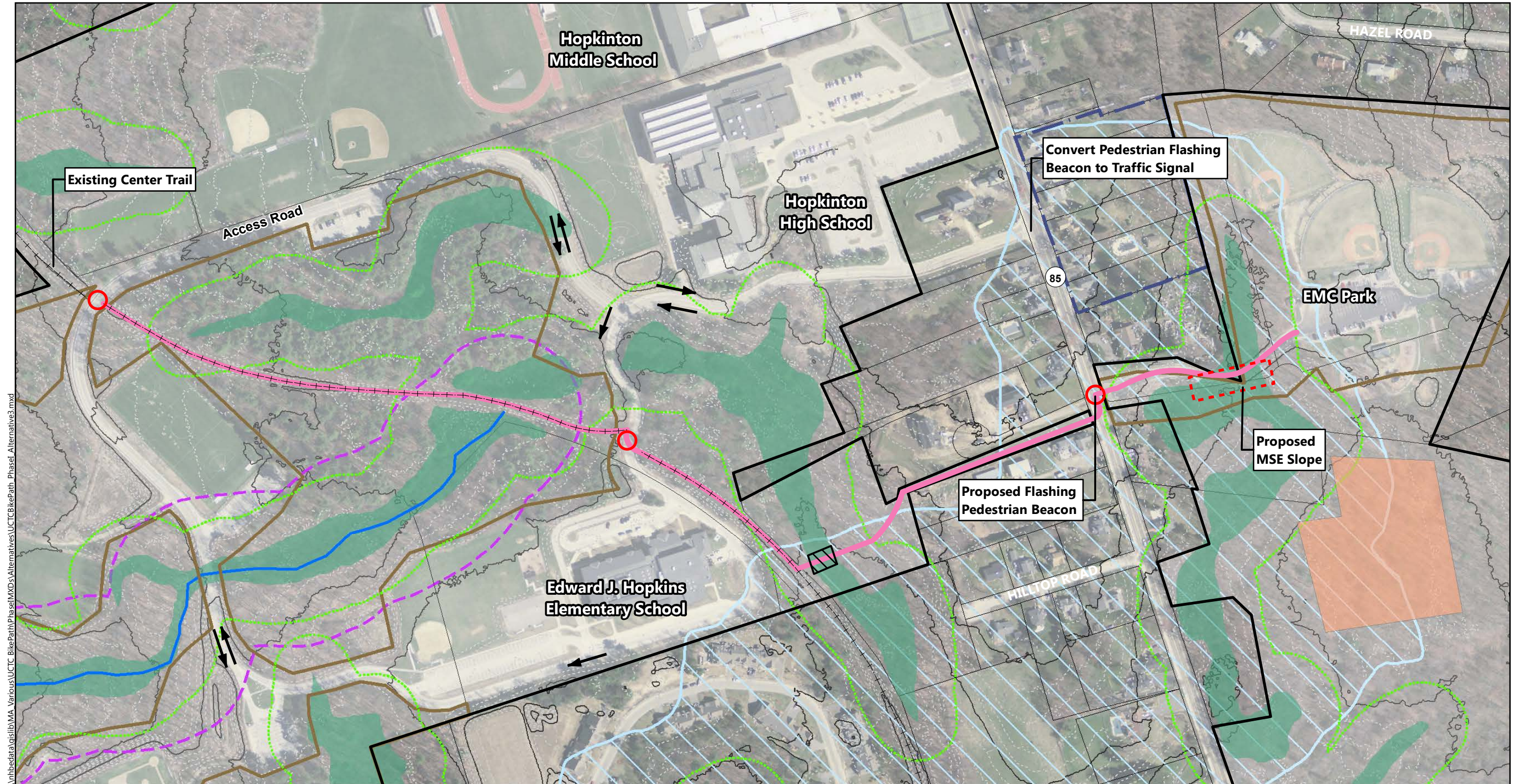
6.1 Conclusion

The three alternative alignments were scored based the favorability of the 19 criteria described above Scoring was based on which alternative was the most effective or had the least impact for each of the criteria. A score of 3 was the most favorable, while a score of 1 was the least favorable. The scores were totaled for each to arrive at the final score to determine the most favorable alternative overall.

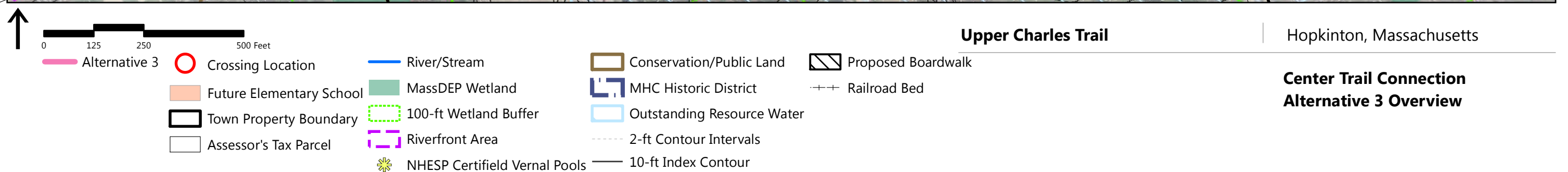
Alternative 3, with a score of 47 points was the most favorable in this analysis, while Alternative 2 was the least favorable with 40 points. Alternative 1 scored 44 points.

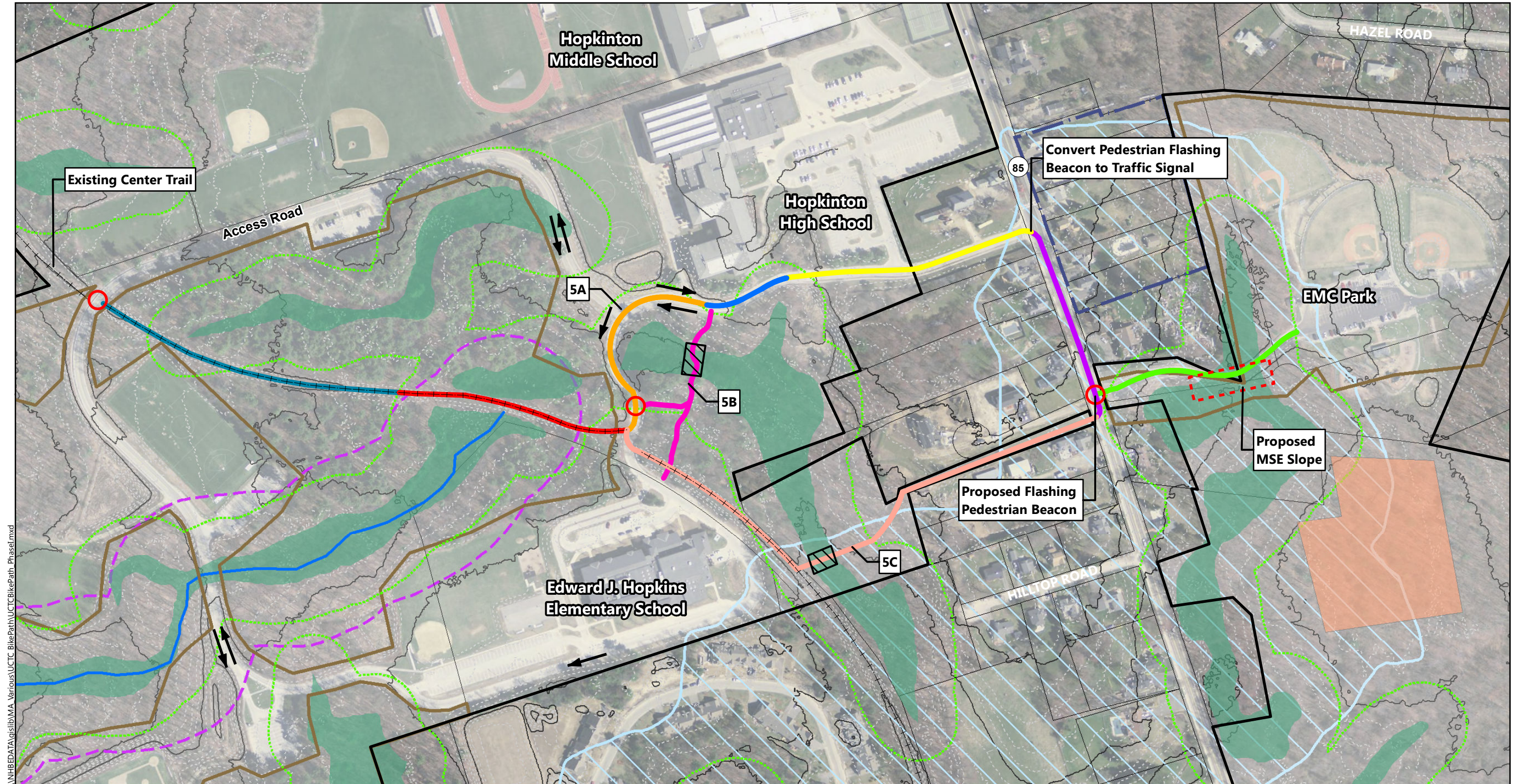






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0 125 250 500 Feet

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|------------|------------|--------------------------|------------------------------|----------------------------|------------------------|
| Segment 1 | Segment 5b | Crossing Location | River/Stream | Conservation/Public Land | Proposed Boardwalk |
| Segment 2 | Segment 5c | Future Elementary School | MassDEP Wetland | MHC Historic District | Railroad Bed |
| Segment 3 | Segment 6 | Town Property Boundary | 100-ft Wetland Buffer | Outstanding Resource Water | 2-ft Contour Intervals |
| Segment 4 | Segment 7 | Assessor's Tax Parcel | Riverfront Area | 10-ft Index Contour | |
| Segment 5a | | | NHESP Certified Vernal Pools | | |

Upper Charles Trail

Hopkinton, Massachusetts

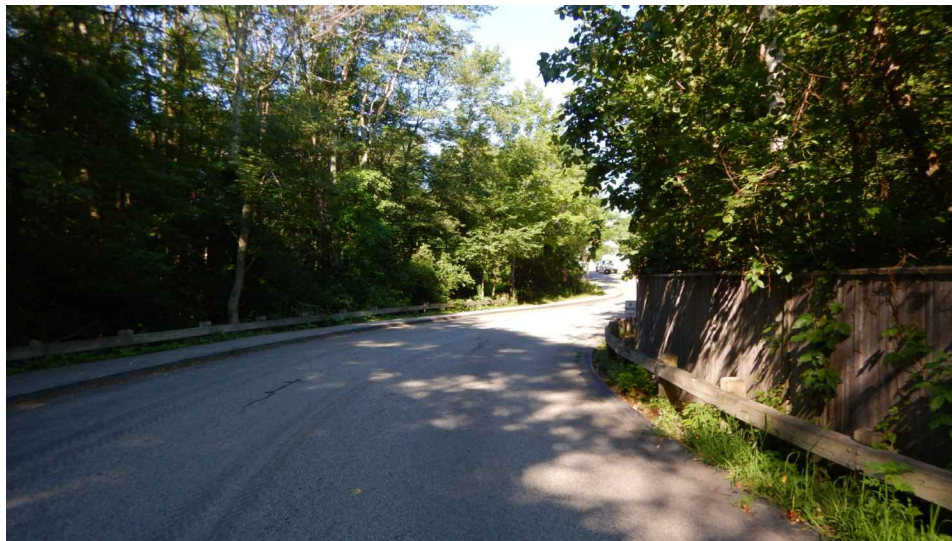
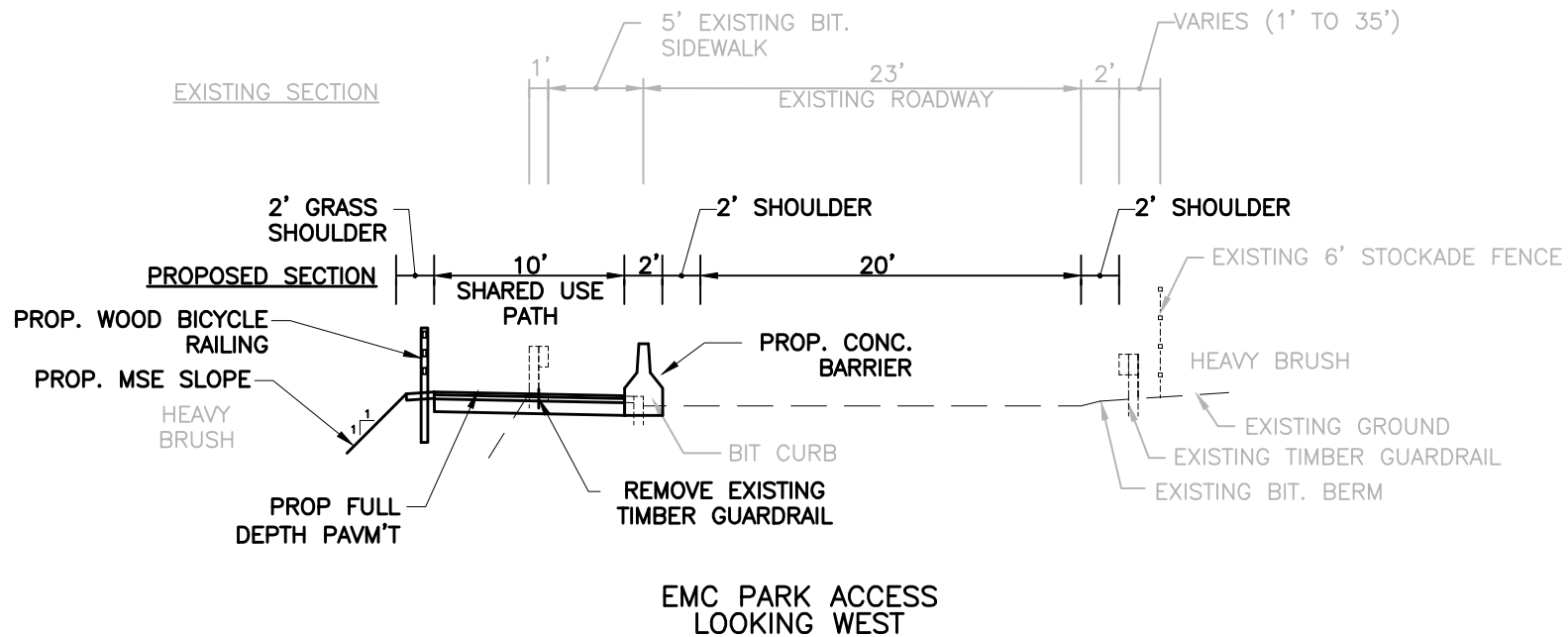
**Center Trail Connection
Typical Section Overview**

Alternatives Ranking Matrix

#	Impact Criteria	Alternative 1 (Segments 1,2,3,4,5a,6,7)	Rank ¹	Alternative 2 (Segments 1,2,3,4,5b,6,7)	Rank ¹	Alternative 3 (Segments 1,5c,6,7)	Rank
1.	Relocation Impacts and ROW Acquisition	May Require minor acquisitions.	2	May Require minor acquisitions	2	May Require minor aquisitions.	3
2.	Considerations Relating to Pedestrians and Bicyclists	Improved accommodations for recreation and transportation connecting the existing Center Trail with schools and EMC Field. This alternative has the most length of path adjacent to a roadway.	1	Improved accommodations for recreation and transportation connecting the existing Center Trail with schools and EMC Field. This alternative has some length of path adjacent to a roadway.	2	Improved accommodations for recreation and transportation connecting the existing Center Trail with schools and EMC Field. This alternative has the least length of path adjacent to a roadway.	3
3.	Air Quality Impacts	Temporary minor impacts during construction	2	Temporary minor impacts during construction	2	Temporary minor impacts during construction	2
4.	Noise Impacts	Temporary minor impacts during construction	2	Temporary minor impacts during construction	2	Temporary minor impacts during construction	2
5.	Outstanding Resource Water (ORW) Impacts	Segments 1 and 3 may impact ORW.	2	Segments 1 and 3 may impact ORW.	2	Segments 1 and 5C may impact ORW.	1
6.	Wetlands	Yes, the off-road bikeway would alter Freshwater Wetlands, 100-Foot Riverbank Wetland and Perimeter Wetland located along its route.	3	Yes, the off-road bikeway would alter Freshwater Wetlands, Perimeter Wetland and 100-Foot Riverbank Wetland and likely alter Palustrine	1	Yes, the off-road bikeway would alter Perimeter Wetland and 100-Foot Riverbank Wetland and likely alter Palustrine Wetland, located along	2
		1,627 SF Direct Impacts		3,056 SF Direct Impacts		2,207 SF Direct Impacts	
		27,654 SF 100' Buffer Area Impacts		32,103 SF 100' Buffer Area Impacts		26,352 SF 100' Buffer Area Impacts	
7.	Floodplain Impacts	8,995 SF 200' Riverbank Impacts	2	8,995 SF 200' Riverbank Impacts	2	8,995 SF 200' Riverbank Impacts	2
		Project limits are not in floodplain.	2	Project limits are not in floodplain.	2	Project limits are not in floodplain.	2
		There may or may not be certified vernal pools within the project limits.	2	There may or may not be certified vernal pools within the project limits.	2	There may or may not be certified vernal pools within the project limits.	2
8.	Certified Vernal Pools	There are no Priority Habitats within the project limits.	2	There are no Priority Habitats within the project limits.	2	There are no Priority Habitats within the project limits.	2
9.	Threatened or Endangered Species (NHESP)	There are no ACEC's within the project limits.	2	There are no ACEC's within the project limits.	2	There are no ACEC's within the project limits.	2
10.	Areas of Critical Environmental Concern (ACEC)	Insignificant impact ²	2	Insignificant impact ²	2	Insignificant impact ²	2
11.	National Register Districts	There are no Hazardous Materials Sites within our project limits.	2	There are no Hazardous Materials Sites within our project limits.	2	There are no Hazardous Materials Sites within our project limits.	2
12.	Hazardous Waste Sites	Temporary. Minor traffic control on Hayden Rowe (SR85), EMC Field Road and Loop Road.	2	Temporary. Minor traffic control on Hayden Rowe (SR85), EMC Field Road and Loop Road.	2	Temporary. Minor traffic control on EMC Field Road and Loop Road.	3
13.	Construction Impacts	Minor impacts due to some clearing and vegetation removal.	2	Minor impacts due to some clearing and vegetation removal.	2	Minor impacts due to some clearing and vegetation removal.	2
14.	Visual Impacts	May impact existing overhead utilities on Segment 2.	2	May impact existing overhead utilities on Segment 2.	2	There are no utility impacts anticipated.	3
15.	Public Utilities	Connects Hopkinton H.S. and Elementary School to Center Trail and EMC Field	3	Connects Hopkinton H.S. and Elementary School to Center Trail and EMC Field	3	Connects Hopkinton H.S. and Elementary School to Center Trail and EMC Field	3
16.	Public Facilities Connections	There are no Environmental Justice areas within our project limits.	2	There are no Environmental Justice areas within our project limits.	2	There are no Environmental Justice areas within our project limits.	2
17.	Environmental Justice	\$1,460,000	3	\$1,600,000	1	\$1,560,000	2
18.	Construction Cost	Recommend a written operations and maintenance plan and an emergency response plan.	2	Recommend a written operations and maintenance plan and an emergency response plan.	2	Recommend a written operations and maintenance plan and an emergency response plan.	2
19.	Operations and Maintenance	Final Score	44		40		47
Final Ranking		2		1		3	

¹ 3=Most Preferred, 1=Least Preferred

² Segment 2 is in close proximity to several buildings associated with a MHC identified historic district (Hayden Rowe Streetscape II), but no buildings are designated.



EXISTING SECTION
EMC PARK ACCESS
LOOKING WEST

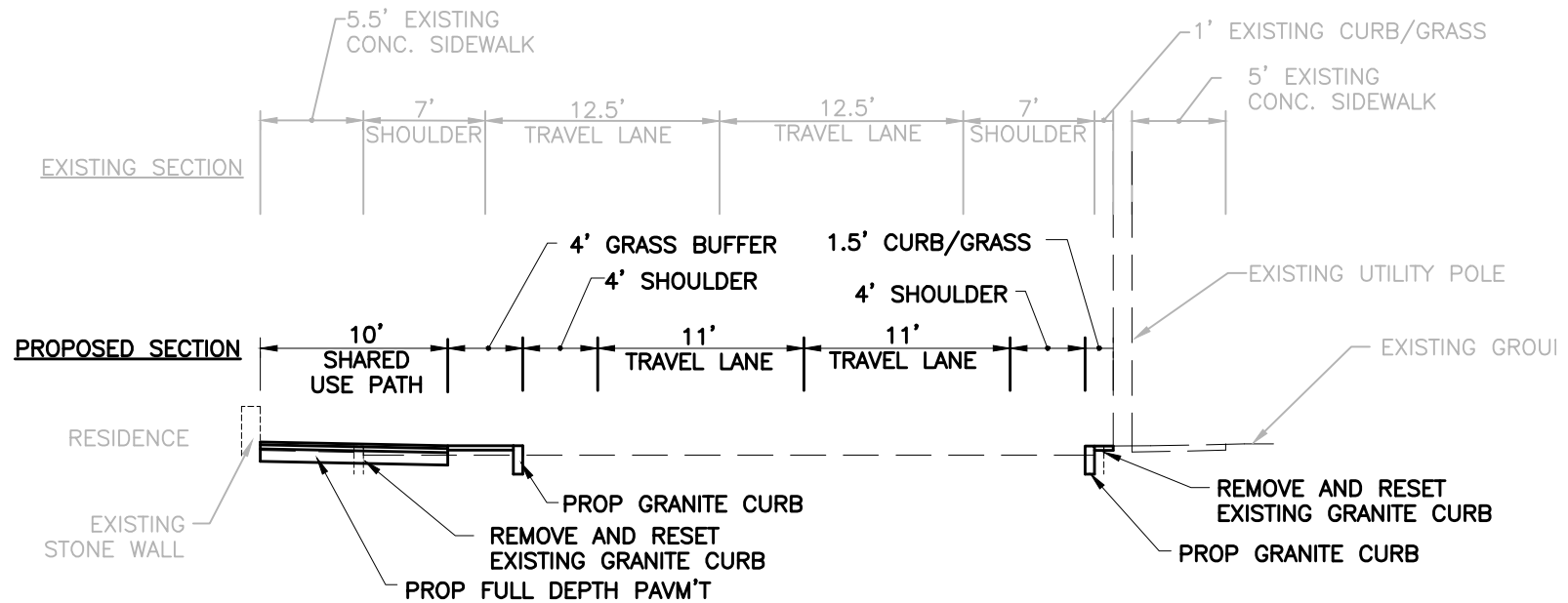
PAVEMENT NOTES:

PROPOSED FULL DEPTH PAVEMENT

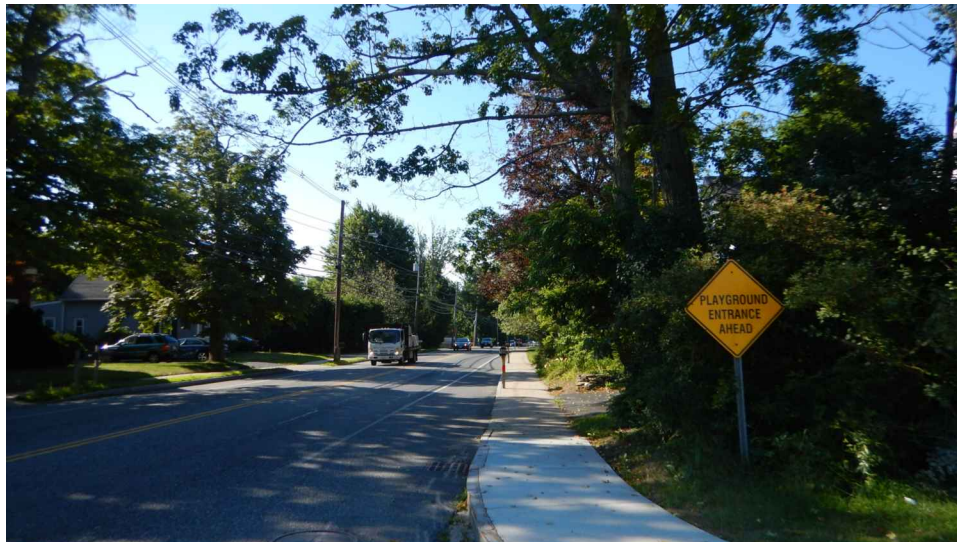
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COURSE 12.5 (SSC-12.5) OVER
2-1/4" SUPERPAVE INTERMEDIATE
COURSE 19.0 (SIC-19.0) OVER

SUBBASE: 8" GRAVEL BORROW, TYPE b





ROUTE 85
LOOKING NORTH



EXISTING SECTION
ROUTE 85
LOOKING SOUTH

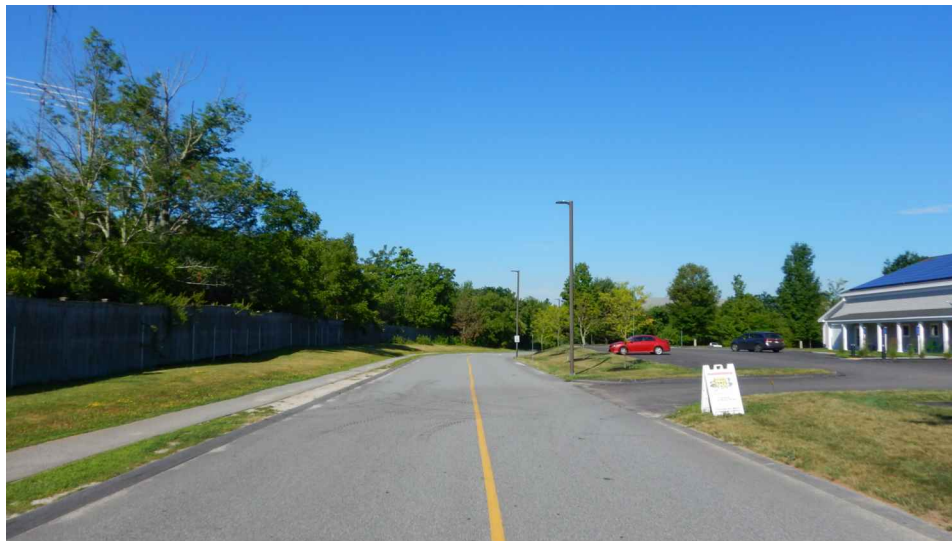
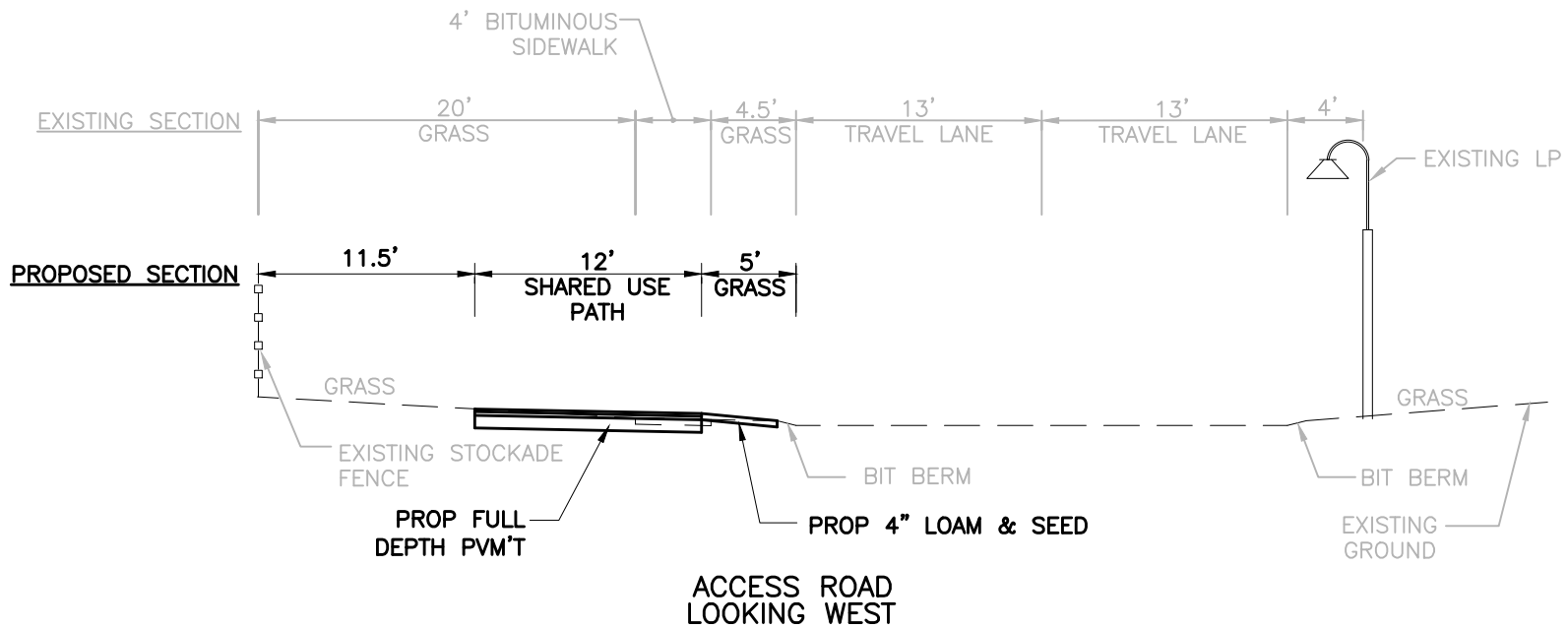
PAVEMENT NOTES:

PROPOSED FULL DEPTH PAVEMENT

SURFACE: 1-3/4" SUPERPAVE SURFACE
COURSE 12.5 (SSC-12.5) OVER
2-1/4" SUPERPAVE INTERMEDIATE
COURSE 19.0 (SIC-19.0) OVER

SUBBASE: 8" GRAVEL BORROW, TYPE b





EXISTING SECTION
HOPKINS SCHOOL ACCESS ROAD
LOOKING WEST

PAVEMENT NOTES:

PROPOSED FULL DEPTH PAVEMENT

SURFACE: 1-3/4" SUPERPAVE SURFACE
COURSE 12.5 (SSC-12.5) OVER
2-1/4" SUPERPAVE INTERMEDIATE
COURSE 19.0 (SIC-19.0) OVER

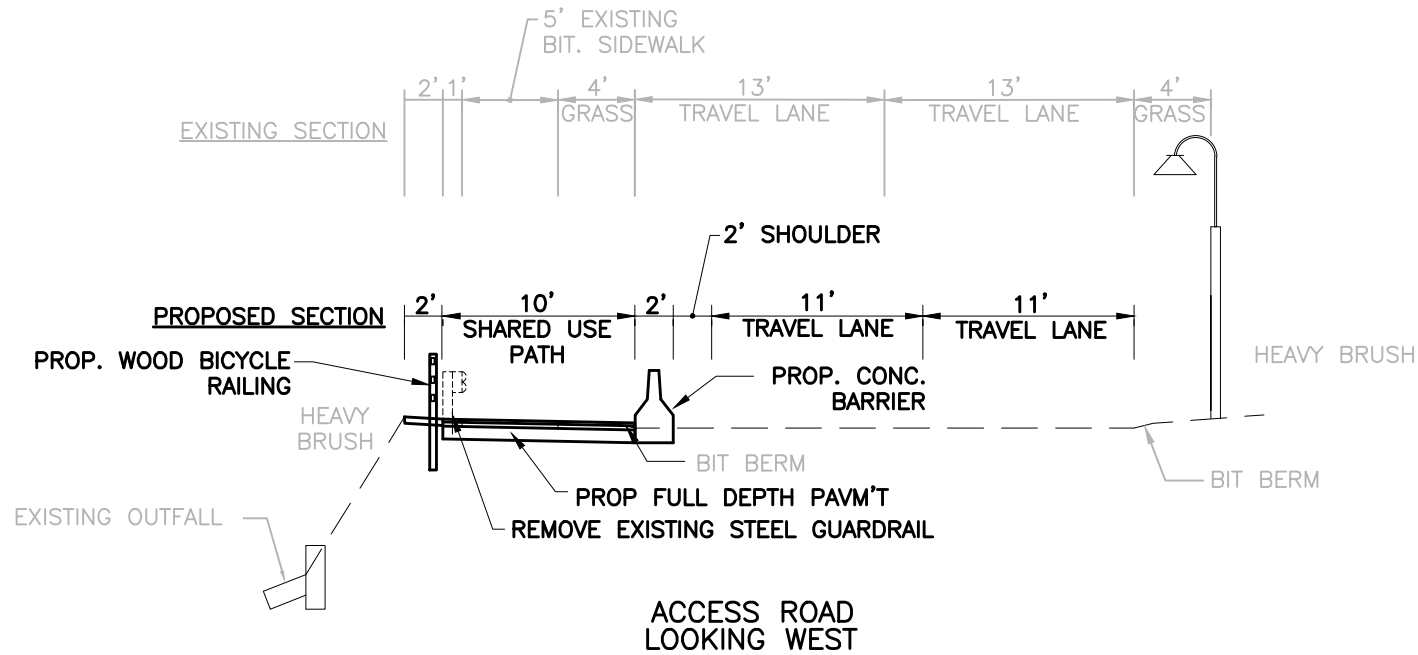
SUBBASE: 8" GRAVEL BORROW, TYPE b



Typical Section
Upper Charles River Trail
Town of Hopkinton, MA

Segment No. 3

8/29/2016



EXISTING SECTION
HOPKINS SCHOOL ACCESS ROAD
LOOKING WEST

PAVEMENT NOTES:

PROPOSED FULL DEPTH PAVEMENT

SURFACE: 1-3/4" SUPERPAVE SURFACE
COURSE 12.5 (SSC-12.5) OVER
2-1/4" SUPERPAVE INTERMEDIATE
COURSE 19.0 (SIC-19.0) OVER

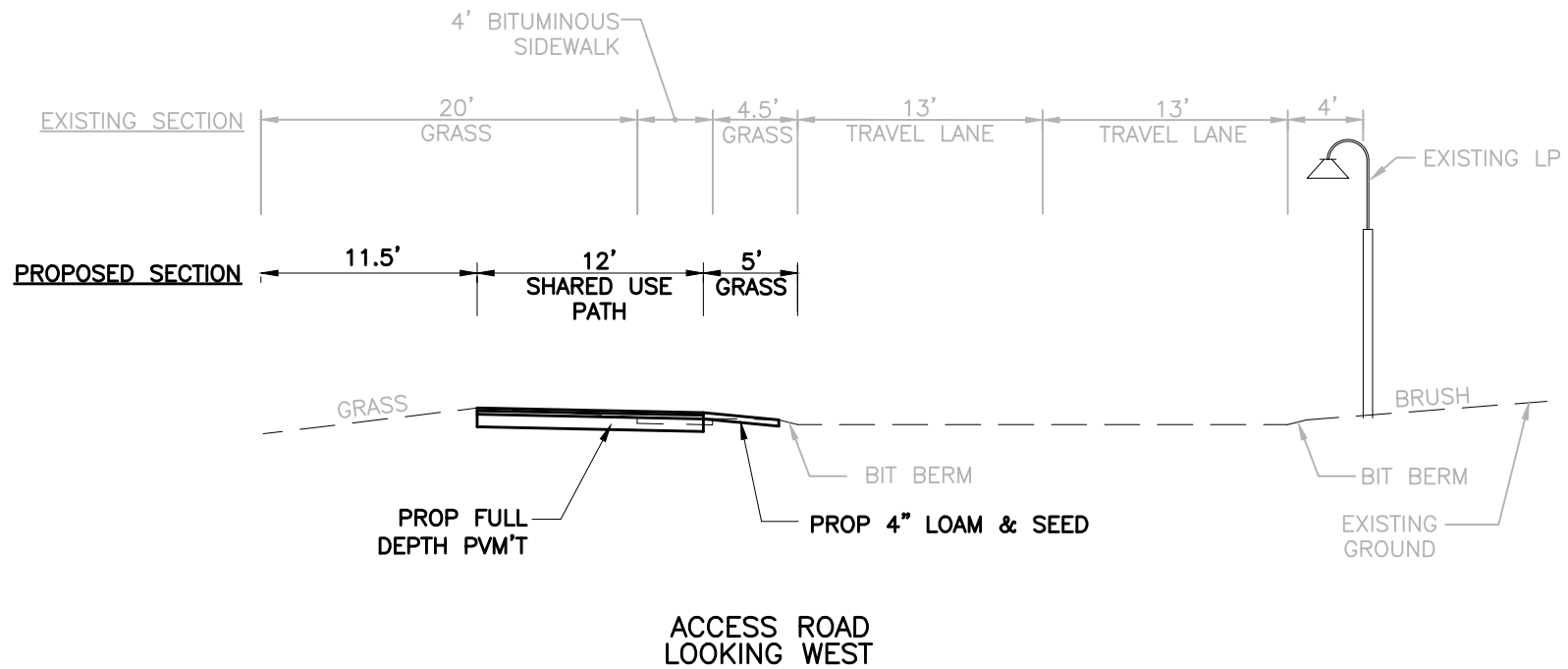
SUBBASE: 8" GRAVEL BORROW, TYPE b



Typical Section
Upper Charles River Trail
Town of Hopkinton, MA

Segment No. 4

8/29/2016



EXISTING SECTION
ACCESS ROAD
LOOKING WEST

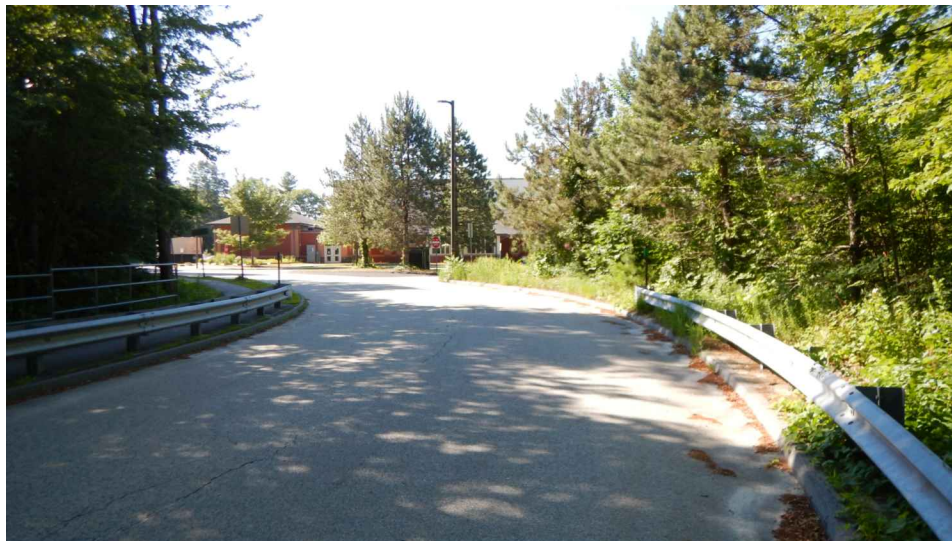
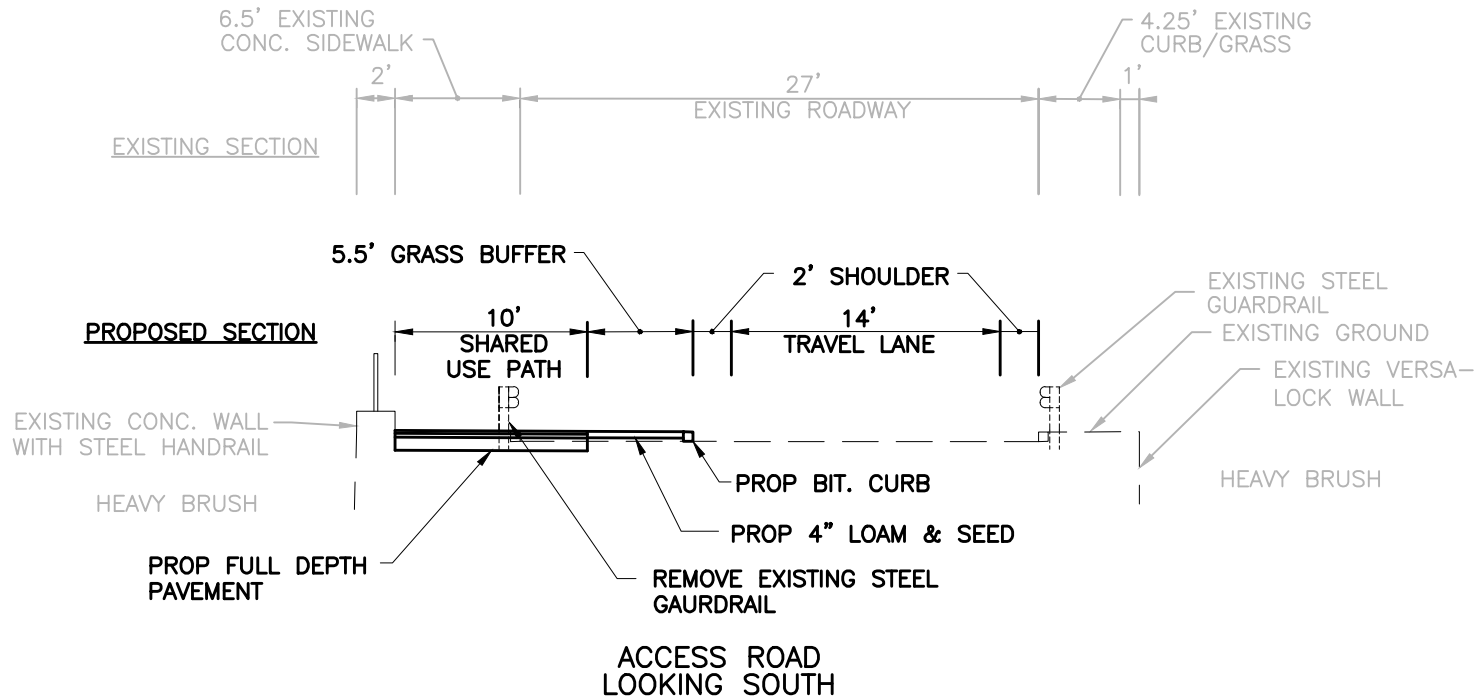
PAVEMENT NOTES:

PROPOSED FULL DEPTH PAVEMENT

SURFACE: 1-3/4" SUPERPAVE SURFACE
COURSE 12.5 (SSC-12.5) OVER
2-1/4" SUPERPAVE INTERMEDIATE
COURSE 19.0 (SIC-19.0) OVER

SUBBASE: 8" GRAVEL BORROW, TYPE b





EXISTING SECTION
ACCESS ROAD
LOOKING SOUTH

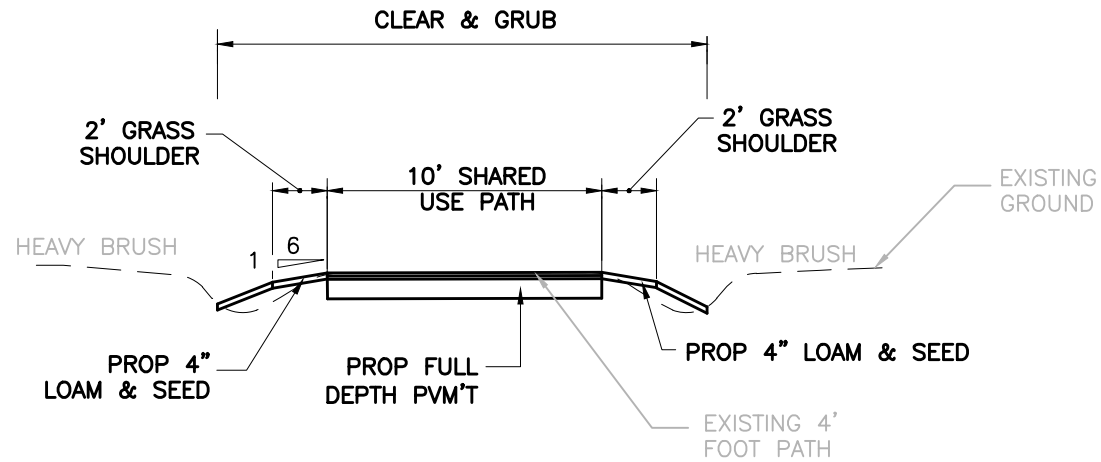
PAVEMENT NOTES:

PROPOSED FULL DEPTH PAVEMENT

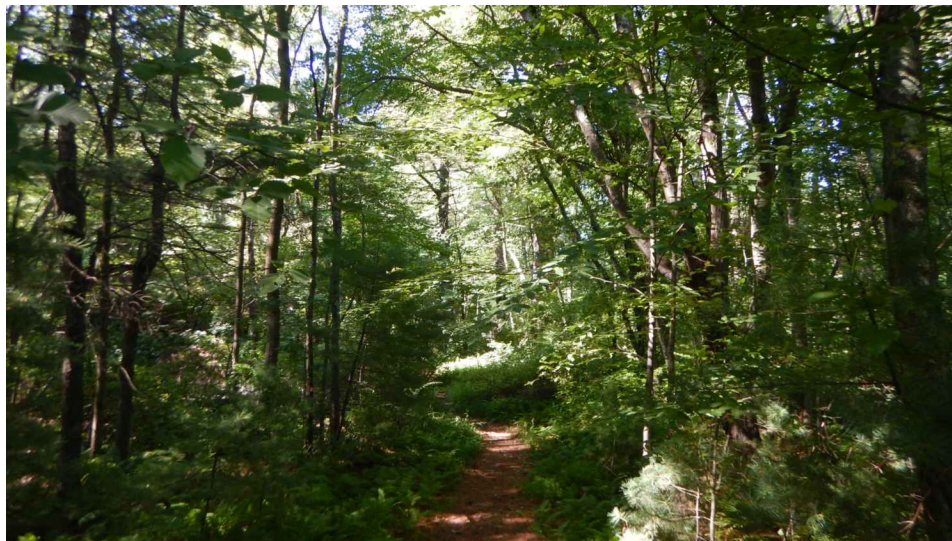
SURFACE: 1-3/4" SUPERPAVE SURFACE
COURSE 12.5 (SSC-12.5) OVER
2-1/4" SUPERPAVE INTERMEDIATE
COURSE 19.0 (SIC-19.0) OVER

SUBBASE: 8" GRAVEL BORROW, TYPE b





RAIL TO TRAIL
LOOKING WEST



EXISTING SECTION
ON FOOTPATH
LOOKING SOUTH

PAVEMENT NOTES:

PROPOSED FULL DEPTH PAVEMENT

SURFACE: 1-3/4" SUPERPAVE SURFACE
COURSE 12.5 (SSC-12.5) OVER
2-1/4" SUPERPAVE INTERMEDIATE
COURSE 19.0 (SIC-19.0) OVER

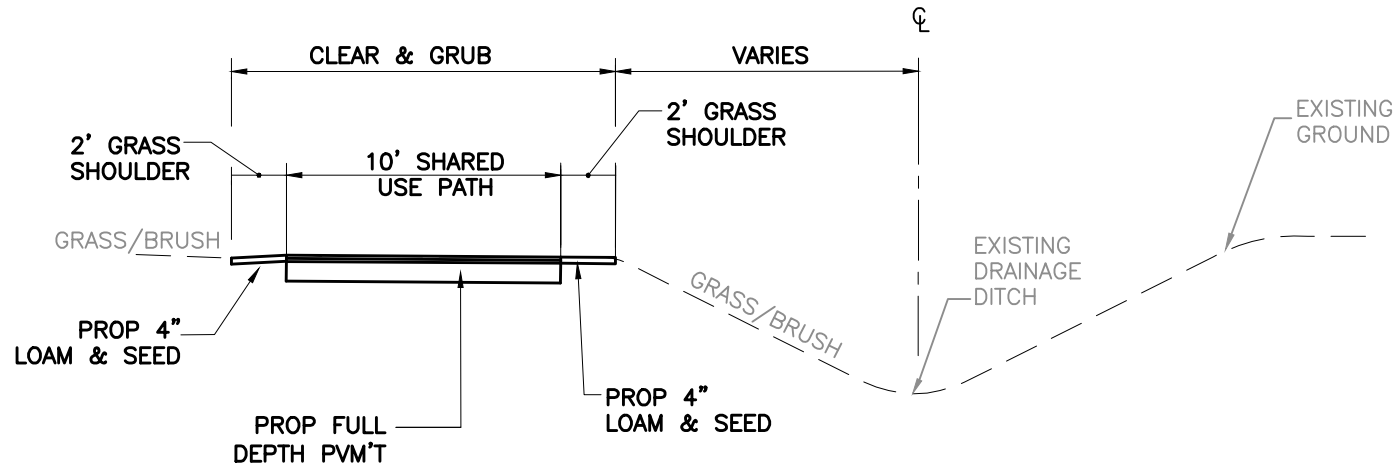
SUBBASE: 8" GRAVEL BORROW, TYPE b



Typical Section
Upper Charles River Trail
Town of Hopkinton, MA

Segment No. 5B

8/29/2016



SHARED USE PATH
LOOKING WEST



EXISTING SECTION
ON ROUTE 85
LOOKING WEST

PAVEMENT NOTES:

PROPOSED FULL DEPTH PAVEMENT

SURFACE: 1-3/4" SUPERPAVE SURFACE
COURSE 12.5 (SSC-12.5) OVER
2-1/4" SUPERPAVE INTERMEDIATE
COURSE 19.0 (SIC-19.0) OVER

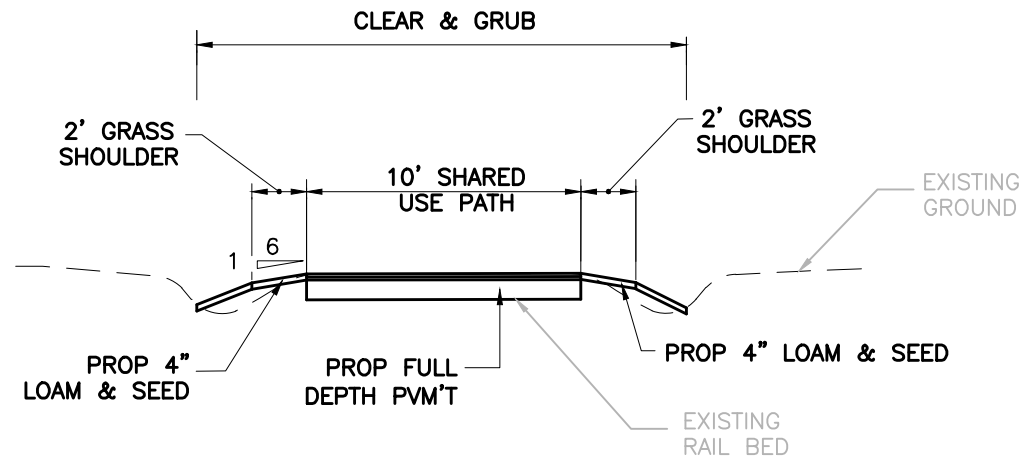
SUBBASE: 8" GRAVEL BORROW, TYPE b



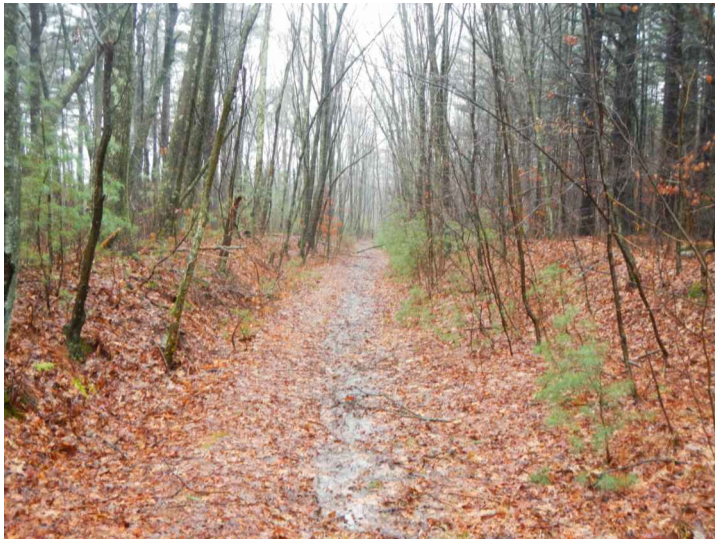
Typical Section
Upper Charles River Trail
Town of Hopkinton, MA

Segment No. 5C

8/31/2016



RAIL TO TRAIL
LOOKING WEST



EXISTING SECTION
ON RAIL BED
LOOKING NORTH

PAVEMENT NOTES:

PROPOSED FULL DEPTH PAVEMENT

SURFACE: 1-3/4" SUPERPAVE SURFACE
COURSE 12.5 (SSC-12.5) OVER
2-1/4" SUPERPAVE INTERMEDIATE
COURSE 19.0 (SIC-19.0) OVER

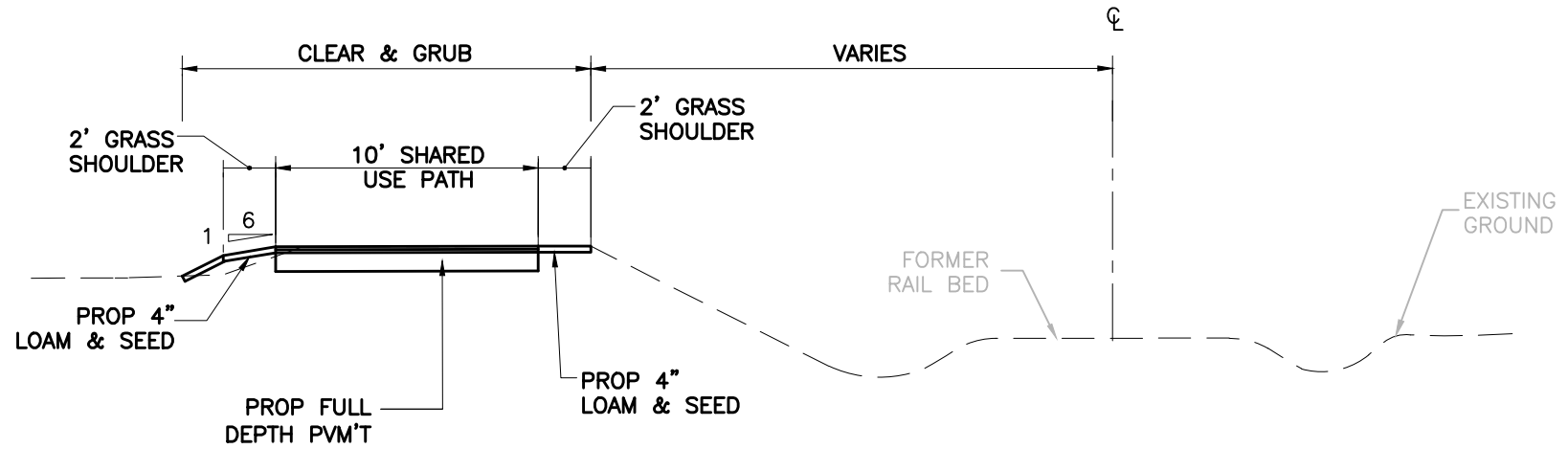
SUBBASE: 8" GRAVEL BORROW, TYPE b



Typical Section
Upper Charles River Trail
Town of Hopkinton, MA

Segment No. 6

8/29/2016



RAIL TO TRAIL — PATH OFFSET
LOOKING WEST



EXISTING SECTION
ADJACENT TO RAIL BED
LOOKING NORTH

PAVEMENT NOTES:

PROPOSED FULL DEPTH PAVEMENT

SURFACE: 1-3/4" SUPERPAVE SURFACE
COURSE 12.5 (SSC-12.5) OVER
2-1/4" SUPERPAVE INTERMEDIATE
COURSE 19.0 (SIC-19.0) OVER

SUBBASE: 8" GRAVEL BORROW, TYPE b



Typical Section
Upper Charles River Trail
Town of Hopkinton, MA

Segment No. 7

8/29/2016



1 Cedar Street
Suite 400
Providence
Rhode Island 02903
401-272-8100

* Prices Based on Weighted Average Bid Prices (August 2016)
Upper Charles River Trail Phase I
Hopkinton, Massachusetts
September 14, 2016

<u>Total Construction Cost Alternative 1</u>		<u>Total Cost</u>
Segment 1	590 LF	\$510,000.00
Segment 2	525 LF	\$180,000.00
Segment 3	550 LF	\$170,000.00
Segment 4	225 LF	\$120,000.00
Segment 5A	580 LF	\$160,000.00
Segment 6	600 LF	\$150,000.00
Segment 7	825 LF	\$170,000.00
	<hr/> 3895 LF	
	Construction Total	\$1,460,000.00
	SAY*:	\$1,460,000.00

<u>Total Construction Cost Alternative 2</u>		<u>Total Cost</u>
Segment 1	590 LF	\$510,000.00
Segment 2	525 LF	\$180,000.00
Segment 3	550 LF	\$170,000.00
Segment 4	225 LF	\$120,000.00
Segment 5B	600 LF	\$300,000.00
Segment 6	600 LF	\$150,000.00
Segment 7	825 LF	\$170,000.00
	<hr/> 3915 LF	
	Construction Total	\$1,600,000.00
	SAY*:	\$1,600,000.00

<u>Total Construction Cost Alternative 3</u>		<u>Total Cost</u>
Segment 1	590	\$510,000.00
Segment 5C	1700	\$730,000.00
Segment 6	600	\$150,000.00
Segment 7	825	\$170,000.00
	<hr/> 3715 LF	
	Construction Total	\$1,560,000.00
	SAY*:	\$1,560,000.00

*Estimate is for comparison purposes only. Estimate does not include costs of design, permitting, ROW acquisition, utility work, lighting improvements.
Estimate does include contingency allowances for Mobilization (3%), Construction (40%), and MassDOT (25%)



1 Cedar Street
Suite 400
Providence
Rhode Island 02903
401-272-8100

* Prices Based on Weighted Average Bid Prices (August 2016)

Upper Charles River Trail
Segment 1 (590 LF +/-)
Hopkinton, Massachusetts
September 14, 2016

<u>Description</u>	<u>Unit Price</u>	<u>Quantity</u>	<u>Total Cost</u>
Full Depth Pavement - Bikeway (Including Excavation)	\$60.00 /SY	660 SY	\$39,600.00
Precast Concrete Barrier	\$106.00 /FT	590 FT	\$62,540.00
MSE Slope (6'H X 300 LF)	\$60.00 /SF	1,800 SF	\$108,000.00
Loam Borrow & Seed	\$8.00 /SY	500 SY	\$4,000.00
Signing, Striping & Pavement Markings	\$3,100.00 /LS	1 LS	\$3,100.00
At-Grade Crossing & HAWK Pedestrian Signal	\$40,000.00 /LS	1 LS	\$40,000.00
Clearing and Grubbing	\$5.00 /SY	700 SY	\$3,500.00
Split-Rail Bicycle Railing	\$50.00 /FT	590 FT	\$29,500.00
Erosion Control Barrier	\$7.50 /FT	750 FT	\$5,625.00
Police	\$500.00 /DAY	15 DAY	\$7,500.00

SUBTOTAL:	\$303,365.00
Mobilization @ 3%	\$9,100.95
Contingency (40%)	\$121,346.00
MassDOT Construction Contingency (25%)	\$75,841.25

Construction Total \$509,653.20

SAY: \$510,000.00



1 Cedar Street
Suite 400
Providence
Rhode Island 02903
401-272-8100

* Prices Based on Weighted Average Bid Prices (August 2016)
Upper Charles River Trail
Segment 2 (525LF +/-)
Hopkinton, Massachusetts
September 14, 2016

<u>Description</u>	<u>Unit Price</u>	<u>Quantity</u>	<u>Total Cost</u>
Full Depth Pavement - Bikeway (Including Excavation)	\$60.00 /SY	525 SY	\$31,500.00
Remove and Reset Granite Curb	\$24.00 /FT	1,050 LF	\$25,200.00
Loam Borrow & Seed	\$8.00 /SY	300 SY	\$2,400.00
Signing, Striping & Pavement Markings	\$4,500.00 /LS	1 LS	\$4,500.00
Drainage Modifications/Improvements	\$27,000.00 /LS	1 LS	\$27,000.00
Erosion Control Barrier	\$7.50 /FT	1,000 FT	\$7,500.00
Police	\$500.00 /DAY	15 DAY	\$7,500.00
SUBTOTAL:			\$105,600.00
Mobilization @ 3%			\$3,168.00
Contingency (40%)			\$42,240.00
MassDOT Construction Contingency (25%)			\$26,400.00
Construction Total			\$177,408.00
SAY:			\$180,000.00



1 Cedar Street
Suite 400
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401-272-8100

* Prices Based on Weighted Average Bid Prices (August 2016)

Upper Charles River Trail
Segment 3 (550 LF+/-)
Hopkinton, Massachusetts
September 14, 2016

<u>Description</u>	<u>Unit Price</u>	<u>Quantity</u>	<u>Total Cost</u>
Full Depth Pavement - Bikeway (Including Excavation)	\$60.00 /SY	740 SY	\$44,400.00
Loam Borrow & Seed	\$8.00 /SY	400 SY	\$3,200.00
Signing, Striping & Pavement Markings	\$2,100.00 /LS	1 LS	\$2,100.00
Retaining Wall (3'H X 25OLF)	\$40.00 /SF	750 SF	\$30,000.00
Erosion Control Barrier	\$7.50 /FT	1,100 FT	\$8,250.00
Police	\$500.00 /DAY	15 DAY	\$7,500.00
SUBTOTAL:			\$95,450.00
Mobilization @ 3%			\$2,863.50
Contingency (40%)			\$38,180.00
MassDOT Construction Contingency (25%)			\$23,862.50
Construction Total			\$160,356.00

SAY:	\$170,000.00
------	--------------



1 Cedar Street
Suite 400
Providence
Rhode Island 02903
401-272-8100

* Prices Based on Weighted Average Bid Prices (August 2016)

Upper Charles River Trail
Segment 4 (225 LF+/-)
Hopkinton, Massachusetts
September 14, 2016

<u>Description</u>	<u>Unit Price</u>	<u>Quantity</u>	<u>Total Cost</u>
Full Depth Pavement - Bikeway (Including Excavation)	\$60.00 /SY	250 SY	\$15,000.00
Precast Concrete Barrier	\$106.00 /FT	225 FT	\$23,850.00
Signing, Striping & Pavement Markings	\$2,900.00 /LS	1 LS	\$2,900.00
Clearing and Grubbing	\$5.00 /SY	125 SY	\$625.00
Remove and Dispose Guardrail	\$3.00 /FT	225 FT	\$675.00
Split-Rail Bicycle Railing	\$50.00 /FT	225 FT	\$11,250.00
Erosion Control Barrier	\$7.50 /FT	500 FT	\$3,750.00
Police	\$500.00 /DAY	15 DAY	\$7,500.00
SUBTOTAL:			\$65,550.00
Mobilization @ 3%			\$1,966.50
Contingency (40%)			\$26,220.00
MassDOT Construction Contingency (25%)			\$16,387.50
Construction Total			\$110,124.00
SAY:			\$120,000.00



1 Cedar Street
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Rhode Island 02903
401-272-8100

* Prices Based on Weighted Average Bid Prices (August 2016)

Upper Charles River Trail
Segment 5A (580 LF +/-)
Hopkinton, Massachusetts
September 14, 2016

<u>Description</u>	<u>Unit Price</u>	<u>Quantity</u>	<u>Total Cost</u>
Segment 5A -1 (300' +/-)			
Full Depth Pavement - Bikeway (Includes Excavation)	\$60.00 /SY	335 SY	\$20,100.00
Loam Borrow & Seed	\$8.00 /SY	175 SY	\$1,400.00
Signing, Striping & Pavement Markings	\$800.00 /LS	1 LS	\$800.00
Erosion Control Barrier	\$7.50 /FT	300 FT	\$2,250.00
Police	\$500.00 /DAY	15 DAY	\$7,500.00
Segment 5A -2 (280' +/-)			
Full Depth Pavement - Bikeway (Includes Excavation)	\$60.00 /SY	325 SY	\$19,500.00
Bituminous Curbing	\$15.00	300 LF	\$4,500.00
Loam Borrow & Seed	\$8.00 /SY	172 SY	\$1,376.00
Signing, Striping & Pavement Markings	\$1,800.00 /LS	1 LS	\$1,800.00
Drainage Modifications/Improvements	\$24,000.00 /LS	1 LS	\$24,000.00
Erosion Control Barrier	\$7.50 /FT	300 FT	\$2,250.00
Police	\$500.00 /DAY	15 DAY	\$7,500.00
SUBTOTAL:			\$92,976.00
Mobilization @ 3%			\$2,789.28
Contingency (40%)			\$37,190.40
MassDOT Construction Contingency (25%)			\$23,244.00

Construction Total \$156,199.68

SAY: \$160,000.00



1 Cedar Street
Suite 400
Providence
Rhode Island 02903
401-272-8100

* Prices Based on Weighted Average Bid Prices (August 2016)

Upper Charles River Trail
Segment 5B (600 LF+/-)
Hopkinton, Massachusetts
September 14, 2016

<u>Description</u>	<u>Unit Price</u>	<u>Quantity</u>	<u>Total Cost</u>
Full Depth Pavement - Bikeway (Includes Excavation)	\$60.00 /SY	670 SY	\$40,200.00
Loam Borrow & Seed	\$8.00 /SY	300 SY	\$2,400.00
Signing, Striping & Pavement Markings	\$1,600.00 /LS	1 LS	\$1,600.00
Clearing and Grubbing	\$5.00 /SY	1,350 SY	\$6,750.00
Erosion Control Barrier	\$7.50 /FT	1,500 FT	\$11,250.00
Boardwalk	\$1,000.00 /FT	100 FT	\$100,000.00
Additional Earthwork	\$35.00 /CY	400 CY	\$14,000.00
SUBTOTAL:			\$176,200.00
Mobilization @ 3%			\$5,286.00
Contingency (40%)			\$70,480.00
MassDOT Construction Contingency (25%)			\$44,050.00
Construction Total			\$296,016.00
SAY:			\$300,000.00



1 Cedar Street
Suite 400
Providence
Rhode Island 02903
401-272-8100

* Prices Based on Weighted Average Bid Prices (August 2016)

Upper Charles River Trail
Segment 5C (1,700 LF+/-)
Hopkinton, Massachusetts
September 14, 2016

Description	Unit Price	Quantity	Total Cost
Segment 5C-1(550LF)			
Full Depth Pavement - Bikeway (Including Excavation)	\$60.00 /SY	625 SY	\$37,500.00
Loam Borrow & Seed	\$8.00 /SY	245 SY	\$1,960.00
Signing, Striping & Pavement Markings	\$1,500.00 /LS	1 LS	\$1,500.00
Clearing and Grubbing	\$5.00 /SY	1,225 SY	\$6,125.00
Erosion Control Barrier	\$7.50 /FT	1,100 FT	\$8,250.00
At-Grade Crossing & Flashing Beacon	\$40,000.00 /LS	1 LS	\$40,000.00
Additional Earthwork	\$35.00 /CY	450 CY	\$15,750.00
Segment 5C-2(450LF)			
Full Depth Pavement - Bikeway (Including Excavation)	\$60.00 /SY	400 SY	\$24,000.00
Loam Borrow & Seed	\$8.00 /SY	178 SY	\$1,424.00
Signing, Striping & Pavement Markings	\$800.00 /LS	1 LS	\$800.00
Clearing and Grubbing	\$5.00 /SY	1,000 SY	\$5,000.00
Erosion Control Barrier	\$7.50 /FT	1,000 FT	\$7,500.00
Boardwalk	\$1,000.00 /FT	150 FT	\$150,000.00
Additional Earthwork	\$35.00 /CY	400 CY	\$14,000.00
Segment 5C-3(550LF)			
Full Depth Pavement - Bikeway (Including Excavation)	\$60.00 /SY	625 SY	\$37,500.00
Loam Borrow & Seed	\$8.00 /SY	245 SY	\$1,960.00
Signing, Striping & Pavement Markings	\$1,200.00 /LS	1 LS	\$1,200.00
Clearing and Grubbing	\$5.00 /SY	1,225 SY	\$6,125.00
Erosion Control Barrier	\$7.50 /FT	1,100 FT	\$8,250.00
Additional Earthwork	\$35.00 /CY	450 CY	\$15,750.00
Segment 5C - 4 (150' +/-)			
Full Depth Pavement - Bikeway (Including Excavation)	\$60.00 /SY	175 SY	\$10,500.00
Bituminous Curbing	\$15.00 /FT	150 LF	\$2,250.00
Loam Borrow & Seed	\$8.00 /SY	85 SY	\$680.00
Signing, Striping & Pavement Markings	\$1,700.00 /LS	1 LS	\$1,700.00
Drainage Modifications/Improvements	\$24,000.00 /LS	1 LS	\$24,000.00
Erosion Control Barrier	\$7.50 /FT	300 FT	\$2,250.00
Police	\$500.00 /DAY	15 DAY	\$7,500.00
SUBTOTAL:			\$433,474.00
Mobilization @ 3%			\$13,004.22
Contingency (40%)			\$173,389.60
MassDOT Construction Contingency (25%)			\$108,368.50
Construction Total			\$728,236.32
SAY:			\$730,000.00



1 Cedar Street
Suite 400
Providence
Rhode Island 02903
401-272-8100

* Prices Based on Weighted Average Bid Prices (August 2016)

Upper Charles River Trail
Segment 6 (600 LF +/-)
Hopkinton, Massachusetts
September 14, 2016

<u>Description</u>	<u>Unit Price</u>	<u>Quantity</u>	<u>Total Cost</u>
Full Depth Pavement - Bikeway (Including Excavation)	\$60.00 /SY	670 SY	\$40,200.00
Loam Borrow & Seed	\$8.00 /SY	300 SY	\$2,400.00
Signing, Striping & Pavement Markings	\$2,100.00 /LS	1 LS	\$2,100.00
Clearing and Grubbing	\$5.00 /SY	1,350 SY	\$6,750.00
Erosion Control Barrier	\$7.50 /FT	1,500 FT	\$11,250.00
Bridge Replacement	\$1,000.00 /FT	8 FT	\$8,000.00
Additional Earthwork	\$35.00 /CY	450 CY	\$15,750.00
SUBTOTAL:			\$86,450.00
Mobilization @ 3%			\$2,593.50
Contingency (40%)			\$34,580.00
MassDOT Construction Contingency (25%)			\$21,612.50
Construction Total			\$145,236.00
SAY:			\$150,000.00



1 Cedar Street
Suite 400
Providence
Rhode Island 02903
401-272-8100

* Prices Based on Weighted Average Bid Prices (August 2016)

Upper Charles River Trail
Segment 7 (825 LF+/-)
Hopkinton, Massachusetts
September 14, 2016

<u>Description</u>	<u>Unit Price</u>	<u>Quantity</u>	<u>Total Cost</u>
Full Depth Pavement - Bikeway	\$60.00 /SY	925 SY	\$55,500.00
Loam Borrow & Seed	\$8.00 /SY	375 SY	\$3,000.00
Signing, Striping & Pavement Markings	\$2,400.00 /LS	1 LS	\$2,400.00
Clearing and Grubbing	\$5.00 /AC	1,835 SY	\$9,175.00
Erosion Control Barrier	\$7.50 /FT	1,650 FT	\$12,375.00
Additional Earthwork	\$35.00 /CY	450 CY	\$15,750.00
SUBTOTAL:			\$98,200.00
Mobilization @ 3%			\$2,946.00
Contingency (40%)			\$39,280.00
MassDOT Construction Contingency (25%)			\$24,550.00
Construction Total			\$164,976.00

SAY:	\$170,000.00
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1 Cedar Street
Suite 400
Providence
Rhode Island 02903
401-272-8100

* Prices Based on Weighted Average Bid Prices (August 2016)
Upper Charles River Trail Phase I
Hopkinton, Massachusetts
September 14, 2016

Estimated Construction Cost - Traffic Signal

Total Cost

Traffic Signal at State Route 85/Hopkins School Road
including mast arms, controller and signal heads

I LS	\$125,000.00
SUBTOTAL:	\$125,000.00
Mobilization @ 3%	\$3,750.00
Contingency (40%)	\$50,000.00
MassDOT Construction Contingency (25%)	\$31,250.00
Construction Total	\$210,000.00

SAY*:	\$210,000.00
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*Estimate is for comparison purposes only. Estimate does not include costs of design, permitting, ROW acquisition, utility work, lighting improvements.