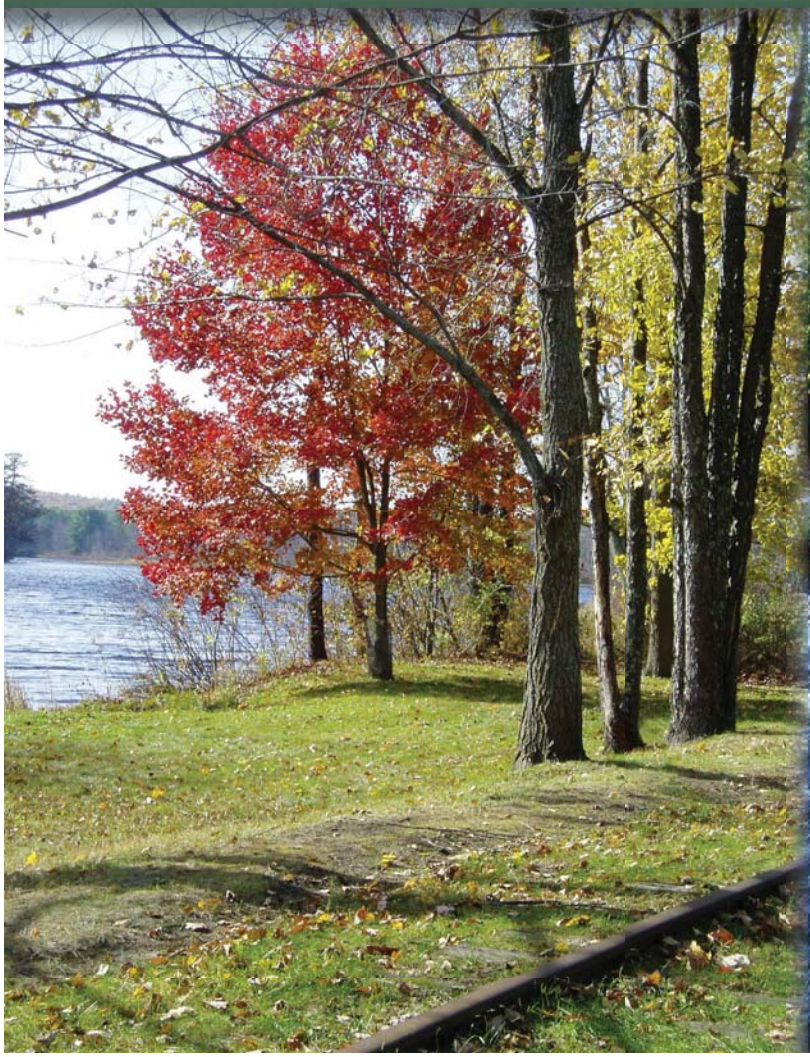
Draft

Squannacook River Rail Trail

Environmental and Engineering Assessment

Townsend & Groton, Massachusetts



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June 2008

Executive Summary

The goal of the *Squannacook River Rail Trail (SRRT) Environmental & Engineering Assessment* was to determine the feasibility of developing a rail trail (shared-use path) along the former "Greenville" branch of the Boston & Maine Railroad in the towns of Townsend and Groton. The Massachusetts Bay Transportation Authority (MBTA) currently owns the corridor. The 3.7-mile corridor begins on Depot Street in Townsend Center and extends to the Bertozzi Conservation Area off Townsend Road in Groton. Approximately 2.8 miles of the trail is located in Townsend and 0.9 miles in Groton. As envisioned, the SRRT will eventually connect to the 11-mile Nashua River Rail Trail and Ayer MBTA Commuter Rail Station via a combination of shared-use paths along the former railroad bed and on-road bikeway facilities along local streets. This regional trail project will connect areas of cultural, economic, social and natural significance along its length and afford commuters with an alternative transportation choice to motorized travel.

The Assessment outlines the corridor's potential as a rail trail and assesses the key design issues involved with the conversion process, including anticipated project impacts, required environmental clearances and rail trail design related issues. In both Towns, one of the main concerns was the corridor's location within the Squannacook River Wildlife Management Area and Squannassit Area of Critical Environmental Concern (ACEC). In Townsend, one of the major issues identified and addressed was the routing of the trail through the South Street area of Townsend Harbor. Other special design considerations included providing a connection from the railroad corridor to Townsend Center as well as a connection to North Middlesex Regional High School.

The environmental screening completed as part of the Study closely mirrors MassHighway's 25% Design Early Environmental Coordination for Design Projects checklist. The screening evaluated wetland & water resources, cultural & historic resources, and hazardous materials along the project corridor. Critical areas identified during this screening included abutting historic resources, endangered species habitat, and a cluster of known contamination issues in the Townsend Harbor area. These areas warrant the need for location specific solutions and the implementation of mitigation measures to avoid/minimize project impacts.

Based on a review of this information, a conceptual rail trail design was developed that includes proposed trail cross sections, at-grade intersection treatments, bridge rehabilitation activities, parking areas, mitigation measures, and trail enhancement opportunities. The preliminary construction cost estimate for the 3.7-mile rail trail is approximately $4.3 million (2013 prices).

The information presented within the Assessment report will help each Town begin to assess its willingness, readiness and ability to proceed with the rail trail project from a project impact and design perspective. The decision to proceed will also be based the level of in-Town support for the project, required level of fiscal expenditures (current and future), and the capacity of Town resources to patrol and maintain the rail trail post-construction. Additional state department/agency and local outreach are needed to determine the availability of project funding and level of commitment on behalf of each Town to see the project through to completion.

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1 Corridor Overview

1.1 Regional Overview

The Squannacook River Rail Trail (SRRT) corridor covered in this Assessment report extends from Townsend Center south to the Bertozzi Wildlife Management Area off of Townsend Road in Groton, a distance of approximately 3.7-miles. The rail trail follows the former "Greenville" branch of the Boston & Maine Railroad, now owned by the Massachusetts Bay Transportation Authority (MBTA). A locus map is shown in Figure 1 and detailed base mapping of the project corridor is included in Appendix A.

As envisioned, this segment of trail will extend further south to connect to the existing Nashua River Rail Trail, an 11-mile trail through Ayer, Groton, Pepperell and Dunstable with an extension over the Massachusetts / New Hampshire border to connect to Nashua City Hall and Mine Falls Park. The trail also has the potential to directly connect to the MBTA Commuter Rail Station in Ayer via a combination of off-road shared use paths along the former railroad bed and on-road bikeway facilities along local streets. The regional trail project will connect areas of cultural, economic, social and natural significance along its length and afford commuters with an alternative transportation choice to motorized travel. A rail trail connection map is shown in Figure 2.

The project has been identified within a federal SAFETEA-LU Transportation Earmark for North Worcester County Bike Paths and is included in Executive Office of Transportation and Public Works Massachusetts Bicycle Transportation Plan (2007 Draft Report).

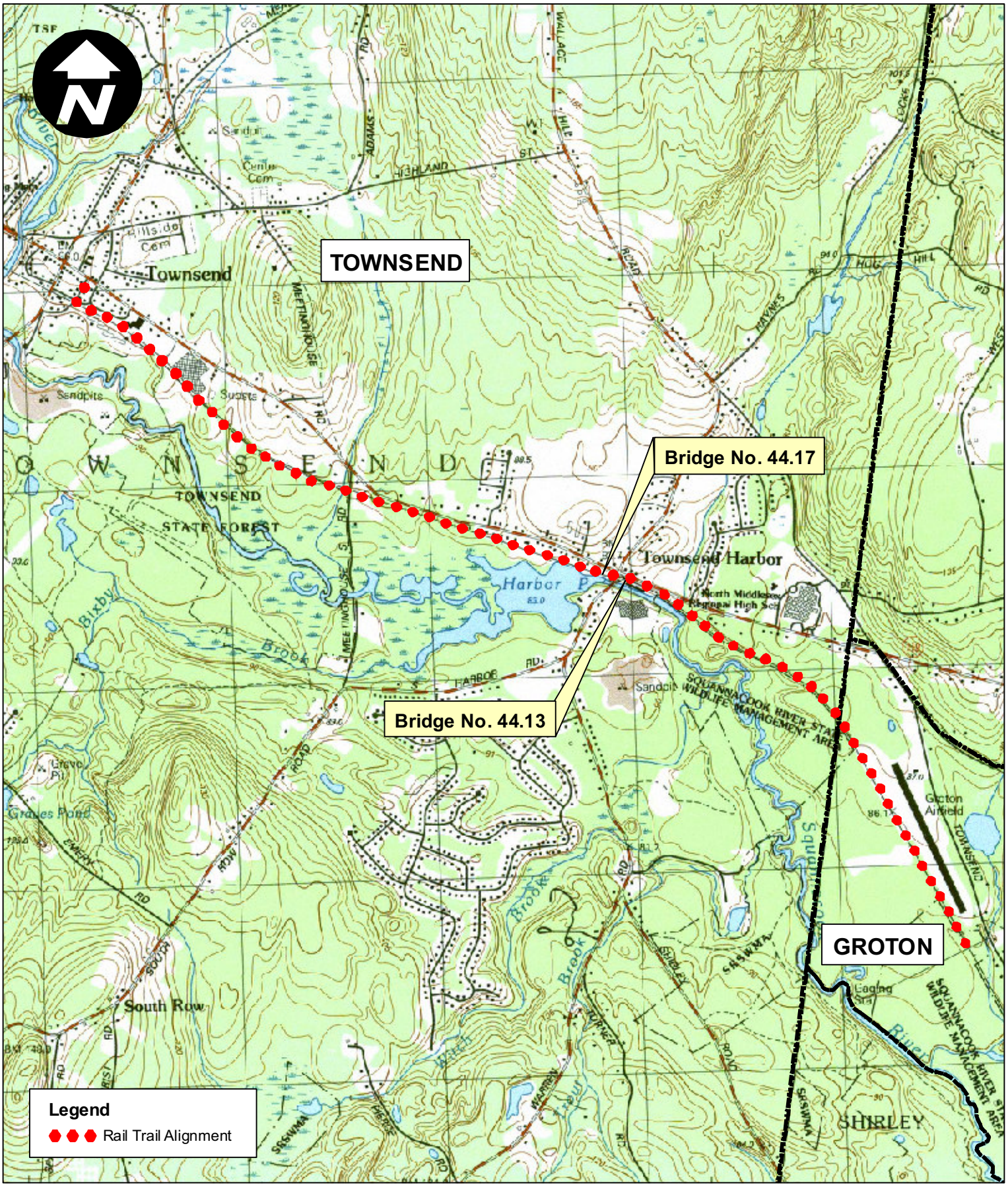
1.2 Local Perspective

The 3.7-mile corridor covered in this Assessment will serve as an alternative transportation facility for local travel to destinations within Townsend and Groton. The trail corridor will connect residential neighborhoods with the public and commercial areas along Route 119 and provide improved bicycle and pedestrian access to the following destinations:

- Public places including Townsend Common, Town Hall, Senior Center, Library and Post Office
- North Middlesex Regional High School
- Historic places within Townsend Center and Townsend Harbor
- Places of worship within Townsend center
- Scenic natural places including the Squannacook River Wildlife Management Area, Bertozzi Wildlife Management Area, Townsend State Forest, Harbor Pond and the Old Meetinghouse Universal Access Fishing Site

The trail will also serve a recreational need by providing a universally accessible trail for users of all ages and abilities.

Maps prepared by the SRRT Committee showing the corridor's location relative to local destinations are included in Appendix B.



Townsend & Shirley USGS Quads

Scale: 0 1,200 2,400 Feet

Figure 1: Locus Map
Squannacook River Rail Trail
Townsend & Groton, Massachusetts

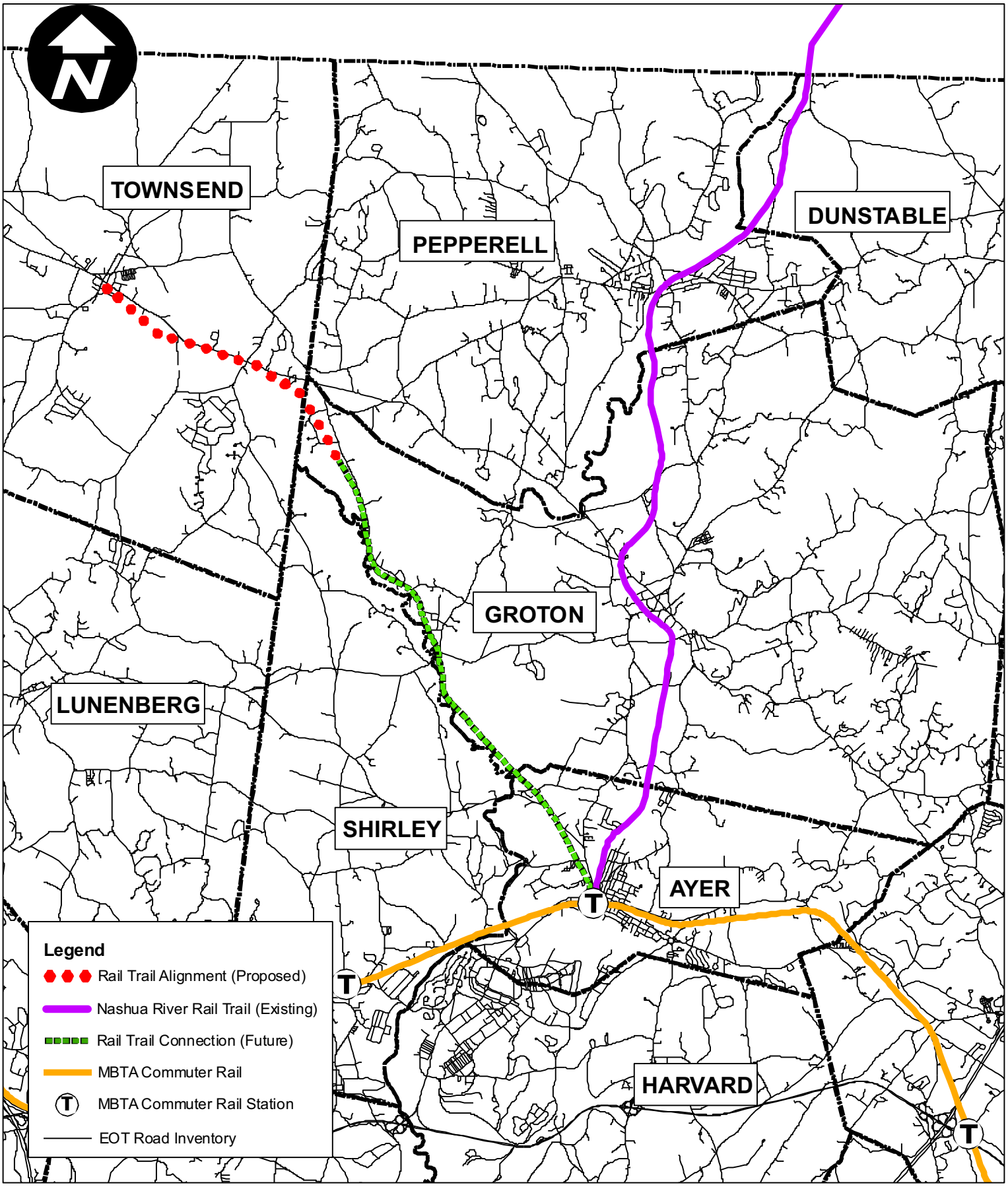


Figure 2: Future Connections
Squannacook River Rail Trail
Townsend & Groton, Massachusetts

1.3 Ownership

The corridor is owned by the MBTA. The MBTA will in turn execute an Alternative Transportation Corridor lease agreement with a municipality for purposes of the installation, operation, maintenance and use as a rail trail. The term of the lease shall be for a period of ninety-nine (99) years, which satisfies Federal Highway Administration (FHWA) Massachusetts Division policies for significant federal-aid investment projects.

1.4 Assessment Purpose

The purpose of this Assessment is to determine the feasibility of developing a rail trail (or shared use path) along a 3.7-mile section of the former "Greenville" branch of the Boston & Maine Railroad corridor in Townsend and Groton.

The primary goals are to:

- Assess existing conditions along the corridor
- Evaluate and document potential environmental impacts
- Discuss key design and constructability related issues
- Develop design and construction cost estimates

Ultimately this study will assist Town officials, committees, and residents within each community to determine their willingness, readiness and fiscal ability to proceed with the rail trail project.

Funding for this Assessment included a Recreational Trails Program grant from the Massachusetts Department of Conservation & Recreation (DCR) awarded to the Townsend Squannacook River Rail Trail Committee and local Community Preservation Act funds approved by the Town of Groton.

2 Railroad Ownership

2.1 History of Rail Service

In the mid 1800's, the Fitchburg Rail Road embarked on a series of branch line expansions. One such line was the Peterborough & Shirley (P&S), a 36-mile route from Groton Junction in Ayer, MA to Peterborough, NH. The P&S was incorporated in 1845 and construction of the Massachusetts section began in 1847. By January 1848, the segment from Groton Junction north to West Townsend was open for service. Construction of the line was completed to Mason Village (now Greenville, NH) in 1850, though it never reached Peterborough.

The Fitchburg Rail Road was leased to the Boston & Maine (B&M) Rail Road in 1900. The line continued to serve only modest traffic and was severely impacted by the closing of Greenville's textile mills in 1930. Freight continued until 1972, when a flood washed out sections of the line in New Hampshire. The B&M sold the Massachusetts section of the P&S to the Massachusetts Bay Transportation Authority (MBTA) in 1976. The line continued to serve the Bates Corrugated Box Factory (off Scales lane) west of Townsend center for a few more years. However, in November of 1981, the B&M restricted freight transportation to the Hollingsworth & Vose paper mill, just west of West Groton. Guilford continued to serve the paper mill for many years but could not continue to benefit the Sterilite Corporation, which had built a factory north of this location only a few years prior.

2.2 Title Conveyance

The deed and taking documents transferring ownership of the corridor from the Boston & Maine Railroad to the Massachusetts Bay Transportation Authority (MBTA) were filed at the Registry of Deeds on December 24, 1976 (Book 13117, page 113) and February 16, 1977 (Book 13156, Page 34), respectively. The MBTA acquired a fee simple title for the Greenville Branch in Groton and Townsend. Under the fee simple title, the MBTA retains exclusive control of the property even after deciding not to operate a train along the corridor. Conversely, under an easement, a railroad possesses a right to operate a train on land owned by others. Therefore, under the current fee simple ownership, the MBTA can choose to develop the property itself or to sell or lease it for any number of uses.

2.3 Property Agreements

The consultant team coordinated with TRA regarding existing legal agreements along the corridor. Based on a review by TRA, there are six (6) use and occupancy agreements along the Greenville Branch right of way. Two agreements are with the Town of Groton Electric Light Department for aerial crossings and underground conduit. The MBTA has a pipe agreement with the Town of Townsend Water Department and a wire crossing agreement with Unitil Service Corporation. Further south along the corridor in Groton, there are also two agreements in place with Hollingsworth and Vose - one is for storage and the other provides them crossing rights at three locations. The Hollingsworth and Vose company is located south of the section of corridor covered in this Assessment.

2.4 Physical Encroachments

Over time, property owners have encroached upon the railroad right-of-way without prior approval from the MBTA. Based on a site walk by the consultant team and a review of existing legal agreements, there are two apparent physical encroachments upon the railroad right of way within the project area. Resolving these encroachments involves identifying the encroachment and requiring that the person/business occupying the property either enter into an agreement with the MBTA for their use of the property, or vacate the property (remove the encroachment).

The identified encroachments are as follows:

M&M Auto Supply: This auto supply store is located in the former railroad depot building at the corner of Elm Street and Railroad Avenue in Townsend center. The railroad right of way is currently being used as a driveway behind the store. This use would need to be eliminated should the Town consider developing parking along this stretch of MBTA owned corridor.

Harbor Auto Body: Harbor Autobody is located at 98 Main Street (Route 119) just north of Townsend Harbor. According to the Rail Road Valuation Map, the Boston & Maine Railroad transferred ownership of a rectangular parcel of land within the railroad right of way to the private property owner in 1961. This parcel extends approximately 23 feet into the right of way. Based on a site visit, Harbor Auto Body installed a chain link fence around their property that encroaches approximately 31 feet beyond where they own.

2.5 Rail to Trail Conversion

In order for the Towns to pursue plans to convert the railroad right-of-way to a rail trail, they must submit a formal application to the MBTA stating their desired use, and plans for the railroad corridor. The MBTA can supply the Towns with access to the land but does not financially contribute to the project. Pending approval from the MBTA, the Towns would be granted a 99-year lease for the design, construction and maintenance of the rail trail. The 99-year lease satisfies Federal Highway Administration (FHWA) Massachusetts Division policies for significant federal-aid investment projects.

3 Environmental Resources

The purpose of this section is to document the types of environmental resource areas along the project corridor and identify potential environmental issues early in the rail trail development process.

A discussion of the environmental resources associated with the rail corridor and regulatory information pertaining to these resources is presented in the following sections.

Development of this corridor into a rail trail will require measures to avoid and minimize impacts to adjacent environmental resources. Site-specific designs aimed at the protection of these resources will be needed to enable a rail trail to coexist within this diverse resource base. This corridor provides an excellent opportunity to educate its users about the importance of natural resources conservation.

3.1 Wetland Resources

A number of Wetland Resource Areas protectable under the Federal Clean Water Act, Massachusetts Wetlands Protection, and the Townsend and Groton Wetlands Protection Bylaws are present along the length of the proposed rail trail in Townsend and Groton (see Figure 5).

Figure 3: Squannacook River at Harbor Pond

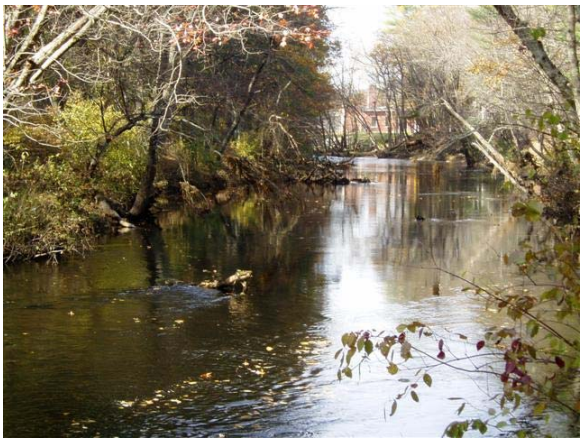
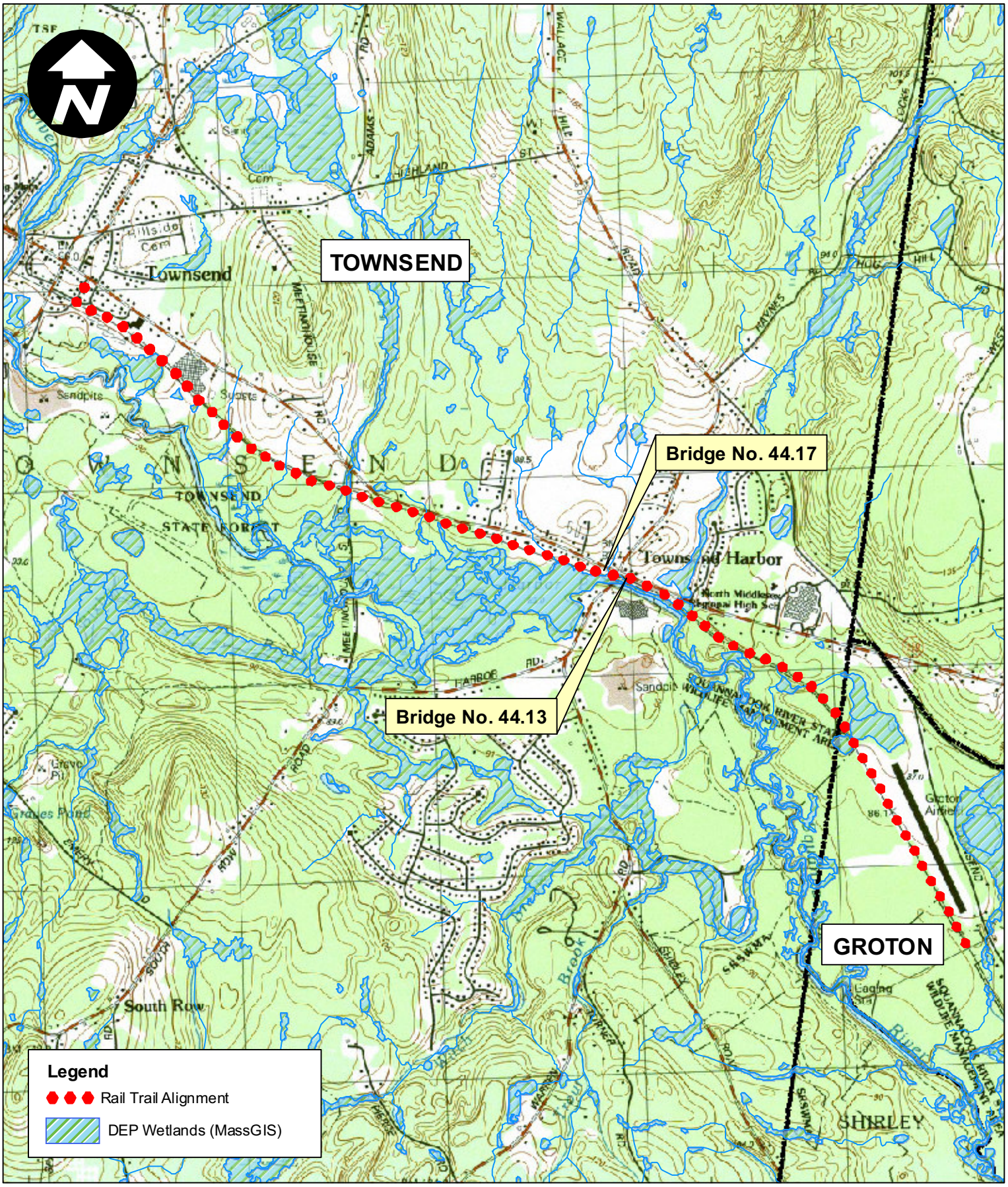


Figure 4: Squannacook River North of Meetinghouse Road

These Wetland Resource Areas include:

- Bordering Vegetated Wetlands (BVW)
- Isolated Vegetated Wetlands (IVW)
- Bank associated with Intermittent and Perennial Streams
- Land Under Waterbodies and Waterways (LUW) associated with perennial streams and ponds
- Riverfront Area associated with perennial streams
- Bordering Land Subject to Flooding (BLSF), otherwise known as the floodplain



Townsend & Shirley USGS Quads

Scale: 0 1,200 2,400 Feet

Figure 5: Wetland Resources
Squannacook River Rail Trail
Townsend & Groton, Massachusetts

Based on our review of available MassGIS mapping, USGS mapping, and other sources, the following provides a description of each resource area and typical locations along the trail where such resources occur.

Bordering Vegetated Wetlands are defined as freshwater wet meadows, marshes, swamps, and bogs that border on rivers, streams, ponds, and lakes. BVW along the trail corridor are associated with the Squannacook River, Harbor Pond, and several intermittent and perennial streams. BVW occurs in the Townsend State Forest south and west of the Sterilite Corporation; associated with an unnamed perennial stream parallel to Meetinghouse Road, Harbor Pond, the Squannacook River, the second unnamed perennial stream at Edwards Road; south of the Harbor Village Shopping Center, and within the Town of Groton Milton Starr Conservation Land.

Isolated Vegetated Wetlands are freshwater wet meadows, marshes, swamps, and bogs that do not necessarily border on rivers, streams, ponds, and lakes. These isolated wetland resource areas are protectable under the Townsend and Groton Wetland Bylaws. An IVW occurs in the Townsend State Forest west of the Sterilite Corporation. Other IVWs may also be present that are not depicted on the MassGIS mapping.

Bank abuts and typically confines water bodies such as intermittent and perennial streams, ponds, and lakes. Bank along the Squannacook River Rail Trail is associated with Harbor Pond, the Squannacook River, two unnamed perennial streams located proximate to Meetinghouse Road and Edwards Road, and approximately seven unnamed intermittent streams located 800 and 2,000 linear feet south of the Sterilite Corporation; 1,200 linear feet southeast of Old Meetinghouse Road; 900 linear feet north of Bridge No. 44.17, 1200 linear feet southeast of Bridge No. 44.17, south of the Harbor Village Shopping Center, and 600 feet south of the Townsend/Groton line in the Town of Groton Milton Starr Conservation Land.

Land Under Waterbodies and Waterways (LUW) is the land beneath rivers, streams, ponds or lakes. As noted above, LUW along the Squannacook Rail Trail is associated with Harbor Pond, the Squannacook River, 2 unnamed perennial streams, and seven unnamed intermittent streams.

Riverfront Area is the area of land that extends 200 feet laterally from a river's (and perennial stream's) mean annual high water line. According to the Wetlands Protection Act, Rivers and streams shown as perennial on the USGS map are presumed to be perennial. The USGS map depicts the Squanacook River, and two unnamed streams as perennial.

Bordering Land Subject to Flooding (BLSF), is the portion of the 100-year floodplain that extends beyond the limits a Bordering Vegetated Wetland. As noted below, work within BLSF or the floodplain requires compensatory storage to ensure work will not cause flooding that will impact land owners or negatively impact other wetland resource areas. BLSF occurs in association with the Squannacook River within the Townsend State Forest behind the Sterling Corporation, with Harbor Pond and the Squannacook River roughly between Reagan Road and Edward Road at Townsend Harbor, and again with the Squannacook River with the Squannacook River State Wildlife Management Area.

A review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps revealed that a 2600 linear foot section of corridor in the vicinity of South Street in

Townsend Harbor falls within a Zone AE floodplain boundary (see Figure 7). Zone AE is an area inundated by 100-year flooding for which Base Flood Elevations (BFEs) have been determined. Cut and fill operations for trail construction shall not cause any net increase in the surrounding natural flood elevation. No greater volume of fill shall be deposited on or within the floodplain than the volume that can be created by compensatory cutting within the floodplain. Compensatory storage will be required for all flood storage volumes that will be lost, if any, as a result of the trail construction. This volume would be determined during the design stage.

3.2 Wildlife Habitat

FST contacted both the United States Department of Interior Fish and Wildlife Service (USFWS) and the Massachusetts Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program (DFW-NHESP) regarding the known presence of any federally or state-listed rare species along the rail trail corridor. The response letter from each agency is included in Appendix C.

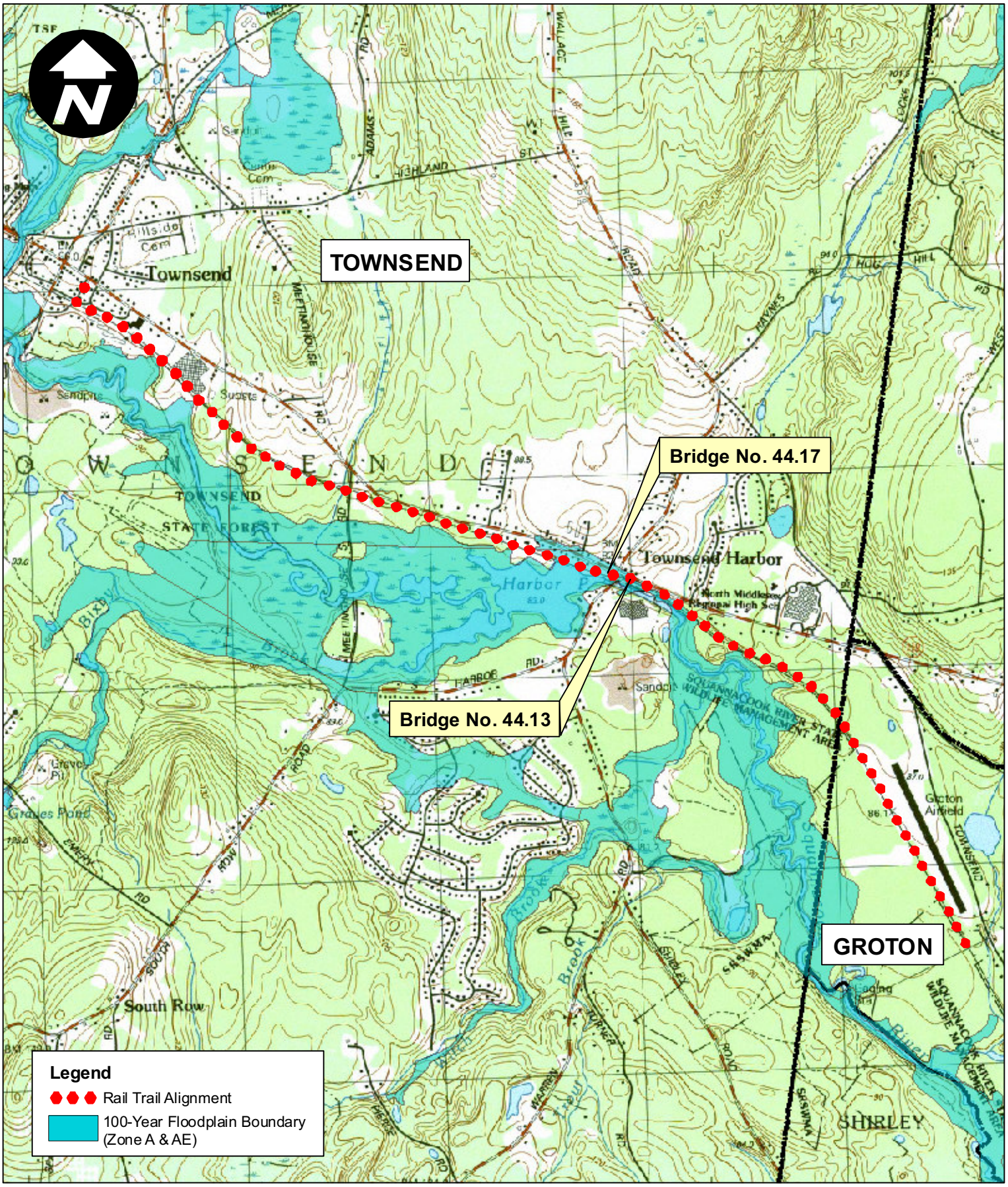
In a letter from USFWS dated March 13, 2008, the USFWS stated that "based on information currently available to us, no federally-listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the US Fish and Wildlife Service are known to occur in the project area(s)."

Correspondence received from the DFW-NHESP dated March 12, 2008 indicates that Priority and Estimated Habitat for seven state-listed species, listed in Figure 6, occurs within the "project site or a portion thereof." As shown in Figure 8, the habitat for these species encompasses all but about 1,500 linear feet of the 3.7-mile corridor. The area extends from a point south of the Bertozzi Wildlife Management Area parking area in Groton to Sterilite Corporation near Townsend Center. Along this length, the rail corridor is bounded on its west side by large undeveloped tracts owned by the Massachusetts Department of Conservation and Recreation (Townsend State Forest) and Division of Fisheries & Wildlife (Squannacook River Wildlife Management Area). Review of the Natural Heritage Atlas and the MassGIS NHESP Data Layer indicate that neither certified vernal pools (CVP) or potential vernal pools (PVP) are located within wetlands directly adjacent to the proposed rail trail.

Figure 6: State-Listed Rare Species

Scientific Name	Common Name	Taxonomic Group	State Status
Glyptemys insculpta	Wood Turtle	Reptile	Special Concern
Emydoidea blandingii	Blanding's Turtle	Reptile	Threatened
Alasmidonta undulate	Triangle Floater	Mussel	Special Concern
Notropis bifrenatus	Bridle Shiner	Fish	Special Concern
Ophigomphus aspersus	Brook Snaketail	Dragonfly	Special Concern
Strophitus undulates	Creeper	Mussel	Special Concern
Stylurus scudderi	Zebra Clubtail	Dragonfly	Endangered

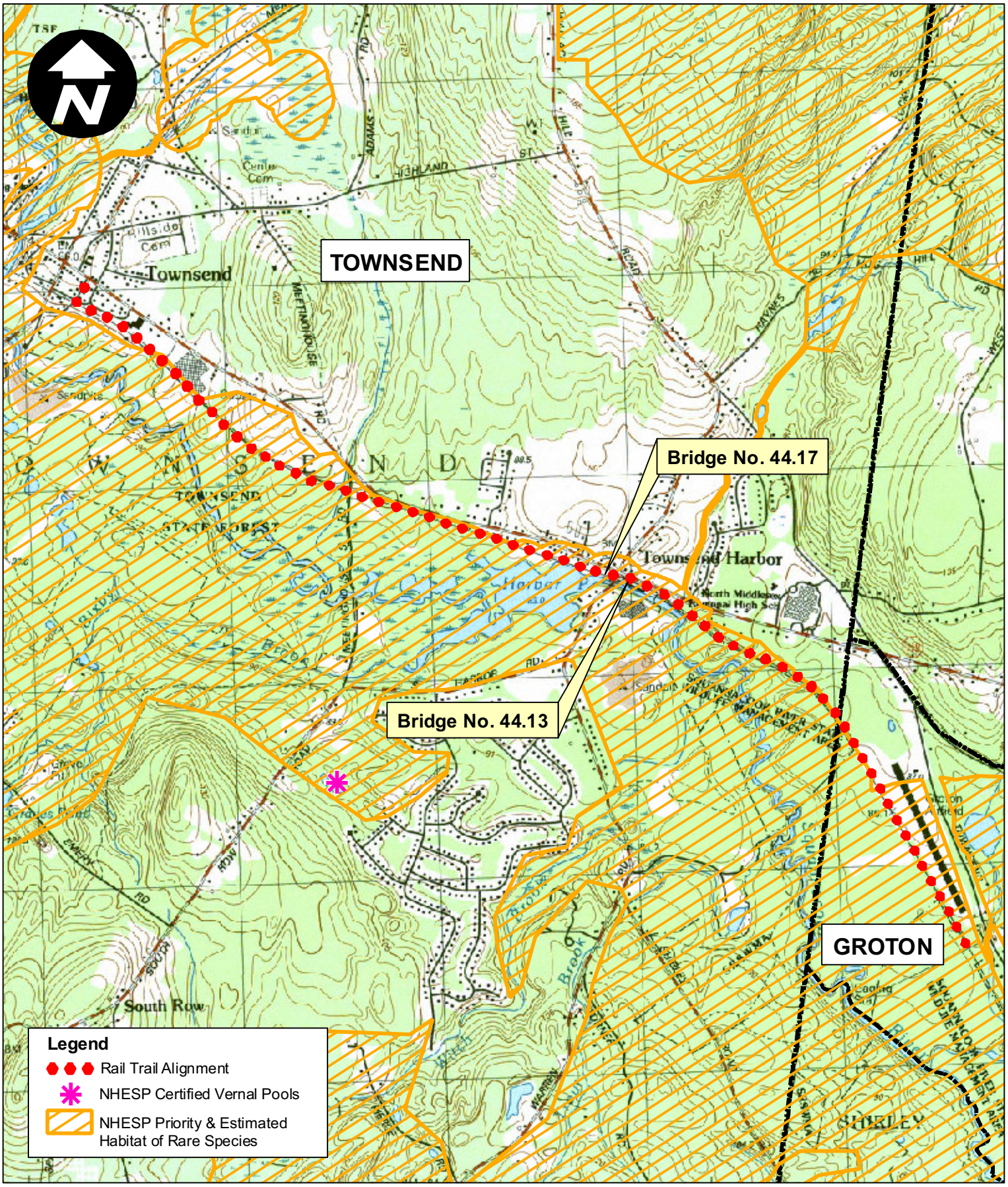
Source: Natural Heritage and Endangered Species (NHESP) letter dated March 12, 2008.



Townsend & Shirley USGS Quads

Scale: 0 1,200 2,400 Feet

Figure 7: Floodplain Boundaries
Squannacook River Rail Trail
Townsend & Groton Massachusetts



Townsend & Shirley USGS Quads

Scale: 0 1,200 2,400 Feet

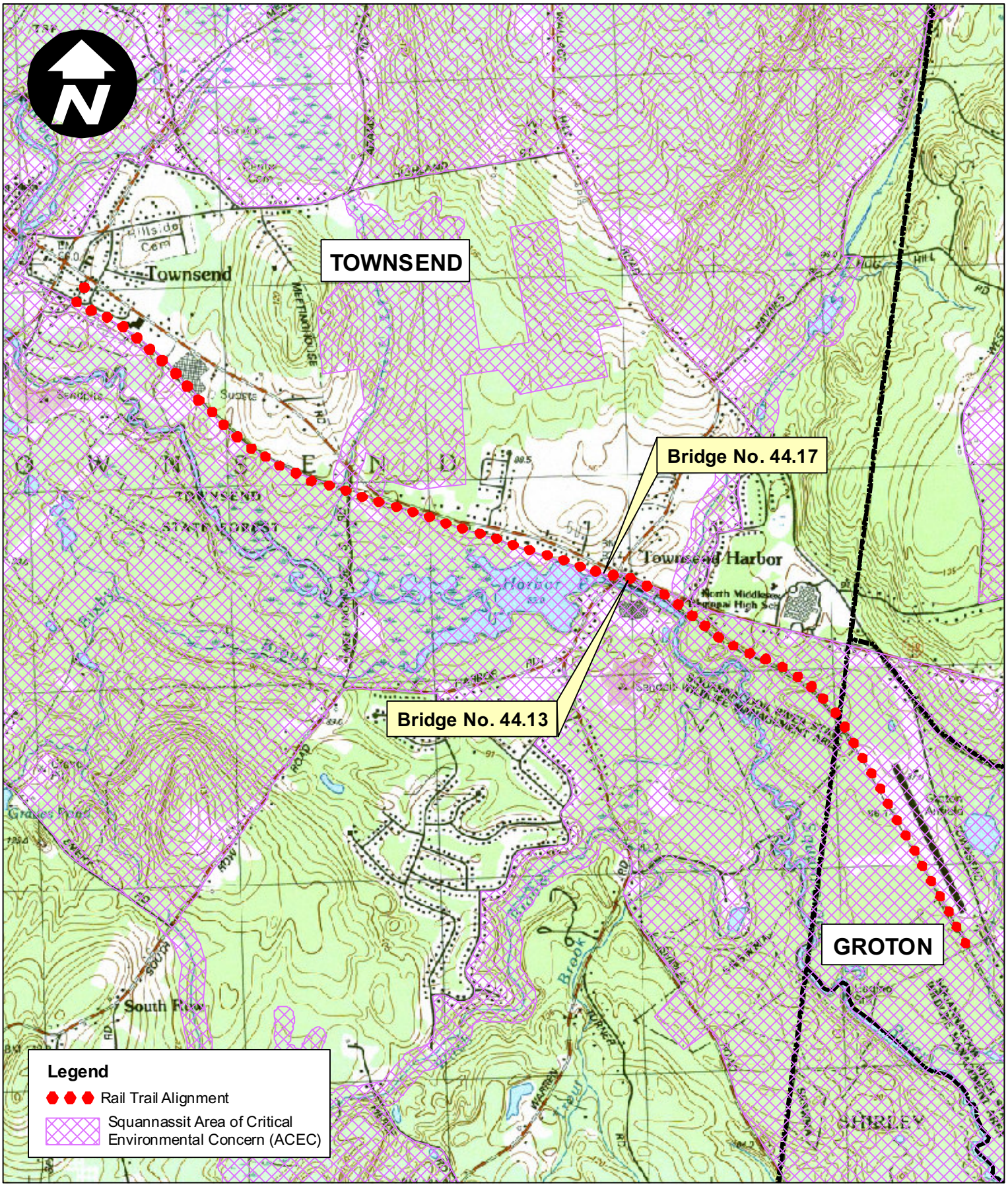
Figure 8: Species Habitat
Squannacook River Rail Trail
Townsend & Groton, Massachusetts

3.3 Squannassit Area of Critical Environmental Concern

Areas of Critical Environmental Concern (ACECs) are areas within the Commonwealth where unique clusters of natural and human resource values exist and which are worthy of a high level of concern and protection. As described in the ACEC Regulations (301 CMR 12.00), the designation process comprises five steps: nomination, review by the Secretary, public hearings, decision by the Secretary of Environmental Affairs, and publication of notice of the results in the Environmental Monitor. The purpose of the designation process is to determine if the nominated area is of regional, state, or national importance or contains significant ecological systems with critical interrelationships among a number of components. After designation, the aim is to preserve and restore these areas and all Executive Office of Energy and Environmental Affairs (EOEEA) agencies are directed to take actions with this in mind.

The Squannassit ACEC is approximately 37,450 acres in size spread out across nine (9) communities including Ashby, Ayer, Groton, Harvard, Lancaster, Lunenburg, Pepperell, Shirley, and Townsend. The Squannassit ACEC is the largest designated in the state. Approximately 11% of the acreage is located in Groton, and 40% in Townsend. As shown on Figure 9, the project corridor travels through the Squannassit ACEC from its starting point near the Bertozzi / Squannacook River WMA north to South Street. From South Street in Townsend Harbor to Depot Street in Townsend center, the railroad corridor forms the western boundary of the ACEC.

The Department of Conservation and Recreation (DCR) administers the ACEC Program on behalf of the Secretary and coordinates with other state agencies and programs. According to the DCR's website, ACECs are addressed in the MEPA regulations at 301 CMR 11.03(11). The proponent of any project (as defined by the MEPA regulations) located within an ACEC must file an Environmental Notification Form (ENF) for MEPA review, unless the project consists solely of one single family dwelling. What this means in practical terms is that projects located within ACECs subject to MEPA jurisdiction require closer scrutiny than projects located outside of ACECs. Project review thresholds (for the size or type of a project) that require a proponent to file an ENF are reduced to include all projects located within an ACEC.



Townsend & Shirley USGS Quads

Scale: 0 1,200 2,400 Feet

Figure 9: Areas of Critical Environmental Concern
Squannacook River Rail Trail
Townsend & Groton Massachusetts

4 Environmental Permitting

As documented in the previous section, the project corridor parallels and traverses several environmentally sensitive areas. Accordingly, the project will require environmental permit applications to be filed in accordance with local, state and federal statutes and regulations.

The following is a list of the anticipated environmental permits.

- National Environmental Policy Act (NEPA)
- Massachusetts Environmental Policy Act (MEPA)
- Massachusetts Wetlands Protection Act (MGL. c. 131 s 40), its implementing *Regulations* (310 CMR 10.00), and Groton and Townsend Wetlands Protection By-Laws
- Massachusetts Endangered Species Act (MGL. c. 131A, MESA) and its implementing Regulations (321 CMR 10.00) [1]
- NPDES General Permit for Discharges from Construction Activities

The proposed rail trail will require permits and/or review with regulators to determine if a permit is required for all of these statutes and regulations.

4.1 National Environmental Policy Act (NEPA)

As most rail trail projects involve Federal funds (TEA-21), compliance with NEPA will be required. However, since rail trail construction infrequently results in significant impacts, these projects are classified as Categorical Exclusions (CEs). CEs are actions which meet the definition contained in 23 CFR 771.1177(a), that is, they are actions which individually or cumulatively do not involve significant social, economic or environmental impacts, and are therefore, categorically excluded from the requirement to prepare an Environmental Assessment (EA) or Environmental Impact Statement (EIS). There are three levels of CEs (Automatic, Programmatic, and Individual).

It is anticipated that Individual Categorical Exclusion (CE) approval from FHWA will be required for this project. The Individual CE, and supporting information will be submitted to the FHWA Division Office for approval during the design phase. The supporting information should clearly establish that there is little or no potential for significant social, economic or environmental impact.

4.2 Massachusetts Environmental Policy Act (MEPA)

The MEPA office is part of the Executive Office of Energy and Environmental Affairs (EOEEA). The purpose of MEPA is to provide an opportunity early in project design for state regulatory agencies to comment on a proposed project prior to the filing of permits.

[1] The regulatory standards under the Massachusetts Endangered Species Act and Regulations do not specify thresholds that automatically require a permit; rather NHESP has established a Project Review process whereby a determination is made on a project-by project basis if a permit is required.

An Environmental Notification Form (ENF) or Environmental Impact Report (EIR) is required to be submitted to MEPA if:

- The project is subject to MEPA review (e.g. the project is undertaken by an Agency [of the Commonwealth]
- Involves State Agency Financial Assistance or requires an Agency Action/Permit); and
- Environmental impacts or review thresholds as referenced in the MEPA regulations are exceeded.

As described 301 CMR 11.03 (11)(b), one of the MEPA review thresholds that automatically triggers the need for an ENF is "Any Project within a designated ACEC, unless the project consists solely of one single family dwelling." Therefore, as the project corridor is located with the Squannassit Area of Critical Environmental Concern (ACEC), an ENF will be required for this project.

Although a determination can not be made until a preliminary design has been established, we do not anticipate the filing of a Draft and Final Environmental Impact Report (DEIR/FEIR) under the Massachusetts Environmental Policy Act (MEPA).

4.3 Massachusetts Wetlands Protection Act and the Groton and Townsend Wetlands Protection Bylaws

Based on a preliminary review of the site and traversing portions of the rail trail bed, the majority of the proposed work will occur within the Buffer Zone to BVW and/or IVW. This work will require the filing of a Notice of Intent (NOI) Application with the Groton and Townsend Conservation Commissions.

It is not anticipated that BVW will be impacted as part of this project. However, should conditions change, and BVW impact be unavoidable, then an alternatives analysis must be conducted to avoid, minimize, and mitigate (310 CMR 10.55) and it is likely that the Conservation Commission and/or DEP will require completion of a wildlife habitat evaluation in accordance with the Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands (March 2006). If the amount of BVW alteration exceeds 5,000 square feet, the proposed project would be required to meet the criteria to be deemed a limited project under 310 CMR 10-53 (3).

In this case with the presence of a BVW, the Regulations state that "where a Bordering Vegetated Wetland occurs, it extends from said wetland" [310 CMR 10.57 (2) (a)]. However, filling within the BVW must also protect the interests of all other wetlands including the function of flood storage; therefore, filling within the floodplain must be addressed either way. Additionally, if greater than 5,000 square feet of BLSF is altered, then a wildlife habitat evaluation is also required for work within the BSLF looking at habitat criteria similar to that of the BVW.

Based on a preliminary review of the site and traversing portions of the rail trail bed, work will occur within Riverfront Area. When work is proposed in Riverfront Area, the Applicant must demonstrate that other wetland resource areas are protected, rare

species are protected, that there are no practicable and substantially equivalent economic alternatives, and that the project will not result in significant adverse impacts to the Riverfront Area. Habitat for seven state-listed rare species is associated with the trail corridor; therefore, protection of rare species will be an important component of work within Riverfront Area. The alternatives analysis must consider cost, existing technology, proposed use, and logistics. While it may be clear that there are no practicable and substantially equivalent economic alternatives, the project will need to demonstrate that it will not result in significant adverse impacts to the Riverfront Area. This includes limiting the amount of Riverfront Area alteration and protection of wildlife habitat. The standards for compliance with the Riverfront Area regulations can be complicated and quite specific. Compliance with these standards should be taken into consideration early in the design process.

4.4 Massachusetts Endangered Species Act (MESA)

At a minimum, project review with the Massachusetts Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program (DFW-NHESP) would be required in order for the NHESP to make a determination if the project will result in a "take" of any of the state-listed species associated with the project site. A "take", in reference to an animal, means to harass, harm, pursue, hunt, shoot, hound, kill, trap, capture, collect, process, or to disrupt nesting, breeding, feeding or migratory activity or attempt to engage in any such conduct, or to assist such conduct. In reference to plants, a "take" means to collect, pick, kill, transplant, cut or process or attempt to engage or to assist in any such conduct.

Based on the mapping of listed-species for this site, the NHESP would likely select one of two avenues for authorization of the project under the Massachusetts Endangered Species Act. The NHESP could determine that based on incorporating certain conditions, that the project would not result in a take and issue a Conditional No-Take Letter. If the NHESP were to determine that the project will result in a "take" then a Conservation and Management Permit would be required in order to ensure that impacts to the local population of the species were avoided, minimized, and mitigated and that the project would result in a net benefit to the species in Massachusetts.

As listed in the letter received from DFW-NHESP dated March 12, 2008, the trail corridor passes through habitat for seven state-listed species - two turtles, two mussels, two dragonflies, and one fish - each with individual and specific habitat requirements. Based on the result of the Blanding's Turtle Monitoring Survey prepared by the SRRT Team in April 2004 and specific concerns expressed by NHESP in January 2004, the current Groton trail ends at the entrance to the Bertozzi Conservation Area and WMA parking area off Townsend Road to protect habitat and migration areas associated with Blanding's Turtle and Wood Turtle. A copy of the January 20, 2004 DFW-NHESP letter is also included within Appendix C. Further dialogue and coordination with NHESP should continue, early on in the design process. This will ensure the project is designed in a manner that protects habitat and the seven species listed above. This also will enable NHESP to comment while the design is still in the development stage and provide recommendations and feedback so the project may result in a long-term net benefit to these species.

4.5 NPDES General Permit for Discharges from Construction Activities

Phase II of the National Pollutant Discharge Elimination System (NPDES) Stormwater program was published in the Federal Register on October 8, 1999. As outlined in Phase II, any construction activity that will disturb one or more acres and has the potential to have a discharge of stormwater to a water of the United States must either have a permit or have qualified for a waiver. Construction activity refers to actual earth disturbing construction activities and those activities supporting the construction project such as construction materials or equipment storage, maintenance, measures used to control the quality for stormwater associated with construction activity, or other industrial stormwater directly associated with construction activity.

Construction of the rail trail would exceed the 1-acre disturbance threshold set forth under Phase II of the National Pollutant Discharge Elimination System (NPDES) Stormwater program and therefore require a permit. In order to apply for permit coverage the owner (Town), oversight agency (Town or MassHighway), and operator (Contractor) will need to submit an NOI, Stormwater Pollution Prevention Plan (SWPPP), and documentation of eligibility to the Environmental Protection Agency before the start of construction. The SWPPP details construction activities, erosion control measures, and inspection schedules to be implemented during construction to ensure that the construction activities do not have an adverse impact on wetlands and waterways.

With respect to stormwater runoff, the rail trail will be limited to non-motorized uses (other than occasional maintenance or emergency vehicle). As such, stormwater runoff will not be a source of pollutant loading (e.g. heavy metals, oils). Regardless, no direct discharges from rail trail construction should be channeled (tributary) to wetlands or waterways. Instead, non-point discharges in the form of stormwater runoff should be directed to existing and new swales along the trail edge. These open swales capture runoff and allow the rainwater to percolate into the soil. In addition, the profile of the rail corridor is relatively flat. Therefore, the rail trail will need to be raised slightly above the surrounding ground and have a cross pitch to ensure the water drains off the trail surface. The direction of the cross slope should preserve the natural drainage patterns at the site. An erosion and sediment control plan will also need to be implemented during construction to effectively prevent sediment and silt runoff to adjacent resource areas.

The goal of stormwater design will be to maintain existing swales and drainage patterns, allow rainwater to percolate into the soil, avoid point source discharge and meet current Massachusetts Stormwater Management Guidelines and Phase II of the NPDES program.

5 Contamination Issues

The purpose of this section is to identify potential contamination issues within or in close proximity to the project corridor.

Contamination along a former rail corridor is typically the result of either residual contamination from railroad operations or contamination associated with adjacent uses along the corridor.

The most common contamination found along a rail corridor is residual contamination from railroad operations. According to the Rails-to-Trail Conservancy's study on "Understanding Environmental Contaminants" (October 2004), the most commonly reported contaminants along rail corridors include arsenic, which was used as an herbicide to control weeds, metals and constituents of oil or fuel (petroleum products), which likely dripped from the rail cars as they passed over the corridor. Coal ash is also considered residual contamination. In addition, any existing railroad ties along a corridor were likely treated with creosote and therefore need to be removed and transported in accordance with local, state, and federal hazardous waste disposal requirements.

There is also the possibility that use histories of adjacent properties may have resulted in contamination along the corridor. Such histories could include improper disposal actions along the rail corridor or a release of oil or hazardous material on an adjacent site. A preliminary hazardous waste and contaminated materials screening was conducted for the project corridor. The preliminary screening is a general review to identify properties in close proximity to the project area that could either contain or be a source of hazardous wastes or contaminated materials. The screening was limited to conducting a brief visual inspection along the corridor, reviewing files at DEPs offices, and querying information from the following searchable databases:

- Massachusetts Department of Environmental Protection (DEP) Bureau of Waste Site Cleanup (BWSC) database for sites where a release of oil or hazardous material (OHM) has been reported to DEP. At the time the search was run, the DEP maintained site/reportable release database was current as of April 15, 2008. This search was supplemented with the DEP Tier Classified Oil or Hazardous Material Sites (MGL c. 21E) datalayer obtainable from MassGIS.

- Comprehensive Environmental Compensation Liability Act (CERCLA) List (Federal Superfund Site List) for sites. The EPA's Superfund Query Form was used to retrieve data from the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database.

- DEP Solid Waste Facility (landfills, transfer stations, and combustion facilities) datalayer obtainable from MassGIS.

Sites abutting the corridor were reviewed and documented as part of this screening. The approximate location of each site was determined using available base mapping in conjunction with each Town's assessor database. Each site was evaluated for potential project impact based on the information provided in the databases including use histories, the type of site and proximity to the project. This screening aims to evaluate

more general issues along the corridor and does not involve details on any one property. Sites of known contamination are a greater concern than sites with potential contamination.

5.1 Screening Results

The following table and accompanying text present sites of concern identified during the preliminary screening. There were no sites of concern identified along the corridor segment in Groton. The three (3) sites identified in Townsend are listed from north to south as follows:

Figure 10: Preliminary Screening Results

Site Name	Address	Site Status	Phase / Class	Release Tracking #
Harbor Auto Body	98 Main Street Townsend	TIER 2	II	2-0000457
Shepherds Auto Body	54 Main Street Townsend	RAO	II	2-0013163
Harbor Village Shops	18 Main Street Townsend	RAO	B1	2-0010482

Source: Massachusetts DEP Bureau of Waste Site Cleanup Searchable Sites Database, April 15, 2008.

Harbor Auto Body: The Harbor Autobody site is located at 98 Main Street (Route 119) just north of Townsend Harbor. As discussed in Section 2.4, this business is currently encroaching upon the right of way. Based on a site visit, Harbor Auto Body installed a chain link fence around their property that encroaches approximately 30 feet beyond where they own. Therefore, the project corridor actually falls within the fenced in area.

FST visited MassDEP's Central Region office on March 13, 2008 to review the files for the Harbor Auto Body site. During this effort, it was determined that the source of the contamination was at the Autobody's former location across Main Street (Route 119). The former site is classified as a Tier II, Phase II site, which indicates that the site is currently undergoing a Comprehensive Site Assessment under the signature of a licensed site professional (LSP). The source of the oil release was from underground storage tanks (UST). According to the files, in 1987, during the removal of four (4) UST's, heavily contaminated soils were noted with the presence of petroleum products. These soils were placed back into the excavation pit due to safety issues. VOC's, specifically benzene, toluene, ethylbenzene, and xylenes were detected at significant concentrations within groundwater concentrations. Groundwater data shows a flow in the south-southeasterly direction, approximately 7 feet below ground towards the location of the potential rail trail location. However, data has confirmed a decrease in VOC concentrations since 1987. A potential for contaminant migration from groundwater to the potential rail location is possible but unlikely to be a construction issue due to the limited depth of excavation, if any, required for rail trail construction.

Shepherds Auto Body: The Shepherd's Auto Body site is located at the corner of Main Street (Route 119) and South Street in Townsend Harbor. The project corridor travels directly through the main entrance / driveway to this business. This property is listed in EPA's CERCLIS database (MAD982190415), and in DEP's database of releases (RTN# 2-0013163). However, the site is not listed on EPA's National Priority List (NPL).

According to the DEP's database, the site is currently classified as a Phase II RAO. Phase II indicates that the site underwent a Comprehensive Site Assessment to determine the risks posed to public health, welfare and the environment. An RAO statement was submitted which asserts that response actions were sufficient to achieve a level of "no significant risk" or at least ensure that all substantial hazards were eliminated.

FST visited MassDEP's Central Region office on March 13, 2008 to review the files for this site. According to the files, previous investigations determined elevated levels of metals, VOCs, SVOC, pesticides, and PCBs in soil samples at the site. The potential rail trail would follow existing track alignment east of the building. Elevated levels of arsenic, from 11-28 ppm, were found at this location, and in May of 2000 remedial activities were conducted to remove and dispose of this material. An excavation volume of 20 ft wide by 25 ft long by 2 ft deep was excavated and samples were analyzed by a grid method. Approximately 9 cubic yards of contaminated soil were excavated. No groundwater was encountered during excavation and groundwater is approximated to be 13 feet below ground. No groundwater data was available. Excavation and soil assessment was completed in a limited area to the south of the building where the potential rail trail would be located. Further soil evaluations along the trail corridor in front of the building would be required during preliminary design. Also, if dewatering for a trench drain as part of driveway reconstruction was to occur, contaminated groundwater could also be a concern.

Harbor Village Shops: The Harbor Village Shops site is located along Main Street (Route 119) in Townsend. The project corridor directly abuts the rear of this shopping center. According to the DEP's database, this site is currently classified as a Class B1 RAO. This classification indicates that a level of "no significant risk" exists.

FST visited MassDEP's Central Region office on March 13, 2008 to review the files for this site. According to the files, a subsurface investigation was warranted after oil and hazardous materials were encountered above reportable concentrations during subsurface work. Tetrachloroethene (PCE) above reportable concentrations in water was found in one monitoring well located south of the dry cleaners. Groundwater flow is mapped as southerly towards the potential rail trail, however, no contaminants were found above method detection limits in the two monitoring well south of the site and closest to the potential rail trail location. Positive headspace readings (area of air above of the soil sample) were recorded at low levels only at the monitoring well closest to the dry cleaners. No headspace readings, odors or stained soil was observed at the two monitoring wells closest to the potential rail trail location. A potential for contaminant migration from groundwater to the potential rail location is possible but unlikely to be a construction issue due to proposed excavation only being a few feet below grade.

5.2 Recommendations

Based on the results of the MassDEP file review and research on the former railroad operations, it is recommended that further soil evaluations be performed during the preliminary design phase. These evaluation locations should include the sections of corridor in front of Shepherd's Auto Body and behind Harbor Auto Body, both in Townsend Harbor. Also of interest is the section of corridor just north of Depot Street in Townsend Center, should it be developed as a trailhead parking area. The section of corridor just north of Depot Street poses a concern based on the history and operations occurring at this site when it was in use as a railroad depot. According to the DEP's "Best Management Practices for Controlling Exposure to Soil during the Development of Rail Trails," these relatively small stretches along a right-of-way would be expected to have contamination elevated over the residual levels, due to more frequent/intense use of pesticides to improve sight lines and greater frequency/intensity of human activities.

Also, of recent concern across the state has been the presence of coal ash along former railroad corridors. Coal ash is residual contamination from former railroad operations. This by-product is exempt from the Massachusetts Contingency Plan (MCP). The MCP (310 CMR 40.0000) is the set of regulations that governs the reporting, assessment and cleanup of oil and hazardous material spills in Massachusetts. While, it is acceptable to both leave and re-use soil containing coal ash along a corridor, the DEP's anti-degradation policy restricts off-site reuse to a similar setting. Consequently, leftover materials may need to be transported to an approved landfill at additional costs to the Contractor, which ultimately increases the overall cost of the trail project to the Town. It is therefore important for the trail design to balance cut and fill volumes to minimize any transportation of material off-site. This policy does not apply to contamination "hot spots" where contamination other than residual contamination is present. For example, if an oil or hazardous material spill has contaminated the soil along a portion of the corridor, this soil cannot be left or place or re-used and must instead be cleaned up under the MCP.

Bridge rehabilitation activities will be included as part of this project and therefore may present lead based paint or lead waste concerns. As documented in the Structures section of this report, the containment and disposal of lead contaminated material is expensive and requires strict compliance with worker and environmental protection regulations. The rail trail construction specifications will need to document proper lead containment, handling and disposal procedures to be followed and account for the costs thereof.

It should be noted that the rail trail construction would not introduce any hazardous waste or contaminated materials to the project area.

6 Cultural & Historic Resources

The purpose of this section is to identify cultural or historical resources along the project corridor. Identifying historical and cultural resources early in the project development process will help ensure that proper mitigation measures and specialist work can be incorporated into the next phase of the project. Further, an inventory is now required as part of the MassHighway Early Environmental Coordination Checklist included with the 25% design submission.

The information gathered from these various sources will:

- Assist the Town and project proponents in addressing community and preservation concerns early in the project planning process
- Help ensure that the project proceeds without causing harm to these important resources

Should the project advance to the design phase and have the potential to impact cultural or historic resources, a full review will need to be conducted in compliance with the regulations governing Massachusetts General Laws Chapter 9, sections 26-27C (as amended by Chapter 152 of the Acts of 1982 and Chapter 254 of the Acts of 1985) and Section 106 of the National Historic Preservation Act of 1966 as amended (36 CFR 800).

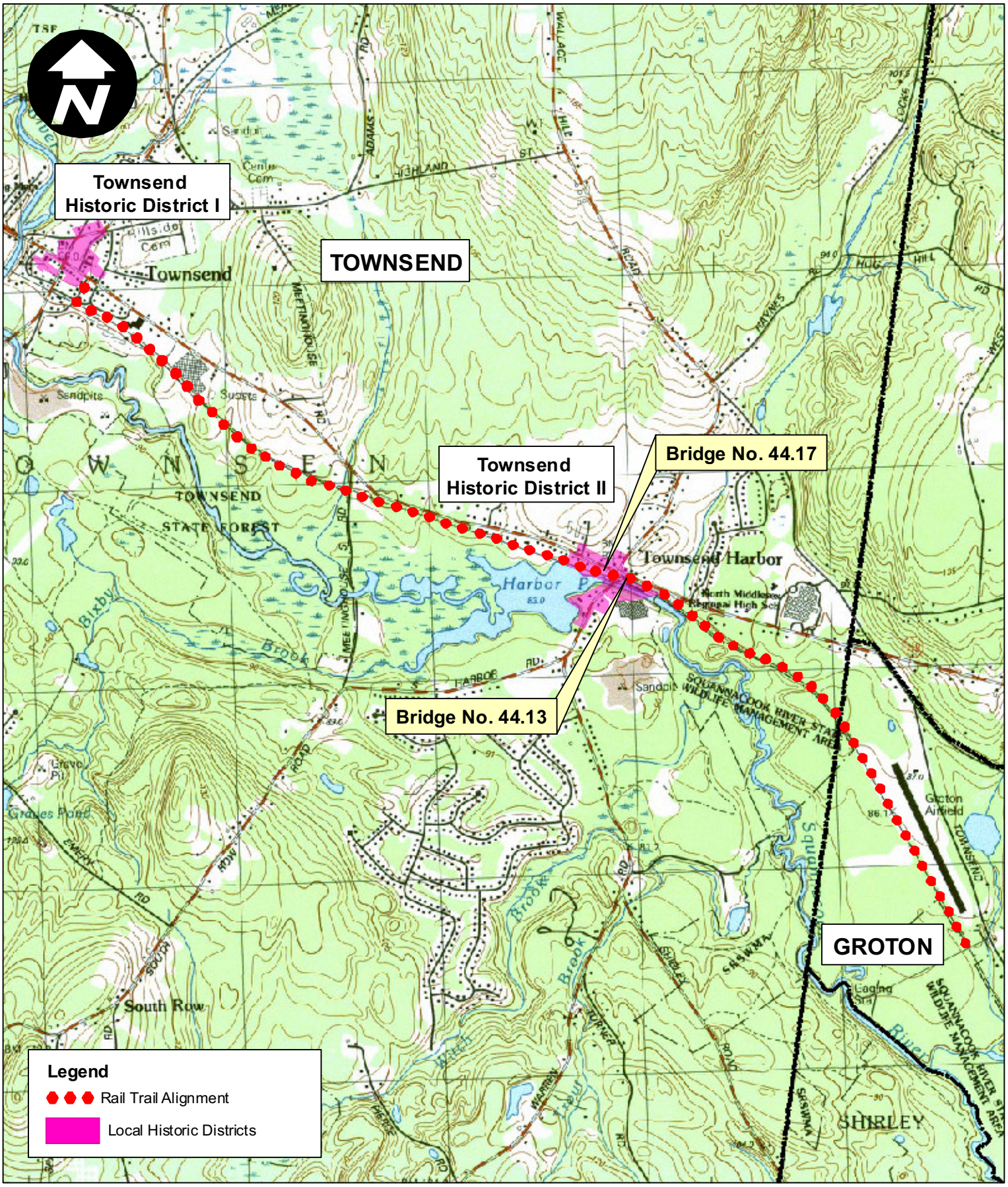
6.1 Local Inventory

The Groton Historical Commission, Townsend Historic District Commission, and Townsend Historical Society were contacted by letter as part of this Assessment to solicit any comments that each group wished to make regarding the rail trail project. Copies of the letters received are included in Appendix E. The Groton Historical Commission and Townsend Historic District Commission act as the official agents of each Town in regards to historic resources. The Townsend Historical Society is a private organization with no jurisdiction. They were contacted at the Committee's request, as they own multiple historic properties along the corridor in Townsend Harbor.

At the beginning of the project in Townsend Center, the trail connection travels adjacent to, but not through, the Townsend Historic District I (MHC Inventory Number TOW.A). Townsend Historic District I was established in 1978 and encompasses the area around Townsend Common along Route 119 and Route 13. Figure 11 graphically shows this local historic district's location relative to the rail trail corridor.

Further south, the rail trail corridor travels through the Townsend Historic District II (MHC Inventory Number TOW.B) and includes an area of Townsend Harbor at the intersection of Main Street (Route 119), South Street and Spaulding Street. This local historic district was established in May 1978 and is graphically shown in Figure 11.

At the end of the project, the railroad corridor travels in proximity to the Squannacook River Area (MHC Inventory Number GRO.S), an area of West Groton also referred to as Thompsonville. Thompsonville was once the site of small settlement and saw mill owned by Asa Howard Thompson along the banks of the Squannacook River. When this mill closed in 1901, the site was sold to the Groton Leatherboard Company and gifted to the Town of Groton as the Squannacook Wilderness Reservation. This site is now known as the Bertozzi Conservation Area as shown in Figure 11. (FST to add)



Townsend & Shirley USGS Quads

Scale: 0 1,200 2,400 Feet

Figure 11: Local Historic Districts
Squannacook River Rail Trail
Townsend & Groton, Massachusetts

6.2 State Inventory

The Massachusetts Cultural Resource Information System (MACRIS) was reviewed to identify known historic and cultural resources in proximity to the project corridor. MACRIS data includes but is not limited to, the Inventory of Historic Assets of the Commonwealth, National Register of Historic Places nominations, State Register of Historic Places listings, and local historic district study reports.

Figure 12 documents sites directly abutting the rail trail corridor. The sites are listed in the order in which are they located from north to south.

Figure 12: Historic Properties Abutting Corridor

MHC Inventory No.	Property Name	Address	Year Built / Established
TOW.A	Townsend Historic District I	Townsend Center	1975
TOW.B	Townsend Historic District II	Townsend Harbor	1978
TOW.52	Townsend Harbor Meeting House	Main Street Townsend	1852
TOW.53	Peter Peterson House	78 Main Street Townsend	1920
TOW.50	Unknown	74 Main Street Townsend	1856
TOW.54	Reed Homestead	72 Main Street Townsend	1856
TOW.906	Townsend Harbor Pond Water Control Dam	Harbor Pond Townsend	1870
TOW.902	Peterborough and Shirley Railroad Bridge	Spaulding Street Townsend	1880
TOW.48	E.S. Spaulding Cooperage	South Street Townsend	1845
TOW.908	Townsend Harbor Bridge #1	South Street Townsend	1937
TOW.903	Peterborough and Shirley Railroad Bridge	Spaulding Street Townsend	1880
TOW.37	Spaulding Leather Board Factory Storage Shed	Main Street Townsend	1920
TOW.34	Spaulding Leather Board Factory	Main Street Townsend	1894
TOW.39	J. Spaulding & Sons Grist Mill	South Street Townsend	1840
GRO.S	Squannacook River Area (Thompsonville)	West Groton	

Source: Massachusetts Cultural Resource Information System (MACRIS) Database, January 2008.

None of these properties are listed in the National Register of Historic Places according to the National Register Information System (NRIS) maintained by the National Park Service (January 2008).

Figure 13: Townsend Harbor Meeting House

Figure 14: Reed Homestead

Figure 15: E.S. Spaulding Cooperage

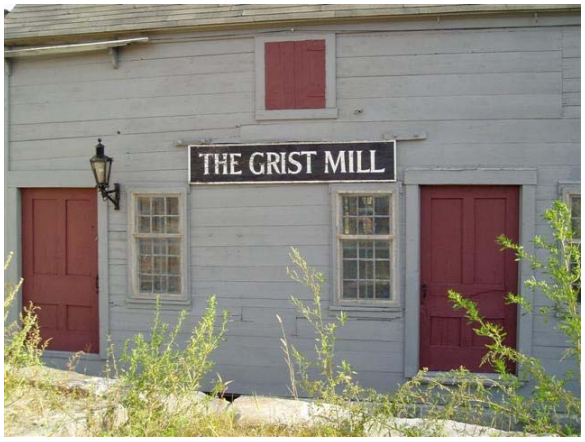


Figure 16: J. Spaulding & Sons Grist Mill

Figure 17: Peterborough and Shirley Railroad Bridge Over Grist Mill Sluiceway

Figure 18: Former Spaulding Leatherboard Factory Site

7 Cross Section

The purpose of this section is to provide an overview of design elements that need to be considered when selecting a typical rail trail (shared use path) cross section.

MassHighway and the Federal Highway Administration (FHWA) require that a shared use path designed or constructed with state or federal funds follow the design standards of the American Association of State Highway & Transportation Officials (AASHTO). However, the new MassHighway Design Guide also acknowledges that site-specific conditions often warrant the need to take a more flexible and accommodating design approach. The guidelines set forth in AASHTO constitute the starting point for the design. Deviations from AASHTO can be justified based on site-specific conditions. All projects are looked at by MassHighway on a case-by-case basis.

The conceptual design for this project is based on the following guidelines and regulations:

- MassHighway Project Development & Design Guide (2006)
- AASHTO Guide for the Planning, Design and Operation of Pedestrian Facilities (2004)
- AASHTO Guide for the Development of Bicycle Facilities (1999)
- The Rules & Regulations of the Massachusetts Architectural Access Board (521 CMR)
- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- Manual on Uniform Traffic Control Devices (MUTCD)

7.1 Design Criteria

The rail trail cross section is typically governed by the existing corridor right-of-way, “rail bed” width, and the location of adjacent environmental resource areas. In addition to site-specific constraints, the rail trail cross section must also meet or exceed the design criteria included in the guidelines and regulations listed above. If these criteria cannot be met, then a formal design waiver must be requested from the reviewing agency (i.e. MassHighway).

7.1.1 Surface Width

Under most conditions a surface width of 10 feet is recommended. This recommendation is consistent with AASHTO and MassHighway guidelines. In rare instances, an 8-foot surface can be adequate where the following conditions prevail:

- Low bicycle traffic
- Low ped traffic
- Good horizontal and vertical alignment
- Low use by maintenance vehicles that could potentially cause edge damage

According to the MassHighway Design Guide, a reduced width of 8 feet may also be acceptable where there are severe environmental, historical, and/or structural constraints. MassHighway's Bicycle - Pedestrian Accommodation Engineer noted that a reduction in width is typically considered for a small stretch of corridor where there are such constraints. Such a design decision is usually discussed during the formal review

process, at which time the designer is often asked to provide justification for the reduction in width.

Regardless of the width, the trail should have a 1.5% cross slope in one direction to aid in drainage. The direction of the cross slope can vary along the corridor depending upon the topography and adjacent land use. A 1.5% cross slope is the same as a typical sidewalk and meets ADA accessibility guidelines.

7.1.2 Shoulders

A minimum 2-foot wide graded clear shoulder should be maintained adjacent to both sides of the trail. This shoulder is not considered part of the traveled way. The shoulder is typically graded to a slope of 1 vertical to 12 horizontal (1:12) to enhance proper drainage to prevent erosion as well as provide a recovery zone for trail users. It is commonly constructed using soft surface materials such as grass, gravel borrow, stone dust, or other stabilized materials.

It is recommended that existing low-lying vegetation located within 6 feet of the edge of the trail surface be cleared and grubbed. In addition, based on recent rail trail designs, it is recommended that a high-density plastic root barrier be installed along sections of the project corridor where future tree root or vegetative growth may pose an issue. The root barrier effectively redirects tree roots down and away from the trail surface, preventing costly root damage while preserving the health and beauty of mature trees. Figure 19 shows a typical root barrier installation along a rail trail. Due to its price, root barrier should only be installed in areas where root damage can be anticipated. The barrier depth and material specifications depend on the tree species along the corridor and is typically determined as part of the design process.

Figure 19: Root Barrier Installation

7.1.3 Equestrian Path

A 4 to 5 foot widened shoulder is included on some projects for use by equestrians, and also by trail runners, walkers and mountain bikers. Due to proximity of several environmental resource areas along this corridor, it is not recommended that a 4 to 5 foot wide soft shoulder be developed along one side of the rail trail.

7.1.4 Horizontal Clearance

A minimum 3-foot clearance should be maintained from the edge of the trail to signs, trees, poles, walls, fences, guardrails, or other obstructions.

A 5-foot separation from the edge of the trail surface to the top of slope is desirable in areas where the trail is located adjacent to ditches or slopes steeper than 1 foot vertical to 3 feet horizontal (1:3). If this offset cannot be achieved, then a physical barrier such as a wood rail fence, dense shrubbery or a chain link fence, should be installed along the top of slope to protect trail users.

Figure 20: Typical Wood Rail Fence

In general, the greater the height of the drop-off, the greater the need for protection. According to AASHTO guidelines, the fence should be set at a height of 3.5 feet (42 inches). Rub-rails are recommended at a height of approximately 3-feet from grade to prevent snagging of handlebars. All fences should be smooth and free of protruding objects such as bolts. An example wood rail fence installation is shown in Figure 20.

7.1.5 Vertical Clearance

A minimum permanent vertical clearance to obstructions of 8 feet is required by 521 CMR and ADAAG. According to MassHighway, in some instances, vertical clearance may need to be greater to permit passage of maintenance and emergency vehicles. Based on recent rail trail construction project, a vertical clear zone of at least 12 feet above the finished grade accounts for the size and physical limitations of the construction equipment. Therefore, it is recommended that the clearance diagrams included with the rail trail design plans show a 12-foot vertical clearance.

7.2 Recommended Cross Sections

Five different typical sections are recommended along the 3.7-mile Squannacook River Rail Trail segment covered in this Assessment report. These sections take into account the design elements discussed in the previous section.

- Section A – Typical Section
- Section B – Typical Section Along Depot Street
- Section C – Typical Section at Harbor Autobody
- Section D – Typical Section Through Historic District
- Section E – Typical Section at Shepherd's Autobody

Each Typical Section is illustrated on the following pages and denoted on the base mapping included in Appendix B.

7.2.1 Section A – Typical Section

The typical section proposed along the majority of the project corridor consists of a 10-foot wide surface with 2-foot shoulders adjacent to both sides of the trail, as shown in Figure 21. This section will meet MassHighway guidelines for the recommended surface width, shoulder width and offset to obstructions.

7.2.2 Section B – Typical Section Along Depot Street

The typical section proposed along Depot Street consists of a separated rail trail located parallel to a single one-way travel lane along Depot Street, as shown in Figure 22. Along this segment, it is recommended that the trail width be reduced from 10 feet to 8 feet to minimize impacts. When a rail trail is located adjacent to a roadway, a 7-foot separation between the edge of the shoulder and bikeway is recommended with the minimum being 5 feet. Section B includes a 5-foot grass shoulder to meet the minimum requirement. In addition, a minimum 3-foot clearance from the edge of the trail to existing obstructions must be maintained. This section will meet MassHighway guidelines for the minimum surface width, shoulder width and offset to obstructions. Field survey is needed in this area to determine which side of the road the separate rail trail facility should be located, in order to minimize impacts to Depot Street abutters. This trail connection is discussed in further detail in Section 11 of this report.

7.2.3 Section C – Typical Section at Harbor Autobody

Approximately 1700 feet north of where the corridor crosses South Street, the rail trail corridor travels behind Harbor Autobody. As discussed in Section 2.4, Harbor Auto Body installed a chain link fence around their property that encroaches approximately 31 feet beyond where they own.

In this section, there is insufficient right-of-way width to relocate the rail trail on top of the stone wall. Also, due to the history of operations occurring at the autobody site, the trail section in this area should be elevated to minimize exposure to any potential contaminant migration from groundwater. Based on this information and the desire to maintain the existing swale in this area, it is recommended that this encroachment be removed and the rail trail routed along the existing track alignment. Section D is shown in Figure 23.

7.2.4 Section D – Typical Section Through Historic District

The proposed rail trail travels through the Townsend Historic District II, which includes an area of Townsend Harbor at the intersection of Main Street (Route 119), South Street and Spaulding Street. This local historic district is discussed further in Section 6.

It is recommended that the trail surface width be reduced from 10 feet to 8 feet through the historic district to minimize the construction footprint through this sensitive area. Two (2) foot shoulders will be provided adjacent to both sides of the trail. This typical section will still meet MassHighway guidelines for the minimum allowed surface width, shoulder width and offset to obstructions. Section C is shown in Figure 24.

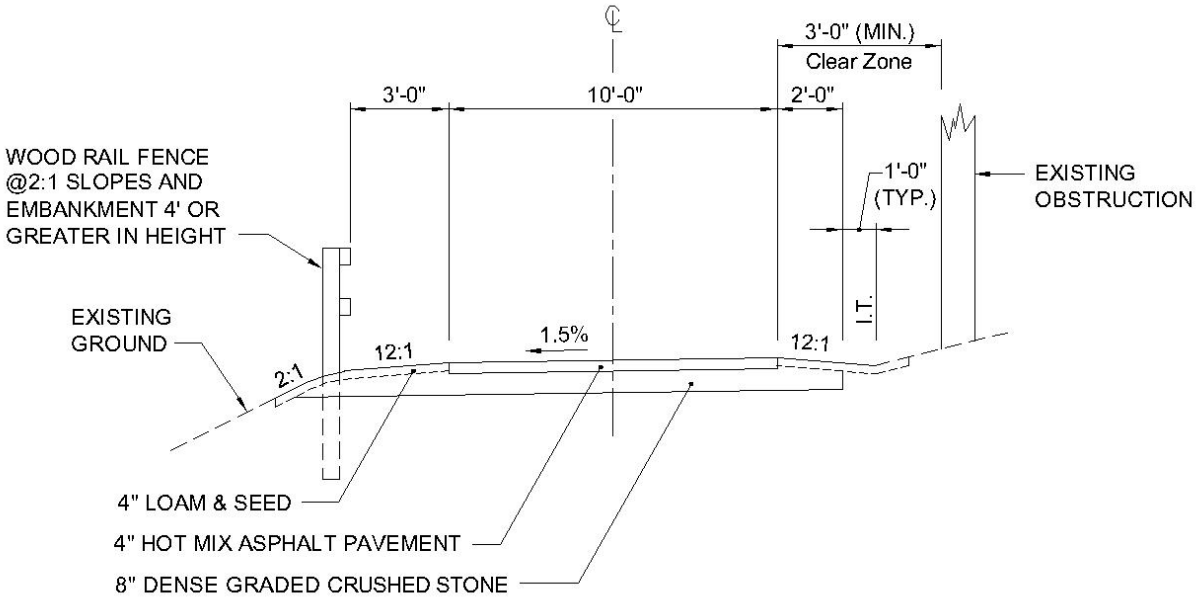
Other design treatments and enhancements proposed within the historic district are further discussed in Section 8.3 and Section 11.2 of this Assessment.

7.2.5 Section E – Typical Section at Shepherd's Autobody

In front of Shepherd's Autobody & Landscaping business in Townsend Harbor, it is recommended that a 300-foot section of the rail trail be realigned to travel adjacent and parallel to Route 119 (Main Street), as discussed further in Section 11.2.

Along this segment, it is recommended that the trail width be reduced from 10 feet to 8 feet to minimize impacts and tie into the proposed Section D through the Townsend Harbor historic district. This trail segment will be treated as a driveway opening and be constructed as a concrete driveway apron. A concrete trail surface along Route 119 will serve as a visual cue of rail trail alignment to users and motorists. The driveway apron will consist of an 8-foot trail with a 5-foot separation to Route 119. In addition, a minimum 3-foot clearance from the edge of the trail to existing trees and utility poles must be maintained. This typical section will meet MassHighway guidelines for the minimum allowed surface width, shoulder width and offset to obstructions. Section E is shown in Figure 25.

❖ Cross Section

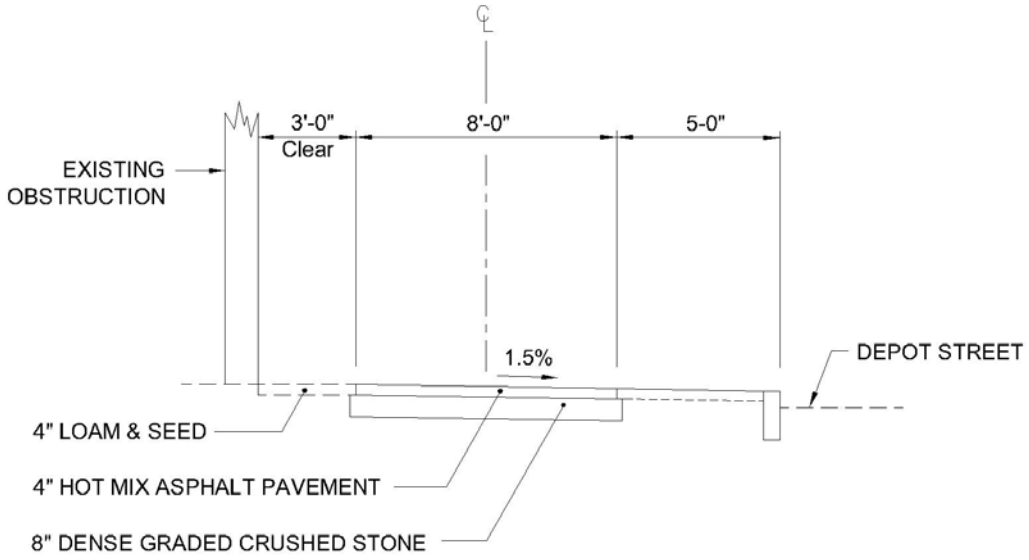


Proposed Trail Cross Section

Existing Condition

Figure 21: Section A – Typical Section

❖ Cross Section

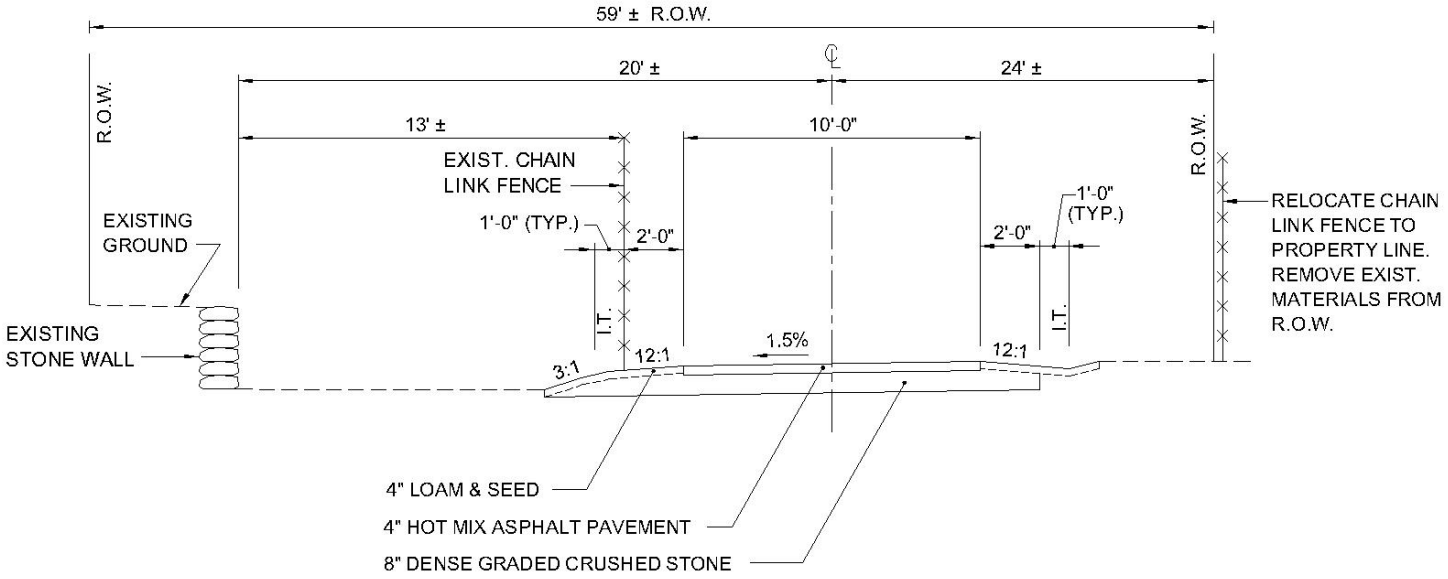


Proposed Trail Cross Section

Existing Condition

Figure 22: Section B – Typical Section Along Depot Street

❖ Cross Section

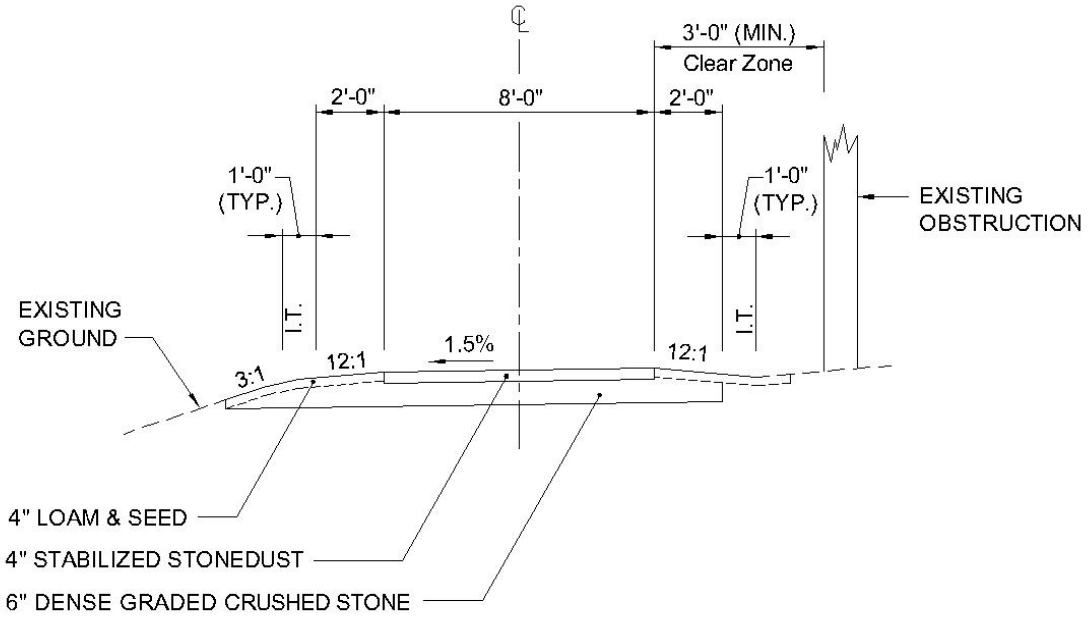


Proposed Trail Cross Section

Existing Condition

Figure 23: Section C – Typical Section at Harbor Autobody

❖ Cross Section

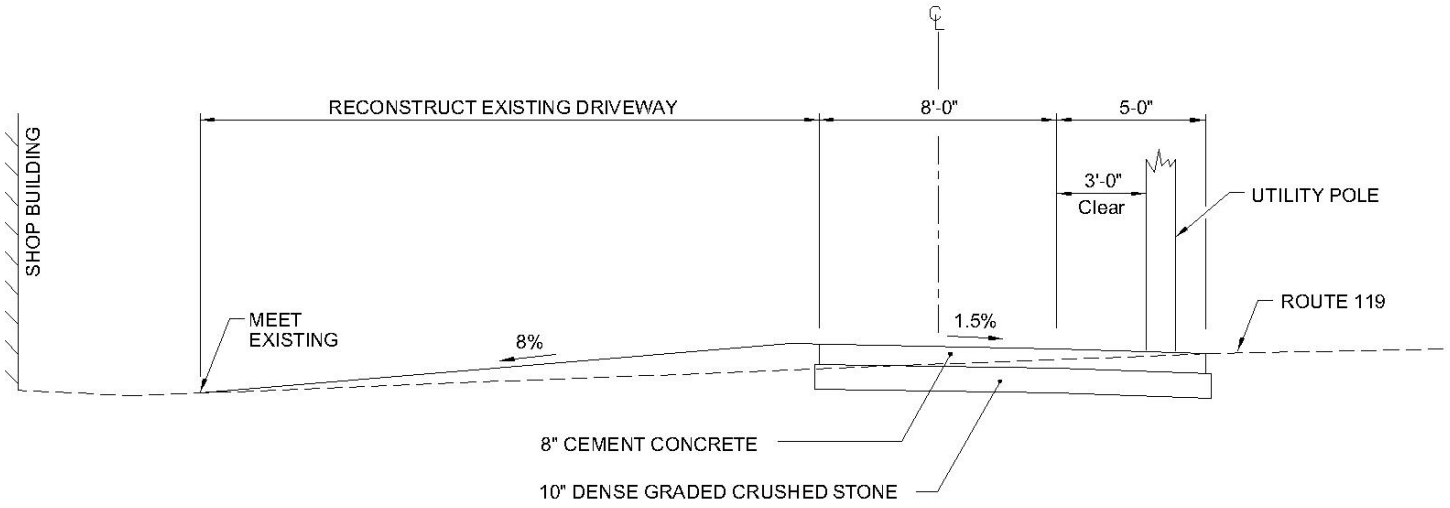


Proposed Trail Cross Section

Existing Condition

Figure 24: Section D – Typical Section Through Historic District

❖ Cross Section



Proposed Trail Cross Section

Existing Condition

Figure 25: Section E – Typical Section At Shepherd's Autobody

8 Trail Surface

The purpose of this section is to discuss some of the available surface materials commonly used in rail trail construction.

An important consideration in rail trail design is the type of surface that will be provided. The selection of a suitable material is a very important aspect of the functionality and aesthetic appeal of the final product.

The selection of surface material primarily depends on:

- Intended types of use
- Intensity of use
- Project setting (environmental, historic and aesthetic)
- Maintenance requirements

Other factors to consider include:

- Project terrain and climate
- Material costs
- Constructability

At a minimum, the selected surface needs to be "accessible" in accordance with the Americans with Disabilities Act (ADA) Accessibility Guidelines (ADAAG). An accessible surface must be "stable, firm and slip resistant."

8.1 Materials

The following is a brief discussion of common surface materials used in rail trail construction. Each Town will need to weigh the pros and cons of each material option to determine what is an appropriate surface material for both communities.

In the past, Transportation Enhancement (TE) funding, administered by MassHighway, prioritized asphalt surfaced rail trail projects. However, there have been a handful of projects that have been funded and constructed with alternative surface materials. The new MassHighway Project Development & Design Guide specifically addresses the option to use both paved and unpaved surface materials. However, the selected surface will be subject to review and discussion during the formal MassHighway review process.

8.1.1 Paved Surfaces

Hot Mix Asphalt: Hot mix asphalt, also referred to as pavement or bituminous concrete, is the same surface material used on roadways and other Massachusetts rail trails (i.e. Nashua River Rail Trail, Assabet River Rail Trail, Ashuwillticook Rail Trail). Asphalt is a durable material which, when properly constructed, requires minimal maintenance and has a long service life. For example, the Cape Cod Rail Trail was recently resurfaced after more than 25 years of use. Surface and crack sealing can further expand its service life. By its nature, asphalt meets ADAAG requirements for firmness, stability and skid resistance. Asphalt accommodates the widest variety of users and is suitable for all levels and abilities.

The color of asphalt tends to contrast with its surroundings more than other surface material options. As an impervious surface, runoff from the asphalt needs to be directed to adjacent vegetated swales. In addition, its hard, smooth surface tends to lead to faster speeds for bicycles and use by inline skaters.

8.1.2 Granular Surfaces

Some naturally occurring granular surfaces are considered firm and stable when properly installed and maintained. When selecting a natural surface, it is important to consider the properties of the material in both wet and dry conditions. For example, many granular surfaces may be firm when dry but get soft when wet. In addition, because these surfaces are not impenetrable, seeds can establish root in the trail to produce weeds without proper maintenance.

Stone Dust: A crushed stone or stone dust mixture can be placed on a compacted base, separated by a geosynthetic liner. When properly compacted and maintained, such granular surfaces can provide moderately firm and stable surfaces to meet ADAAG requirements. Angular, crushed fines will interlock and provide a more stable surface than aggregates with a higher percentage of "round" particles. Stone dust provides a repairable surface with a natural appearance. The performance of stone dust is dependent upon drainage patterns, as it is highly susceptible to rutting and washouts. This type of surface requires a considerable level of ongoing maintenance including such activities as re-grading, resurfacing and weed removal. An edge treatment may be needed to prevent the stone dust from mixing with the shoulder material. Crushed stone or stone dust surfaces also limits the types of user activities. When dry, a stone dust surface is flexible and when it becomes wet, the entire surface softens.

8.1.3 Stabilized Granular Surface

Natural surfaces may also become firm and stable when combined with a stabilizing agent. Stabilizing agents can be in the form of a spray application or a material admixture. This agent, when added or applied to native soils, granite or crushed aggregate screenings, binds the aggregate to provide a firm natural surface that meets ADAAG requirements. As the water evaporates from the mixture, the surface becomes hard and will resembles an asphalt surface. Stabilized granular surfaces can provide increased durability and erosion resistance over conventional granular surfaces. Repairs can be accomplished with a small mixer. The color, texture and appearance of the finished surface depends on the selected aggregate (e.g. tan, gray, red). There are many different products available including, for example, Stabilizer Solutions, PolyPavement, DirtGlue and Road Oyl. Stabilizer Solutions is the same material used at the Minuteman National Park Battle Road Trail and DCR's Charles River Reservation trails. When dry, a stabilizer granular surface is firm and when it becomes wet, the top ¼" of the surface softens.

8.2 Cost Comparison

The following is a comparison of a complete-in-place construction cost of each surface material option.

Figure 26: Surface Material Cost Comparison

Surface Material	Unit Price per Square Foot (Installed)	Notes
Hot Mix Asphalt	$4.50	4" Asphalt 8" Dense Graded Crushed Stone or Gravel Borrow
Granular (Stone Dust)	$4.00	4" Stone Dust Geotextile fabric for separation 6" Dense Graded Crushed Stone or Gravel Borrow
Stabilized Granular Surface	$5.50	4" Stabilized Stone Dust (3" nominal compacted) Geotextile fabric for separation 6" Dense Graded Crushed Stone or Gravel Borrow

These prices are intended to be used for comparison purposes. They do not include the cost of excavation or edge materials such as root barrier.

Actual construction costs will vary based on such factors as:

- Economy of scale considerations (total square feet)
- Accessibility of the project site
- Specialized equipment required to perform the work
- Restrictions placed on size and weight of equipment used

8.3 Recommendation

For the Squannacook River Rail Trail, FST recommends use of a *hot mix asphalt surface* material for its durability, user friendliness and ease of maintenance. Also from a funding perspective, MassHighway has prioritized paved surface rail trail projects in the past. The recommended pavement design consists of:

Surface Course: 1.5" Hot Mix Asphalt (HMA) Surface Course Type A
Intermediate Course: 2.5" Hot Mix Asphalt (HMA) Intermediate Course Type B
Base Material: 4" Dense Graded Crushed Stone or Gravel Borrow

Using this design, the estimated lifetime of the pavement wearing surface is approximately 11-13 years. Practicing preservation maintenance would extend the service life of the pavement.

Ideally, the rail trail surface material should be consistent along the entire corridor. However, FST also recognizes the need to preserve the integrity of the Townsend Historic District II in the South Road area of Townsend Harbor. This local historic district is discussed further in Section 6. Therefore, we recommend that consideration be given to transitioning the surface material from a hot mix asphalt to a *stabilized granular surface* in this area.

The recommended stabilized granular surface design for this corridor consists of:

Surface Course:	4” Stabilized Stone Dust (3” nominal compacted) Geotextile fabric for separation
Base Material:	6” Dense Graded Crushed Stone or Gravel Borrow

This surface transition area should be limited to the district boundary that extends from the north side of Shepherd’s business to a point just north of the Harbor Church (Townsend Harbor Meeting House), a distance of approximately 1,000 feet. As trail surface material can limit user groups, proper notice would need to be posted at trail access points to alert users to this transition area.

Also, where the trail parallels Route 119 and Shepherd’s Auto Body in Townsend Harbor, it is recommended that the trail transition to a *concrete surface* as it will function as both a sidewalk and shared use path for a distance of approximately 300 feet. Based on conversations with Shepherd’s, the concrete surface will need to accommodate a 22-wheeler truck weighing upwards of 50 tons. The recommended concrete surface design for this corridor consists of:

Surface Course:	8” Concrete
Base Material:	10” Dense Graded Crushed Stone or Gravel Borrow

Nonetheless, the towns can consider the appropriate trail surface material option for both communities. If state and federal funding is sought for this project, then the selected surface material will also be subject to review and approval by MassHighway during the design process.

9 Roadway Crossings

The purpose of this section is to discuss the engineering design issues that need to be taken into consideration where the project corridor crosses roadways at-grade. Along the main project corridor, there are a total of five (5) at-grade roadway crossings. Introducing a trail crossing at each of these locations presents operational and safety issues for both vehicles and rail trail users.

Figure 27: Roadway Crossings along SRRT

Intersecting Roadway		Town
1	Depot Street	Townsend
2	Old Meetinghouse Road	Townsend
3	South Street	Townsend
4	Crosswinds Drive	Groton
5	Crosswinds Drive	Groton

A trail spur to the North Middlesex Regional High School is also proposed which requires users to cross Route 119. This connection is discussed in Section 11.1 of this report.

The development of an appropriate design treatment at each rail trail / roadway crossing requires an evaluation of a variety of issues not typically addressed in the traditional approach to intersection design. Traditionally, intersection design has focused primarily on providing sufficient capacity to safely handle expected motor vehicle volumes. However, a successful design must now also consider the expectations of both motorists and rail trail users.

9.1 Design Considerations

The primary design goal will be to develop a consistent strategy to improve intersection safety at each trail / roadway crossing. Design issues evaluated at each intersection include alignment, approach, sight distance, access, signage & pavement markings, and traffic control.

9.1.1 Alignment

The project corridor can be characterized by long, uninterrupted stretches that are straight and relatively flat. Although this alignment creates a trail that is easy for users of all ages/abilities to enjoy, it also tends to reduce the awareness of an approaching roadway and results in some users disregarding stop signs.

To address this issue, two different alignment options were considered at each trail / roadway crossing. The appropriateness of each option depends upon site constraints and the characteristics of the intersecting roadway.

Reverse Curve Alignment: This option introduces short, reverse curves (e.g. 'S' curves) in the rail trail alignment, which effectively increases user awareness of a change in conditions (e.g. an approaching intersection) and requires bicyclists to reduce speed.

At skewed intersections, the reverse curve alignment serves to divert the trail from the current alignment and reposition the user at the preferred crossing location (Figure 28). This realignment creates close to a 90 degree crossing and shortens the crossing length, while resulting in minimal trailside disturbance. Recognizing the benefits of this approach treatment, it is also recommended for consideration at locations where the existing crossing is already at 90 degrees. This option typically requires additional vegetative clearing and grading to realign the trail. Therefore, while the Reverse Curve Alignment is the preferred treatment for safety reasons, it must be weighed against the extent of anticipated trailside impacts.

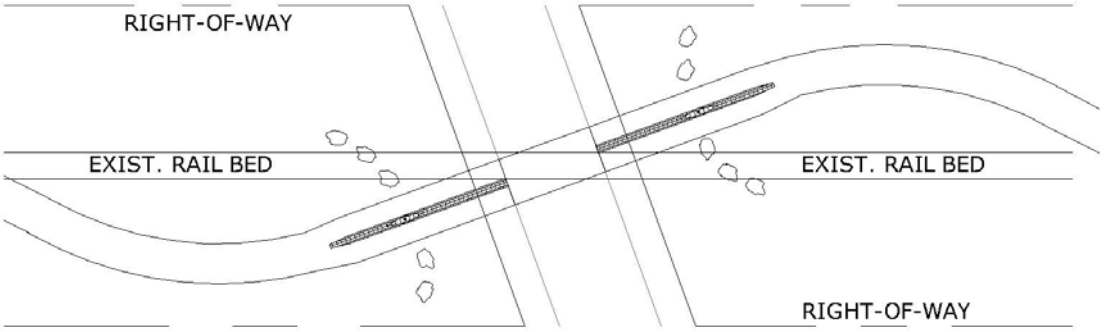


Figure 28: Reverse Curve Alignment

Straight Alignment: This alignment option keeps the trail along the existing track alignment and is commonly used where realigning the trail may not be feasible or necessary. This option is often used where either site constraints are too restrictive (e.g. proximity of wetland resource areas, private property, or utility poles) or where the cross street is a low volume/speed roadway. At these locations, a Straight Alignment is typically recommended (Figure 29).

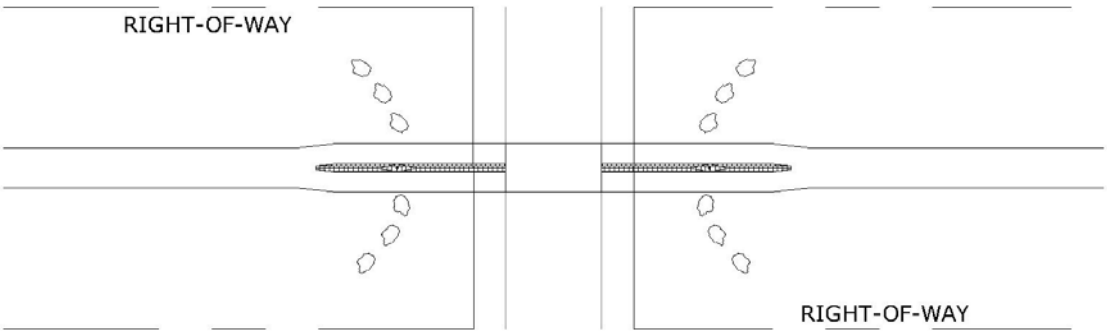


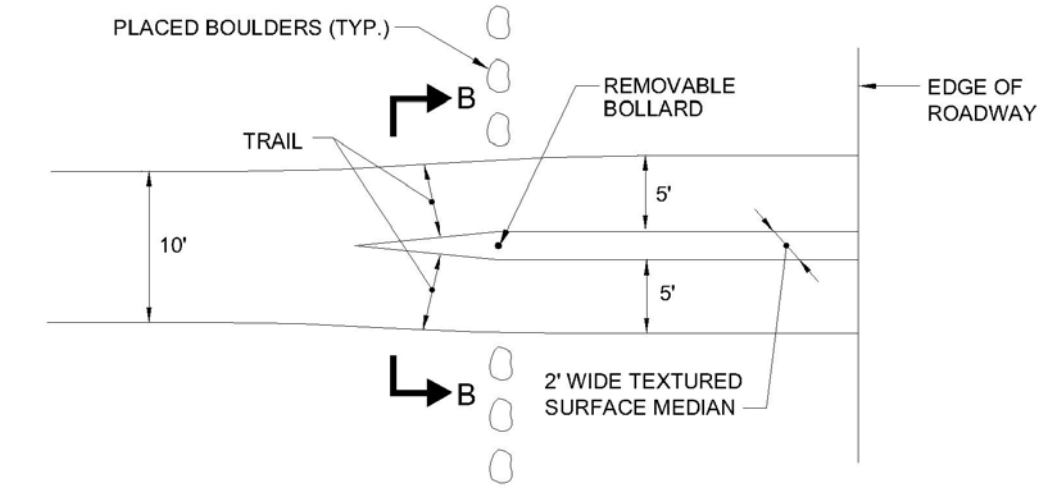
Figure 29: Straight Alignment

9.1.2 Approach

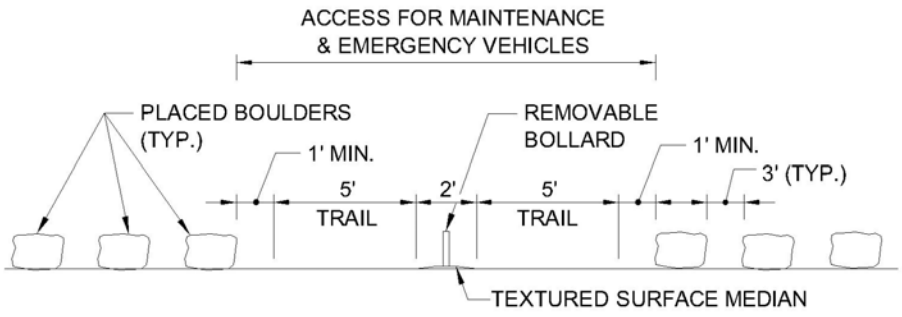
The alignment options discussed in the previous section can be combined with different approach treatments to further define the location of rail trail / roadway crossings to both users and motorists. Two such approach treatments are discussed below.

Narrow Median: As show in Figures 30 and 31, this approach treatment features a flush, 2-foot wide divisional island on the approach to the intersection. A removable bollard is placed in the center of the divisional island to restrict unauthorized motor vehicle access while permitting access by maintenance and emergency vehicles. The flush island can consist of textured pavement in a brick pattern (e.g. Imprint), for example, or simply pavement markings. The island in effect splits the trail into two, one-way routes, a measure that also tends to reduce the speed of bicyclists approaching the intersection. This treatment is well suited for locations where site constraints restrict the extent to which the trail can be widened. In addition, this design raises users awareness of the bollard and requires little to no maintenance.

Figure 30: Narrow Median Application



Plan

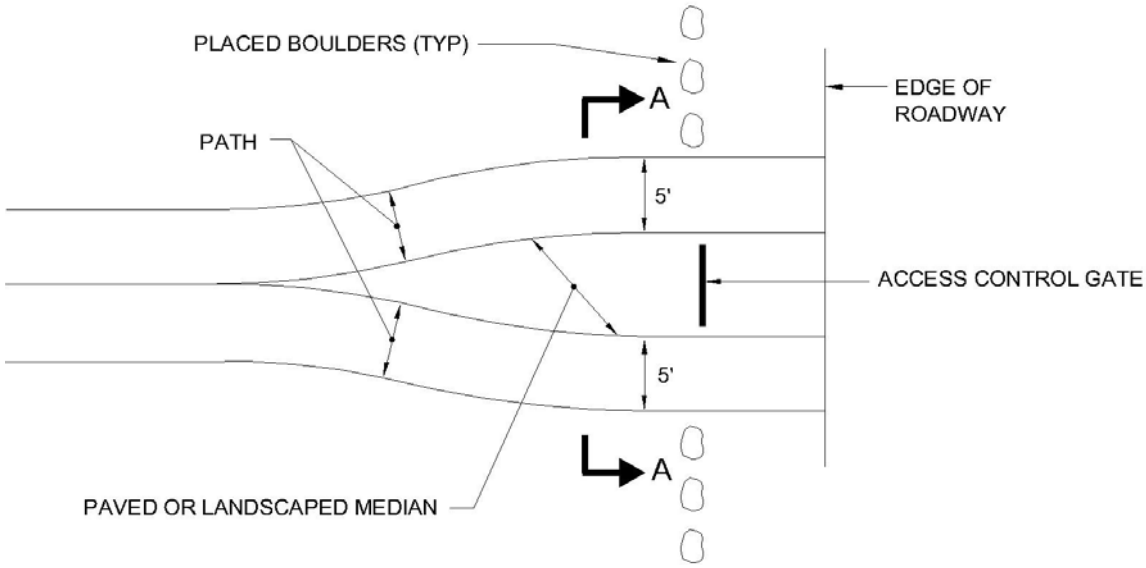


Elevation A-A

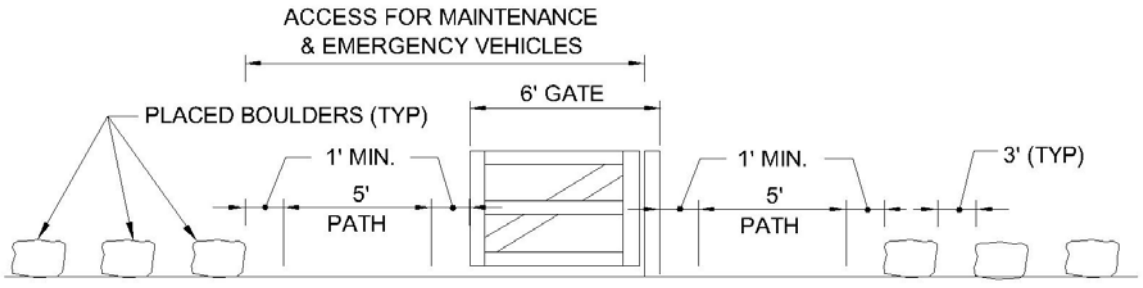
Figure 31: Narrow Median Approach Treatment with Bollard

Wide Median: As shown in Figures 32 and 33, this approach treatment features a wider median island with a gate on the approach to the intersection and can be used where site conditions are less restrictive (i.e. available right of way, lack of proximate resource areas). The gate serves to restrict unauthorized motor vehicle access while permitting access by maintenance and emergency vehicles. Common gate designs include a rustic wooden gate with the trail name engraved on it such as the one shown in Figure 32. The wider median can consist of scored concrete or pavers, for example, or low-lying native vegetation that will require minimal maintenance, and not impair gate operation or user sight distance. This treatment functions similar to the narrow median but offers an additional opportunity to create a gateway entrance at each intersection.

Figure 32: Wide Median Application



Plan



Elevation A-A

Figure 33: Wide Median Approach Treatment with Gate

9.1.3 Sight Distance

Sight distance is the length of roadway visible to a motorist and in this case, also a trail user. Appropriate sight distance is related to driver and pedestrian safety and smooth traffic operations. Sight distance is affected by road geometry; such as grades and curves; roadside vegetation or other objects (i.e. signs, stone walls, fences, and so forth). Sight lines must be kept free of obstructions that might interfere with the ability of a motorist or trail user to verify that the roadway is clear.

Vegetative clearing will likely be required along all roadways to improve sight distance both for users (stopped at the intersection waiting to cross the roadway) and motorists (approaching the crossing). In general, the clearing limits at each crossing will call for the selective clearing and thinning of vegetation approximately 8 feet back along the trail in order to provide a 200-foot stopping distance from the center of the travel lane on the intersecting roadway (See Figure 34). This distance will vary depending on the curvature of the roadway and speed of the approaching vehicle, and will be calculated as part of the design phase when detailed survey is available. A graphic showing example clearing limits is included on the following page.

The design of each trail / roadway intersection should strive to balance maximum sight lines and minimize associated roadside impacts.

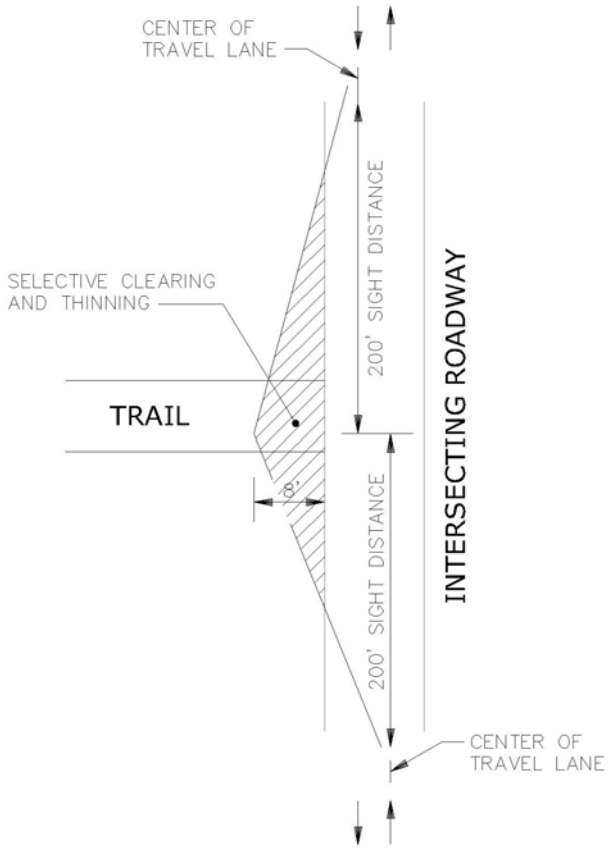


Figure 34: Clearing Limits for Sight Distance

9.1.4 Signage & Pavement Markings

Proper warning and regulatory signage and pavement markings will be utilized to improve safety conditions for both trail users and motorists as outlined in the MUTCD.

In addition, for user safety and emergency response actions, it is recommended that a mile marker and signage program be developed to assist users in identifying their current location along the trail.

This program should include:

- Post mile markers located consistently and correctly along one side of the trail that identifies the town where the marker is located
- One half-mile markers located along the trail surface between the mile markers
- Street name signs mounted on top of the stop signs at each trail/roadway intersection

9.1.5 Traffic Control

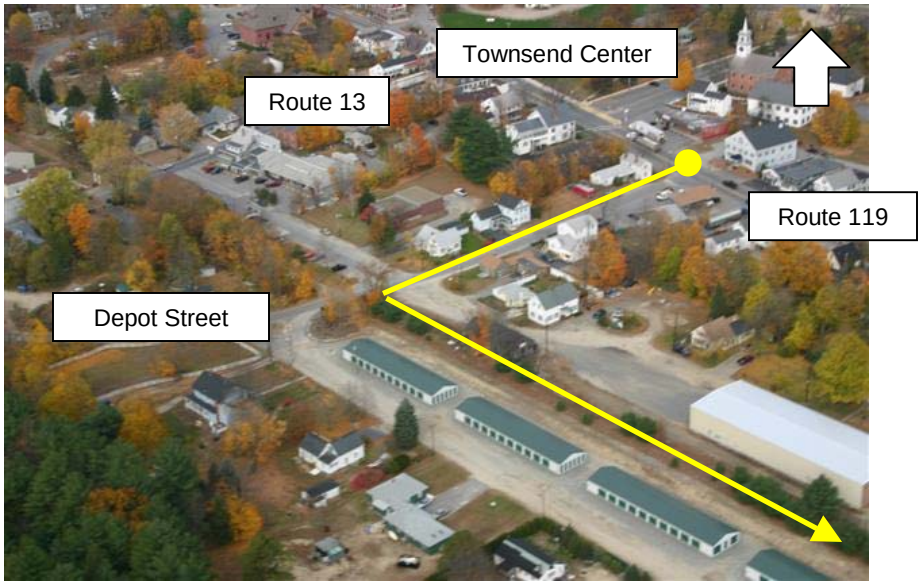
A traffic control system improves the safety of an intersection by providing additional warning of the approaching intersection to both vehicles and trail users. As noted in the MassHighway Project Development & Design Guide, traffic signals shall be considered where a trail crosses a roadway with volumes greater than 10,000 vehicles per day. Motor vehicle speeds along the crossing corridor are also an important factor in this analysis. According to the EOT Road Inventory database, none of the five (5) intersecting roadways along the main trail alignment meet or exceed the traffic volume threshold.

9.2 Intersection Improvements

The following Section discusses each crossing in more detail and outlines the deficiencies and general characteristics of each intersecting roadway.

Data presented in this section was compiled from the Commonwealth of Massachusetts Office of Transportation Planning Road Inventory Database (2006) maintained by the Executive Office of Transportation (EOT) and supplemented with field observations.

9.2.1 Depot Street – Townsend



Description: Depot Street is a one-way roadway that is used as a cut through between Elm Street (Route 13) and Main Street (Route 119). As discussed further in Sections 11 and 12, the need to physically cross Depot Street will depend on the location of proposed parking and which side of Depot Street the rail trail will continue along to connect to Route 119.

Type of Roadway: Local
Jurisdiction: Town
Est. Volume (ADT): 200 vehicles
Surface Width: 14 feet

Figure 35: Depot Street Crossing Looking Towards Route 119

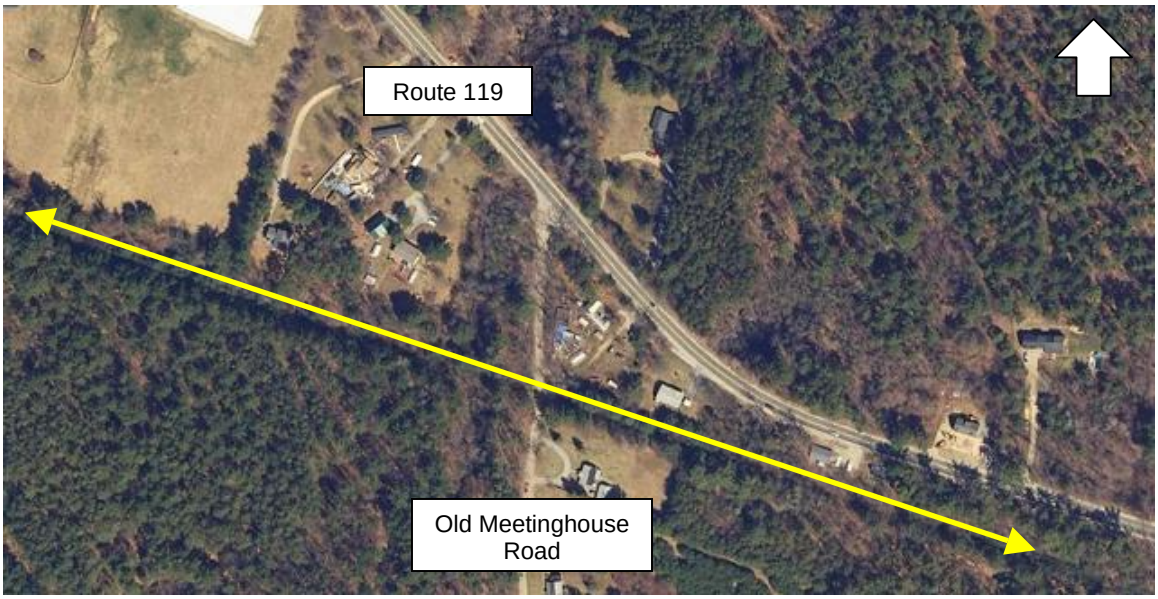
Issues:

- Motorists tend to speed through this area
- Poor sight distance to the west due to poor vertical and horizontal roadway geometry

Recommendations:

- Use of a narrow median approach treatment with a bollard
- Straight rail trail alignment due to limited rail bed width
- Apply a bold color or textured surface treatment (e.g. Imprint) between the crosswalk lines to raise awareness of the crossing
- Install advanced warning signs and pavement markings

9.2.2 Old Meetinghouse Road – Townsend



Source: Microsoft Windows Live Local

Description: Old Meetinghouse Road is a low-volume local roadway accessible from Route 119 (Main Street). West of the rail crossing, the roadway transitions to an unpaved surface and dead-ends at a path leading to the DCR owned Old Meetinghouse Universal Access Fishing Site on the Squannacook River. Other than a handful of residences, Old Meetinghouse Road is primarily bordered by state-owned open space parcels.

Type of Roadway:	Local
Jurisdiction:	Town
Est. Volume (ADT):	200 vehicles
Surface Width:	14 feet

Issues:

- Narrow, unimproved roadway
- Poor sight distance exiting Old Meetinghouse Road onto Route 119

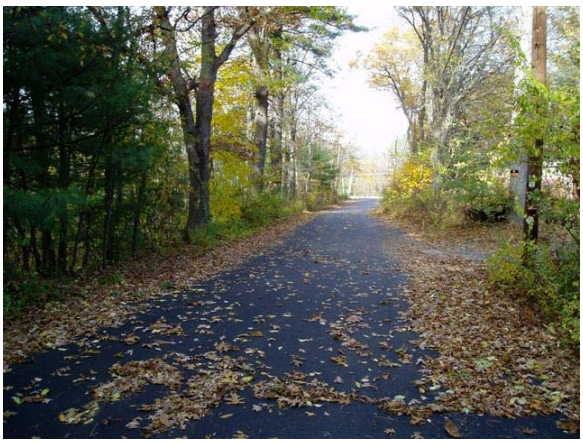
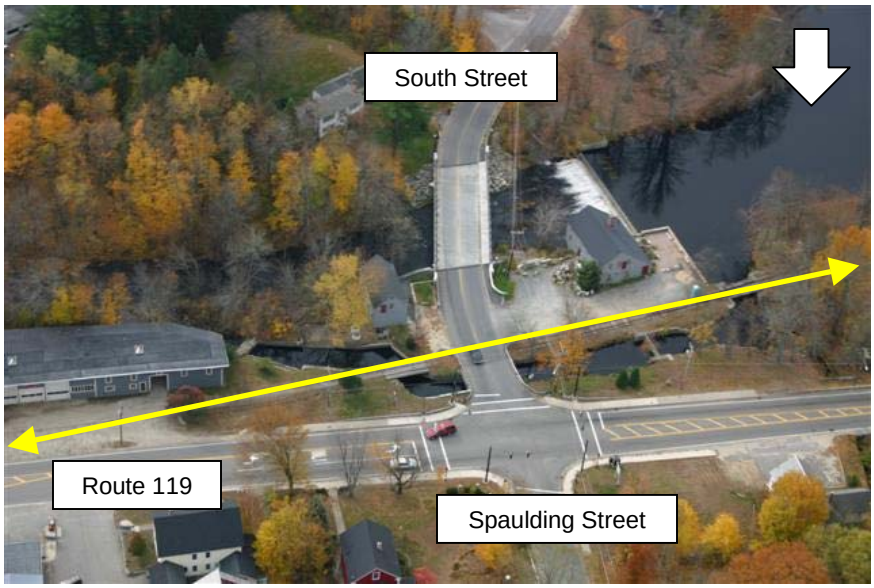


Figure 36: Old Meetinghouse Road Crossing Looking Towards Route 119

Recommendations:

- Use of a narrow median approach treatment with a bollard
- Straight rail trail alignment due to limited rail bed width and proximity of residences on the west and east sides of the crossing
- Apply a bold color or textured surface treatment (e.g. Imprint) between the crosswalk lines to raise awareness of the crossing
- Install advanced warning signs and pavement markings

9.2.3 South Street – Townsend



Description: South Street parallels Route 13 (Townsend Center) and extends from Townsend Harbor through Shirley and Lancaster to connect to Route 2. The Route 119 / South Street / Spaulding Street intersection was upgraded in the late 1980's and the South Street Bridge over the Squannacook River was replaced 5 years ago.

Type of Roadway:	Urban minor arterial
Jurisdiction:	Town
Est. Volume (ADT):	1600 vehicles
Surface Width:	22 feet

Issues:

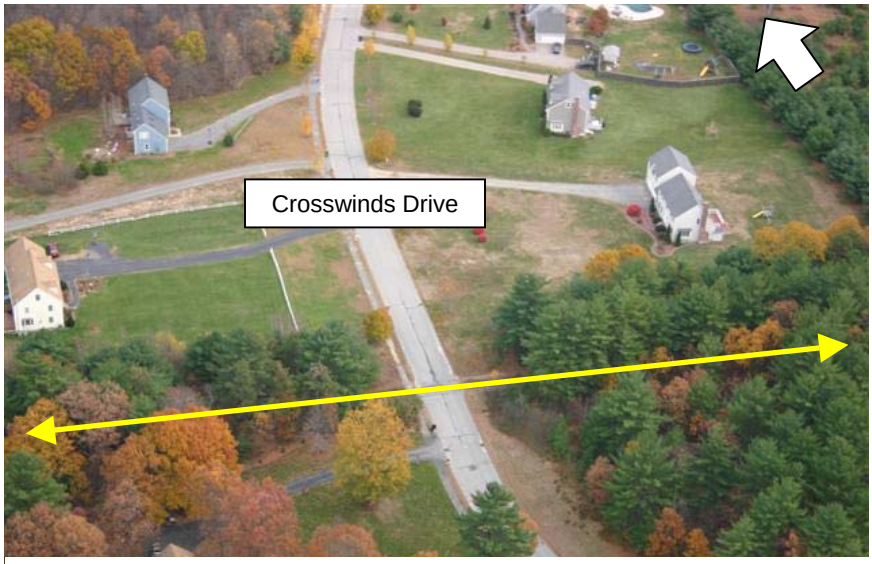
- Location within Townsend Historic District II
- Trail parallels existing commercial uses
- Crossing location in proximity to existing signalized intersection

Figure 37: South Street Crossing Looking South Towards Shepherd's

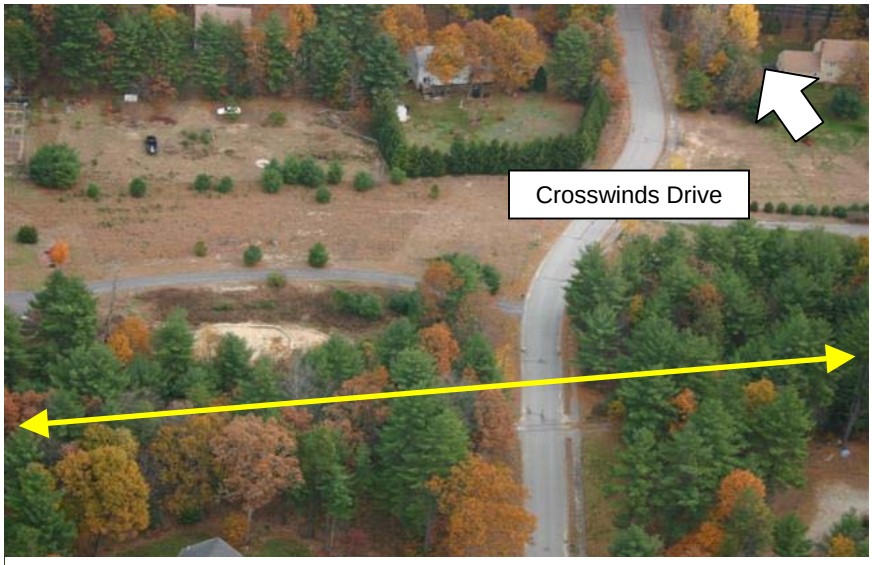
Recommendations:

- Use of a narrow median approach treatment with a bollard
- Straight rail trail alignment due to limited width and obstructions (i.e. sluiceway, packing lot, railroad bridges)
- Apply a textured surface treatment (e.g. Imprint) between the crosswalk lines to raise awareness of the crossing and complement the historic district.
- Install advanced warning signs and pavement markings
- Consider installing a push button actuated pedestrian crossing at the rail trail crossing to be coordinated with the pedestrian phase of the existing Route 119/South Street signalized intersection
- Install signs to warn motorists not to block the crosswalk

9.2.4 Crosswinds Drive – Groton



Northern Crossing of Crosswinds Drive



Southern Crossing of Crosswinds Drive

Description: Crosswinds Drive is a U-shaped residential subdivision road that crosses the railroad corridor twice. This subdivision was developed on the site of the former Groton airfield.

Type of Roadway:	Local Road
Jurisdiction:	Town
Est. Volume (ADT):	200 vehicles
Surface Width:	20 feet

Figure 38: Crosswinds Drive Northern Crossing

Figure 39: Crosswinds Drive Southern Crossing

Issues:

- Unexpected crossing location at slight low points in the vertical roadway curves

Recommendations:

- Use of a narrow median approach treatment with a bollard
- Straight rail trail alignment to minimize extent of vegetative disturbance and grading in this residential area
- Apply a bold color paint or a textured surface treatment (e.g. Imprint) between the crosswalk lines to raise awareness of the crossing.
- Install advanced warning signs and pavement markings along Crosswinds Drive.

10 Structures

The purpose of this section is to discuss the existing culverts and bridge structures along the project corridor.

10.1 Culverts

Along the right-of-way alignment, several existing culverts convey natural waterways and drainage to either side of the rail bed embankment.

The Boston & Maine Railroad Right-of-Way and Track Maps (Valuation Maps) were used as a guide for identifying culverts along the corridor. As the maps date back to 1915, it can be expected that adjacent land uses have changed significantly over time. Consequently, some of the culverts may have been replaced or removed since the time the railroad was in operation.

The following list of culverts was developed based on the Valuation Maps:

Figure 40: Culvert Listing

#	Val Map Station	Size / Material	Culvert Number (1946 System)
Depot Street			
1	522+11	1’ x 1’ Wood Box	45.98
2	522+05	6” Cast Iron Pipe	45.98
3	514+95	3’ x 3’ Stone Box	45.84
4	512+21	2’-8” x 2’-0” Wood Box	45.78
5	502+17	3’ x 1’ Stone Box	45.60
6	493+67	3’ x 2’ Stone Box	45.44
7	485+88	1’ Stone Box	45.29
8	485+13	2’ x 2’ Stone Box	45.28
9	482+73	12” Vitrified Clay Pipe	45.23
10	471+98	4’ x 3’ Stone Box	45.03

Figure 40: Culvert Listing (Cont'd)

#	Val Map Station	Size / Material	Culvert Number (1946 System)
Old Meetinghouse Road			
11	458+58	2.5' x 2.5' Stone Box	44.07
12	436+14	4' x 4' Stone Box	44.35
13	434+95	1' x 1' Wood Box	44.33
14	434+55	Wood Box	44.32
15	431+57	18" Vitrified Clay Pipe	44.26
South Street			
16	412+14	3' x 5' Stone Box	43.89
17	388+51	4' x 5' Stone Box	43.45
18	376+58	2' x 2' Stone Box	43.22
19	331+40.5	3' x 4' Stone Box	42.37
Townsend / Groton Town Line			
20	317+11.5	Pipe	42.09

Source: Boston & Maine Railroad Right-of-Way and Track Maps.

Figure 41: Culvert No. 44.35
South of Old Meetinghouse Road

Figure 42: Culvert No. 42.09
North of Crosswinds Drive

A new culvert is needed to replace the collapsed 3' x 4' stone box culvert (Culvert No. 42.37) behind the Harbor Village Shopping Center, as shown in Figures 43 and 44. Based on a meeting between the MBTA and the Town of Townsend on February 29, 2008, the MBTA discussed their plans to reconstruct the culvert in 2008 to address the public safety hazard. This culvert should have a natural substrate bottom and accommodate wildlife passage in accordance with the Massachusetts River and Stream Crossing Standards.

Figure 43: Culvert No. 42.37
Collapsed Culvert

Each of the culverts listed in Figure 40 will need to be further evaluated as part of the Preliminary Design Phase. This evaluation will include a condition assessment of existing conditions, including inlet and outlet structure, piping systems, and upstream and downstream channels, as well as document recommendations for necessary improvements at each culvert location.

Figure 44: Culvert No. 42.37
Failing Railroad Embankment

10.2 Bridges

The purpose of this section is to identify the design criteria for a rail trail bridge and discuss the types of structures that meet these criteria.

There are two bridges along the project corridor:

- Bridge No. 44.17 – North of South Street
- Bridge No. 44.13 – South of South Street

A visual assessment of each crossing was conducted. Both bridges have short spans and good vertical and horizontal geometry.

Bridge No. 44.17: Bridge No. 44.17 is located 150 feet north of South Street in Historic Townsend Harbor. This bridge also straddles the sluiceway which connects Harbor Pond to the former Grist Mill on the south side of South Street. The length between abutments is approximately 24 feet. The existing abutments are showing signs of surface deterioration.

Figure 45: Bridge No. 44.17
Looking North

Figure 46: Bridge No. 44.17
Side View

Bridge No. 44.13: Bridge No. 44.13 is located 25 feet south of South Street in Historic Townsend Harbor. The bridge straddles the sluiceway directly adjacent to the former Grist Mill. The length between abutments is approximately 26 feet according to the Valuation Maps. The existing abutments appear to be in good serviceable condition. A new timber deck was constructed over the railroad ties.

Figure 47: Bridge No. 44.13
Looking South

Figure 48: Bridge No. 44.13
Side View

The following sections discuss design considerations specific to each structure. It is recommended that the proposed width, design load, materials and railings be similar for each bridge. Additional design details are typically considered in the Type Study Report prepared as part of the MassHighway 25% Design.

10.2.1 Design Criteria

A rail trail bridge should be designed in accordance with the Guide Specifications for the Design of Pedestrian Bridges and the Standard Specifications for Highway Bridges, both published by the American Association of State Highway and Transportation Officials (AASHTO).

Width: According to the MassHighway Project Development & Design Guide, the minimum clear width between bridge railings should be the same as the shared use path approach plus a minimum 2-foot wide clear shoulder on both sides of the path. For emergency, patrol and maintenance vehicle access, the minimum clear width needs to be 10 feet. Carrying the clear width area across a structure provides 1) a minimum horizontal shy distance from the railing and 2) maneuvering space to avoid conflicts with users stopped on the bridge.

As discussed in Section 7.2, an 8-foot trail width is recommended through the historic section of Townsend Harbor (Townsend Historic District II).

According to MassHighway, on new bridge structures the minimum width should be 10 feet plus the 2-foot wide clear areas. The same criteria could apply to the 8-foot width if properly justified (e.g. short span width good vertical and horizontal geometry). Variations from these dimensions are typically considered in the Type Study Report prepared as part of the MassHighway 25% Design.

Design Load: Pedestrian bridges in Massachusetts are typically designed to accommodate an H10 design load. H10 is a light truck, such as a standard maintenance, construction, emergency or patrol vehicle, with a rear axle weighing 18,000 pounds. The operating level for this bridge would permit an occasional load over H10. Given the short span and intended use of the bridges along this corridor, it is not recommended that either of these bridges be designed to accommodate an H25 design load (45,000 pounds). An H10 design loading is much less than the original railroad loading and should permit reuse of the existing stone abutments. A unit cost for abutment rehabilitation is included as part of the construction cost estimate.

Materials: Many of the same elements that influence the type of structure also affect the choice of bridge material. Such considerations include, but are not limited to, cost, constructability, future maintenance requirements, environmental impact, and overall aesthetics.

Four of the most commonly used pedestrian / bikeway bridge types include:
Reuse of Existing Steel Stringers
Prefabricated Bridge
Prestressed Concrete Bridge
Laminated Timber Bridge

Prefabricated structures are the most common type of pedestrian/bicycle bridge used throughout the United States. These bridges come completely fabricated for easy installation and reduced onsite construction costs.

Railing: On a bridge, a wood railing serves to protect users from falling off the structure. The railings should be mounted on both sides of a structure and set at a minimum of 42 inches (3.5 feet) high. The railings should be free of protruding objects to prevent snagging of bicycle handlebars. The railing should tie into a wood rail fence on the approach to the structure. The ends of the wood rail fence should be flared to help direct users onto the structure and so that the blunt ends do not pose a hazard to users.

10.2.2 Recommended Structure Type

As noted above, the choice of bridge materials is often based on overall aesthetics, among other considerations. Both Bridge No. 44.17 and Bridge No. 44.13 are located in historic Townsend Harbor. In keeping with the historic nature of this area, it is recommended that both bridges be rehabilitated using rustic timber materials rather than replaced with a new structure. This bridge rehabilitation section is shown in Figure 49.

It is recommended that each proposed bridge structure consist of an 8-inch deep glued laminated timber bridge deck supported on the existing steel girders. Use of glued laminated timber minimizes the penetration of water between the laminations. Pressure treated southern pine or decay resistance white oak planks can be used for the floor beams (wearing surface). Another option would be to install a composite decking material (recycled plastic and wood fibers). For comparison, a wooden wearing surface costs approximately $5 per square foot installed and a composite wearing surface costs approximately $10 per square foot installed. A wood rail fence needs to be mounted to the new bridge deck. This bridge rehabilitation section is shown in Figure 49

Structural engineers will need to inspect the bridge and determine the areas of work needed to rehabilitate the bridge for the intended use as part of the preliminary design.

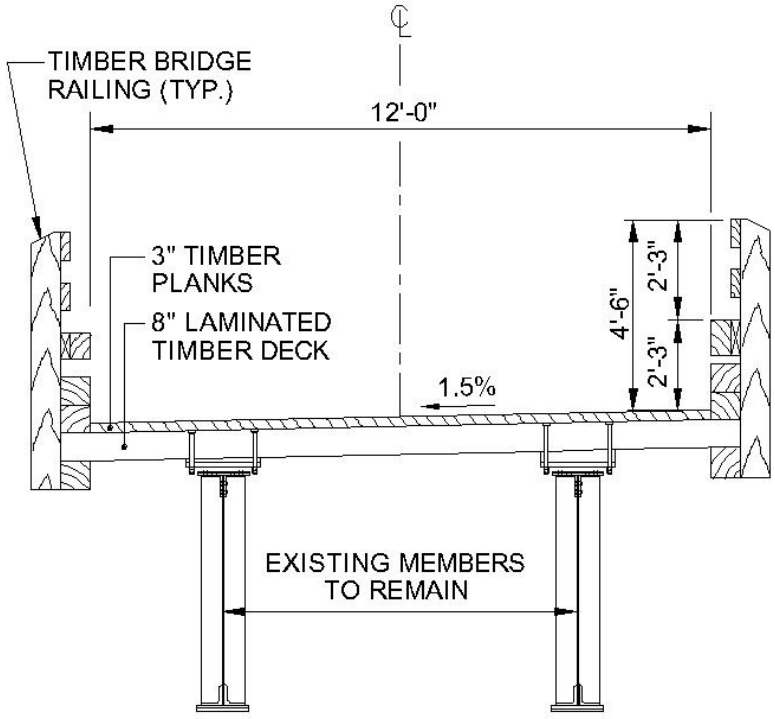


Figure 49: Bridge Rehabilitation Section

Testing for lead paint on the steel stringers was not completed as part of this Assessment. However, assuming the presence of lead paint, the reuse of the existing structure is a labor-intensive activity due to the need to clean and delead the existing steel stringers prior to applying new paint. The painted steel stringers will also require periodic repainting over its lifetime.

Lead paint removal operations present particular environmental constraints. Special precautions need to be taken to prevent lead emissions into the environment, as lead is a known air, soil, and water pollutant. In order to safely delead the steel stringers, the bridge would need to be either 1) encapsulated on-site or 2) transported to a controlled environment. Off-site removal will require truck crane access, sufficient maneuverability and a staging (i.e. lay down) area. The proximity of both structures to Main Street (Route 119) and South Street will enable off-site removal for this project.

Should the contractor decide to perform the lead paint removal operations on site, encapsulation methods must be employed to contain and recover paint and debris generated during cleaning and deleading operations. The containment and disposal of lead contaminated material requires strict compliance with worker and environmental protection regulations.

Again, testing for lead paint on the steel stringers was not completed as part of this Assessment. It is possible that the paint may have worn away from the steel over time, thus reducing the work effort required and associated cost of lead paint removal. Lead testing will need to be completed during the design stages of the project to verify the extent of lead paint on each bridge and more accurately quantify the extent of deleading operations.

Figure 50: Structure Cost Estimate

			Bridge No. 44.17 24 Foot Span		**Bridge No. 44.13 26 Foot Span**	
Work Description	**Unit**	**Unit Price**	**Quantity**	**Cost**	**Quantity**	**Cost**
Composite Wearing Surface	SF	$10	290	$2,900	310	$3,100
Laminated Timber Deck (8")	BF	$4	2,880	$11,520	3,120	$12,480
Clean and Paint Steel Members	LS	$50,000	1	$50,000	1	$50,000
Modify Abutment	CY	$1,500	1	$1,500	1	$1,500
Wood Railing	LF	$60	48	$2,880	52	$3,120
		Total		$68,800		$70,200
		Budget		$75,000		$75,000
Note: These costs assume a 12-foot wide structure This cost also includes full compensation for all labor, equipment, containment and disposal of cleaning residue, removal and disposal of debris, progress reporting, and all other incidental work thereto.						

11 Special Design Considerations

Along the project corridor, there were a certain rail tail segments that required special design consideration due to site-specific conditions. These segments included:

- Connection from railroad corridor to Townsend Center
- Alignment through Townsend Historic District II
- Alignment in vicinity of Shepherd's Landscaping & Auto Body
- Connection to North Middlesex Regional High School

The evaluation of design options was completed utilizing aerial orthophotographic mapping, geographic information system data, field investigation, and other publicly available information. Each option was evaluated in terms of their consistency with the project goal of creating a safe and continuous path that can be used and enjoyed by the public. Equally important is the availability of right-of-way, which may be the most important factor when evaluating alternatives.

11.1 Townsend Center Connection

One of the project goals was to provide a pedestrian / bicyclist connection from the rail trail corridor to the Townsend Center area. The Townsend Center area is a destination point along the corridor due to its proximity to the Town Common, places of worship, Town Hall, Senior Center, Library and Post Office as well as shopping centers, variety stores and restaurants Two general design options were considered for this connection:

- Option 1: Facility Along Route 13 (Elm Street)
- Option 2: Facility Along Depot Street

Option 1: This design option would bring trail users from the Town Common across Route 119 at the existing signalized intersection and along Route 13. From Route 13, users would either travel on-road along Railroad Avenue or behind M&M Auto on the existing railroad corridor to connect to the rail trail.

One advantage of this option is that users would be crossing Route 119 via an existing pedestrian actuated signalized crossing as opposed to a mid-block crossing. However, creating a separated rail trail adjacent to Route 13 would result in significant roadside impacts. It is also not recommended that an on-road facility (i.e. bike lanes or shared use lane) be developed along Route 13 as it is a busy thoroughfare and presents operational safety concerns for both trail users and motorists.

Option 2: This design option would bring the trail connection across Route 119 via an existing crosswalk or at the signalized Route 119/ Route 13 intersection and require users to walk their bikes along the existing sidewalk to connect to Depot Street.

Depot Street is a one-way street and therefore an on-road facility would not be feasible due to the need to prevent users from traveling counterflow to the traffic. Based on the EOT's Road Inventory Database, the right-of-way width along Depot Street is 40 feet and the existing pavement is approximately 23 feet. Therefore, it would be feasible to construct an 8-foot wide rail trail spur adjacent to Depot Street within the roadway right-of-way. This trail spur would consist of an 8-foot trail surface, 5-foot grass shoulder separating the trail from Depot Street, and a 3-foot minimum clearance to obstructions.

Figure 51: Route 119 Crossing Looking East

Figure 52: Depot Street Looking West

Recommendation: Option 2 is the preferred alternative for providing a Townsend Center connection. The recommended typical trail section is discussed further in Section 7 of this report. Field survey is needed in this area to determine which side of the road the separate rail trail facility should be located, in order to minimize impacts to Depot Street abutters.

Figure 53: Townsend Center Connection
Squannacook River Rail Trail
Townsend & Groton, Massachusetts

11.2 Townsend Harbor Historic District Alternatives

The rail trail corridor travels through the Townsend Harbor historic district. At the request of the SRRT Committee, three (3) different alignment options were considered through the historic district:

- Option 1: Following the current railroad corridor
- Option 2: Rerouting the trail alongside and parallel to Route 119 both north and south of South Street
- Option 3: Rerouting the trail alongside Route 119 north of South Street

Option 1: This design option would continue the trail along the railroad corridor alignment through the historic district as shown in Figures 54 and 55. This option would be located within the railroad right-of-way and not require any easements or takings from the private property owners.

Figure 54: Railroad Corridor Behind Reed Homestead

Figure 55: Railroad Corridor Between Harbor Pond and Abutters

Option 2: This design option would bring the trail alongside and parallel to Route 119 through the entire historic district. This option would require a separate rail trail bridge parallel to Main Street (Route 119) on the south side of South Street and a culvert extension or bridge on the north side of South Street. There lacks sufficient width between the edge of the road and the spillway / culvert in this area to accommodate a rail trail, as shown in Figures 56 and 57. In addition, 5 feet is the minimum width required between the edge of the road and the trail, with 7 feet being the preferred as stated in the MassHighway Design Guide. As shown in Figure 58, this separation distance will likely impact the granite posts along the Reed Homestead frontage. Based on available GIS mapping, it is anticipated that this alignment would require an easement or taking from the private property owners with frontage along Route 119. After crossing in front of the Harbor Church, the trail would return to the railroad corridor on the west side of the building. According to the SRRT Committee, there is a general understanding that the property line is about 20 feet west of the building.

Figure 56: Route 119 Looking North South of South Road

Figure 57: Route 119 Looking North North of South Road

Option 3: This design option would bring the trail over the two existing railroad bridges and then cut perpendicular along the Reed Homestead property to parallel Route 119. As discussed in Option 2, the required separation distance will likely impact the mature trees along the Reed Homestead frontage and require an easement or taking from Reed Homestead as well as the other private property owners with frontage along Route 119. After crossing in front of the Harbor Church, the trail would return to the railroad corridor on the west side of the building, as shown in Figure 59. This option would require some physical "barrier" to prevent people from creating their own path along the railroad corridor to connect to the trail segment past the Harbor Church.

Figure 58: Reed Homestead Frontage Along Route 119

Figure 59: West Side of Harbor Church

Recommendation: Option 1 is the preferred design alternative through Townsend Harbor due to the availability of right-of-way and directness of the alignment. It is important to preserve the integrity of the historic district in this area. Therefore, the conceptual design recommendations discussed in this Assessment include the possibility of transitioning from a paved surface to a stabilized stone surface in the historic district and rehabilitating (rather than replacing) the old railroad bridges. This rehabilitation would involve deleading the steel stringers and installing a new timber deck with a timber railing. Interpretive exhibits would further serve to enhance this area.

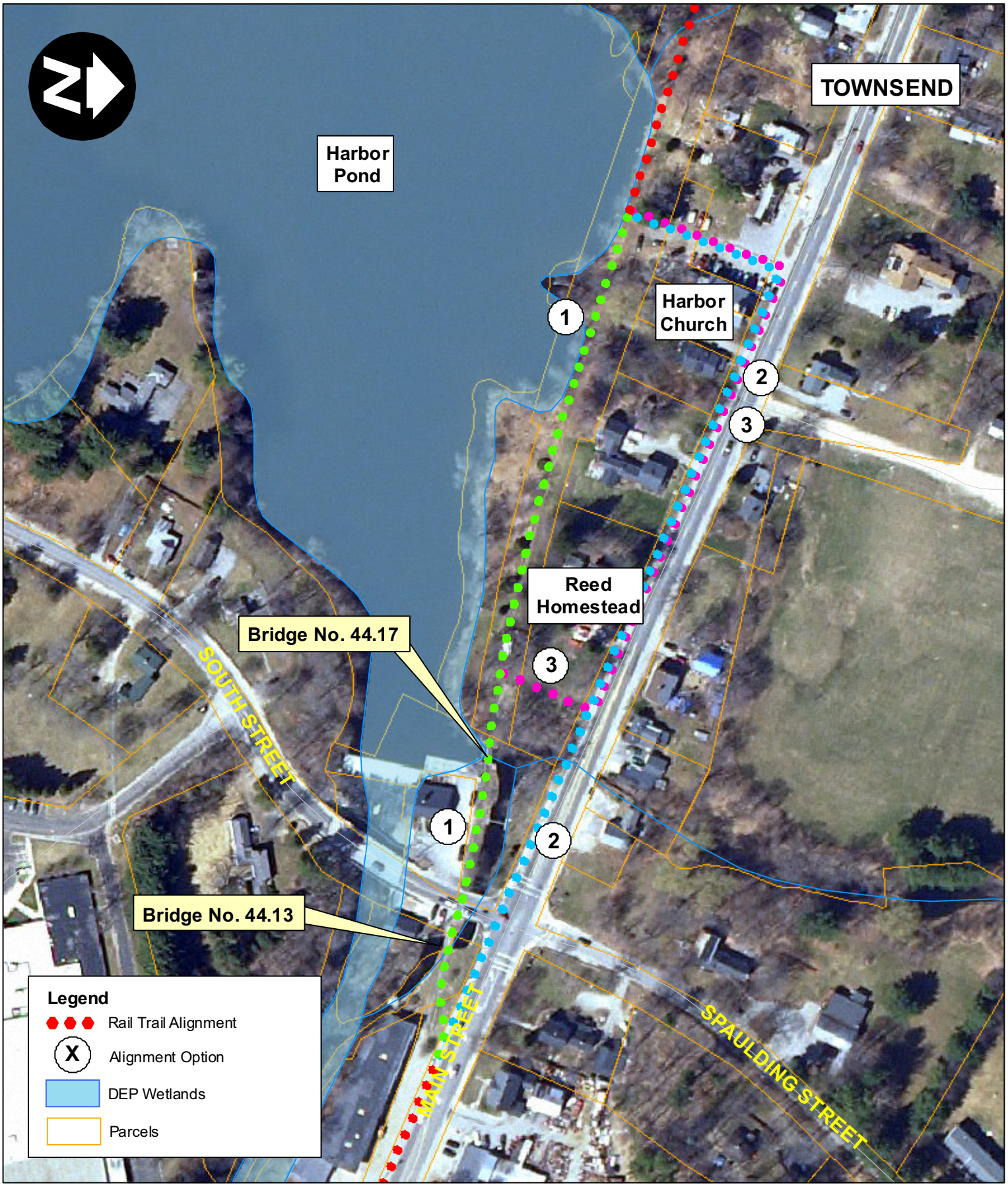


Figure 60: Townsend Harbor Historic District
Squannacook River Rail Trail
Townsend & Groton, Massachusetts

11.3 Shepherd's Autobody & Landscaping Alternatives

Shepherd's Autobody and Landscaping is located at 55 Main Street (Route 119) directly adjacent to South Street in Townsend Harbor. Shepherd's garage doors abut the railroad right of way thereby requiring them to routinely drive across the tracks to enter/exit their facility. Routing the trail through Shepherd's business entrance is the only feasible alternative as the location of the Squannacook River and Grist Mill sluiceway prevents the trail from being re-routed around the rear of the building.

Figure 61: Shepherd's Auto Body Looking North Along Railroad Corridor

Figure 62: Shepherd's Auto Body Looking South Along Railroad Corridor

Two design options were considered:

- Option 1: Routing the rail trail along the current track alignment
- Option 2: Aligning the rail trail closer to Route 119

Option 1: This design option would delineate a rail trail route segment along the track alignment using pavement markings, signage or special pavers. This route segment would provide a defined linear extension of the rail along the length of the property. This lane would serve two purposes. First, it would help guide rail trail users through the area and secondly, it would warn workers/visitors about the presence of rail trail users. Safety concerns still remain related to rail trail user / vehicle conflicts, especially when backing vehicles into this lane with trail users present. While this problem cannot be prevented, it can be mitigated with additional signage directed at both motorists and rail trail users, using colored pavement or painting the lane a solid color to raise awareness. Another disadvantage of this option is that it would prevent Shepherd's from being able to park vehicles in their driveway as they would block trail user access.

Option 2: Aligning the rail trail closer to Route 119 was also considered. In this option, the trail would be treated as a sidewalk across a concrete driveway apron. A concrete trail surface along Route 119 will serve as a visual cue of rail trail alignment to users and motorists. To accommodate the variety of trucks using Shepherd's, the driveway apron would extend along their entire driveway opening rather than creating defined curb cuts. The driveway apron would consist of an 8-foot trail with a 5-foot separation to Route 119. In addition, a minimum 3-foot clearance from the edge of the trail to existing trees and utility poles would need to be maintained.

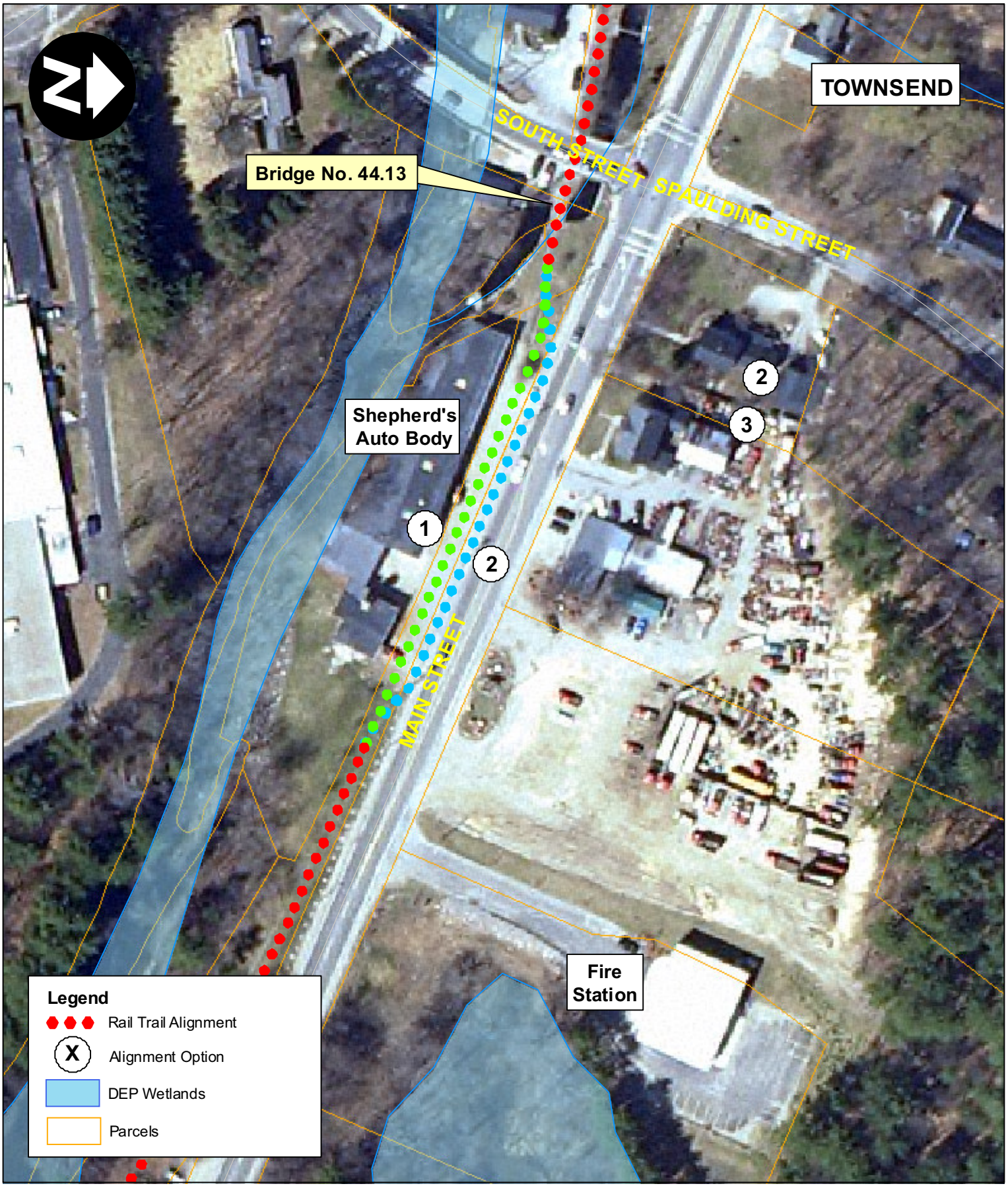


Figure 63: Shepherd's Autobody
Squannacook River Rail Trail
Townsend & Groton, Massachusetts

Figure 66: North Middlesex Regional HS Connection
Squannacook River Rail Trail
Townsend & Groton, Massachusetts

Recommendation: The recommended design must balance the safety and mobility of rail trail users with the daily operations of Shepherd's business. Option 2 is the preferred alternative for crossing Shepherd's Auto Body shop entrance. The recommended typical trail section is shown as Figure 25 in Section 7 of this report.

11.4 North Middlesex Regional High School Connection

One of the key objectives of this project is to connect to the North Middlesex Regional High School, located on the opposite side of Route 119 from the Harbor Village Shopping Center in Townsend. As the trail corridor does parallel the school, a separate spur trail will be required for this connection.

Figure 64: Access Road Between Harbor Village Shopping Center and McDonald's Looking East

Figure 65: Sidewalk Along Route 119 Looking North From Existing Crosswalk Location

It is recommended that the spur trail deviate from the railroad corridor just north of the existing shopping center building, to connect to the access road shown in Figure 64. Trail users would then travel on-road along this existing driveway / access road to get to Route 119. The low volume of vehicles and width of the existing pavement will permit the shared use by trail users and motorists. Signs and pavement markings should be installed to indicate the shared use of this roadway. The Town will need to work with the owners of the Harbor Village Shopping Center to negotiate an easement in this area.

Rather than introduce a new crosswalk where the access road intersects Route 119, it is instead recommended that the spur trail utilize the existing crosswalk at the school entrance. A separated shared use path should be constructed along the alignment of the existing sidewalk in front of the Harbor Village Professional Center, as shown in Figure 65. This trail segment would be of similar construction to the typical trail section proposed along Elm Street and consist of an 8 to10-foot trail surface, 5-foot grass shoulder separating the trail from Route 119, and a 3-foot minimum clearance to obstructions. It is unknown if this spur segment will require an easement from the Professional Center or use of the Route 119 roadway right of way under the control of MassHighway.

It is recommended that trail users be directed to the existing crosswalk with an overhead flashing beacon at the school entrance. This option does not preclude the upgrade to a full signal at a later time should trail user volumes along this spur trail satisfy the warrant

analysis for a signal at this location. Additional signs and pavement markings should be installed along Route 119 to heighten motorists' awareness of this crossing and improve user safety. Any improvements within the Route 119 roadway right of way will require coordination and approval by MassHighway.

This recommended North Middlesex High School connection discussed above is shown graphically in Figure 66. (FST to add trail alignment to Figure 66)

Figure 66: North Middlesex Regional HS Connection
Squannacook River Rail Trail
Townsend & Groton, Massachusetts

12 Parking Areas

Trailhead parking provides points of access for rail trail users. These access points will not only accommodate people from the immediate area, but those who have traveled further to use the trail. Although a number of residents will likely walk or bike to the trail from their homes, it can be anticipated that many people will also choose to drive.

Along the project corridor, there are limited locations where existing Town facilities could be utilized for rail trail parking. Therefore, it is recommended that new rail trail parking areas be considered at the following locations:

- Depot Street Area in Townsend Center
- Townsend State Forest off Old Meetinghouse Road
- Off Route 119 in Townsend Harbor
- Bertozzi Wildlife Management Area

A graphic showing the general location of each of these areas relative to the railroad corridor is included at the end of this Section.

Each of these parking areas will need to be further explored as part of the Preliminary Design Phase when more detailed survey is available in order to further assess lot size, feasibility, practicality, permitability and safety issues associated with each area.

12.1 Depot Street - Townsend

Figure 67: Depot Street Area Potential Parking Area 1A

Figure 68: Depot Street Area Potential Parking Area 1B

In the Depot Street area, there are two tracts of land within the railroad corridor right-of-way that could be used for the rail trail parking.

Area 1A: This proposed area would be created in the open parcel to the north of the former freight house and south of where the corridor intersects Depot Street. According to the Valuation Maps, the MBTA owns the land up to 46 feet east of the centerline in the area east of Depot Street. The Assessor's Parcel GIS datalayer incorrectly shows the property lines in this area. It is anticipated that Area 1A could accommodate approximately 10 to 20 vehicles depending upon the parking layout. Should it be

determined that the MBTA owns the former freight house, then it is recommended that the structure be torn down, due to its dilapidated condition, and the parking area expanded.

Area 1B: This proposed area would utilize the linear corridor tract between Depot Street and Route 13 (Elm Street) to create a one-way circulation pattern with parallel parking. This approximate 380-foot corridor segment varies in width from 35.75 feet to 27.5 feet. It is anticipated that Area 1B could accommodate approximately 15 vehicles.

Recommendation: It is recommended that both Area 1A and 1B be developed as part of the rail trail project. An approximate cost for constructing these two parking areas has been included in the construction cost estimate. This cost assumes these areas will be paved.

12.2 Old Meetinghouse Road - Townsend

Figure 69: Old Meetinghouse Road Potential Parking Area 2A

Figure 70: Old Meetinghouse Road Potential Parking Area 2B

The section of rail corridor from Old Meetinghouse Road to Hirsh Lumber, near Townsend Center, is abutted to the west by Townsend State Forest land. In its entirety, Townsend State Forest comprises 3,229 acres and is used for hiking, mountain biking, horseback riding and winter trail sports. Off Old Meetinghouse Road, there is an existing parking area and cleared area abutting the rail corridor that are part of the State Forest.

FST contacted the Department of Conservation & Recreation (DCR) Division of State Parks & Recreation regarding providing rail trail parking on Townsend State Forest property. A copy of the letter issued to the DCR is included in Appendix C.

Area 2A: This proposed area would be developed within the existing cleared area abutting Old Meetinghouse Road and Townsend State Forest. It is recommended that this parking area remain an informal, unpaved pocket parking area and not be developed as a formal trailhead. It is anticipated that Area 2A could accommodate approximately 5 vehicles.

Area 2B: This proposed area would utilize the existing cleared area abutting the rail trail corridor. If this area was to be developed as a parking area, then Area 2A would serve

as the entrance into the larger parking area. There is a wetland system and stream that run alongside and under the cleared access road via an existing culvert. Therefore, detailed survey, wetland resource delineation, and an evaluation of the structural integrity of the culvert need to be completed in order to further determine the feasibility of developing this area. It is anticipated that Area 2B could accommodate upwards of 50 vehicles.

Recommendation: It is recommended that Area 2A and 2B be further considered during the preliminary design phase pending input and approval by the DCR.

12.3 Route 119 - Townsend

Figure 71: Route 119
Potential Parking Area 3
Looking South Along Narrow Corridor

Figure 72: Route 119
Potential Parking Area 3
Looking South Towards WMA Lot

In Townsend Harbor, the railroad corridor extends approximately 200 feet along Route 119 (Main Street) before heading southwest along the Squannacook River. Shepherd's Autobody owns the parcels of land directly to the north and south. To the south is also small informal parking area used for access to the Squannacook River Wildlife Management Area (WMA). This informal parking is often used by fisherman, and occasionally becomes crowded. The WMA users could also benefit from the increased parking in the Townsend Harbor area.

Area 3: This proposed parking area would utilize the existing railroad corridor right-of-way frontage along Route 119. Figure 71 shows the 200 feet of frontage where the MBTA-owned railroad corridor is approximately 20 feet wide. As shown in Figure 72, further south the corridor width increases and therefore could accommodate more vehicles. It is anticipated that a parking area in this general location could accommodate approximately 10 to 15 vehicles.

Recommendation: It is recommended that Area 3 be developed as part of the rail trail project due to its central location and visibility from Route 119. In addition, it is recommended that a kiosk, seating area and river overlook be created on the south side of the proposed parking area where the corridor widens and directly parallels the Squannacook River. An approximate cost for constructing this parking area has been included in the construction cost estimate. This cost assumes this area will be paved.

12.4 Townsend Road - Groton

Figure 73: Townsend Road Potential Parking Area 4A

Figure 74: Townsend Road Potential Parking Area 4B

The section of corridor covered in this Assessment extends to the Squannacook River WMA parking area off Townsend Road in Groton. The Squannacook River WMA is owned by the Commonwealth of Massachusetts Division of Fisheries & Wildlife (MassWildlife). This area, accessible from Townsend Road, is one of seven (7) existing parking areas shown on the WMA property map developed by MassWildilife.

FST contacted MassWildlife regarding providing rail trail parking on the WMA property. A copy of the letter issued to the MassWildlife is included in Appendix D. (FST to insert)

Area 4A: This proposed area would utilize the existing unpaved parking area on the Squannacook River WMA property. The existing parking spaces are carved out between existing mature trees. Area 4A currently accommodates approximately 12 vehicles.

Area 4B: This proposed area would utilize the Town of Groton Bertozzi Conservation Land on the west side of the railroad corridor. If Area 4B area was to be developed as a rail trail parking area, then Area 4A would serve as the entrance by which to access the rear parking area accessible via an existing dirt roadway beyond a metal pipe gate. Area 4B could likely be designed to accommodate approximately 10 to 15 vehicles within the railroad corridor right-of-way. Detailed survey would need to be completed in order to further determine the feasibility of developing this area. It is recommended that any parking area in this location remain natural (dirt) rather than paved.

Recommendation: It is recommended that Area 4A and 4B be further considered during the preliminary design phase. Both options require input and approval by MassWildlife to use the existing Squannacook River WMA parking area. In addition, it is recommended that the Towns work closely with the Groton Conservation Commission and Natural Heritage & Endangered Species Program (NHESP) office.

12.5 Private Property

In some cases, private businesses or non-profits (i.e. churches) may also be willing to negotiate a public access agreement, recreational easement or land gift with restrictions with the Town(s). The Towns would need to meet with these entities to determine their willingness to entertain rail trail parking on their properties during off-peak hours.

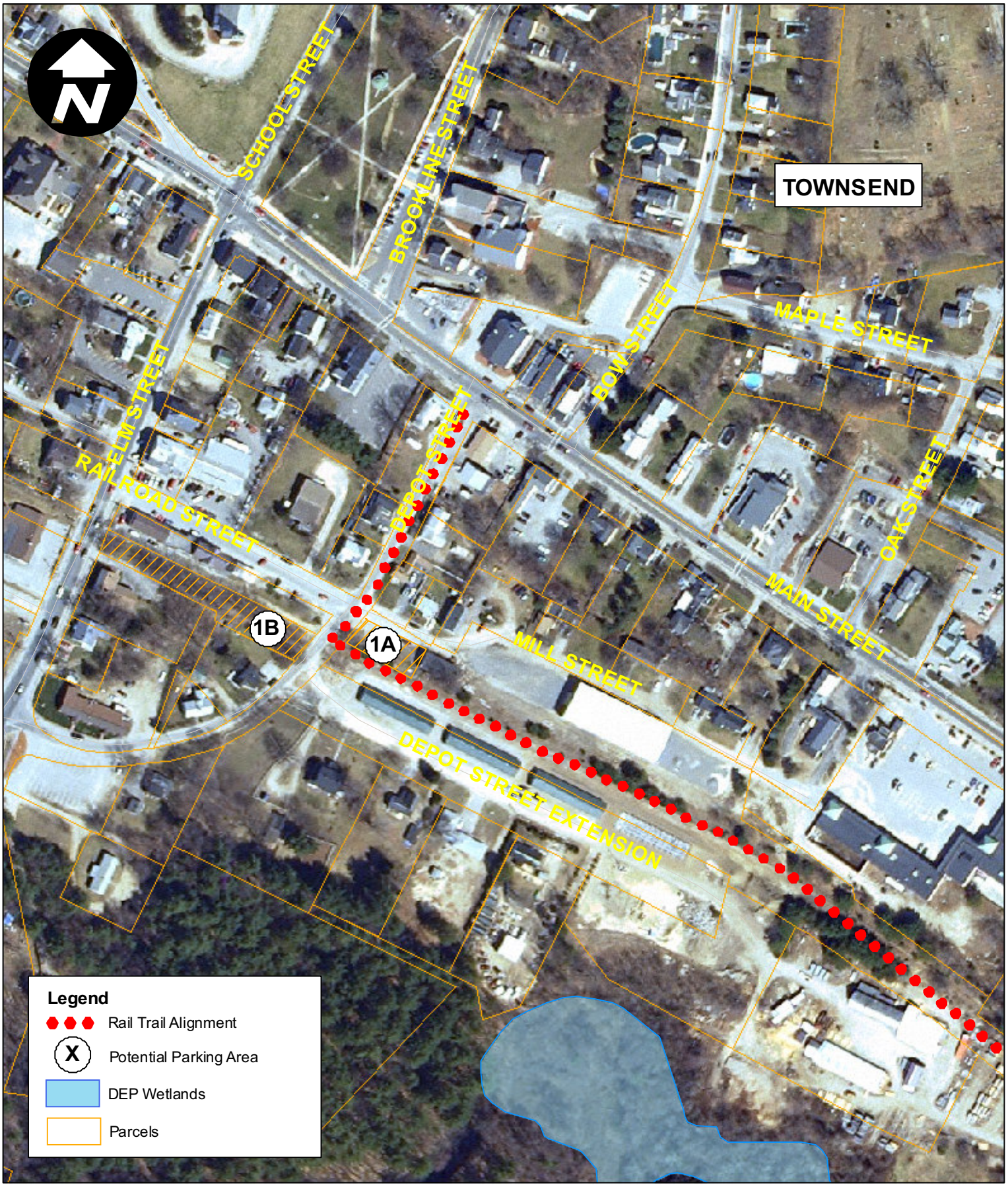


Figure 75: Depot Street Parking Areas
Squannacook River Rail Trail
Townsend & Groton, Massachusetts

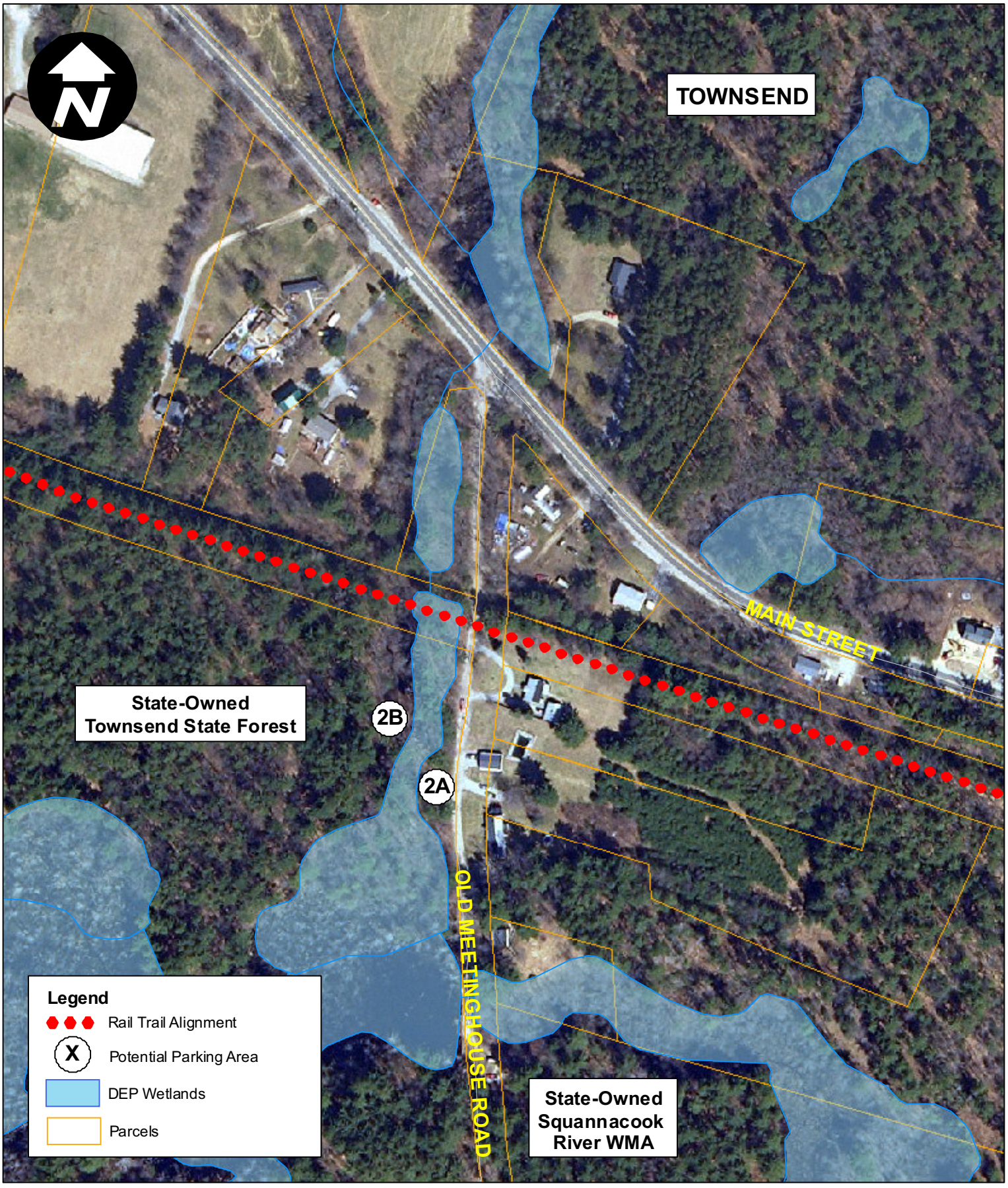


Figure 76: Townsend State Forest Parking Areas
Squannacook River Rail Trail
Townsend & Groton, Massachusetts

Figure 77: Townsend Harbor Parking Areas
Squannacook River Rail Trail
Townsend & Groton, Massachusetts

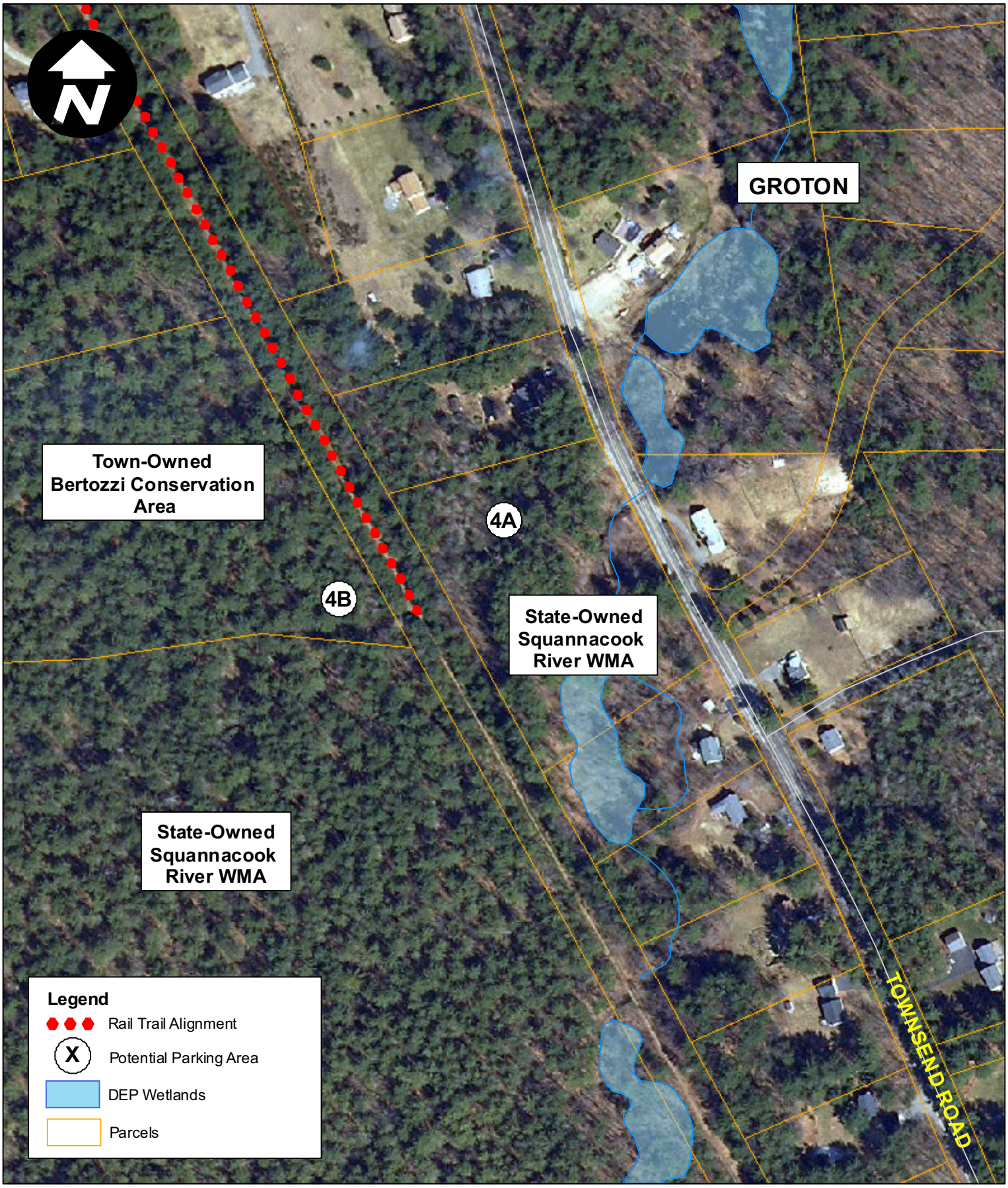


Figure 78: Squannacook River WMA / Bertozzi Conservation Parking Areas
Squannacook River Rail Trail
Townsend & Groton, Massachusetts

13 Mitigation Measures

The purpose of this section is to outline potential measures to mitigate the impact of trail development on abutting properties and sensitive resource areas.

The mitigation measure that is selected is based on location specific conditions and the input of the abutting property owner. One abutter may request a stockade wood fence whereas another may prefer evergreen trees. The design consultant and Town will work with individual abutters to develop a mitigation design that addresses their concerns.

There are three primary mitigation measures that are typically used to control and block unwanted access from a rail trail to abutting properties. These measures can retain the privacy of abutting properties, without sacrificing the overall visual quality of the corridor.

These measures include:

Signage: Signage identifying where the adjacent land is private property is a basic measure that can be used to deter trespassers. Signage used in combination with the other mitigation measures listed below will improve its effectiveness in controlling unwanted access.

Fencing: The installation of a 3.5-foot high wood rail fence or post and rail fencing along the corridor can discourage users from traversing an adjacent side slope or wandering outside the right-of-way in search of a new vista. Low growing, native plantings could be massed in natural forms along the fencing to further discourage unwanted access. Six (6) foot high chain link fences also provide a physical barrier between the trail and adjacent property but are unattractive in comparison to more natural looking materials. Another fence option that is typically used is a wood stockade fence.

Vegetation: One of the primary design goals is to maintain the natural vegetative buffer between the rail trail and abutting properties. Typical clearing limits call for trees to be removed within 5 to 7 feet on each side of the 8 to 10 foot rail trail surface. The actual railroad right-of-way provides ample width to retain a vegetative buffer between the trail and abutting properties in most areas. However, in areas where there is limited vegetation, landscaping can be planted to further retain the privacy of adjacent uses. Enhancing the vegetative buffer with additional evergreen trees can help address abutters concerns about maintaining privacy.

MassHighway will pay for the construction of all reasonable mitigation requests. However, the Town will ultimately be responsible for maintaining all such mitigation measures located within the rail corridor. In some instances, MassHighway will consider constructing measures on private property as part of a project, which would then become the maintenance responsibility of the private landowner.

Figure 79: Rear of Sterilite Property

Figure 80: Townsend Harbor Abutters

As an example, two potential locations for mitigation measures include the section of corridor behind the Sterilite building and in the residential area in Townsend Harbor, as shown in Figures 79 and 80.

Depending upon the location of the trail within the railroad corridor and extent of required vegetative clearing, it is recommended that a 6 foot high black vinyl clad chain link fence be installed along the rear of Sterilite's property. This 1500 linear feet of fence will prevent trespassing by trail users onto Sterilite's property, as well as by others cutting through Sterilite's property to access the Squannacook River.

Another area where mitigation may be desired is in Townsend Harbor where the railroad corridor travels behind Harbor Pond and a series of residential homes. In this section, it is important to preserve the privacy of the residences. In this area, wood fencing and/or vegetative plantings would help address abutter concerns.

As the project advances, abutters will have multiple opportunities to request mitigation measures. At the current study phase of the project, any requests should be directed to the rail trail committee. During the design phase, there will be a Local Issues Meeting and a 25% Design Public Hearing conducted as part of the public outreach process. At these meetings, abutters can request specific measures. These measures will be added to the design plans and included as part of the construction cost estimate.

14 Trail Amenities

The purpose of this section is to discuss opportunities to enhance the corridor through the proper siting of trail amenities including site furnishings, signage, scenic vistas, and landscaping.

14.1 Site Furnishings

Site furnishings will enhance the comfort and enjoyment of trail users. These amenities could include:

- Benches
- Picnic tables
- Trash receptacles
- Information kiosks
- Directional signage
- Bike racks or lockers

Figure 81: Picnic Area

Primary considerations for recommending amenities and other trailside items should include:

- Appropriateness
- Functionality
- Attractiveness of design
- Desired materials (i.e. natural and/or sustainable materials)
- Durability
- Maintenance requirements
- Cost

Figure 82: Information Kiosk

These amenities should be strategically placed in areas along the corridor where the Towns specifically want people to gather.

14.2 Scenic Vistas, Rest Areas and Interpretation

There are a number of scenic and historic views along the way which could be highlighted through controlled vista pruning and the careful siting of overlooks and rest areas. These vistas / areas can be a simple as a flat, paved pull off adjacent to the trail in the shade with vista pruning to reveal scenic views or as developed as a special location with interpretative signage, picnic tables, bike racks and other amenities. The placement of ground or rail mounted interpretive signage at these areas can give the trail a unique character and increase users appreciation of the corridor's railroad history and natural resources.

Figure 83: Scenic Overlook

During the preliminary design phase, it will be important to solicit input from local Town Boards, Committees and the public to determine where a overlooks and/or rest areas may be appropriate, and which features are chosen for interpretation along the trail.

Figure 84: Scenic Overlook

14.3 Universal Access

The rail trail project should be designed in accordance with the Americans With Disabilities Act (ADA) and the Massachusetts Architectural Access Board (MAAB) Specifications to ensure that the trail meets universal accessibility guidelines for grade, cross slope, tread width, and surface material. Equally important is the need to design trail amenities and parking areas to accommodate all users. For example, parking areas should have van accessible spaces and interpretive elements should be mounted at a wheelchair accessible height.

Figure 85: Interpretive Signage

14.4 Landscaping

Ornamental native plantings and screening will serve to strengthen visual connections along the railroad corridor. Uniform treatments and proper vegetative management will improve the visibility and overall appearance of the rail trail. Some recommendations include:

- Introduce new plantings to reinforce the trail entry points, enhance and support desirable views at scenic vistas and/or areas to rest.
- Strategically locate new plantings to buffer unwanted views and the rear of commercial/industrial buildings.
- Minimize the extent of disturbance to existing vegetation between private properties and the railbed. Install additional plantings, where needed, to retain the privacy of these owners.
- Selectively clear vegetation back from both sides of the trail at entry points, to increase visibility and sight lines and to cue both drivers and trail users of crossings and trail access points.

Figure 86: Landscaping

The goal of landscape design should be two-fold, to add to and enhance existing vegetation and introduce new, self-sustaining native species where needed along the corridor.

14.5 Comfort Facilities

Public comfort facilities are often installed along rail trail corridors. Figures 87 and 88 shows the composting toilet structures installed on two rail trails managed by the DCR. These structures are self sufficient, featuring solar powered exhaust and a recycling composting septic system. The primary maintenance activities consist of facility cleaning and restocking products. These types of facilities are often used on trails where a simple, compact, environmentally-responsible restroom is needed.

If comfort facilities are desired along the SRRT, it is recommended that they be considered at the proposed Depot Street trailhead / parking area in Townsend Center, where users would tend to gather and/or begin/end their trip. Facilities at this location may serve as an acceptable alternative to the portable restrooms used on Townsend Common.

Figure 87: Example Comfort Facilities
Nashua River Rail Trail

Figure 88: Example Comfort Facilities
Cape Cod Rail Trail

15 Cost Estimates

The purpose of this section is to provide a budgetary estimate of anticipated construction and project development costs for the 3.7-mile rail trail.

15.1 Construction Costs

The preliminary construction cost estimate is based on:

- Bids received from contractors on other MassHighway advertised rail trail projects across the state (as published in the CIM Construction Journal)
- Current MassHighway Weighted Average Bid Prices
- Similar work recently designed by the Consultant

The construction cost assumes:

- Use of the recommended Typical Sections (Section 7.2 and Appendix B)
- Implementation of recommended intersection improvements (Section 9.2)
- Installation of a wood rail fence along slope areas greater than 3:1
- Installation of root barrier along approximately 75% of the corridor
- New concrete box culvert behind Harbor Village Shopping Center will be constructed by the MBTA
- Rehabilitation of the two existing railroad bridges (Section 10.2)
- Use of the recommended special design considerations (Section 11)
- Creation of parking areas as denoted in cost estimate (Section 12)
- Track and tie removal at current MassHighway Weighted Average Bid Prices

Removal of existing track is a labor-intensive item that includes cutting the track into manageable sections for hauling purposes and removing tie plates, spikes, pins, rail anchors, and all other rail hardware. Disposal of the treated timber ties includes the cost of removing and stockpiling the ties and transporting the ties to an approved waste facility. Based on the current price of steel, the salvage value of the rail currently outweighs the cost of tie removal, thereby resulting in a cost-plus scenario. However, future steel prices will fluctuate based on market demands. It is unknown if the MBTA will remove the rails for salvage value before signing a property agreement with the Towns. This issue would be more fully developed in the context of the lease agreement. Therefore, for the purposes of this Assessment, it is assumed that track and tie removal will be completed as part of the overall rail trail construction contract.

A 10% contingency cost has been included to account for specific items of work that will be determined during the preliminary design phase. Also, the estimated cost has been escalated using a flat inflation rate (4%) and compounded annually to estimate for expected increases in the cost of construction before the trail may actually be built (a five year timeframe was assumed).

The construction cost estimate has been broken down by major items of work and presented in tabular form in Figure 89. This estimate is based on 2008 construction costs and does not include design costs. A more accurate estimate would need to be developed during the preliminary design stages of the project in order to program the necessary funding.

Figure 89: Construction Cost Estimate

Item	Work Description	Unit	Unit Price	Quantity	Cost
1	Clearing and Grubbing	Acre	$15,000	2.4	$36,000
2	Excavation	CY	$25	11,500	$287,500
3	Gravel Borrow for Shoulders (8")	CY	$30	3,600	$108,000
4	Section A – Typical Section	SF	$4.50	172,000	$774,000
5	Section B – Typical Section Along Depot Street	SF	$4.50	3,360	$15,120
6	Section C – Typical Section at Harbor Autobody	SF	$4.50	4,000	$18,000
7	Section D – Typical Section Through Historic District	SF	$5.50	8,000	$44,000
8	Section E – Typical Section at Shepherd's Autobody	SF	$9	3,900	$35,100
9	Rehabilitation of Bridge No. 44.17	LS	$75,000	1	$75,000
10	Rehabilitation of Bridge No. 44.13	LS	$75,000	1	$75,000
11	Push Button Activated Pedestrian Signal at Route 119/North Middlesex Regional High School	LS	$50,000	1	$50,000
12	Roadway Intersection Improvements	EA	$17,000	5	$85,000
13	Depot / Elm Street Parking Area 1A	LS	$25,000	1	$25,000
14	Depot / Elm Street Parking Area 1B	LS	$75,000	1	$75,000
15	Townsend Harbor / Route 119 Parking Area 3	LS	$25,000	1	$25,000
16	Wood Rail Fence	LF	$40	5,000	$200,000
17	6-Foot Chain Link Fence (Black Vinyl Clad)	LF	$25	1,500	$37,500
18	Root Barrier	LF	$6	25,000	$150,000
29	Granite Curb	LF	$30	420	$12,600
20	Loam Borrow & Seeding for Shoulders	SF	$1	115,000	$115,000
21	Drainage	LS	$25,000	1	$25,000
22	Landscaping & Amenities	LS	$100,000	1	$100,000
23	Wetlands Protection	LS	$100,000	1	$100,000
24	Track Removal	LF	$6	38,000	$228,000
25	Tie Removal	TON	$200	1,150	$230,000
	Subtotal				$2,925,820
	Contingencies (~ 20%)				$585,000
	Total Estimated Construction Cost				$3,510,820
	Inflation Adjustment (~4% for 5 years)				$760,000
				Total	$4,270,820
				SAY	**$4.3M**

15.2 Project Development Costs

15.2.1 Lease

As previously stated, at no cost to the Towns, the MBTA will in execute a 99-year Alternative Transportation Corridor lease agreement with the Towns for purposes of the installation, operation, maintenance and use as a rail trail..

15.2.2 Insurance

Before the MBTA will lease or convey land to a city or town, the authority requires that the city or town hold the MBTA harmless for any pre-existing environmental contamination, but it will not allow testing to take place before the lease is signed. To address the MBTA indemnification clause and third party liability issues, Senator Resor introduced an amendment to the 2006 Economic Stimulus bill, which became law in July 2006. This amendment allows towns to purchase insurance to cover the cost of cleaning up rail trail corridors found to be severely contaminated. A five-year environmental insurance policy is estimated at $50,000, with the state covering one half of this cost.

15.2.3 Design

The engineering design and permitting fee is typically between 10% and 20% of the construction cost, with the variation being attributed to the complexity of design issues along the corridor, number of structures and extent of required permitting. For planning purposes, a ballpark fee for the 3.7-mile rail trail includes a total estimated design cost of approximately $450,000.

This fee estimate assumes an economy of scale of this project being designed and permitted under one contract. This approach will help reduce overall project costs by allowing tasks to be performed as a single effort rather than having to prepare two separate design plan sets and permit applications.

Assuming a MassHighway design process is followed, a 25% MassHighway Design (preliminary design) is typically 50% of the total design fee. Therefore, the 25% Design fee for the Squannacook River Rail Trail would be approximately $225,000. This fee estimate is not based on detailed tasks and related work efforts but rather is a ballpark estimate intended for programming purposes.

The 25% Design phase, according to the MassHighway Project Development & Design Guide, includes a complete topographic survey including delineation of environmental resource areas, and preparation of preliminary alignment plans, profiles and typical cross sections for the trail. Based on this information, it is possible to determine the extent of actual impacts, if any, that a trail would have upon adjacent resource areas and private properties. During the 25% Design phase, the designer will determine which permits and approvals will be required for the project, and will initiate early coordination with those local and state agencies.

After the 25% Design is completed and approved by MassHighway, a Design Public Hearing is held in the community. The project can then advance to the final design phases (75% Design → 100% Design → Final Plans, Specifications & Estimates). All necessary permits are secured before the project is put out to bid for construction.

15.3 Maintenance & Public Safety Oversight

As the rail trail will be a public facility, the Town(s) will be responsible for maintenance to keep the trail in a safe, usable condition. There may also be opportunities to engage local volunteers in the maintenance and oversight of the trail. The use of volunteer labor and/or resources will help reduce the costs to the Town.

Many publicly owned and managed rail trails incur trail maintenance costs as part of their annual public works or parks & recreation programs and budgets. These entities typically do not keep a separate cost and activity record of the maintenance and management of the trail. Therefore it is difficult to identify the costs related to as-needed, seasonal and long-term maintenance activities.

The Rails-to-Trails Conservancy (RTC) Northeast Regional Office recently completed a study of various trail maintenance and operations issues for more than 100 open rail-trails in the northeast region of the United States. Their findings have been compiled in a publication entitled "*Rail-Trail Maintenance & Operation: Ensuring the Future of Your Trail - A Survey of 100 Rail-Trails*." This publication is available on RTC's website [http://www.railtrails.org/]. The Town should consult this publication for valuable information on budgetary issues, staffing, equipment and various other needs related to the operation and maintenance of a rail trail.

15.4 Funding

In 2005, a $4 million dollar federal earmark under The Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was awarded for the design and construction of four North Worcester County Bike Paths. Earmarks are offered as amendments to the budget setting aside a specific amount of money for a specific program or initiative. Congressman John W. Olver spearheaded this earmark. The projects included in the earmark include the Twin City Rail Trail in Fitchburg / Leominster, North Central Pathway in Gardner / Winchendon, Hardwick Bike Path in Hardwick, and the Squannacook River Rail Trail in Townsend. Congressional earmarks are only released and subsequently programmed in the State's Transportation Improvement Program (STIP/TIP) when full funding is available to cover the entire cost of the project, and the project is ready to be advanced. Therefore, each of these projects is essentially competing for these earmark funds.

As part of this process, the project proponents must demonstrate the project's feasibility to MassHighway. The first step is to complete a Project Need Form (PNF) and submit it to the MassHighway District 3 Office. This form should also be forwarded to the Montachusett Regional Planning Commission for their files. This Environmental & Engineering Assessment should be attached to the PNF to provide additional information. The PNF can be prepared with or without the help of a consultant. A town official, such as the planner, DPW director, or Town administrator/manager, should take the lead and act as the principal point of contact for the project in each community. MassHighway will review the PNF and evaluate the merits and readiness of the project. They will also provide the Town with advice on how to proceed, both in terms of the design process and other available funding sources.

Additional funding for the design and construction of the rail trail will need to be secured from local, state, and federal sources. The two most commonly used funding programs

for rail trail projects are the Transportation Enhancement (TE) Program and Congestion, Mitigation and Air Quality (CMAQ) Program. Both programs were originally funded through the federal Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and continued via the Transportation Equity Act for the 21st Century (TEA-21). These programs are included in the current reauthorization of the Act, entitled The Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2003 (SAFETEA).

Transportation Enhancement Program: In order for a project to be considered for the TE Program, a Town needs to apply for funding through a two step pre-application / final application administered by the Montachusett Regional Planning Commission. The Commission is responsible for selecting which regional projects are eligible for consideration as TE Program funded projects. Selected projects are reviewed for eligibility and preparedness for implementation before a project is forwarded to MassHighway and the State Transportation Enhancement Steering Committee. Under this program, a Town must be prepared to provide a local funding commitment comprised of a cash match in the amount of 10% of the total project construction cost. The remaining project cost is funded 80% federal and 10% state. Most communities fund the engineering design to meet their cash match. At the time a TE Program application is submitted, the Towns should have completed or substantially completed the 25% Design phase; or the Towns should have committed in writing to fund the project development and 25% Design phase pursuant to MassHighway design standards.

Congestion Mitigation and Air Quality Improvement Program: A rail trail project often fits the eligibility requirements for both the TE Program and the Federal Congestion Mitigation and Air Quality Improvement Program (CMAQ) of SAFETEA. CMAQ is a transportation air quality improvement program that provides funding for both bike and pedestrian facilities that serve to reduce automobile travel. A Town must complete a CMAQ Air Quality Analysis Worksheet for Bicycle and Pedestrian Projects to document a quantifiable reduction in auto emissions and/or congestion to be eligible under this program. Under this program, the project cost is funded 80% federal and 20% state or local match. The Towns must be prepared to provide a local funding commitment comprised of a cash match in the amount of 10% of the total project construction cost. Most communities fund the engineering design to meet their cash match. Similar to the TE Program, project funded under the CMAQ Program must adhere to MassHighway design standards.

The availability of state and federal funding will dictate whether a rail trail project will proceed through the TE Program or CMAQ Program.

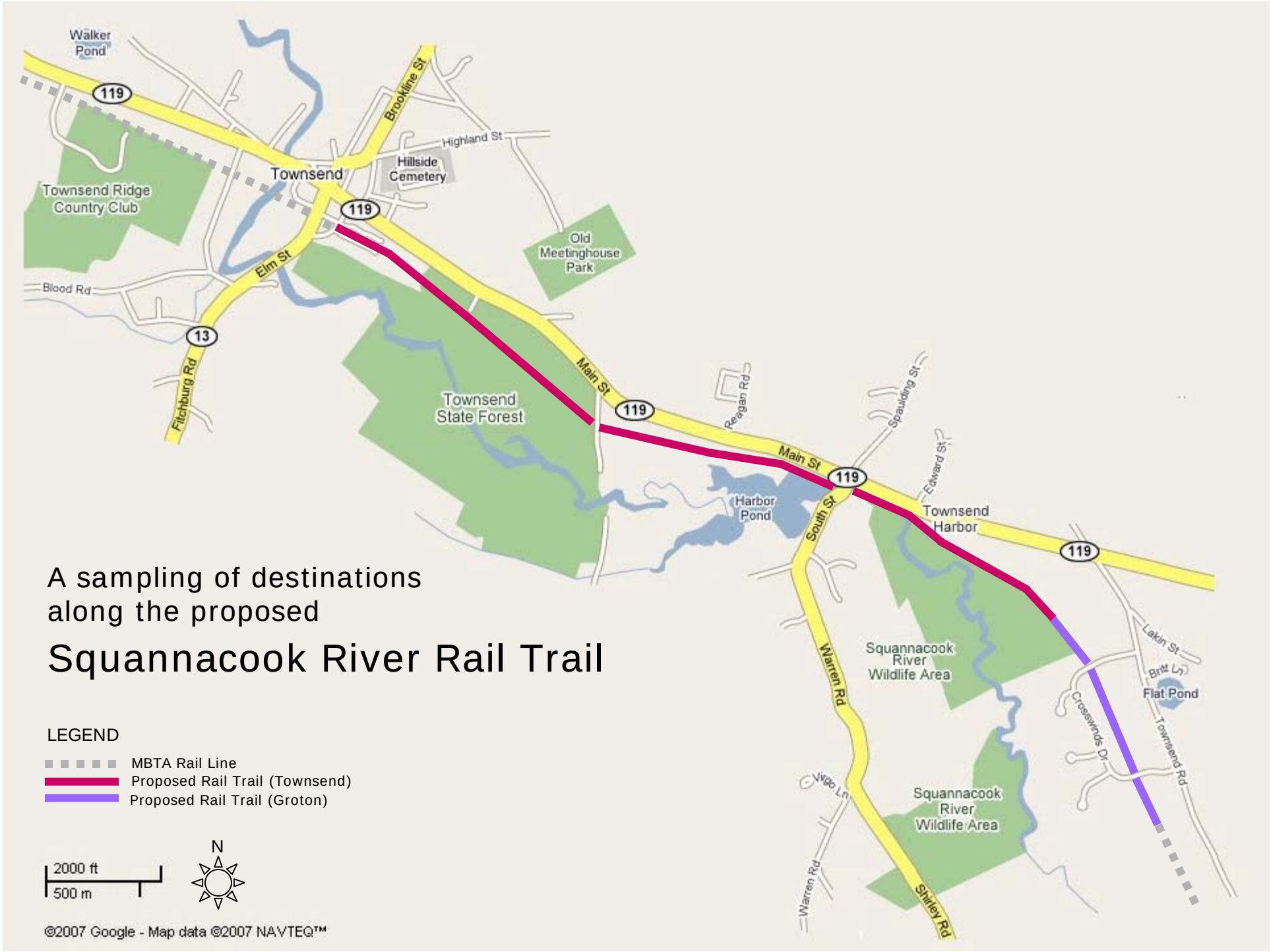
If the Towns decide to seek additional federal funding (i.e. Transportation Enhancement or CMAQ) and funds the entire design as its 10% local match, then the Town would act as the Project Proponent and administer the design contract. MassHighway would be responsible for constructing the project using the federal funding. The design would still be subject to MassHighway review and approval at each stage of design.

16 Project Implementation

FST to complete following discussion with Committee

Appendix A – Corridor Base Mapping

Appendix B – Local Destination Maps


A sampling of destinations
along the proposed
Squannacook River Rail Trail
LEGEND
MBTA Rail Line
Proposed Rail Trail (Townsend)
Proposed Rail Trail (Groton)
2000 ft
500 m
N
©2007 Google - Map data ©2007 NAVTEQ™
Walker Pond
119
Brookline St
Highland St
Townsend
Hillside Cemetery
Townsend Ridge Country Club
Old Meetinghouse Park
Elm St
Blood Rd
13
Fitchburg Rd
Townsend State Forest
Main St
Reagan Rd
Spaulding St
Edward St
Harbor Pond
South St
Townsend Harbor
Squannacook River Wildlife Area
Warren Rd
Lakin St
Britt Ln
Flat Pond
Crosswinds Dr
Townsend Rd
Vigo Ln
Shirley Rd

Public Places

1 **Townsend Library**

2 **Town Hall**

3 **Townsend Common**

4 **Senior Center**

5 **Post Office**

6 **North Middlesex High School**

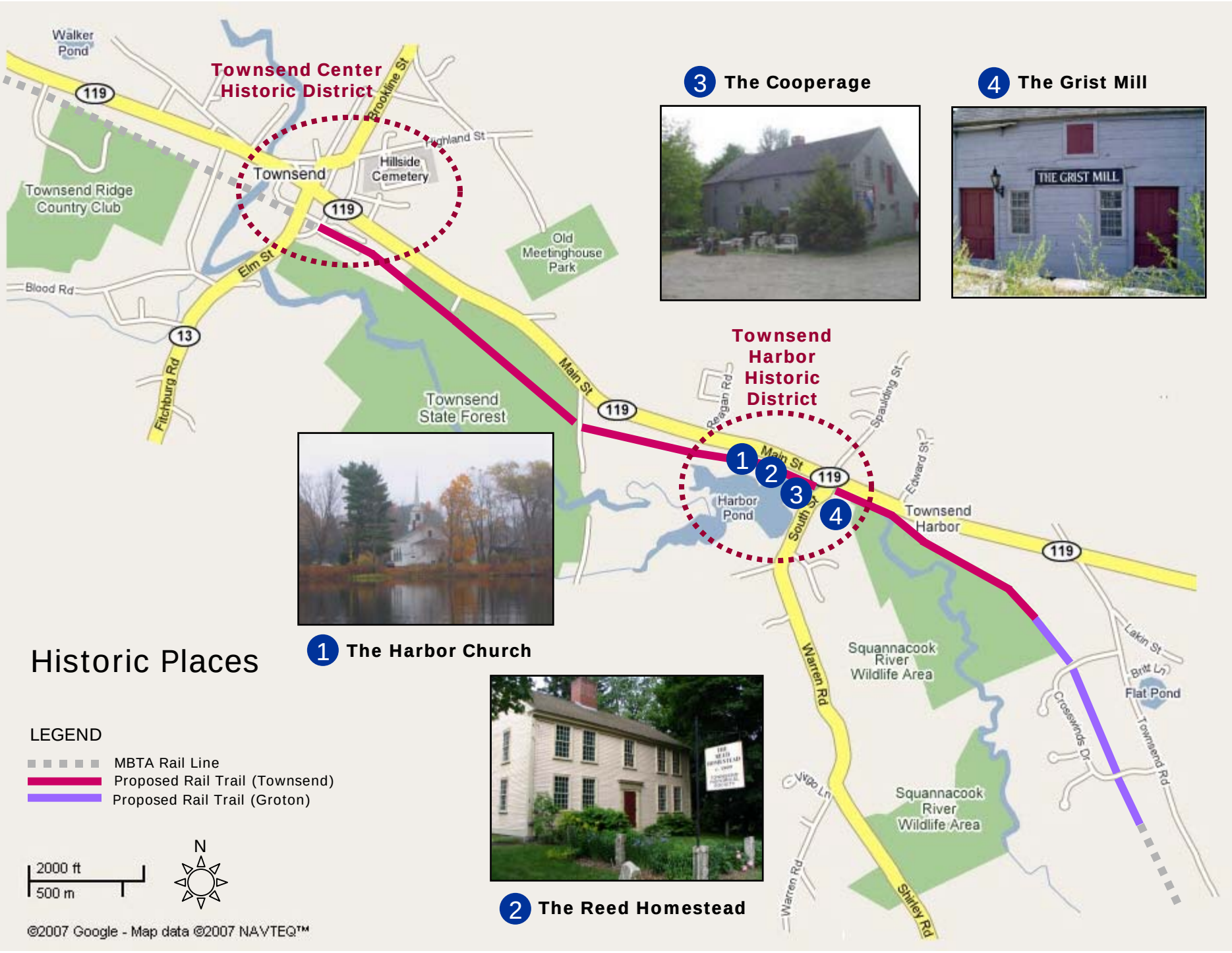
LEGEND

- MBTA Rail Line
- Proposed Rail Trail (Townsend)
- Proposed Rail Trail (Groton)

2000 ft
500 m

N

Historic Places



3 **The Cooperage**

4 **The Grist Mill**

1 **The Harbor Church**

2 **The Reed Homestead**

LEGEND

- MBTA Rail Line
- Proposed Rail Trail (Townsend)
- Proposed Rail Trail (Groton)

2000 ft
500 m

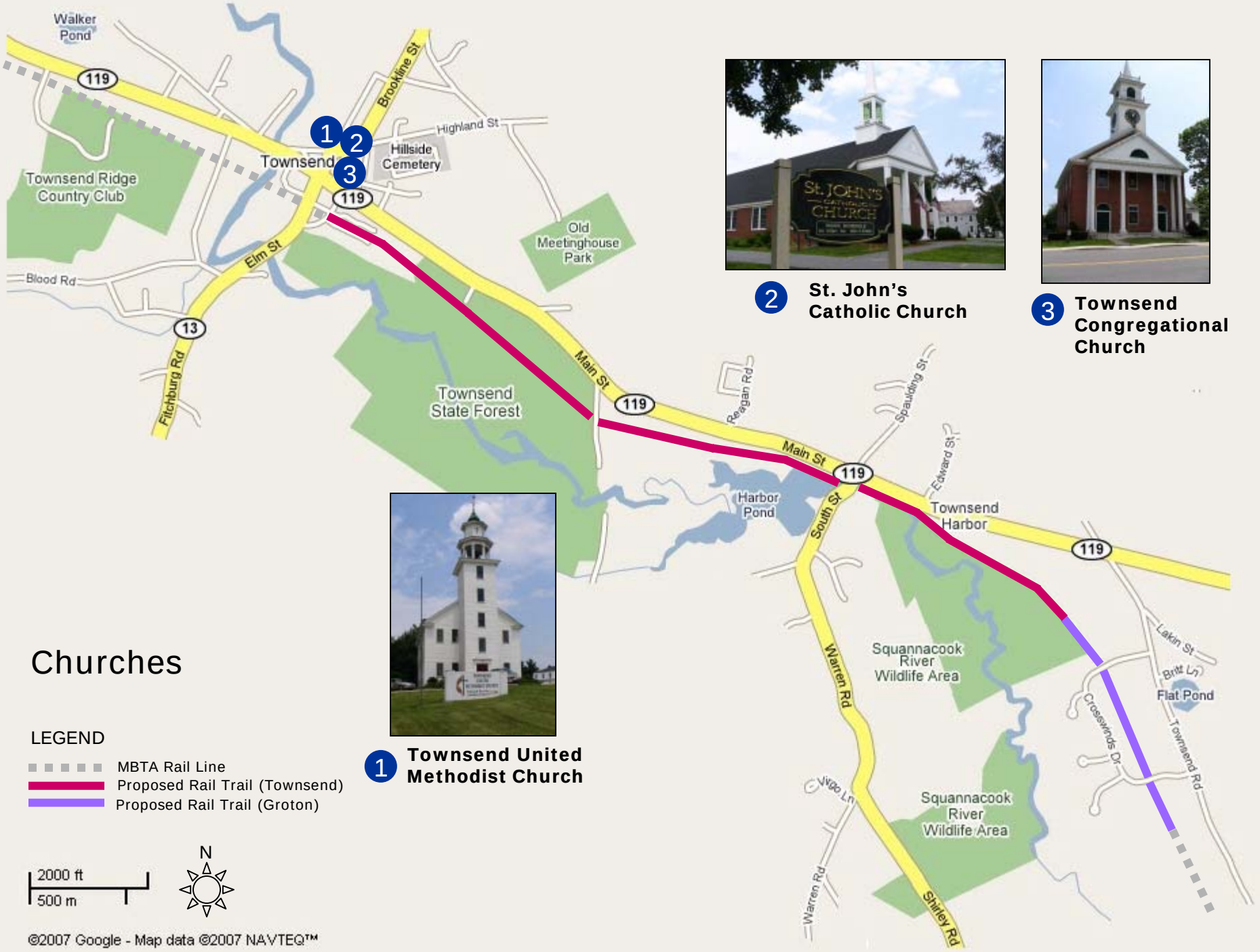
N

Churches

1 Townsend United Methodist Church

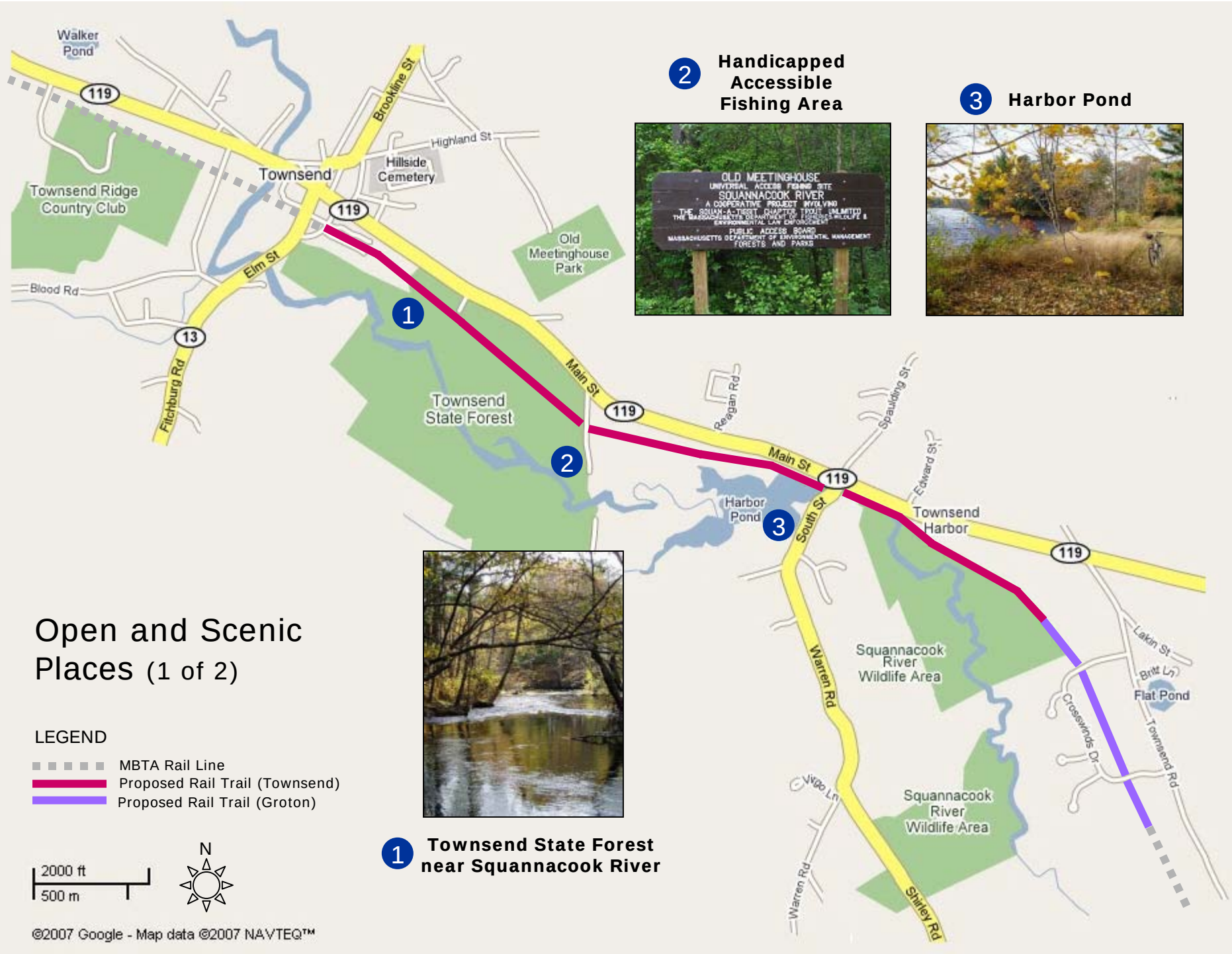
2 St. John's Catholic Church

3 Townsend Congregational Church




Walker Pond
119
1
Brookline St
Highland St
Townsend
Hillside Cemetery
Townsend Ridge Country Club
119
Elm St
Blood Rd
Townsend State Forest
Main St
119
2
Reagan Rd
3
Spaulding St
Edward St
Main St
119
Harbor Pond
South St
Townsend Harbor
119
4
Warren Rd
Squannacook River Wildlife Area
Lakin St
Britt Ln
5
Flat Pond
Crosswinds Dr
Townsend Rd
Vigo Ln
Squannacook River Wildlife Area
Warren Rd
Shirley Rd
2 Reagan Road (25+ homes)
3 Edwards Rd./Spaulding St. (100+ homes)
5 Crosswinds (100+ homes)
1 Townsend Center (150+ homes)
4 Timberlee Park (600+ homes)
Population Centers
LEGEND
MBTA Rail Line
Proposed Rail Trail (Townsend)
Proposed Rail Trail (Groton)
2000 ft
500 m
N
©2007 Google - Map data ©2007 NAVTEQ™

Open and Scenic Places (1 of 2)



2 Handicapped Accessible Fishing Area

3 Harbor Pond

1 Townsend State Forest near Squannacook River

Open and Scenic Places (2 of 2)

Shopping Centers & Variety Stores

1 Mr. Mike's

2 Honey Farms

3 Central Plaza Shopping Center

4 Harbor Village Shopping Center

LEGEND

- MBTA Rail Line
- Proposed Rail Trail (Townsend)
- Proposed Rail Trail (Groton)

2000 ft
500 m

N

Places to Eat (1 of 3)

1 **Dunkin Donuts**

2 **Ice Cream Factory**

3 **Townsend House**

4 **Cliff's Cafe**

5 **Townsend Pizza**

LEGEND

- MBTA Rail Line
- Proposed Rail Trail (Townsend)
- Proposed Rail Trail (Groton)

2000 ft
500 m

N

Places to Eat (2 of 3)

6 Central Plaza Pizza

7 Main St. Cafe

8 Brick Steamer

9 Patriot Pizza

LEGEND

- MBTA Rail Line
- Proposed Rail Trail (Townsend)
- Proposed Rail Trail (Groton)

2000 ft
500 m

N

Places to Eat (3 of 3)

10 **Dunkin Donuts**

11 **McDonald's**

12 **Pizza Pizzazz**

13 **Panda Wok**

LEGEND

- MBTA Rail Line
- Proposed Rail Trail (Townsend)
- Proposed Rail Trail (Groton)

2000 ft
500 m

N

Appendix C – Agency Correspondence

Commonwealth of Massachusetts

Division of Fisheries & Wildlife

MassWildlife

Wayne F. MacCallum, *Director*

3/12/2008

Jennifer Shemowat
Fay, Spofford & Thorndike
5 Burlington Woods
Burlington MA 01803

RE: Project Location: Squannacook River in Groton to NH border; through Townsend.
Town: GROTON, TOWNSEND
NHESP Tracking No.: 03-13131

To Whom It May Concern:

Thank you for contacting the Natural Heritage and Endangered Species Program ("NHESP") of the MA Division of Fisheries & Wildlife for information regarding state-listed rare species in the vicinity of the above referenced site. Based on the information provided, this project site, or a portion thereof, is located **within** *Priority Habitat 31* (PH 31) and *Estimated Habitat 818* (EH 818) as indicated in the *Massachusetts Natural Heritage Atlas* (12th Edition). Our database indicates that the following state-listed rare species have been found in the vicinity of the site:

Scientific name	Common Name	Taxonomic Group	State Status
Glyptemys insculpta	Wood Turtle	Reptile	Special Concern
Emydoidea blandingii	Blanding's Turtle	Reptile	Threatened
Alasmidonta undulata	Triangle Floater	Mussel	Special Concern
Notropis bifrenatus	Bridle Shiner	Fish	Special Concern
Ophiogomphus aspersus	Brook Snaketail	Dragonfly	Special Concern
Strophitus undulatus	Creeper	Mussel	Special Concern
Stylurus scudderi	Zebra Clubtail	Dragonfly	Endangered

The species listed above are protected under the Massachusetts Endangered Species Act (MESA) (M.G.L. c. 131A) and its implementing regulations (321 CMR 10.00). State-listed wildlife are also protected under the state's Wetlands Protection Act (WPA) (M.G.L. c. 131, s. 40) and its implementing regulations (310 CMR 10.00). Fact sheets for most state-listed rare species can be found on our website (www.nhesp.org).

Please note that projects and activities located within Priority and/or Estimated Habitat **must be** reviewed by the NHESP for compliance with the state-listed rare species protection provisions of MESA (321 CMR 10.00) and/or the WPA (310 CMR 10.00).

Wetlands Protection Act (310 CMR 10.00)

If the project site is within Estimated Habitat and a Notice of Intent (NOI) is required, then a copy of the NOI must be submitted to the NHESP so that it is received at the same time as the local conservation commission. If the NHESP determines that the proposed project will adversely affect the actual Resource Area habitat of state-protected wildlife, than the proposed project may not be permitted (310 CMR 10.37,

Division of Fisheries and Wildlife
Field Headquarters, North Drive, Westborough, MA 01581 (508) 389-6300 Fax (508) 389-7891
An Agency of the Department of Fish and Game

10.58(4)(b) & 10.59). In such a case, the project proponent may request a consultation with the NHESP to discuss potential project design modifications that would avoid adverse effects to rare wildlife habitat.

A streamlined joint MESA/WPA review process is now available. When filing a Notice of Intent (NOI), the applicant may now file concurrently under the MESA on the same NOI form and qualify for a 30-day streamlined joint review. For a copy of the revised NOI form, please visit the MA Department of Environmental Protection's website: http://www.mass.gov/dep/water/approvals/wpaform3.doc.

MA Endangered Species Act (M.G.L. c. 131A)

If the proposed project is located within Priority Habitat and is not exempt from review (see 321 CMR 10.14), then project plans, a fee, and other required materials must be sent to NHESP Environmental Review to determine whether a probable "take" under the MA Endangered Species Act would occur (321 CMR 10.18). Please note that all proposed and anticipated development must be disclosed, as MESA does not allow project segmentation (321 CMR 10.16). For a MESA filing checklist and additional information please see our website: www.nhesp.org ("Regulatory Review" tab).

We recommend that rare species habitat concerns be addressed during the project design phase through consultation with our office, prior to submission of a formal MESA filing, as avoidance and minimization of impacts to rare species and their habitats is likely to expedite endangered species regulatory review.

Fisheries Comments

The Squannacook River is a significant coldwater resource. Fisheries surveys have yielded 21 species: American eel (*Anguilla rostrata*), banded sunfish (*Enneacanthus obesus*), blacknose dace (*Rhinichthys atratulus*), bluegill (*Lepomis macrochirus*), native brook trout (*Salvelinus fontinalis*), brown bullhead (*Ameiurus nebulosus*), reproducing brown trout (*Salmo trutta*), chain pickerel (*Esox niger*), common shiner (*Notropis cornutus*), creek chubsucker (*Erimyzon oblongus*), fallfish (*Semotilus corporalis*), golden shiner (*Notemigonus crysoleucas*), largemouth bass (*Micropterus salmoides*), longnose dace (*Rhinicthys cataractae*), pumpkinseed (*Lepomis gibbosus*), rainbow trout (*Oncorhynchus mykiss*), rock bass (*Ambloplites rupestris*), tessellated darter (*Etheostoma olmstedi*), white sucker (*Catastomus commersoni*), yellow bullhead (*Ameiurus natalis*) and yellow perch (*Perca flavescens*). Additionally, the river is annually stocked in the spring and fall with brook trout, brown trout, rainbow trout and/or tiger trout (*Salmo trutta x Salvelinus fontinalis*). Coldwater resources are highly susceptible to changes in water quality and/or quantity such as siltation, water level fluctuations and alterations of the temperature regime. Therefore, the project must not in any way diminish the ability of the river to support coldwater fish species.

This evaluation is based on the most recent information available in the Natural Heritage database, which is constantly being expanded and updated through ongoing research and inventory. If you have any questions regarding this letter please contact Emily Holt, Endangered Species Review Assistant, at (508) 389-6361.

Sincerely,

Thomas W. French

Thomas W. French, Ph.D.
Assistant Director

Commonwealth of Massachusetts

Division of Fisheries & Wildlife

MassWildlife

Wayne F. MacCallum, *Director*

January 20, 2004

Al Futterman, Land Programs and Outreach Director
Nashua River Watershed Association
592 Main Street
Groton, MA 01450

RE: Groton-Townsend Rail Trail
West Groton to NH border
NHESP File No. 03-13131

Dear Mr. Futterman:

Thank you for providing the Natural Heritage and Endangered Species Program (NHESP) of the Massachusetts Division of Fisheries and Wildlife with information about the proposed route for a new rail-trail from the vicinity of West Groton to the NH border in Townsend. As you are aware, portions of the proposed rail-trail are within Estimated Habitat of Rare Wildlife (WH 492) and Priority Habitat of Rare Species (PH 66), as delineated in the *Massachusetts Natural Heritage Atlas, 11th Edition*. Based on a review of the information contained in our database, the NHESP has determined that ten state-protected rare species occur in the vicinity of the proposed rail-trail, including three state-listed turtles and four state-listed Odonates (dragonflies & damselflies).

Although the NHESP believes that the proposed rail-trail can be constructed so as to avoid impacts to most of these state-listed species, the NHESP is concerned that development of some portions of the proposed rail-trail could adversely affect Blanding's and Wood Turtles and their habitats. The Blanding's Turtle (*Emydoidea blandingii*) is listed as "Threatened" and the Wood Turtle (*Clemmys insculpta*) is listed as a species of "Special Concern" pursuant to the provisions of the Massachusetts Endangered Species Act (MGL c. 131A) and its implementing regulations (321 CMR 10.00). The Massachusetts Endangered Species Act (MESA) establishes rules and prohibitions regarding activities which "take" Endangered, Threatened, and Special Concern species native to Massachusetts (321 CMR 10.04). A "take" of an animal is defined in the MESA regulations to include activities that will harm, kill, or disrupt the nesting, breeding, feeding or migratory activity of state-listed rare species (321 CMR 10.02).

Of particular concern is the section of the proposed rail-trail shown in red on the attached map. Based upon the information that has been provided and the information contained in our database, it is the opinion of the NHESP that development of this section of the rail-trail would result in a probable "take" of state-protected turtles. Blanding's Turtles have been documented

Division of Fisheries and Wildlife
Field Headquarters, One Rabbit Hill Road, Westborough, MA 01581 (508) 792-7270 Fax (508) 792-7275
An Agency of the Department of Fisheries, Wildlife & Environmental Law Enforcement

to use wetlands associated with the Squannacook River west of this rail section, and the rail-bed itself provides nesting habitat. Blanding's Turtles have also been documented to use wetlands and vernal pools east of Townsend Road, and records of Blanding's Turtles along Townsend Road indicate that this is a potentially important turtle migration area. As a result, development of this approximately one mile long section of the proposed rail-trail would disrupt the breeding, migratory and feeding behaviors of Blanding's and possibly Wood Turtles, and would result in a probable "take" of state-protected turtles.

The NHESP is also concerned that development of the section of rail-trail shown in yellow on the attached map could adversely impact state-listed turtles. In particular, the NHESP has records of Blanding's Turtles in the vicinity of the former Groton Airfield, and is concerned that this section of the proposed rail-trail could be another important nesting and migratory area for the Blanding's Turtle. Additional information is required in order to determine the extent to which this section of the proposed trail would impact state-protected turtles. If the project proponents wish to proceed with development of this section of the proposed trail, the NHESP requests that a rare turtle habitat assessment and spring field surveys for Blanding's and Wood Turtles be conducted. The NHESP must approve survey protocols prior to initiation of any surveys. The NHESP will assess potential impacts to rare turtles in this area once the results of this habitat assessment and survey are available.

The NHESP believes that the remainder of the proposed trail, north of the former airfield could be developed without adversely impacting rare species and their habitats. However, modest restrictions on the timing of some construction activities may be necessary to protect rare wildlife. Please note that the NHESP rare species database is continually updated as new information is obtained about the distribution of rare species. Should the proposed project change, or should new rare species information become available, potential impacts of the proposed project would have to be reexamined. Please feel free to contact Jon Regosin, Ph.D. at (508) 792-7270, ext. 316, if you have any questions about this letter.

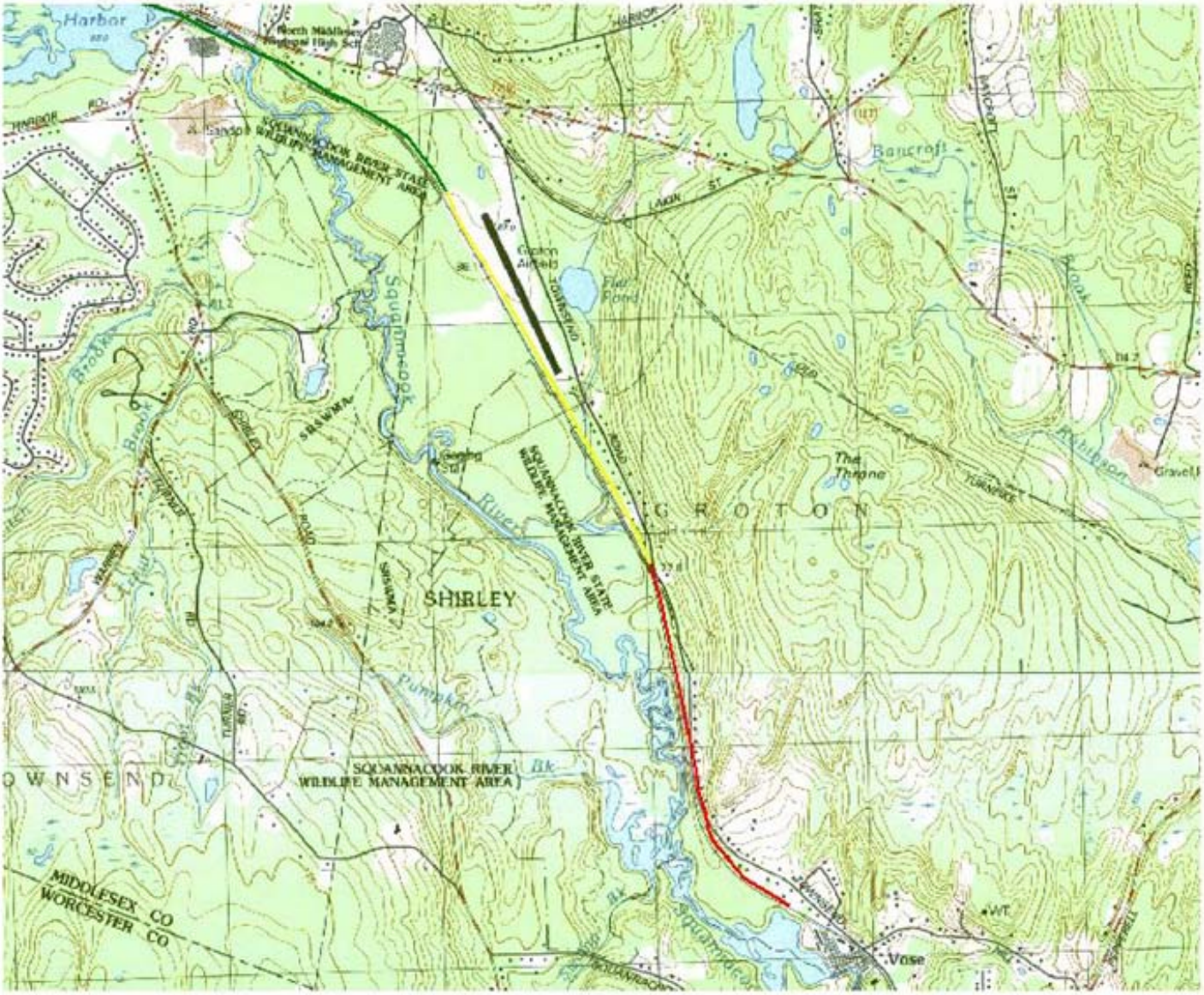
Sincerely,

Thomas W. French

Thomas W. French, Ph.D.
Assistant Director

cc: Groton Conservation Commission
Groton Planning Board
DEP Central Regional Office, Wetlands Section

Portion of proposed Groton-Townsend rail trail.
Sections of the trail shown in red and yellow are referenced in the attached letter.



Sources: USGS, NHESP, MassGIS
prepared 1/04

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087
http://www.fws.gov/northeast/newenglandfieldoffice

March 13, 2008

Reference:	Project	Location
	Rail trail	Groton and Townsend, MA

Jennifer Shemowat
Fay, Spofford & Thorndike, LLC
5 Burlington Woods
Burlington, MA 01803

Dear Ms. Shemowat:

This responds to your recent correspondence requesting information on the presence of federally-listed and/or proposed endangered or threatened species in relation to the proposed activity(ies) referenced above.

Based on information currently available to us, no federally-listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service are known to occur in the project area(s). Preparation of a Biological Assessment or further consultation with us under Section 7 of the Endangered Species Act is not required.

This concludes our review of listed species and critical habitat in the project location(s) and environs referenced above. No further Endangered Species Act coordination of this type is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

In order to curtail the need to contact this office in the future for updated lists of federally-listed or proposed threatened or endangered species and critical habitats, please visit the Endangered Species Consultation page on the New England Field Office's website:

www.fws.gov/northeast/newenglandfieldoffice/EndangeredSpec-Consultation.htm

In addition, there is a link to procedures that may allow you to conclude if habitat for a listed species is present in the project area. If no habitat exists, then no federally-listed species are present in the project area and there is no need to contact us for further consultation. If the above conclusion cannot be reached, further consultation with this office is advised. Information describing the nature and location of the proposed activity that should be provided to us for further informal consultation can be found at the above-referenced site.

Thank you for your coordination. Please contact us at 603-223-2541 if we can be of further assistance.

Sincerely yours,

Anthony P. Tur
Endangered Species Specialist
New England Field Office

ENGINEERS
FST
Since 1914

FAY, SPOFFORD & THORNDIKE
5 Burlington Woods
Burlington, MA 01803
Toll Free: 800.835.8666
T: 781.221.1000
F: 781.229.1115
www.fstinc.com

February 13, 2008

Ms. Susan Hamilton, Regional Director
MA DEPARTMENT OF CONSERVATION & RECREATION
Division of State Parks & Recreation
P.O. Box 829
Carlisle, MA 01741

Subject: **Squannacook River Rail Trail**
Groton & Townsend, Massachusetts

Dear Ms. Hamilton:

This letter is in follow-up to our phone conversation on January 28, 2008. As we discussed, the Towns of Groton and Townsend are considering the development of a shared use path (or rail trail) along the former railroad right of way of the Boston & Maine Rail Road, now owned by the Massachusetts Bay Transportation Authority (MBTA). The Squannacook River Rail Trail Committee in each community selected Fay, Spofford & Thorndike (FST) to conduct an *Environmental and Engineering Assessment* to determine the feasibility of developing a rail trail along this former railroad right of way.

As shown on the attached locus map, the portion of the Squannacook River Rail Trail project corridor covered in this *Assessment* extends from the Bertozzi Wildlife Management Area parking lot on Townsend Road in Groton to Depot Street in Townsend Center, a distance of approximately 3.3 miles.

We are identifying potential parking areas for rail trail users as part of this *Assessment*. Should the project advance to the design phase, each of these areas will need to be further evaluated using detailed topographic survey. One potential parking area identified during our site visit is located on Townsend State Forest land off Old Meetinghouse Road. We have attached two photos of this location, which show the dirt parking area along Old Meetinghouse Road and a cleared area further set back from the road.

We are contacting the DCR to determine the agency's willingness to consider allowing rail trail parking on the Townsend State Forest land. In addition, the Committees are also interested in the possibility of engaging DCR to help maintain the rail trail in cooperation with the local towns and volunteers. Please review this request at your earliest convenience and forward any comments that DCR wishes to make regarding this project. Submit your comments to: Al Futterman, Nashua River Watershed Association, 592 Main Street, Groton, MA 01450.

If you have any questions regarding the proposed project or need additional information, please feel free to contact me at 781-221-1031 or via email <*jshemowat@fstinc.com*>.

Sincerely,
FAY, SPOFFORD & THORNDIKE, LLC
By
Jennifer A. Shemowat, P.E.
Project Engineer

Enclosures
cc: Al Futterman, Nashua River Watershed Association
Jeff Ritter, Town of Groton

Appendix D – Local Correspondence

TOWN OF GROTON
Groton Conservation Commission
173 Main Street
Groton, MA 01450-1237
(978) 448-1106
Fax: 978-448-1113
e-mail:bganem@townofgroton.org

March 12, 2008

Jeffrey Ritter, Interim Town Administrator
Town Hall
173 Main Street
Groton, MA 01450

RE: Proposed Squannacook Rail Trail

Dear Mr. Ritter:

The Conservation Commission reviewed and discussed the proposed Rail Trail to follow the abandoned B & M railroad now owned by the MBTA at its regular meeting on March 11, 2008. The Commission believes that this would be an important regional trail connection and supports the concept of a recreational trail in this location.

Based on several members' participation in a turtle tracking effort approximately three summers ago, it is the Commission's understanding that the current starting point, the Bertozzi Wildlife Management Area, avoids rare species habitat. Nevertheless, it is recommended that the consultant immediately request specific rare species information from the Natural Heritage & Endangered Species Program to assist in both the feasibility planning and the final design of the project.

The Peterborough & Shirley branch of the old Fitchburg railroad parallels the Squannacook River for much of its length in West Groton, but the portion of the abandoned railroad north of the Bertozzi area is a considerable distance from the River. The Commission has concerns, however, about an extensive wetland north of the second Crosswinds Drive crossing that tends to fluctuate in size in response to beaver activity in the area. Any work on the railroad bed in the vicinity of this wetland is likely to require a Notice of Intent filing with the Conservation Commission. The chief issues would be protecting the resource areas during construction, appropriate sizing of the culvert (consider a bridge?) that connects the wetland areas, anticipated users of the trail, the surfacing of the trail itself, and future maintenance.

The Commission would welcome the opportunity to attend an informational meeting on the proposed trail.

Sincerely yours,

Barbara V. Ganem
Conservation Assistant

BoS 3/24 #63 Squannacook River Rail Trail Committee —
FST —

TOWNSEND FIRE-EMS DEPARTMENT

Proudly serving the citizens of Townsend since 1875

PO Box 910 – 13 Elm St.
Townsend, MA 01469

Headquarters: 978-597-8150 Fax: 978-597-2711

Donald Klein
Chief of Department

March 18, 2008

TO: Greg Barnes, Town Administrator

FROM: Donald Klein, Chief Townsend Fire-EMS

RE: Request Comments on Proposed Rail Trail Project

Greg,

The Rail Trail will offer the Fire-EMS department good excess to part of our forestland which today can only be accessed visa foot. During brush fire season this will afford us an easier method of getting our equipment into some of these areas. The down side will be the need to provide medical services to these remote sites, while we do have an ATV that can traverse this trail, it is not currently set-up to handle medical calls.

PRO's

1. Much needed walking, biking, hiking trails.
2. Able to get forestry equipment into hard to reach places.

CON's

1. Difficult to get medical help into and extraction from some areas.
2. Will have to upgrade ATV to handle emergency medical calls.
3. I for see increase calls for my dept for brush & medical along the trail route.

If this Rail Trail goes forward, the top priority for my department would be to upgrade the ATV to provide medic coverage along the trail.

Regards,

Donald Klein, Chief
Townsend Fire-EMS Department

TOWNSEND POLICE DEPARTMENT
P. O. Box 137
70 Brookline Road
Townsend, Massachusetts 01469

Erving M. Marshall, Jr. **978-597-2242**
Chief of Police **978-597-6214**

To: Board of Selectmen

From: Erving M. Marshall, Jr., Chief of Police

Re: Rail Trail

Date: June 1, 2006

I have been furnished a copy of the "Final Report of the Squannacook River Rail Trail Feasibility Study Committee" and would like to clarify a couple of issues.

On page (4) of this report it states that a presentation was offered to me in early 2003 and that I was "in support of the concept" which is true and still is. On page (10) of this document it states again that I "expressed support" for the trail which is also true.

I just wanted it understood that the support that I have expressed for the Rail Trail was based on the review of documentation that I had in my possession that dates back to 1997 when the Rail Trail was first being discussed, coupled with my conversations with neighboring Police Chief's who had the trail in their communities, and my first-hand observations of those using the trail in these same communities. I was particularly impressed by what I saw in the downtown square area in Pepperell where one can see, just driving through, how many people are using the trail and how the trail seems to have been at least a part of revitalizing this area. These facts coupled with the success in other communities of the Rail Trail along with the idea that the trail was initially going to run the full length from the harbor area to the New Hampshire line (6.8 miles) and link to Groton, MA and Mason, NH, and that there would be no cost to the town as the 10% local match was slated to be raised by donation was all taken into consideration by myself during the early stages of this process.

While I still support the "concept" of the Rail Trail, many issues have been raised over the past three years since I first "expressed support." Today, one of my main concerns is parking and available access to the trail which is now proposed to run from the harbor area to the center of town. My concerns about parking, stem from issues that (we) the Townsend Police Department, have had to deal with for the last couple of years at the Harbor Mall concerning student parking at that location. Much time and effort has gone into addressing concerns of the Harbor Village Management by my staff and myself and in working with the school to eliminate parking by

students at Harbor Village. I know first hand that the management company of Harbor Village is vehemently opposed to parking by the students from the high school and can only assume that they would also oppose parking by those accessing a rail trail. I have similar concerns about parking along the entire length of the trail including Duncan Donuts, The Cooperage, Harbor Auto Body, as well as the Center Mall and those businesses surrounding this area. The only likely places that I can see to access the proposed trail is in the harbor east of Shepherd's building and on Railroad Street next to the Center Mall and these areas are at the least, questionably owned by private parties. The point that I am trying to make is that I do not need the extra workload of addressing parking issues unless these points can be clarified and so that my resources are not being utilized to track down the owners of illegally parked vehicles that might be out on the trail.

The second concern that I have is the cost either direct or indirect that might be attached to this proposal. The obvious cost which I have considered and which would directly impact my department would be patrolling the Rail Trail or calls for service from the police department. I can only say that those officials that I have spoken to in other communities have advised me that they have seen no significant increase attributed to the trails in their respective communities thus feel that there would be no significant impact on my department based on these conversations and that I would be able to absorb any additional cost for calls for service into my existing budget. Should the need arise for extra patrols of the trail, I would be able to utilize available grant funding for this purpose as I do with the ATV patrols that we now have.

The overall impact of the Rail Trail, however, needs to be seriously considered, as there are maintenance issues, liability issues, environmental issues, privacy or encroachment issues, and other legal issues, which could end up costing the town in either the short or long term. I know that these issues have been discussed, however, it seems that some of these issues have been glossed over in this final report and need to be looked at further and in greater detail. The one thing that I don't want to see happening is for the town to get into a position where any additional costs that might not be apparent, being put on the backs of the town departments who are already struggling to provide adequate service to the community.

In closing, I just felt the need to set the record straight. When I see my name printed in a document that indicates that I am in favor of something I want it documented what exactly it is that I'm in favor of, which is the "concept" of the Rail Trail and not the "feasibility."

Sincerely,

Erving M. Marshall, Jr.
Chief of Police

cc: Rail Trail file

TOWN OF TOWNSEND
Highway Department
PO Box 621
12 Dudley Road
Townsend, Massachusetts 01469
(978) 597-1712
FAX: (978) 597-0726

MEMORANDUM

Date: March 26, 2008

To: Gregory W. Barnes

From: Ed Kukkula, Highway Superintendent

Subject: Rail Trail Comments

In June of 2006 I was provided with the Final Report for the Squannacook River Rail Trail Feasibility Study. After reading the report some questions and concerns arose regarding the Highway Department's involvement with the maintenance of the trail once it is completed. On June 5, 2006 those concerns were provided to the Board of Selectmen. Those questions and concerns are reiterated below and still need to be addressed.

Not being a resident of the town I am neither for or against having the trail constructed but I do have concerns as the Highway Superintendent because it appears that our department might be responsible for the care and maintenance of this trail. As it stands now the Highway Department has all it can do to maintain the 100 plus miles of roadway with the limited manpower and funds allocated for their repair and maintenance.

I must be straightforward and say that if the Highway Department is saddled with the maintenance of the trail there is no way that our department will be able to manage the added responsibility. Nor do I foresee any other department being able to handle it either.

If the trail is built and I am advised that I "must" maintain it, must first question is; where will the funding come from? The high end of the stated yearly maintenance expense is approximated at $4,800. However the continued rising cost of materials will more than likely drive this expense up yearly. Will this expense be added to the Highway Department's yearly operating budget? And what about the additional manpower necessary to maintain it?

Lets not overlook the cost of repaving the trail. The final report states it would require resurfacing approximately ever 15 years at a cost of between $50,000 and $120,000 depending on the type of surface used for the trail. If a dense graded base is used, maintenance would most likely be needed yearly due to the fact that normal traffic and rain causes rutting and depressions with this type of material. If the trail is paved with asphalt the material **might** last 15 years depending on the thickness it is put down at and how well the trial is designed to handle storm water runoff. However the edges (shoulders) of the trail will most likely have to be repaired yearly so that no drop-offs would exist. Repaving the trail at today's cost would be approximately $80,000. If material costs increase 3% per year 15 years from now the cost will rise to $125,000…30 years…$195,000. Where will this funding come from?

Then there is the trash that might be generated from people using the trail. Are trashcans going to be supplied along the trail? If so, who will be responsible for empting them and how would a vehicle travel down the trail if it is only six feet wide? And how much will this add to the town's overall trash removal costs?

Again, I am not for or against a trail in town but these concerns must be addressed.

Jennifer Shemowat

From: Jeffrey R. Peduzzi [townsendplanning@comcast.net]
Sent: Monday, April 07, 2008 10:58 AM
To: Jeanne Hollows
Cc: Greg Barnes
Subject: Re: Site Walk-Rail Trail

Hi Jeanne & Greg:
Jed, Nik, and myself walked the rails from the Center St. gym to the Police Tape to just past the Hannaford. I believe strongly this is an excellent project. The entire stretch was easily navigable. There is a lot of clearing to do, and there certainly are culverts in need of repair. Some of those repairs can be effected in such a way as to alleviate some of the abutters issues with flooding. There are also several instances of abutters apparently 'squatting' on portions of the rail. Most notable appears to be Harbor Auto. It *appears* that their chain link fence travels right across the tracks. I italicize*appears,* because there was a lot of snow, and we could be mistaken, but it sure looks like several abutters have encroached into the rail road right of way, and some into the track area itself! It's no wonder some of these abutters are objecting to the project.
While the location is obviously environmentally sensitive, it is no more so that the Ayer-Pepperell Trail, which I use and love.I believe that business will benefit as well, as they appear to have done in Ayer. Nik mentioned he know someone in Ayer government, and (I hope) will solicit an opinion from them. I suggest Greg make a formal request of the Ayer Selectmen to solicit their comments on the impact of their trail.
Again, I believe the project can actually improve the area not only by it's presence, but by the fact that some good engineering can result in better upland drainage to the river, resulting in reduced flooding for residents north of 119.I do not know what the reference to the area behind Hannaford being "all wet" meant, as it was perfectly dry a week ago Sunday. We observed the Police Tape, and perhaps there was an issue there recently.It is also an opportunity to have installed some newer technology storm water treatment devices at some of parking lots that abut the trail.
It is important to note that the entire length appears to already be well travelled. There is strong evidence of foot and vehicular traffic. Formalizing it as a rail trail will add safety and value to the town and it's residents. I say we should extend it all the way to the NH border to the NW, andall the way into West Groton to the SE.
The building next to the Gym is in bad shape, and would appear to be the biggest obstacle I saw (aside from the culvert/trestle/bridge repairs needed). That building would have to be demolished (looks a bit far gone for restoration) in order to make the area safe for users.
We also observed several locations that look like they have been used to access the river from 119. These should be researched to determine ownership, and then either blocked or enhanced, as is appropriate.
Jed mentioned that it would tie the eastern and central villages of town together, allowing access to services that are dangerous for pedestrians at the moment. (Who would want their child to go to McDonalds or anywhere else in the plaza, from the center, if they would have to walk on SR 119?)

Anyway, Huge thumbs up from me.

Best Regards,

Jeff

On Mar 25, 2008, at 4:00 PM, Jeanne Hollows wrote:

> Hi Everyone,
> Just a reminder for those who can make it to check out the proposed "rail trail." Meet this **Sunday** at the Center St. Gym parking lot (off Depot St. at **9:00 a.m.** for a site walk. Notice & map attached.
> Thanks,
> Jeanne

Town of Townsend
Historic District Commission
P.O. Box 669
Townsend, Massachusetts 01469

Date: March 25, 2008

To: Board of Selectmen
Town of Townsend

From: Historic District Commission
Town of Townsend

RE: Request for comments dated 13 March, 2008

Dear Selectmen:

The Townsend Historic District Commission does not wish to comment On the proposed rail trail project at this time. We have not received any correspondence from any of the parties involved and without any information the HDC is not going to put its name in the assessment report. Please keep us apprised of continuing developments.

Thank you,

Eino Kauppi
Chairman
Townsend Historic District Commission

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FAY, SPOFFORD & THORNDIKE
5 Burlington Woods
Burlington, MA 01803
Toll Free: 800.835.8666
T: 781.221.1000
F: 781.229.1115
www.fstinc.com

February 13, 2008

Ms. Jeannie Bartovics, Site Administrator
TOWNSEND HISTORICAL SOCIETY
Box 95
72 Main Street / Route 119
Townsend, MA 01469

Subject: **Squannacook River Rail Trail**
Groton & Townsend, Massachusetts

Dear Ms. Bartovics:

The Towns of Groton and Townsend are considering the development of a shared use path (or rail trail) along the former railroad right of way of the Boston & Maine Rail Road, now owned by the Massachusetts Bay Transportation Authority (MBTA). The Squannacook River Rail Trail Committee selected Fay, Spofford & Thorndike (FST) to conduct an *Environmental and Engineering Assessment* to determine the feasibility of developing a rail trail along this former railroad right of way.

As shown on the attached locus map, the portion of the Squannacook River Rail Trail project corridor covered in this *Assessment* extends from the Bertozzi Wildlife Management Area parking lot on Townsend Road in Groton to Depot Street in Townsend Center, a distance of approximately 3.3 miles.

We are contacting the Society as part of this *Assessment* so that we can assist the project proponents in addressing community and preservation concerns early in the project planning process. Our immediate goal is to evaluate and document historic and cultural resources along the project corridor. As part of this research, we will determine the need for mitigation measures and identify potential locations for interpretive waysides.

We request that you solicit any comments that the Society wishes to make regarding this project at your earliest convenience. Please provide your written comments to: Al Futterman, Nashua River Watershed Association, 592 Main Street, Groton, MA 01450. A copy of your response letter will be included in the *Assessment* report. A coordination letter has also been submitted to the Townsend Historic Districts Commission.

We will be contacting you in the coming weeks to set up a meeting to discuss the Society's comments and some of our design ideas for the Townsend Harbor area. In the meantime, if you have any questions regarding the proposed project or need additional information, please feel free to contact me at 781-221-1031 or via email <*jshemowat@fstinc.com*>.

Sincerely,
FAY, SPOFFORD & THORNDIKE, LLC
By
Jennifer A. Shemowat, P.E.
Project Engineer

Enclosures
cc: Al Futterman, Nashua River Watershed Association

Appendix E – List of Acronyms

The following is a list of acronyms used throughout the study:

AASHTO	American Association of State Highway and Transportation Officials
ACOE	Army Core of Engineers
ADA	American with Disabilities Act
ADAAG	American with Disabilities Act Accessibility Guidelines
ADT	Average Daily Traffic
BLSF	Bordering Land Subject to Flooding (Floodplain)
B&M	Boston & Maine Railroad
BMPs	Best Management Practices
BWSC	Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup
BVW	Bordering Vegetative Wetland
CE	Categorical Exclusion Checklist
CERCLA	Comprehensive Environmental Compensation Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CMAQ	Congestion Mitigation and Air Quality Program
CMR	Code of Massachusetts Regulations
CVP	Certified Vernal Pool
CY	Cubic Yard
DCR	Massachusetts Department of Conservation & Recreation
DFW	Massachusetts Division of Fisheries & Wildlife
EA	Each
EH	Estimated Habitats for Rare Wildlife
EIR	Environmental Impact Report
ENF	Environmental Notification Form
EOEA	Massachusetts Executive Office of Environmental Affairs
EOT	Commonwealth of Massachusetts Executive Office of Transportation
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FST	Fay, Spofford & Thorndike (Consultants)

List of Acronyms (cont'd):

IVW	Isolated Vegetated Wetland
LB	Pound
LEC	LEC Environmental Consultants
LF	Linear Foot
LS	Lump Sum
LSP	Licensed Site Professional
LUW	Land Under Waterbodies and Waterways
MA	Massachusetts
MACRIS	Massachusetts Cultural Resource Information System
MA DEP	Massachusetts Department of Environmental Protection
MassGIS	Massachusetts Geographic Information Systems
MBTA	Massachusetts Bay Transportation Authority
MCP	Massachusetts Contingency Plan
MEPA	Massachusetts Environmental Policy Act
MESA	Massachusetts Endangered Species Act
MGL	Massachusetts General Laws
MHC	Massachusetts Historical Commission
MPH	Miles Per Hour
MRPC	Montachusett Regional Planning Commission
MS4s	Municipal Separate Storm Sewer Systems
MUTCD	Manual on Uniform Traffic Control Devices
NEPA	National Environmental Policy Act
NHESP	Natural Heritage & Endangered Species Program
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NRWA	Nashua River Watershed Association
OHM	Oil or hazardous material
PH	Priority Habitat for Rare Species
PNF	Project Need Form
PVP	Potential Vernal Pool
RAO	Response Action Outcome Statement
REMOPS	Remedy Operation Status

List of Acronyms (cont'd):

RFA	Riverfront Area
ROW	Right-of-Way
RTC	Rails-to-Trails Conservancy
SAFETEA	Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2003
SF	Square Foot
SRRT	Squannacook River Rail Trail
SRTS	Safe Routes to School
SWPPP	Storm Water Pollution Prevention Plan
TE	Transportation Enhancement Program
TRA	Transit Realty Associates
USGS	United States Geological Survey
USFWS	United States Fish & Wildlife Service
UST	Underground Storage Tank
WPA	Wetlands Protection Act