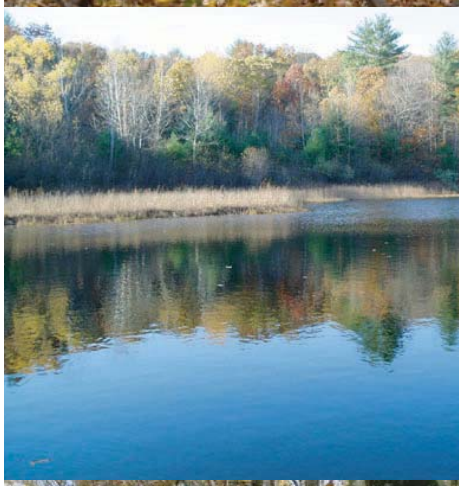
Bruce Freeman Rail Trail

Environmental & Engineering Assessment

Town of Sudbury, MA

FAY, SPOFFORD & THORNDIKE
Engineers - Planners - Scientists

December 2006



Bruce Freeman Rail Trail
Environmental & Engineering Assessment Report
Sudbury, Massachusetts

December 2006

Prepared For:

TOWN OF SUDBURY, MASSACHUSETTS

Prepared By:

FAY, SPOFFORD & THORNDIKE LLC
Engineers • Planners • Scientists

In Association With:

WETLANDS & WILDLIFE, INC.

Acknowledgements

Sudbury Rail Trail Conversion Advisory Committee (RTCAC)

Sudbury Board of Selectman
Maureen Valente, Town Manager

Bill Place - Director of Public Works / Town Engineer
Jody Kablack - Director of Planning & Community Development
Debbie Dineen - Conservation Coordinator
Dennis Mannone - Park & Recreation Director
Chief Peter Fadgen - Police Department
Chief Ken MacLean - Fire Department
Jim Kelly – Building Inspector

Funds for the Assessment report were approved at the 2005 Sudbury Town Meeting through the Community Preservation Act (CPA).

Executive Summary

The Bruce Freeman Rail Trail (BFRT) is a proposed 25-mile rail trail between Lowell and Framingham along the former Lowell Secondary Track right-of-way of the Old Colony Rail Road. The trail is named in remembrance of the late State Representative Bruce Freeman, a Republican from Chelmsford, who was a key supporter for the creation of the trail during his term. The rail trail is at various stages of development along the project corridor -- concept, study, design and pre-construction.

In light of recent and ongoing efforts along trail sections in neighboring communities, the Town of Sudbury hired a consultant team to prepare a BFRT Environmental & Engineering Assessment report in May 2006. The section of rail corridor covered in the Assessment extends from South Sudbury (Chiswick Park) north to the Concord Town line, a distance of approximately 4.6 miles. This section is owned in its entirety by the Commonwealth of Massachusetts, under the care and control of the Executive Office of Transportation (EOT).

The goal of this Assessment was to determine the feasibility of developing a rail trail along the corridor in accordance with the MassHighway Project Development & Design Guide (2006). Under this scenario, the trail would be designed and constructed using a combination of local (10%), state (10%) and federal (80%) funds. Other options under consideration by the Town include a No-Build alternative or a Town Design/Build alternative.

The new MassHighway Project Development & Design Guide affords communities with the opportunity to take a more flexible and accommodating design approach to local projects. Drawing upon this flexibility, the Assessment report discusses various rail trail design options that meet state and federal design guidance and accessibility requirements. For example, the report outlines commonly used trail surface materials (paved, granular and stabilized granular), tread widths (5, 8 and 10 feet) and bicycle/pedestrian structure types. Each trail design option was considered in terms of existing corridor conditions, potential project impacts, required environmental clearances and anticipated construction costs.

For each design option considered, the key to minimizing the adverse effects of rail trail development and usage requires the selection and implementation of design elements and mitigation measures directed at the avoidance/minimization of direct and indirect impacts to the natural environment and abutting property. Example measures include minimizing the limits of rail trail construction (i.e. impact footprint) in ecologically sensitive areas and installing fencing and vegetative screening to control and block unwanted informal access to abutting properties.

Based on a review of the information gathered as part of the Assessment process, it is deemed feasible to convert the former rail corridor to a rail trail from an environmental and engineering standpoint. Trail development along this corridor will require a contextually appropriate design that complements the varying commercial, residential, historic and natural areas along the rail corridor. Project area conditions warrant the need for location specific engineering solutions and the implementation of mitigation measures designed to preserve and protect sensitive resource areas and abutting property.

The information presented within the Assessment report will begin to assist residents and officials to consider what is the best option for the community. However, additional corridor reconnaissance activities, board/department/agency coordination, and local outreach are needed to determine the Town's desire and ability to advance the rail trail project forward.

The Assessment effort was guided by input from Town staff and officials, with the assistance of the Rail Trail Conversion Advisory Committee (RTCAC). Public outreach activities included a local issues meeting at the outset of the project, individual outreach meetings with abutting business owners, environmental coordination activities with boards/agencies, monthly meetings with the RTCAC, and a public information meeting to present the findings of the Assessment. All electronic and written correspondence received as part of the public outreach effort has been included in the Town's project record.

Table of Contents

1 Introduction

The purpose of this Section is to provide an overview of the Bruce Freeman Rail Trail project from a regional, local and study perspective.

1.1 Regional Overview

The Bruce Freeman Rail Trail (BFRT) is a proposed 25-mile rail trail between Lowell and Framingham along the former Lowell Secondary Track right-of-way of the Old Colony Rail Road. The proposed facility is a rail trail which is a shared use path created along a former railroad right-of-way. Depending on the trail surface and width, these non-motorized facilities can support a variety of uses including, for example, bicycling, walking, inline skating, cross-country skiing, and wheelchairs.

The rail trail is named in remembrance of the late State Representative Bruce Freeman, a Republican from Chelmsford, who served from 1969 until he passed away from cancer in 1986. Freeman was a key supporter for the creation of the trail during his term. His successor and fellow supporters continued to promote the project and were successful in obtaining the endorsement of the State Legislature in the Spring of 1987.

The rail trail project is at various stages of development along the corridor -- concept, study, design and pre-construction. The project has been segmented into three phases based on corridor ownership and level of development.

Phase 1 - Extends from the Lowell / Chelmsford line near Cross Point Towers / Route 3 south to Route 225 in Westford (7 miles). This phase has been designed and funded and construction will begin in the near future. This section of right-of-way is jointly managed by the MA Executive Office of Transportation (EOT), MA Department of Conservation and Recreation (DCR), and the towns of Chelmsford and Westford.

Phase 2 - Extends from Route 225 in Westford south through Carlisle, Acton, Concord and Sudbury to a point just north of Route 20 near Chiswick Park (13 miles). The project is currently advancing on a town-by-town basis; permitting individual towns to proceed forward independently of adjacent communities. Acton, Carlisle and Westford have hired a consultant to begin preliminary design on their 4.5-mile section of rail trail. MassHighway has hired a consultant to prepare the necessary environmental documentation and preliminary design plans for the redesign of the Concord rotary. This project will study design options for the rail trail crossing at Route 2 at the Acton / Concord town line. A detailed rail trail assessment report has been completed for the Town of Concord and they are currently drafting a request for proposals for preliminary design. This section of right-of-way is owned by the Commonwealth of Massachusetts, under the care and control of the EOT.

Phase 3 - Extends from a point just north of Route 20 in Sudbury, south to Route 9 in Framingham (5 miles). The Central Transportation Planning Staff (CTPS) of the Boston Metropolitan Planning Organization (MPO) will be releasing a study on this section of right-of-way that will discuss the major issues and opportunities related to potential rail to trail conversion. This section of right-of-way is owned by CSX Corporation. CSX removed the tracks and ties from the railroad corridor and indicated that it will no longer be used for rail service. The EOT is engaged in aggressive conversations with CSX regarding the purchase of multiple properties, and this corridor extension has been identified as one of the assets on the agency's priority list.

1.2 Local Perspective

The portion of rail corridor included in this Assessment extends from South Sudbury north to the Sudbury / Concord Town line. This portion of rail corridor is owned in its entirety by the Commonwealth of Massachusetts, under the care and control of the EOT. According to the Old Colony Rail Road Valuation Maps, the length of State-owned corridor within Sudbury is approximately 4.6 miles.

Figure 1: Rail Crossing in South Sudbury

The study area begins where the east-west Massachusetts Bay Transportation Authority (MBTA) rail corridor crosses the north-south Old Colony Rail Road corridor. This crossing is located in South Sudbury, near Crumble Station and the entrance drive to Sudbury Lumber and Chiswick Park. The Town specifically excluded the portion of rail corridor south of this crossing from the Assessment. Though this rail line is continuous, each segment is owned by a different entity. The southern extension is privately owned by CSX Corporation and the status of negotiations between EOT and CSX to purchase this segment is pending at this time.

A locus map of the project area on the Maynard and Framingham USGS Quad Maps is included on the following page.

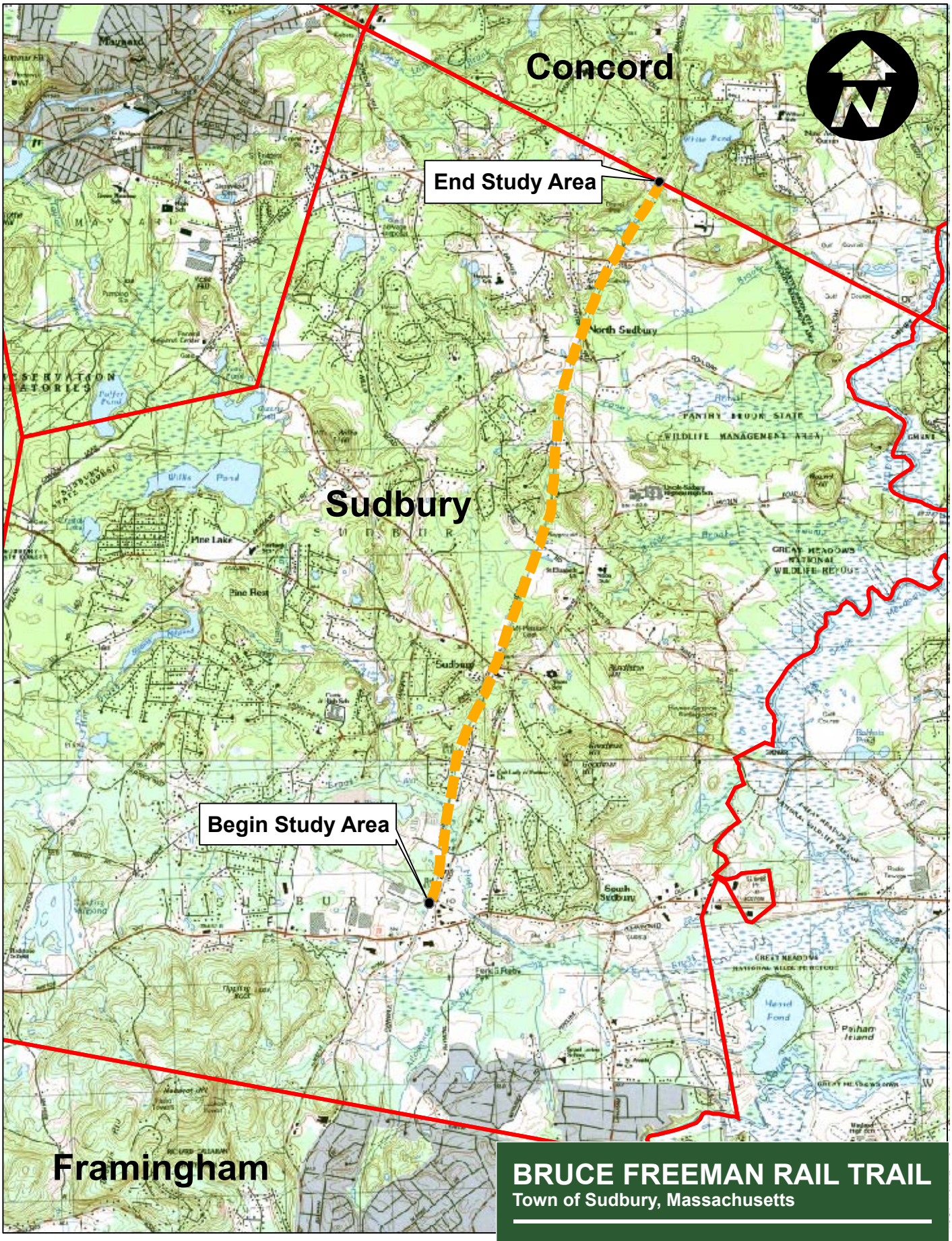
1.3 Assessment Purpose

The purpose of this assessment is to determine the environmental and engineering feasibility of developing a rail trail along the Sudbury portion of the former rail corridor.

The primary goals of this Assessment are to:

- Assess existing conditions along the corridor
- Evaluate and document potential project impacts
- Discuss key design and constructability related issues
- Identify means and ways to mitigate project impacts, if practicable
- Develop design and construction cost estimates

Ultimately this Assessment will assist Town officials and residents to determine their willingness, readiness and fiscal ability to proceed with the rail trail project.



BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

Locus Map

Figure 2

Data Source: Office of Geographic and Environmental Information (MassGIS)
Commonwealth of Massachusetts Executive Office of Environmental Affairs

Map Scale: 1 inch = 4,000 feet

1.4 Assessment Oversight

This Assessment effort has been guided by input from Town staff and officials, with the assistance of the Town's Rail Trail Conversion Advisory Committee (RTCAC).

Town staff and officials include the Town Manager and Board of Selectman, Town Engineer / Public Works Director, Park & Recreation Director, Conservation Coordinator and the Town Planning and Community Development Director. RTCAC membership includes representation by Town staff and at-large positions filled by Town residents appointed by the Board of Selectman.

For further information about the work of the RTCAC, including documents available for downloading and meeting minutes, visit the Town's website at:

http://www.town.sudbury.ma.us/committees/railtrail

The funds for the Assessment were approved at the 2005 Sudbury Town Meeting under the Community Preservation Act (CPA).

2 Project Area Description

2.1 Location

The rail corridor covered in this Assessment extends from a point near Route 20 in South Sudbury northward to the Concord town line for a distance of approximately 4.6 miles.

The rail corridor crosses Hop Brook and Pantry Brook via existing railroad trestles. There are seven at-grade crossings at Old Lancaster Road, Hudson Road (Route 27), Morse Road, Haynes Road, Pantry Road and North Road (Route 117) and one private road, Codjer Lane.

Detailed mapping of the corridor is included in Appendix A and B of this Environmental and Engineering Assessment.

2.2 Length & Width

The railroad right-of-way is 66 feet wide for most of its 4.6-mile length. The right-of-way is also wider than 66 feet in some locations and includes a few outcrops of land to the east and west. The section of right-of-way between Haynes Road and Pantry Road is 99 feet wide, though it appears as though 33 feet of this width may have been sold to a private residential owner. The approximate centerline of the existing track is the established baseline for the right-of-way. The railbed (which is the earthen area on which the tracks and ties are laid) varies in width depending upon the adjacent cut and fill slopes and bordering wetlands. A rail trail would be located on the railbed, along the alignment of the existing track.

2.3 Topography and Vegetation

The profile of the rail corridor is relatively flat. The adjacent cut and fill slopes transition over the length of the corridor. Certain sections of corridor are relatively level across the width of the right-of-way whereas, in other areas, the cut and fill sections range from an elevation difference of 3 feet to over 20 feet.

The majority of the corridor is lined with varying depths of woodland vegetation. This vegetation provides some screening between adjacent properties and the corridor, particularly during the spring and summer months. Only in the immediate commercial / industrial area between the southern end of the corridor and Codjer Lane is there limited vegetation.

The rail trail would follow the existing track alignment and profile atop the railbed. This approach minimizes the amount of required grading and disturbance to existing vegetation and adjacent environmental resource areas.

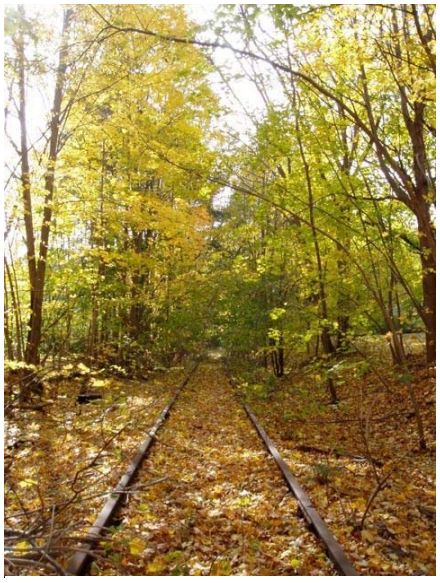


Figure 3: Railbed South of Hudson Road (Route 27)

2.4 Adjacent Uses

The majority of the rail corridor travels through areas characterized by residential, open space / conservation and recreational uses. Many of these parcels are owned by the Town. Commercial / industrial uses are located south of Codjer Lane and nearby the Hudson Road (Route 27) and North Road (Route 117) crossings.

The sheets noted below reference the mapping included in Appendix A, Corridor Base Mapping, of this Environmental and Engineering Assessment.

Between the start of the study area and a point just north of Codjer Lane, the rail corridor travels adjacent to a number of businesses with frontage on Union Avenue. The corridor intersects two commercial driveways, Paris Trust LLC and Methods Machine Tools Inc., and crosses Codjer Lane, the private access drive into the multi-acre Cavicchio Greenhouses property. (See Figure A-1).

Figure 4: Hop Brook Railroad Trestle

North of Codjer Lane, the rail corridor travels through Town-owned land and crosses Hop Brook via an existing railroad trestle. The rail corridor defines the western edge of the Town-owned conservation parcel. North of Hop Brook, the rail corridor crosses Old Lancaster Road and travels through residential areas to its intersection with Hudson Road (Route 27). (See Figure A-2 and A-3).

Just past the Hudson Road (Route 27) crossing, the rail corridor parallels the entranceway to Ti-Sales equipment. The rail corridor is bordered by large open tracts of land between Hudson Road and Morse Road. Three of the parcels along the west side are owned by the Town of Sudbury. (See Figure A-3 and A-4).

At Morse Road, the rail corridor crosses by some agricultural use properties and connects to the Town-owned Featherland Park recreational field complex. The parcel on the southwest side of Morse Road is held under an Agricultural Preservation Restriction (APR). With an APR restriction, this land will remain actively devoted to agriculture or horticulture, thereby remaining undeveloped. (See Figure A-4).

From Featherland Park north to Haynes Road, the rail corridor is bordered on either side by residential properties clustered around cul-de-sac developments. The rail corridor crosses Pantry Brook via an existing railroad trestle. This crossing is contiguous to the Town-owned Barton Farm conservation land on the west side of the rail corridor. (See Figure A-5).

Figure 5: Pantry Brook Railroad Trestle

Between Haynes and Pantry Roads, the rail corridor abuts residential uses and the far rear section of the privately-owned Willow Hill School, a school for special learning for grades 6 through 12. North of Pantry Road, the rail corridor is bounded on its east side by the Town-owned Davis Farm conservation land and residential properties on the west side. (See Figure A-6).

Figure 6: Rail Corridor Parallel to Maurer Company Access Drive

After the North Road (Route 117) crossing, the rail corridor travels parallel to the access drive to a site development company (Maurer Company). This access drive crosses the rail corridor approximately 1,200 feet north of North Road to access the company's 32-acre parcel, which contains both commercial and residential uses. On the east side of the rail corridor is a 76-acre Town-owned parcel. This parcel, which also abuts the Concord town line, contains both the Frost Farm conservation land and a senior housing complex. (See Figure A-7).

3 Railroad Right-of-way

3.1 History of Rail Service

Sudbury had two railroad lines in town that crossed in South Sudbury at Union Avenue. One rail line was the east-west Massachusetts Central Railroad, built in 1881, which later became the Boston & Maine (B&M) Railroad. The other rail line was the north-south Framingham and Lowell Railroad.

The Framingham and Lowell (F&L) Railroad was chartered in 1870 and opened in November 1871. Ten years later, the F&L Railroad was sold at foreclosure due to a lack of traffic. The railroad was reorganized into the Lowell & Framingham Railroad and subsequently merged into the Old Colony Railroad. In 1887, the railroad station at the junction of the two rail lines burned down and it was not until 1889 when a new station was built. The new Sudbury Railroad station (Figure 7) was a grand building that served both railroads. In 1893, the Old Colony Railroad became part of the New Haven Railroad system. Passenger service on the north-south line ceased in 1933. The station building was torn down in 1952 and replaced with a smaller structure that exists today (Figure 8).

Figure 7: Former South Sudbury Station Building

The Old Colony Railroad line operated as part of this system until 1969, when it was acquired by the Penn Central Transportation Company and renamed the Lowell Secondary. At that time, the Lowell Secondary served a nightly freight train traveling from South Boston to Lowell via Readville, Walpole and Framingham. It continued to service this route until Penn Central declared bankruptcy in June of 1970. Consequently, there was a move to increase the efficiency of the railroad by consolidating traffic onto fewer lines. As a result, the Lowell Secondary began to only service a local freight train between Framingham and Lowell in 1973.

Figure 8: Existing Railroad Station Building

In 1976, the Consolidated Rail Corporation (Conrail) system was implemented to take over the operations of the key Penn Central lines. Because the traffic on most of the Lowell Secondary was below average, Conrail only acquired the 4.7 miles from Framingham Center to South Sudbury. The Boston and Maine Corporation purchased the 1.6 miles from the Lowell yard to U.S. Route 3 in Chelmsford that continued to serve several customers.

In the 1970's, most of the traffic on the Lowell Secondary constituted shipments of building materials to distributors in North Acton and Chelmsford. It was expected that traffic would continue to increase along the line and therefore the Commonwealth of Massachusetts Executive Office of Transportation (EOT) decided to subsidize service from South Sudbury to Chelmsford Center. The EOT leased the track from Penn Central and contracted with Conrail to provide service. Unfortunately, by 1979, it became clear that the line's traffic volumes did not develop due to a prolonged economic downturn in the building industry. The Lowell Secondary became the least cost-effective line in the EOT's rail subsidy program and freight service was suspended in April 1982. The EOT did however decide to purchase the segments of rail line in order to preserve the right-of-way for other public uses.

3.2 Title Conveyance

The deed transferring ownership of the railroad right-of-way from ConRail to the Commonwealth of Massachusetts, acting through the EOT was executed through two separate deeds. The first deed agreement was signed on May 3, 1982 and covers the section of railroad right-of-way from West Concord north to Bridge No. 9.83 over Nashoba Brook in North Acton. This deed is filed in Book 14609 / Page 302 at the Middlesex South District Registry of Deeds. The second deed agreement was signed on November 23, 1982 and covers the sections of railroad right-of-way from South Sudbury to West Concord, Bridge No. 9.83 over Nashoba Brook in North Acton north to Route 3 on the Chelmsford/Lowell border. This deed is filed in Book 2579 / Page 256 at the Middlesex North District Registry of Deeds.

Rail operation has officially ceased along the Lowell Secondary Track right-of-way, United States Railway Association Line Code 4130. The right-of-way is managed by the EOT on behalf of the Commonwealth of Massachusetts. The EOT has indicated that the Commonwealth has a strong interest in preserving the corridor for future transportation uses and is open to discussing its future with the Town.

3.3 Private Crossings

Based on a site walk by the consultant team and a review of the railroad valuation maps, there are a number of locations where outside parties are currently using a portion of the railroad right-of-way to access their property. Each of these locations is identified in Figure 9.

Many of these crossings are shown as "private crossings" on the railroad valuation maps. At the time the valuation maps were drafted, these crossings were likely cow paths, etc. The nature of the rights of these private crossings will need to be assessed on a case-by-case basis. The only way to validate the legality of the private crossings as they currently exist would be to review the original deeds into the railroad (i.e., what rights were reserved by the original Grantor), as well as any dispositions / rights granted by the railroad after its initial acquisition, and to evaluate these documents in their current context. This additional reconnaissance should be included as part of a preliminary corridor title review, to be conducted during the post-study phase of the project. Further research into each of these crossings should be coordinated with the EOT Rail Unit.

The access drive crossings are discussed in further detail in Section 11 of this Assessment.

Figure 9: Private Crossings of Rail Corridor

Val Map Station	Party	Description
246+00	Paris Trust LLC	Access drive from Union Avenue to commercial / industrial parcel
246+10	AAA Limo	Commercial business in former RR station where Lowell Secondary intersects east-west MBTA corridor
255+00	Methods Machine Tools	Access drive to Methods Machine Tools at 64-65 Union Ave; owns property on either side of ROW
262+00	Codjer Lane	Private road used by Cavicchio Greenhouses; owns property on either side of ROW
321+00	Ti-Sales	Access drive to Ti-Sales parallels and is located within ROW
364+00	Farm Crossing	Private crossing used by agricultural/farm owner; owns property on either side of ROW
390+50	Private Crossing	South of Haynes Road
395+40	Private Crossing	South of Haynes Road
414+80	Private Crossing	South of Haynes Road
466+00	Frank Maurer Co.	Private crossing used by Maurer Company; owns property on either side of ROW

3.4 Rail to Trail Conversion

In order for the Town to pursue plans to convert the railroad right-of-way to a rail trail, the Town must submit a formal application to the EOT stating their desired use and plans for the railroad corridor. The EOT can supply the Town with access to the land but does not financially contribute to the project.

Pending approval from the EOT, the Town would be granted a property agreement for the design, construction and maintenance of the rail trail. The EOT will consider such property interests as required to operate a rail trail along the corridor. It is anticipated that the terms of the agreement will be an easement.

The EOT generally recommends that a full title review be conducted for the corridor. This review should be a coordinated effort of the Town and EOT and carried out by a consultant experienced in railroad right-of-way research. The title report will trace the title from when the railroad originally acquired the land, forward in time to the present. The nature of the rights of various interests in the right-of-way, including the legality of private crossings, will be clarified in the context of this title review.

4 Environmental Resources

The preliminary screening of environmental resources was conducted to identify potential environmental issues early in the rail trail development process. As described below, highly diverse vegetative communities and wildlife habitats along the Sudbury segment of the Bruce Freeman Rail Trail corridor. This finding is based on field reconnaissance activities, existing source materials (e.g. MassGIS and Flood Insurance Rate Maps for the Town of Sudbury) and discussions with Town staff.

Much of the rail corridor traverses upland forest and lands in various stages of ecological successions (e.g. open fields, and land dominated by saplings and shrubs), and agricultural/fallow fields, as well as commercial and residential development. Wetland resources adjacent and/or proximate to the rail trail include intermittent streams; perennial waterways and associated riverfront areas (see Section 4.1.1); forest, scrub/shrub and emergent communities; vernal pools; and lands subject to flooding during 100-year storm events.

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. Assuming these measures are implemented and the rail trail is constructed, this corridor provides an excellent opportunity to educate its users about the importance of natural resources conservation.

Environmental resource areas associated with the rail corridor are shown on the mapping included in Appendix B, Natural Resources Base Mapping, of this Environmental and Engineering Assessment.

A discussion of the environmental resources associated with the rail corridor and regulatory information pertaining to these resources is presented in the following sections. Rail trail planning/design and permitting will adhere to the procedures and performance standards set forth in the MA Wetlands Protection Act (WPA; MGL Chapter 131, Section 40) and associated regulations (310 CMR 10.00 et. Seq.) and the Sudbury Wetlands Administration Bylaw and Regulations.

4.1 Wetland Resources

The MA Wetlands Protection Act (WPA; MGL Chapter 131, Section 40) and associated regulations (310 CMR 10.00 et. seq.) identify multiple freshwater resources subject to protection under the Act/regulations. With respect to the rail corridor, these resources include:

- Land Under Water Bodies/Waterways
- Bank
- Bordering Vegetated Wetland
- Isolated/Bordering Land Subject to Flooding
- Riverfront Area

Isolated Vegetated Wetlands (IVW) also occur in scattered locations along or proximate to the rail corridor. However, unless meeting specific State-listed criteria relative to flood storage, IVW areas are not subject to regulation under the WPA/regulations. Similarly,

unless meeting other State and Federal criteria, IVW areas also do not constitute jurisdictional resources regulated by the MA Department of Environmental Protection (DEP) or the U.S. Army Corps of Engineers (ACOE) under Sections 401 and 404 of the Clean Water Act, respectively.

The subsequent sections address each of the above-referenced resource areas relative to the rail corridor.

4.1.1 Land Under Water Bodies/Waterways, Bank and Riverfront Areas

Land Under Water Bodies and Land Under Waterways occur alongside and traverse the rail corridor at multiple locations. Each of these areas is designated as a Class B water pursuant to the State Surface Water Quality Standards (314 CMR 4.00 et. seq.).

Land Under Water Bodies (i.e. land beneath ponds and lakes at least 10,000 square feet in area) primarily occur near the northern portion of the rail corridor, generally from approximately 250 feet south of Haynes Road to the Sudbury / Concord Town boundary. The largest pond complex is located north of Route 117 adjacent to the driveway entrance to lands owned by the Frank Maurer & Sons. The ponds south of Haynes Road are tributary to Pantry Brook, while the ponds north of Route 117 are tributary to Cold Brook. Each of these waterways, in turn, is tributary to the Sudbury River.

Land Under Waterways is associated with perennial streams located along and beneath the rail corridor. Based on the U.S. Geological Survey (USGS) map of the Maynard quadrangle, these waterways include Hop Brook, Pantry Brook, and a tributary to Cold Brook located north of Route 117.

In addition, there are at least three intermittent streams in proximity to the rail corridor as depicted on the USGS map.

1. The more southerly stream is tributary to Hop Brook and traverses the rail corridor south of Hudson Road, between Peakham and Concord Roads. (This stream does not have a name).

2. A waterway known as Mine Way Brook, which is tributary to Pantry Brook, is located north of Hudson Road and south of Morse Road.

3. The more northerly stream also is a tributary to Pantry Brook and actually consists of the downstream extension of Mine Way Brook. This waterway, known as Sawmill Brook, generally parallels the western side of the rail corridor between Ridge Hill Road and Pantry Brook.

According to Deborah Dineen (Sudbury Conservation Coordinator) these three streams may constitute perennial waterways though depicted as intermittent on the USGS map.

It should be noted, however, that the watershed area above the point at which the stream south of Hudson Road meets the rail corridor is approximately 0.15 square miles (96± acres). This determination is based on watershed mapping conducted and calculated by Wetlands & Wildlife, Inc. using Maptech Terrain Navigator® software. Based on this same approach, the watershed area above the point at which Mine Way Brook meets the rail corridor also is relatively minimal, totaling approximately 0.46

square miles (295± acres). In contrast, the watershed area upgradient of the point at which Sawmill Brook begins to flow along the rail corridor is approximately 1.25 square miles (800± acres).

As stated in the MA Wetlands Protection Act regulations at 10.58(2)(a)1:

1. A river or stream shown as perennial on the current United States Geological Survey (USGS) or more recent map provided by the Department is perennial.

2. A river or stream shown as intermittent or not shown on the current USGS map or more recent map provided by the Department, that has a watershed size greater than or equal to one square mile, is perennial.

3. A stream shown as intermittent or not shown on the current USGS map or more recent map provided by the Department, that has a watershed size less than one square mile, is intermittent unless:

    a. The stream has a watershed size of at least one-half (0.50) square mile **and** has a predicted flow rate greater than or equal to 0.01 cubic feet per second at the 99% flow duration using the USGS Stream Stats method. The issuing authority shall find such streams to be perennial;

Accordingly, because the first two of the above-described waterways are shown on the USGS map as intermittent and their watershed areas are less than 0.50 square miles, these streams are intermittent under State regulations and further analysis in this regard, including application of the Stream Stats method, is not required. Notwithstanding the above, according to the watershed mapping analysis, the area above the point at which Mine Way Brook traverses the rail trail is 0.46 square miles; only 0.04 square miles (25 acres) less than the 0.50 square mile review threshold above which application of the Stream Stats method is required by State regulations to determine a stream's intermittent/perennial status. Given this limited differential, more detailed investigations relative to the watershed area contributing to Mine Way Brook upstream of the rail corridor and the perennial/intermittent status of Mine Way Brook appear warranted. With respect to Sawmill Brook, its watershed area meets the criteria as stated above in 10.58(2)(a)1b and, therefore by definition, constitutes a perennial waterway as it flows along the rail trail.

Based on the above evaluation, there are four perennial streams located along and beneath the rail corridor which include: Hop Brook, Sawmill Brook, Pantry Brook, and a tributary to Cold Brook located north of Route 117. In addition to the intermittent streams discussed above, there are also several other intermittent streams that traverse or occur proximate to the rail corridor, though not shown on the USGS map. Further investigations of each of these streams will be required to document their intermittent/perennial status.

Bank resources abut and confine project area surface waters. While some banks are vegetated, other bank areas exhibit exposed and varied substrate materials.

Lastly, pursuant to the passage of the Rivers Protection Act in 1996, regulations were promulgated by DEP governing activities within a newly defined resource subject to protection, namely Riverfront Areas (RFA) associated with perennial rivers and

waterways. These regulations, set forth in the WPA regulations at 310 CMR 10.58, define a 'river' and RFA as follows:

> **River:** Streams that are perennial because surface water flows within them throughout the year. Intermittent streams are not rivers [as defined in the regulations] because surface water does not flow within them throughout the year.
>
> **Riverfront Area:** The area of land between a river's mean annual high water line (MAHWL) measured horizontally outward from a river and a parallel line located 200' away… The riverfront area does not have a buffer zone.

In turn, a river's mean annual high water line (MAHWL) is defined as:

> **Mean Annual High Water Line:** The line of a river that is apparent from visible markings or changes in the character of soils or vegetation due to the prolonged presence of water and that distinguishes between predominantly aquatic and predominantly terrestrial land. Field indicators of bankfull conditions shall be used to determine the mean annual high water line. Bankfull field indicators include but are not limited to: changes in slope, changes in vegetation, stain lines, top of point bars, changes in bank materials, or bank undercuts.

For the most part, the banks of perennial streams along with the rail corridor are anticipated to serve as the MAHWL relative to the establishment of RFA boundaries. According to Debbie Dineen (Sudbury Conservation Coordinator), however, the Town's Conservation Commission has found that due to Sudbury's low, flat floodplain areas, the MAHWL often extends to the edge of the bordering vegetated wetland. Thus, site-specific verification of the MAHWL of project area perennial streams will be required during wetland resource delineation efforts, anticipated to be conducted during the next phase of the project.

4.1.2 Bordering and Isolated Vegetated Wetlands

Based on field reconnaissance activities and the review of MassGIS datalayers, the majority of bordering and isolated vegetated wetlands along the rail trail corridor are dominated by forest communities. For the most part, forested wetlands are primarily red maple (*Acer rubrum*) in the overstory, although American elm (*Ulmus americana*) and cottonwood (*Populus deltoides*) occasionally are present. Understory species commonly include highbush blueberry (*Vaccinium corymbosum*), arrowwood (*Viburnum recognitum*), alder (*Alnus rugosa*), pussy willow (*Salix discolor*), winterberry (*Ilex verticillata*), silky dogwood (*Cornus amomum*), wild lily-of-the-valley (*Maianthemum canadense*), skunk cabbage (*Symplocarpus foetidus*), sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmunda cinnamomea*) and tussock sedge (*Carex stricta*).

Figure 10: Hop Brook (Land Under Waterways) with Forested & Scrub / Shrub Wetlands

Figure 11: Emergent Marsh West of Rail Corridor & South of Codjer Lane

Scrub/shrub wetlands, however, occur along Hop Brook and in other locations proximate to the rail corridor. These communities primarily consist of red maple, gray birch (*Betula populifolia*), highbush blueberry, silky dogwood, glossy buckthorn (*Frangula alnus*), elderberry (*Sambucus canadensis*), arrowwood, purple loosestrife (*Lythrum salicaria*) and sensitive fern.

Emergent wetlands also are present at multiple locations, such as east and west of the rail corridor approximately 200 feet south of Haynes Road, and west of the corridor approximately 100 feet and 300 feet north of Route 117. Plant species common to these areas include cattail (*Typha latifilia*), purple loosestrife, jewelweed (*Impatiens capensis*), common reed (*Phragmites australis*), reed canary grass (*Calamagrostis canadensis*), cinnamon fern, marsh fern (*Thelypteris palustris*), soft rush (*Juncus effusus*) and tussock sedge.

As noted above, the identification of wetland resources conducted to date has been based on MassGIS data, supplemented by field reconnaissance efforts. For regulatory and permitting purposes, however, all wetland resource areas within 100 feet of the right-of-way will need to be delineated, as will perennial streams within 200 feet of the rail corridor. Once delineated, these areas will need to be incorporated into the baseline survey for the rail corridor. In conjunction with the delineation, detailed investigations will be required relative to resource area classification and jurisdictional determinations. These activities will facilitate environmental permitting activities, as discussed further in Section 6, Environmental Permitting, of this report.

4.1.3 Vernal Pools

Vernal pool habitat is defined in the WPA regulations as follows:

> Vernal pool habitat means confined basin depressions which, at least in most years, hold water for a minimum of two continuous months during the spring and/or summer, and which are free of adult fish populations, as well as the area within 100 feet of the mean annual boundaries of such depressions, to the extent that such habitat is within an Area Subject to Protection Under M.G.L. c. 131, § 40 as specified in 310 CMR 10.02(1). These areas are essential breeding habitat, and provide other extremely important wildlife habitat functions during non-breeding season as well, for a variety of amphibian species such as wood

frog (*Rana sylvatica*) and the spotted salamander (*Ambystoma macultum*), and are important habitat for other wildlife species.

Based on the *MA Natural Heritage Atlas* [MA Natural Heritage & Endangered Species Program (NHESP); 12th Edition, Effective October 1, 2006], two (2) vernal pools certified as such by the NHESP occurs within 300 feet of the rail trail corridor. These vernal pools include Certified Vernal Pool (CVP) #s 2504 and 1428. CVP # 2504 is located approximately 300 feet west of the rail trail corridor and 400 feet north of Old Lancaster Road. CVP # 1428 is located approximately 200 feet west of the rail trail and 1,500 feet north of Hudson Road.

Figure 12: CVP #1428 North of Hudson Road

According to Deborah Dineen (Sudbury Conservation Coordinator), each of these pools serves as breeding habitat for wood frogs (*Rana sylvatica*) and spotted salamanders (*Ambystoma maculatum*). CVP # 1428, however, also serves as breeding habitat for bull frogs (*Rana catesbeiana*) and blue-spotted salamanders (*Ambystoma laterale*), a State-listed species of special concern. This permanent pool of relatively deep standing water contains fairy shrimp (*Eubranchipus vernalis*) and is frequented by spotted turtles (*Clemmys guttata*), as well.

In addition to these CVPs, there are several vernal pools adjacent to the rail corridor that have not been certified by the NHESP. A July 2005 map available in the Conservation Commission Office depicts these pools, which were field verified in 2004 by B. Hanson (former Conservation Commission member) and Deborah Dineen (Sudbury Conservation Coordinator). These pools primarily occur within bordering forested wetlands while other pools appear isolated. Consequently, detailed site-specific investigations will be required to determine the jurisdictional status of these pools.

All certified vernal pools constitute Class B Outstanding Resource Waters. Furthermore, vernal pools certified by the NHESP are protected under the WPA regulations, but only to the extent that they also are located within an area subject to regulatory protection, e.g. the pools occur within bordering vegetated wetlands or constitute isolated land subject to flooding. As previous stated, unless meeting other State and Federal criteria, vernal pools associated with IVW areas also do not constitute jurisdictional resources regulated by the DEP and COE under Sections 401 and 404 of the Clean Water Act, respectively. Notwithstanding these criteria and assuming its applicability to the rail trail project, all certified vernal pools and other pools as depicted on the above-referenced July 2005 map are subject to regulation under the Sudbury Wetlands Administration Bylaw/Regulations.

4.1.4 Bordering Land Subject to Flooding

A review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps for the Town of Sudbury revealed that the rail corridor is within Zone AE in areas proximate to the following waterway crossings: Hop Brook (north of Codjer Lane), Mineway Brook (north of Hudson Road), Pantry Brook (south of Haynes Road) and

tributaries to Cold Brook (north of Route 117). Zone AE is an area inundated by 100-year flooding for which Base Flood Elevations (BFEs) have been determined. A tributary to Cold Brook (at Pantry Road) is within Zone A, which is an area inundated by 100-year flooding for which BFEs have *not* been determined.

Compensatory storage will be required for all flood storage volumes that will be lost, if any, as a result of the rail trail construction. This volume will be determined during the design stage.

4.2 Wetland Resource Functions/Values

As listed and described in The Highway Methodology Workbook Supplement – Wetland Function and Values/A Descriptive Approach (U.S. Army Corps of Engineers, New England Division; November 1995), eight (8) functions and five (5) values may be associated with a given wetland. These functions/values include:

FUNCTIONS

- Groundwater Recharge/Discharge
- Floodflow Alteration (Storage and Desynchronization)
- Fish and Shellfish Habitat
- Sediment/Toxicant/Pathogen Retention
- Nutrient Removal/Retention/Transformation
- Production Export
- Sediment/Shoreline Stabilization
- Wildlife Habitat

VALUES

- Recreation (Consumptive and Non-Consumptive)
- Education/Scientific Value
- Uniqueness/Heritage
- Visual Quality/Aesthetics
- Threatened or Endangered Species Habitat

In accordance with the MA Wetlands Protection Act regulations, wetland resource areas are presumed significant to a variety of statutory interests, as indicated in the following table.

Figure 13: Wetland Resource Statutory Interests
(310 CMR 10.54 through 310 CMR 10.58)

Statutory Interest	LUWB / WW	Bank	BVW	RFA	BLSF
Protection of Public / Private Water Supply	X	X	X	X	--
Protection of Groundwater Supply	X	X	X	X	--
Flood Control	X	X	X	X	X
Storm Damage Prevention	X	X	X	X	X
Prevention of Pollution	X	X	X	X	--
Protection of Fisheries	X	X	X	X	--
Protection of Wildlife Habitat	X	X	X	X	--
Definitions: Land Under Water Body (LUWB), Land Under Waterway (LUWW), Bordering Vegetative Wetland (BVW), Riverfront Area (RFA) and Bordering Land Subject to Flooding (BLSF)					

Generally speaking, all wetlands associated with the rail corridor exhibit a variety of functions in accordance with The Highway Methodology Workbook Supplement – Wetland Function and Values/A Descriptive Approach. Floodflow alteration is a principal function of wetlands subject to flooding during 100-year storm events, while sediment/toxicant/pathogen retention is a principal function of wetlands receiving stormwater runoff from area roadways or other similar sources. The primary value served by most project area wetlands is anticipated to pertain to:

- Visual Quality/Aesthetics
- Uniqueness/Heritage
- Threatened or Endangered Species Habitat

The actual significance of resource areas with respect to State statutory interests, however, is dependent upon such factors as subsurface soil conditions, the intermittent/perennial status of associated surface waters and their position in the landscape, particularly with respect to other wetlands. For example, wetlands underlain by clay or other impervious materials do not significantly contribute to groundwater recharge/discharge. Likewise, intermittent surface waters, which by regulatory definition constitute bank resources, are not considered significant to fisheries in that low/no flow conditions do not provide suitable fisheries habitat. Additionally, headwater resources and resources located in the upper reaches of watersheds often do not function with respect to flood control/storm damage prevention due to their elevated topographic gradient and landscape conditions.

In light of the above, detailed site-specific investigations will be required to definitively document the functions/values and statutory interests of wetlands associated with the rail corridor.

4.3 Wildlife Habitat

4.3.1 Rare Species

Information was requested from both the NHESP and the U.S. Fish & Wildlife Service (FWS), New England Field Office, regarding the presence/absence of State-listed and Federally-listed endangered/threatened species and species of special concern within and proximate to the rail trail corridor. The response letter from each agency is included at the end of this Section.

According to the FWS, there are no Federally-listed or proposed, threatened or endangered species or critical habitat under the agency's jurisdiction along the rail corridor. Therefore, the preparation of a Biological Assessment or further consultation with the FWS under Section 7 of the Endangered Species Act is not required at this time.

As stated by the NHESP and/or indicated in the MA Natural Heritage Atlas, the rail corridor or a portion thereof is located within the following Priority Habitat of Rare Species (PH) and Estimated Habitats of Rare Wildlife (WH):

PH 608/WH 7382: This area generally is located between Hudson Road and Morse Road. Encompassed within this area is a headwater tributary to Pantry Brook, CVP # 1428, and at least three (3) vernal pools that are in the process of being certified by the NHESP (Personal Communication – Deborah Dineen, Sudbury Conservation Coordinator).

PH 506/WH 163: This priority habitat and estimated habitat of rare wildlife is located in North Sudbury. This area includes Pantry Brook and a perennial tributary to Pantry Brook.

According to NHESP, the blue-spotted salamander (*Ambystoma laterale*), a state-listed rare species of special concern, is associated with the above-referenced habitats. However, based on discussions with Deborah Dineen (Sudbury Conservation Coordinator), at least two (2) other locations adjacent and proximate to the rail corridor provide documented habitat for rare species, including the blue-spotted salamander and the Eastern box turtle (*Terrapene c. carolina*), which is also a State-listed species of special concern.

Based on the above information, it is recommended that the Town contact NHESP to discuss rare species issues. At the same time, the Town should request that NHESP field analysts visit the project site, particularly in the areas of rare species observation located outside of the designated NHESP habitat polygons.

4.3.2 Other Wildlife Species

The undeveloped lands along the entirety of the rail corridor provide habitats for a diverse assemblage of wildlife species. These species range from the ±250 pound white-tailed deer (*Odocoileus virginianus*) to the one ounce/3 to 4-inch long white-footed mouse (*Peromyscus leucopus*), as well as the 4-foot/5 pound great blue heron (*Ardea herodias*) to the 3 – 4 inch/0.1 ounce ruby-throated hummingbird (*Archilochus colubris*).

In addition to forested, scrub/shrub, emergent and open water wetlands, wildlife diversity along the rail trail corridor is enhanced by the presence of upland forests, plant communities in various stages of succession and old field communities. Overall wildlife habitat favorability also is enhanced by the presence of large contiguous tracts of undeveloped land scattered throughout the corridor.

Upland forests, for the most part dominated by oaks (*Quercus spp*.), red maple (*Acer rubrum*), birches (*Betula spp*.) and white pine (*Pinus strobus*) provide diverse ecological niches for wildlife, particularly with respect to food sources and breeding/nesting sites. With respect to acorn-producing oaks, Martin, Zim and Nelson (1951) state that "Acorns rate a position at, or very near, the top of the wildlife food list, not so much because they are a preferred food item but because they constitute a good and abundantly available staple – the staff of life for many wildlife species." Wildlife species that feed upon acorns include white-tailed deer (*Odocoileus viginianus*), raccoon (*Procyon lotor*), gray squirrel (*Sciurus carolinensis*), Eastern chipmunk (*Tamias striatus*), white-footed mouse (*Peromyscus leucopus*), blue jay (Cyanocitta cristata), white-breasted nuthatch (*Sitta carolinensis*), tufted titmouse (*Baeolophus bicolor*) and red-bellied woodpecker (*Melanerpes carolinus*), among others.

The seeds, buds, flowers, twigs and foliage of red maple (common to both wetlands and uplands) also serve as food for numerous wildlife species, including white-tailed deer (twigs/foliage), Eastern chipmunk (seeds), red fox (Vulpes fulva; seeds/flowers/bark/twigs), white-footed mouse (seeds) and evening grosbeak (Coccothraustes vespertinus; seeds/buds/flowers). Black birch and gray birch are important wildlife food sources, as well. Birch twigs and foliage are consumed by Eastern cottontail (Sylvilagus floridanus) and birch seeds by black-capped chickadees (*Poecile atricapilla*). Lastly, as described by Martin, Zim and Nelson (1951), "Pines rank near the very top in importance to wildlife". Some species that feed on white pine seeds, bark foliage or twigs include white-tailed deer, red squirrel (*Tamiasciurus hudsonicus*), Eastern cottontail, beaver (*Castor canadensis*), white-footed mouse, red-breasted nuthatch (*Sitta canadensis*), white-breasted nuthatch and black-capped chickadee.

Successional communities primarily consist of edge habitats adjacent to developed lands and/or agricultural/open fields. These areas typically provide abundant sources of food, cover and breeding/nesting sites for wildlife. The more open agricultural and old field communities, such as those in the vicinity of Pantry Brook, are expected to provide suitable habitat for varied species of grassland birds, as well as habitat for hunting by such birds of prey as red-tailed hawks (*Buteo jamaicensis*) and great-horned owls (*Bubo virginianus*).

As noted above, red maple is utilized for food by several species of wildlife. This plant species is the dominant component of forested wetlands along the rail trail. Other plant species common to forested and/or scrub/shrub wetlands include highbush blueberry (*Vaccinium corymbosum*), various species of viburnum (*Viburnum spp.*), silky dogwood (*Cornus amomum*) and winterberry (*Ilex verticillata*). Collectively, these and other wetland plant species provide sources of food for wildlife, such as white-tailed deer, red fox, Eastern cottontail, cardinal (*Cardinalis cardinalis*), evening grosbeak, cedar waxwing (*Bombycilla cedrorum*), bluebird (*Sialia sialis*), American robin (*Turdus migratorius*), gray catbird (*Dumetella carolinensis*), mockingbird (*Mimus polyglottos*), Eastern kingbird (*Tyrannus tyrannus*) and purple finch (*Carpodacus purpureus*), among many others.

It is important to note that forested, scrub/shrub and emergent wetlands, in and of themselves, also serve as habitat for numerous species of wildlife, including large and small mammals, furbearers, birds of prey, waterfowl, passerine (e.g. songbirds) and gallinaceous (ground-dwelling) birds, and a wide variety of reptiles (snakes and turtles) and amphibians (frogs, toads and salamanders). Each of these wildlife groups is well represented within the collective habitats associated with the rail trail corridor.

Finally, as for the rail corridor, itself, this area is not expected to provide each and every life-sustaining requirement of any wildlife species associated with the project area. Rather, it likely serves as a habitat component, although the extent of its contribution to the diversity and abundance of wildlife is anticipated to be relatively limited.

4.4 Environmental Consequences and Mitigation Measures

Rail trail construction, existence and use have the potential to result in both short- and long-term adverse effects to environmental resources, including the alteration of resources and resource buffers. Project implementation also has the potential to generate such human-induced impacts as the disruption of wildlife movements/behavior and wildlife harassment.

Key to minimizing the adverse effects of rail trail development and usage will be the selection and implementation of design features and mitigation measures directed at the avoidance/minimization of direct and indirect impacts to these resources. Example measures include:

- Shifting the trail alignment away from resource areas where feasible
- Reducing the width of the trail
- Placing the trail on an elevated boardwalk
- Installation of wood rail fencing to help control and confine human activity to the rail trail itself
- Delineation of construction work area using haybales and silt fencing
- Flagging individual trees to be saved along the corridor

Of particular importance, however, will be the need to control and confine human activity to the rail trail, itself. While fencing and interpretive signage will assist in this regard, educational awareness will be critical in instilling a respect for and understanding of the natural environment in rail trail users.

In terms of wildlife, some species will more readily adapt to habitat changes and existence of the rail trail, while others are anticipated to exhibit changes in behavior relative to habitat selection and use, at least to some degree. However, the extent of these impacts, including potential impacts to State-listed rare species, will require detailed site-specific investigations relative to habitat usage and movement patterns vis-à-vis the rail corridor on a species-specific basis. Similarly, the potential need for wildlife passageways beneath the rail trail, if any, will depend upon site-specific investigations regarding wildlife movements relative to the rail trail corridor.

Perhaps most challenging is the control of human activity, and the preclusion of human-induced impacts and disturbances to vegetation and wildlife resources. While fencing and interpretive signage will assist in this regard, educational awareness will be critical in instilling a respect for and understanding of the natural environment in rail trail users.

Depending on the results of future investigations, this may be especially critical relative to the breeding season of rare species, when closure of the rail trail or segments thereof may be warranted.

4.4.1 Wetland Resources

One of the primary objectives of rail trail implementation will be the avoidance/minimization of wetland resource impacts. In certain instances, existing site conditions present a noteworthy challenge to this objective.

Based on field reconnaissance activities, there are locations where vegetated wetlands have formed immediately adjacent to the railbed, particularly where the railbed occurs within a cut section, as opposed to a fill section. Appropriate mitigation measures will need to be incorporated into the design and construction phases of the rail trail project to protect these wetland resource areas.

To preclude the direct alteration of vegetated wetlands, the limits of rail trail construction will need to be minimized to the maximum extent practicable in these ecologically sensitive areas. Also, in low-lying railbed areas proximate to adjacent streams, such as the southern approach to Hudson Road and Morse Road, consideration should be given to placing the trail on an elevated boardwalk. The boardwalk foundations (e.g. concrete or helical screw anchors) would be located within the footprint of the existing tracks. A boardwalk would eliminate the need to place fill or construct a retaining wall to elevate the trail above the stream channel. Further, a boardwalk will serve to protect the stream flows and retain current drainage patterns.

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 vernal pools, 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. 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 eventual avoidance of wetland resource impacts, however, will depend upon the site-specific delineation of vegetated wetlands and rail trail design at each of these sites.

4.4.2 Vegetation

Figure 14: Minimal Vegetative Growth

Figure 15: Substantial Vegetative Growth

Clearly, rail trail construction will result in the physical alteration of existing vegetative communities within the designated limits of work. Along some corridor segments, disturbance will be minimal due to the relative absence of vegetation (Figure 14). In other areas, vegetative disturbances will be more substantial due to the extent of vegetative growth along the corridor (Figure 15).

A representative cross section calls for the removal of tree branches within a 12-foot vertical clearance of the trail surface. Removal of this mid-story vegetative layer will still allow the overstory canopy to remain. One of the design goals should be to protect mature trees along the corridor in order to preserve the natural canopy. Retaining the natural canopy will help sustain existing physical conditions (light, wind, temperature) in adjacent forested areas. Further, retaining a vegetative buffer alongside the trail will help blend the trail into its natural surroundings.

As with many linear developments, there is concern that rail trail construction will create conditions suitable for the establishment, growth and proliferation of invasive plant species. In actuality, many such plant species as listed by the ACOE and NHESP presently occur in vast numbers throughout the rail trail corridor. Paramount among these is glossy buckthorm (Frangula alnus), an invasive shrub introduced from Europe. As such, the further proliferation of this species as a result of rail trail construction is not anticipated to be significant. Rather, rail trail construction will result in the removal of this invasive plant species within the maintained cross section. Notwithstanding the above, there remains the possibility that invasive species presently absent along the corridor may be introduced as a result of rail trail construction and/or usage."

4.4.3 Wildlife Habitat

It is difficult to identify, predict and quantify the impact that human presence will have upon wildlife habitat/behavior. As indicated previously, some species will more readily adapt to habitat changes and existence of the rail trail, while others may exhibit changes in behavior. The extent of these impacts, including potential impacts to State-listed rare species, will require detailed site-specific investigations relative to habitat availability and wildlife movement patterns vis-à-vis the rail corridor on a species-specific basis.

However, it is clear that the placement of built elements within the existing rail corridor may influence wildlife behavior. It is unknown exactly how surface width and material will influence an animal's willingness to cross the trail. However, it is obvious that a retaining wall will pose a barrier to wildlife movement. With this in mind, the trail design should minimize the rail trail footprint where practicable and evaluate the placement of vertical barriers (e.g. fence or walls) relative to wildlife movement.

Currently, the steel rail of the existing train tracks could be acting as a barrier to smaller species such as amphibians and reptiles. Overtime, this barrier may have altered the distribution, feeding and breeding habits of these species. In fact, the rail may prohibit certain wildlife (e.g. salamander and turtle species) from crossing the railbed unless suitable debris has filled in near the rails to facilitate passage. To document the veracity of these potential impacts to wildlife movements/behavior, however, a wildlife habitat assessment would be needed to determine the locations of potentially affected state-listed and other wildlife species and their seasonal movements relative to the railbed.

Figure 16: Washed Out Culvert at Stream Crossing

While obstacles are present, there are also numerous culverts along this corridor that likely function as a migratory pathway for wildlife across the existing embankment. These structures should remain intact as part of rail trail construction thereby allowing wildlife to continue to move between wetland systems on either side of the railbed. As indicated in Figure 16, at least one location will require the installation of a new culvert to accommodate passage over a stream channel and the 'washed out' segment of the railbed. The design of this new culvert will need to have a natural substrate bottom and accommodate wildlife passage in accordance with the Massachusetts River and Stream Crossing Standards.

It is also quite possible that the existing cow passes are used as a wildlife passageway for larger mammals and other species. Based on the Old Colony Rail Road Company Valuation Maps and field reconnaissance, the following list of structures was developed:

Figure 17: Cattle Pass Listing

#	Val Map Station	Size / Material	Location Description
1	336+23	9'x5' Stone Box	North of Hudson Road / Ti-Sales Field
2	404+15	5'x5' Rail Top	South of Pantry Brook
3	415+44	4'x5' Stone Box	North of Pantry Brook
4	467+16	4'x6' Stone Box	North of Route 117

Figure 18: Cattle Pass Near Pantry Brook

The cattle pass north of Hudson Road is located within priority habitat and estimated habitat PH 608/WH 7382. Two of these cattle underpasses are located near Pantry Brook and within priority habitat and estimated habitat PH 506/WH 163. The remaining underpass is located north of Route 117.

The need for additional wildlife crossing structures will depend upon existing terrain and site-specific investigations regarding habitat usage and movement patterns vis-à-vis the rail corridor on a species-specific basis. The Town is currently looking into funding sources for a wildlife habitat study.

Commonwealth of Massachusetts

Division of Fisheries & Wildlife

MassWildlife

Wayne F. MacCallum, *Director*

August 7, 2006

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

Re: Bruce Freeman Rail Trail
Sudbury, MA
NHESP Tracking No. 06-20152

Dear Ms. Shemowat:

Thank you for contacting the Natural Heritage and Endangered Species Program ("NHESP") of the MA Division of Fisheries & Wildlife for information regarding state-protected rare species in the vicinity of the above referenced site. We have reviewed the site and would like to offer the following comments.

This project site, or a portion thereof, is located **within** *Priority Habitats 506* (PH 506) & *608* (PH 608) and *Estimated Habitats 163* (WH 163) & 7382 (WH 7382) as indicated in the 11th Edition of the Massachusetts Natural Heritage Atlas. 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
Ambystoma laterale	Blue-Spotted Salamander	Amphibian	Special Concern

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 10.37 and 10.59). Fact sheets for most state-listed rare species can be found on our website http://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). If the project site is within Estimated Habitat for Rare Wildlife and a Notice of Intent (NOI) is required, then a copy of the NOI must be submitted to the NHESP in a timely manner, so that it is received at the same time as the local conservation commission. If the proposed project is located within a Priority Habitat and is not exempt from review (see 321 CMR 10.14), then project plans, a fee, and other required filing 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

Division of Fisheries and Wildlife
Field Headquarters, North Drive, Westborough, MA 01581 (508) 792-7270 Fax (508) 792-7275
An Agency of the Department of Fish and Game

and additional information about the MESA review process, please see our website: www.nhesp.org under the "Regulatory Review" tab. On a case by case basis, field surveys and habitat assessments may be required as part of the MESA review process in order to locate rare species on the project site, and to determine their patterns of distribution and habitat use.

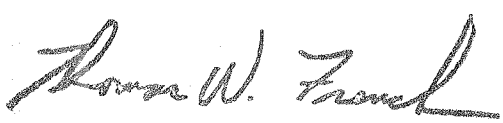
We recommend that rare species habitat concerns be addressed during the project design phase prior to submission of a formal MESA filing, as avoidance and minimization of impacts to rare species and their habitats is likely to expedite endangered species regulatory review.

MA Endangered Species Act (M.G.L. c. 131A)
If NHESP determines that the proposed project would "take" a rare species, then it may be possible to redesign the project to avoid a "take." If such revisions are not possible, the applicant should note that projects resulting in the "take" of state-protected wildlife may only be permitted if they meet the performance standards for a "Conservation and Management Permit" under MESA (321 CMR 10.23). Please note that projects resulting in a "take" may require submission of an Environmental Notification Form, pursuant to the MA Environmental Policy Act regulations (301 CMR 11.00).

Wetlands Protection Act
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, 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.

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. Should your site plans change, or new rare species information become available, this evaluation may be reconsidered. If you have any questions regarding this review please call Rebecca Skowron, Endangered Species Review Assistant, at (508) 792-7270, ext. 148.

Sincerely,



Thomas W. French, Ph.D.
Assistant Director

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087

August 2, 2006

Reference: Project: Rail trail; Location: Sudbury, 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.

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

Sincerely yours,

Michael J. Amaral

Michael J. Amaral
Endangered Species Specialist
New England Field Office

5 Stormwater Management

5.1 Culverts

Along the right-of-way alignment, several existing culverts convey natural waterways and drainage to either side of the rail trail embankment. Given that the rail trail should not significantly alter the hydrologic characteristics of the watershed area tributary to each crossing, these culverts will remain.

The Old Colony Rail Road Company Valuation Maps were used as a guide for locating culverts in the field. 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 could not be located in the field and additional culverts may have been constructed since the time the railroad was in operation.

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

Figure 19: Culvert Listing

#	Val Map Station	Size / Material	Location Description
1	250+80±	24” Cast Iron Pipe	North of MBTA tracks in South Sudbury
2	298+03±	12” Cast Iron Pipe	North of Old Lancaster Road
3	305+70±	3’x3’ Stone Box	North of Old Lancaster Road
4	312+88±	3 - 12” Vitrified Clay Pipes	Stream crossing south of Hudson Road; Pipes washed out
6	343+63±	3’x3’ Stone Box	Mineway Brook crossing north of Hudson Road
7	361+50	8” Pipe	Under Morse Road
7	371+79±	42” Cast Iron Pipe	North of Morse Road
8	386+57±	3’x3’ Stone Box	North of Morse Road
9	390+50±	1’x1’ Wood Box	North of Morse Road
10	392+95±	2’x2’ Stone Box	North of Morse Road
11	397+00±	8” Tile Pipe	South of Pantry Brook
12	403+35±	1’x1’ Wood Box	South of Pantry Brook
15	408+10±	Stone Box Culvert	South of Pantry Brook
17	419+10±	2.5’x3’ Stone Box	North of Pantry Brook

#	Val Map Station	Size / Material	Location Description
18	429+20±	12” Vitrified Clay Pipe	At Pantry Road crossing
19	430+00±	2’x3’ Stone Box	Under Pantry Road
20	435+47±	2.5’x2.5’ Stone Box	North of Pantry Road
21	446+90±	12” Vitrified Tile Pipe	North of Pantry Road
22	452+21±	3’x2’ Stone Box	At North Road (Route 117) crossing
24	467+98±	3’x3’ Stone Box	Tributary to Cold Brook; North of Route 117
25	478+16±	8” Cast Iron Pipe	Tributary to Cold Brook; South of Concord Town Line

The structural integrity and functionality of these culverts will need to be evaluated as part of the preliminary design process. If replacement is found to be necessary for structural reasons, culverts must be replaced in such a manner that results in no alterations to the existing hydrology between wetland systems.

Figure 20: Culvert Location #4

Figure 21: Culvert Location #17

Culvert Location # 4 (as discussed in Section 4.4.3) will require the installation of a new culvert to accommodate passage over a stream channel and the ‘washed out’ segment of the railbed. This design of this, or any, new culverts will need to have a natural substrate bottom and accommodate wildlife passage in accordance with the Massachusetts River and Stream Crossing Standards.

5.2 Stormwater Management

The goal of stormwater design will be to:

- Avoid point source discharge
- Allow rainwater to percolate into the soil
- Maintain existing swales and drainage patterns
- Meet current Massachusetts Stormwater Management Guidelines
- Comply with Phase II of the National Pollutant Discharge Elimination System Stormwater (NPDES) program
- Comply with the Town's stormwater management plan

Figure 22: Existing Swale

Non-point discharges in the form of stormwater runoff should be directed to existing swales along the corridor or to new, vegetated swales constructed along the trail edge. Depending on the terrain, swales may be needed on one or both sides of the trail. These open swales capture runoff and promote groundwater recharge and infiltration. In a typical cut section, a swale will also control flow from the upslope area.

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.

Under NPDES Phase II permit, rail trail construction activities will be conducted in accordance with a sediment and erosion control program that includes best management practices appropriate for reducing pollutants in any stormwater runoff to adjacent resource areas.

5.3 Erosion Control Measures

Specific measures to control erosion will be selected based on the trail cross section and site specific conditions (e.g. drainage and soil characteristics). Such measures should be designed such that they do not impede wildlife movement.

Such measures include:

- Access control measures using vegetative, natural or man-made barriers
- Vegetative slope stabilization
- Erosion control fabrics and mats
- Regrading and/or installation of stone mulch or modified rockfill

Access Control: Control and block unwanted informal access at steep slopes. Access can be controlled at point of entry with one or more of the following barriers as applicable; hedgerow or screen plantings, boulders, wood guard rails, fencing or earthen berms.

Vegetative Slope Stabilization: This includes treatments such as replacing lost topsoil with new loam in gullies and replanting slopes with native plant species that grow with fibrous, adventitious roots that spread and hold the steep slopes.

Other: Other erosion control measures, often used with intensive vegetative slope stabilization on longer and steeper slopes include erosion control fabrics and mats, cellular confinement systems (such as geocell) or placed stone.

Figure 23: Existing Eroded Area

Details of these options are typically included as part of the preliminary design phase.

6 Environmental Permitting

As documented in the previous sections, the rail corridor includes and parallels several environmentally sensitive areas. Accordingly, design and construction measures will need to be implemented to avoid/minimize and compensate for unavoidable adverse impacts associated with rail trail construction. These measures will constitute integral components of the requisite environmental permit applications, as described below.

The following is a list of the anticipated environmental permits.

6.1 National Environmental Policy Act (NEPA)

As most rail trail projects involve Federal funds (TEA-21), compliance with NEPA will be required. However, since bikeway construction infrequently results in significant environmental impacts, it automatically is classified as a Categorical Exclusion (CE). Therefore, except in unusual circumstances, rail trail projects do not require Federal Highway Administration (FHWA) approval. With specific respect to this project, FHWA approval is not anticipated to be required.

6.2 Massachusetts Environmental Policy Act (MEPA)

The MEPA office is part of the Executive Office of Environmental Affairs (EOEA). The purpose of MEPA is to evaluate environmental impacts of a proposed project. An Environmental Notification Form (ENF) or Environmental Impact Report (EIR) is required to be submitted to MEPA if:

1. 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
2. Environmental impacts or review thresholds as referenced in the MEPA regulations are exceeded.

Although there are many review thresholds for all types of projects from airports to electric generating facilities, the two most common thresholds to trigger an ENF for rail trails are as follows:

- Creation of 5 or more acres of impervious area. This translates to 4.2 miles for a 10-foot wide trail, 5.2 miles for an 8-foot trail, and 8.3 miles for a 5-foot trail. The surface area quantity and whether it is considered impervious will vary depending upon the selected trail surface material and width, and whether the Town decides to pave or expand parking areas as part of the project.

- Alteration of 5,000 or more square feet of bordering or isolated wetlands.

Trail construction is not expected to impact greater than 5,000 square feet of vegetated wetlands. Accordingly, the need to file an ENF primarily will depend upon the presences/absence of financial assistance from an agency of the Commonwealth, the need for State agency permits, potential width of the proposed trail surface along the 4.6-mile corridor, and inclusion of impervious parking areas as part of the project.

6.3 Wetlands/Rivers Protection Acts

The WPA/regulations, which also incorporate regulations promulgated pursuant to the Rivers Protection Act, govern activities affecting wetlands and is administered through the local Conservation Commission, with DEP oversight. In general, any activity which will remove, fill, dredge or alter an area subject to regulation (i.e. wetlands, rivers and floodplains) requires the filing of a Notice of Intent (NOI). Also, any activity within 100 feet of an area subject to regulation (i.e. the Buffer Zone) that, in the judgment of the issuing authority, will alter an area subject to protection also requires the filing of an NOI. Assuming its applicability to the rail trail project, this filing also is required pursuant to the Sudbury Wetlands Administration Bylaw and Regulations.

Also under the oversight of the Conservation Commission is compliance with the DEP Stormwater Management Policy and associated performance standards, effective November 18, 1996. These standards regulate water quality (pollutants) and water quantity (flood control) through the use of such Best Management Practices (BMPs) as silt fences, haybales, infiltration trenches and vegetative swales.

With respect to the Sudbury portion of the Bruce Freeman Rail Trail, early coordination with the Commission is recommended due to the sensitive nature of the project. Subsequently, an NOI will be filed with the Conservation Commission once detailed design plans have been prepared.

6.4 Natural Heritage and Endangered Species Program (NHESP)

Figure 24: Local Sign Along Haynes Road

A primary responsibility of the Natural Heritage and Endangered Species Program (NHESP) is the regulatory protection of rare species and their habitats as codified under the Massachusetts Endangered Species Act (MESA) (M.G.L. c.131A) and Wetlands Protection Act (M.G.L c.131s.40).

As the rail corridor occurs within Priority Habitat of Rare Species, as well as Estimated Habitat of Rare Wildlife, and does not meet the Massachusetts Endangered Species Act (MESA) filing exemptions, the Town must file with the NHESP for Environmental Review. This filing should include a project description, site photographs, sufficiently detailed corridor mapping, and preliminary project plans (e.g. trail alignment, representative cross sections). Any other environmental or habitat studies conducted along the rail corridor should also be submitted with this filing.

Based on this information, NHESP will likely require incorporation of appropriate and effective mitigation measures into the preliminary project design and call for special construction methods to protect rare species and rare species habitat. Such measures may include seasonal limitations on construction or the installation of wildlife crossing structures, for example. NHESP may also require the Town to conduct additional habitat assessments as part of the review process. Ultimately, NHESP will determine whether a

probable "take" of rare species would occur as defined within the MESA regulations. Projects resulting in a "take" of state-listed rare species *may* be eligible for a Conservation and Management Permit (321 CMR 10.23).

6.5 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 Sudbury portion of the Bruce Freeman Rail Trail would exceed the 1-acre disturbance threshold set forth under NPDES and therefore require a permit. In order to apply for permit coverage the operator (Town or contractor) will need to submit an NOI, Stormwater Pollution Prevention Plan (SWPPP), and documentation of eligibility to the Environmental Protection Agency (EPA). 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.

The Town of Sudbury has a partially regulated small municipal separate storm sewer system (MS4). Phase II requires operators of regulated small MS4s to implement and enforce a program that will address stormwater runoff from new development and redevelopment projects that disturb greater than one acre and discharge to the municipal system. As part of this minimum control measure, the Engineering Department and Conservation Commission performs a preconstruction review of proposed stormwater management BMPs. Accordingly, this project will be reviewed to determine if the proposed stormwater BMPs are adequate.
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7 Contamination Issues

7.1 Overview

Contamination along a rail corridor is typically the result of either:

- Residual contamination from railroad operations
- Contamination associated with adjacent uses along the railroad 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, the existing railroad ties along the 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 rail 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 rail corridor and reviewing 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 August 7, 2006. 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.

- Underground Storage Tank (UST) registry for tank and facility information on sites that use or store hazardous materials. This registry is administered through the Massachusetts Department of Fire Services, Office of the State Fire Marshall, to track the installation, operation, removal and disposal status of every regulated UST in the Commonwealth. This search was supplemented with the UST Locations datalayer obtainable from MassGIS.

Sites within a 0.25-mile radius of the rail trail were reviewed and documented as part of this screening. The approximate location of each site was determined using the Town of Sudbury's Parcel datalayer in conjunction with the Town's assessor database. Some sites could not be located based on the limited address information included in the databases.

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 rail trail and does not involve details on any one property. Sites of known contamination are a greater concern than sites with potential contamination.

7.2 Screening Results

The following table and accompanying text present sites of concern identified during the preliminary screening. The sites are listed in the order in which are they located from south to north.

Figure 25: Preliminary Screening Results

Site Name	Address	Site Status	Phase / Class	Release Tracking #
Cumberland Farms/Gulf	470 Boston Post Rd	REMOPS	V	3-0004202
South Sudbury Industrial Park	Boston Post Rd and Nobscot Rd	RAO	B1	3-0019973
Cumberland Farms	470 Boston Post Rd	RAONR		3-0023429
Fuel Depot Former	450 Boston Post Rd	RAO	II / A2	3-0004638
Mobil Station	465 Boston Post Rd	REMOPS	V	3-0002341
Mobil Service Station 01-474	432 Boston Post Rd	RAONR		3-0023726
Mobil Station	432 Boston Post Rd	ROSTRM	V	3-0002423
Mobil Station #01-474	432 Boston Post Rd	RAONR		3-0024771
Mobil Service Sta #10381 (Frmr 01-474)	432 Boston Post Rd	UNCLSS		3-0026036
Union St	428 Boston Post Rd	REMOPS	V	3-0010592
15 Union Ave	15 Union Ave	RAO	II / A2	3-0014107

Site Name	Address	Site Status	Phase / Class	Release Tracking #
Chiswick Properties Fmr	Boston Post Road Union St	RAO	IV/ C1	3-0000020
Coatings Engineering	33 Union Rd	TIER 1C	V	3-0000074
Mullen Lumber	39 Union Ave	RAO	IV / C1	3-0002640
Union Palmer Realty Trust	80 Union Ave	RAO	II / A1	3-0003371
No Location Aid	46-51 Hudson Rd	RAO	A1	3-0020705
Town Hall	322 Concord Rd	RAO		3-0014035
Town Hall	Sudbury Ctr	RAO	A3	3-0001149
No Location Aid	100 North Rd	RAO		3-0021667
Sperry Research Center Fmr	100 North Rd	TIER1A	IV	3-0000435
Rte 117	142 North Rd	DPS	II	3-0019132

Source: Massachusetts DEP Bureau of Waste Site Cleanup Searchable Sites Database

Cumberland Farms: This site is located approximately 1,100 feet south of the project area. Based on the description, the Town also believes that RTN #3-0019973 occurred at this site. There are three reports listed for this location. The site is currently classified as REMOPS (Remedy Operation Status), which indicates that a remedial system, which relies upon active operation and maintenance, is being operated for the purpose of achieving a permanent solution. Topography suggests that any migration of contamination from the site would not head towards the corridor.

Fuel Depot Fmr: The address of this site places it approximately 700 feet south of the project area. It is currently a Citizens Bank branch office. The site is currently classified as RAO status, Phase II Class A2 site. This status means that a Response Action Outcome Statement (RAO) has been submitted. A RAO Statement asserts that the response actions were sufficient to achieve a level of "no significant risk" or at least ensure that all substantial hazards have been eliminated. Phase II indicates that the site underwent a Comprehensive Site Assessment. Class A2 indicates that remedial actions left contamination levels above background but below cleanup standards. Topography suggests that any migration of contamination from the site would not head towards the corridor.

Mobil Service Station: This site is located approximately 700 feet south of the project area. There are five reports listed for this location. The site is currently in Phase 5, the phase during which long-term treatment processes are implemented and monitored to track cleanup progress. Topography suggests that any migration of contamination from the site would not head towards the corridor.

428 Boston Post Road: The address of this site places it approximately 650 feet south of the project area, near the corner of Union Avenue and Boston Post Road. It is unknown if this site is Colonial Auto or the property to the east. The site is currently classified as REMOPS status, Phase V. REMOPS (Remedy Operation Status) means that a remedial system which relies upon Active Operation and Maintenance is being operated for the purpose of achieving a Permanent Solution. Phase V indicates that long-term treatment processes have been implemented and monitored to track cleanup progress. Topography suggests that any migration of contamination from the site would not head towards the corridor.

15 Union Ave: This site is located approximately 250 feet south of the rail corridor along Union Avenue. It is currently used by Sudbury Coffee Works. The site is classified as a RAO status, Phase II Class A2. This status means that a Response Action Outcome Statement (RAO) has been submitted. A RAO Statement asserts that the response actions were sufficient to achieve a level of “no significant risk” or at least ensure that all substantial hazards have been eliminated. Phase II indicates that the site underwent a Comprehensive Site Assessment. Class A2 indicates that remedial actions left contamination levels above background but below cleanup standards. While this site is closer to the project corridor than the sites discussed above, it is unlikely any soil contamination extends from it to the corridor and if any remnant contaminants in groundwater exist, they are expected to migrate away from the corridor.

Chiswick Properties Former: This site is located just west of the corridor, near the limits of the project area. It is unclear where the release occurred within Chiswick Park, as this complex is a series of buildings used by a wide variety of tenants. The site is currently classified as RAO status, Phase IV Class C1 site. This status indicates that while the site does not present a "substantial hazard", it has not reached a level of no significant risk. If this site has contaminated groundwater, it may migrate toward the corridor.

Coatings Engineering: The address places this site at the limit of the project area, between the rail corridor and Union Avenue. This site is classified as a Tier IC, Phase V site. This site was originally reported to DEP in 1986. Remedial activities are ongoing.

Mullen Lumber: The address places this site at 33 Union Avenue, which abuts the rail corridor between Union Avenue and the MBTA corridor. This site is classified as a Phase IV site with a Class C1 RAO. This status indicates that while the site does not present a "substantial hazard", it has not reached a level of no significant risk, and contamination remains on the site at significant concentrations.

Union Palmer Realty Trust: This site is located approximately 300 feet east of the corridor, on the other side of Union Avenue. The site is classified as a RAO status, Phase II Class A1. A Class A1 RAO indicates that remedial actions have reduced contamination levels to background. Phase II indicates that the site underwent a Comprehensive Site Assessment. This site is not expected to effect the corridor.

46 - 51 Hudson Road: This site is located in proximity to the corridor at Hudson Road. However, it is unclear which site the address corresponds to. A Class A1 RAO indicates that remedial actions have reduced contamination levels to background. At this level of remaining contaminant concentrations, this site is not expected to affect the corridor.

Town Hall: This site is located approximately 1,100 feet east of where the corridor crosses Hudson Road in the center of Town. Fuel oil leaked from an underground tank. RAO status indicates that the response actions were sufficient to achieve a level of "no significant risk." This site is not expected to affect the corridor.

Sperry Research Center: Based on the 100 North Road address listed in the DEP database, this site is located approximately 1,100 feet east of where the corridor crosses North Road. The former Sperry Research Center is currently owned by Verrill Farm (according to the Assessor database). The site is classified as Tier 1A, Phase IV. Oil was discharged to a leachfield prior to 1987. Clean up activities are still underway. While this site appears to have contaminated groundwater, a stream between it and the corridor should prevent groundwater from reaching the corridor.

142 North Rd: This site is a commercial building located approximately 1,000 feet east of the corridor. The site is classified as a DPS status, Phase II. DPS indicates that the site has a Downgradient Property Status (DPS), meaning that the groundwater on that particular site has become contaminated as the result of the former and/or current use of another area site. One presumption is that the contamination on site originated at the Sperry facility. As with the Sperry facility, while this site appears to have contaminated groundwater, a stream between it and the corridor should prevent groundwater from reaching the corridor.

7.3 Conclusion

A review of various database searches did not indicate any overt sources of contamination within the limits of the former railroad corridor itself. However, the review did reveal current or past environmental contamination issues on sites located either directly adjacent to or in close proximity to the railroad corridor.

The cluster of sites at the southern end of the corridor and the associated industrial land use raises contamination concerns. A review of DEP files for Former Chiswick Properties, Coatings Engineering and Mullen Lumber is recommended during the next phase of this project to determine if the design should consider any related contamination issues. In addition, a more detailed investigation will be needed should the Town consider extending the rail trail south to Framingham due to the concentration of releases in the Route 20 area.

The location of the former South Sudbury Rail Station, at the junction of the two rail lines off Union Avenue, also poses a concern based on the history and operations occurring at this site. 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. Again, a more detailed investigation may be needed during the next phase of the project and/or necessary environmental precautions required during reconstruction activities depending upon the type of work and extent of excavation proposed along this section of corridor.

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 rail trail 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 rail trail project to the Town. It is therefore important for the rail trail design to balance cut and fill volumes to minimize any transportation of material off-site. It is recommended that the Town test for coal ash when taking the planned soil test holes along the corridor. An independent laboratory should complete the coal ash testing. Confirming the presence of coal ash will allow the Town to utilize this exemption.

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 demolition and/or removal activities will likely be included as part of this project and therefore there will be 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 rail trail construction would not introduce any hazardous waste or contaminated materials to the project area.

8 Cultural and Historic Resources

The purpose of this section is to document historic and cultural resources in proximity to the rail corridor.

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

It is unlikely that any historic or archaeological sites will be affected by the rail trail project given the nature of the proposed work. However, appropriate avoidance or mitigation measures should be implemented, if warranted.

Should the project advance to the design phase and have the potential to impact these resources, a full review will need to be conducted in compliance with the regulations governing Section 106 of the National Historic Preservation Act of 1966 as amended (36 CFR 800).

8.1 Local Inventory

FST contacted the Town of Sudbury Historical Commission and Town of Sudbury Historic Districts Commission to solicit any comments that each Commission wished to make regarding the rail trail project. In addition, it was requested that each Commission provide information about the Town's historic or cultural resources.

It should be noted that the rail corridor travels through the northwest quadrant of the Sudbury Centre Historic District (MHC Inventory No. SUD.A). The former Penn Central corridor is shown in Figure 26. Therefore, special design treatments and enhancements will need to be designed to complement the historic nature of this area. Such enhancements are discussed in Section 15 of this Assessment.

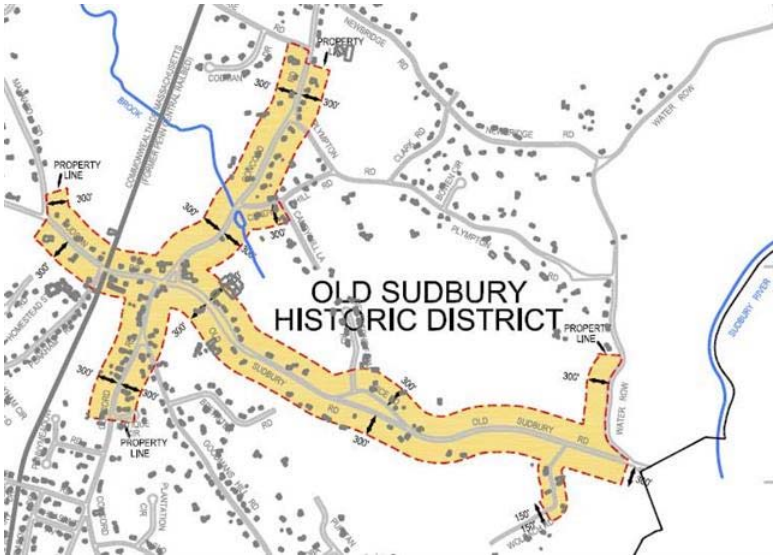


Figure 26: Sudbury Centre Historic District

A copy of the letter received from the Town of Sudbury Historical Commission is included at the end of this Section.

8.2 State Inventory

A Project Notification Form was submitted to the Massachusetts Historical Commission (MHC) to determine if there are any other historical or archaeological sites along the project corridor. On July 11, 2006, MHC responded by noting that the Commission will review and comment on the project once the project has advanced past the study phase and plans have been developed. It should be noted that a recent response letter (June 1, 2005) received from MHC with regard to the Concord section of the Bruce Freeman Rail Trail noted that the rail corridor traveled through archeologically sensitive areas that may contain as yet undiscovered archaeological sites based on their environmental characteristics and recent finds in similar areas.

It is unclear why MHC provided less information in response to Sudbury's request for information, however it may be attributed to the fact that the letters originated from two different individuals at MHC.

In follow-up, the Massachusetts Cultural Resource Information System (MACRIS) was reviewed to identify any resources adjacent to or near the rail 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.

The table on the following page documents sites in close proximity to the rail corridor. The sites are listed in the order in which are they located from south to north.

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 for the MassHighway 25% design submission.

Figure 27: Historic Properties Near Rail Corridor

MHC Inventory No.	Property Name	Street	Year Built
SUD.A	Sudbury Center Historic District		
SUD.279	Sudbury Hearse House	293R Concord Road	1800
SUD.65	Joel Moore House	10 Hudson Road	1802
SUD.64	Thomas Stearns House	18 Hudson Road	1830
SUD.176	Hanow House	24 Hudson Road	1950
SUD.175	Quirk Property (Village Green)	27 Hudson Road	1950
SUD.174	Schulte House	30 Hudson Road	1925
SUD.63	Framingham & Lowell Railroad Station	40 Hudson Road	1890
SUD.204	Bowker Store	Haynes Road	1910
SUD.150	Reuben Haynes House	196 North Road	1750
SUD.277	Josiah Haynes House	206 North Road	1820

Source: Massachusetts Cultural Resource Information System (MACRIS) Database

The Commonwealth of Massachusetts
William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

July 11, 2006

Jennifer A. Shemowat
Project Engineer
Fay, Spofford & Thorndike, LLC
5 Burlington Woods
Burlington, MA 01803

RE: Bruce Freeman Rail Trail, Former Old Colony Railroad/ConRail, Sudbury, MA.
MHC #RC.40147.

Dear Ms. Shemowat:

Thank you for submitting the Project Notification Form (PNF) for the project referenced above. The proposed project involves the development of a shared use path along the former railroad right of way of the Old Colony Railroad/ConRail.

The project is still in a study phase. When project plans are further developed, please provide them to the MHC for review and comment.

These comments are offered to assist in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR 800), Massachusetts General Laws, Chapter 9, Sections 26-27C (950 CMR 71), and/or MEPA (301 CMR 11). If you have any questions, please feel free to contact Gregory R. Dubell, at this office.

Sincerely,

Edward L. Bell
Senior Archaeologist
Massachusetts Historical Commission

xc: Sudbury Historical Commission

220 Morrissey Boulevard, Boston, Massachusetts 02125
(617) 727-8470 • Fax: (617) 727-5128
www.sec.state.ma.us/mhc

Sudbury Historical Commission
Sudbury Center
Sudbury, MA 01776

Clay Allen
Adolf Wahlkow
Win Fitzgerald
Carole Wolfe
Jim Hill
Jim Hodder
Lyn MacLean

25 August 2006

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

Attention: Jennifer Shemowat

Subject: Sudbury Proposed Rail Trail

Gentlemen:

Attached is the response your company requested from the Sudbury Historical Commission regarding the proposed rail trail.

The Commission thanks Fay, Spofford and Thorndicke for soliciting their comments.

Sincerely,

Lyn MacLean
CoChair SHC

CC: Bill Place
Director of Public Works/Town Engineer

The Sudbury Historical Commission views the creation of a rail trail through the heart of our town as a further step toward the urbanization of Sudbury. As it becomes more and more crucial to maintain the remnants of Sudbury's rural character and agrarian history, each project involving the Commission is assessed as to its impact on these uniquely related distinguishing features.

The Commission is very concerned about both the short and long- term effects a trail will have not only on the scenic roads it will cross but our entire scenic road network, as well as the impact on the historical nature of Sudbury Center. .

The Commission is deeply concerned about the negative visual impact and loss of rural character a trail would have on our scenic roads and historical Town Center. The removal of twenty feet or more of foliage and trees along the old rail bed with ten or more feet of pavement down the middle of this cleared expanse, would have an immediate impact on Sudbury's character. This visual display of urban asphalt would replace the existing greenway, thus creating the illusion of just another straight road extending to the apparent horizon.

Making a narrower, natural trail (not using pavement) would be in keeping with the rural nature Sudbury wishes to preserve. We would recommend using green or brown bollards and/or gates, rather than the usual bright yellow ones, to prevent illegal vehicle use.

Pantry, Haynes, Morse and Old Lancaster Roads will be used by many people accessing or detouring from a trail, all other scenic roads with which these four interconnect will experience similar increased usage. Thus, the Commission is very concerned there will be a demand to remove trees and roadside foliage from most of our scenic roads to enable increased vehicle and bicycle passage.

We would recommend the least removal as possible of foliage and trees so the entrance to each trail off a scenic road does not lend to a view of pavement but to a natural trail with pleasant appeal.

As Sudbury will be the terminus of such a trail for an unknown period of time, parking issues will be of utmost importance. There is the disturbing prospect the South Sudbury business community will find their lots overcrowded with vehicles whose occupants wish to use a trail. To relieve this situation, the easiest parking solution would be to create lots within the railroad right of way at the intersections with scenic roads. The Commission naturally takes a very dim view of this concept and may request the Town's assurance prior to a trail's construction, that the historical integrity of our scenic roads be protected from these and other trail related infringements.

Parking to be designated to one area rather than all along the trail.

The issues that also need to be resolved are the maintenance, graffiti and security.

9 Trail Design

The purpose of this Section is to provide an overview of design elements that need to be considered when selecting a typical rail trail cross-section.

The design criteria discussed below are 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)

The MassHighway Project Development & Design Guide (Chapters 5 and 11) makes the following distinction:

> **Shared Use Path:** A shared use path is a facility for non-motorized uses that is independently aligned and can be used for a variety of purposes including recreation, commuting and local travel. MassHighway and FHWA require that a shared use path designed or constructed with state or federal funds follow the design standards of AASHTO.
>
> **Greenway:** A greenway trail is a recreational facility through backcountry or other remote areas that is generally an unpaved trail that serve hikers, mountain bikers, equestrians and other off-road users. Design guidelines for greenways are not as well established as those for shared use paths.
>
> **Walkway:** A walkway can include, but not be limited to, all walks, sidewalks, overpasses, bridges, tunnels, underpasses, plazas, courts and other pedestrian pathways. A walkway functioning as an off-road path (e.g. not a sidewalk) must meet the Rules & Regulations of the Massachusetts Architectural Access Board for Walkways (521 CMR).

The typical cross section of a rail trail is typically governed by the existing rail corridor right-of-way, railbed width and the location of adjacent environmental or historic resource areas. The new MassHighway Design Guide acknowledges that site-specific conditions often warrant the need to take a more flexible and accommodating design approach.

9.1 Width

The rail trail typical sections under consideration along this corridor include a 5-foot, 8-foot and 10-foot wide surface.

An 8-foot or 10-foot wide rail trail surface qualifies as a shared use path. As noted above, MassHighway and FHWA require that rail trails designed or constructed with state or federal funds follow the design standards of AASHTO. 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.

According to MassHighway's Bicycle - Pedestrian Accommodation Engineer, under most conditions a surface width of 10 feet is recommended. This recommendation is consistent with AASHTO 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.

A 5-foot wide rail trail would be characterized as a walkway or greenway trail. This width would not accommodate the same range of users as an 8-foot or 10-foot trail due the reduced width and potential for conflicts. A 5-foot wide walkway meets the width requirements stated in the Rules & Regulations of the Massachusetts Architectural Access Board for walkways (521 CMR 22.00). A width less than 5 feet requires passing spaces (60”x60”) to be installed at intervals not exceeding 200 feet (521 CMR 20.5). A 6-foot width may be preferred because it allows for two people to walk comfortably side-by-side.

Again, all design decisions are subject to review and approval by MassHighway if the project is being funded using state or federal transportation funds.

Regardless of the width, the rail 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.

9.2 Shoulders and Side Clearance

A minimum 2-foot wide graded clear shoulder should be maintained adjacent to both sides of a shared use path. This shoulder is not considered part of the traveled way. The shoulder is typically graded to a slope of 1 vertical: 12 horizontal (1:12) to enhance proper drainage to prevent erosion as well as provide a recovery zone for rail trail users. It is commonly constructed using soft surface materials such as grass, gravel borrow, stone dust, or other stabilized materials. A minimum 3-foot clearance should be maintained from the edge of the path 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 path is located adjacent slopes steeper than 1 foot vertical to 3 feet horizontal. If this offset can not be achieved, then a 42-inch (3.5 foot) wood rail fence should be should be installed to protect trail users.

On a 5-foot walkway or greenway trail, there are no shoulder width or clearance requirements. However, it is strongly recommended that a 2-foot shoulder be provided in order to accommodate access by occasional maintenance or emergency vehicles.

Due to proximity of 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. A widened shoulder is included on some projects for use by equestrians, trail runners, walkers and mountain bikers.

9.3 Physical Barriers

A wood rail fence would need to be installed along the shared use path sections (8-foot or 10-foot width) to prevent users from traversing the sideslopes. Where a slope of 1:2 or greater exists within 5 feet of the surface and the elevation difference is greater than 10 feet, a physical barrier such as dense shrubbery, railing, or chain link fence should be provided along the top of slope. Other situations may also dictate the need for a physical barrier, such as the height of the embankment or an unsafe condition at the bottom of slope. 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.

9.4 Vegetative Clearing

It is recommended that existing low-lying vegetation located within 6 feet of the edge of the paved trail be cleared and grubbed. In addition, trees and limbs will be cut and cleared to allow a vertical clear zone of at least 10 feet above the finished grade at the proposed rail trail and equestrian trail. This 10 foot vertical clearance will still allow the vegetative canopy to remain.

9.5 Root Barrier

Based on recent rail trail designs, it is recommended that a high-density polyethylene root barrier be installed along sections of the rail trail where future tree root or vegetative growth may threaten the long-term integrity of the trail surface. Due to its price, root barrier should only be installed in areas recommended by a landscape architect.

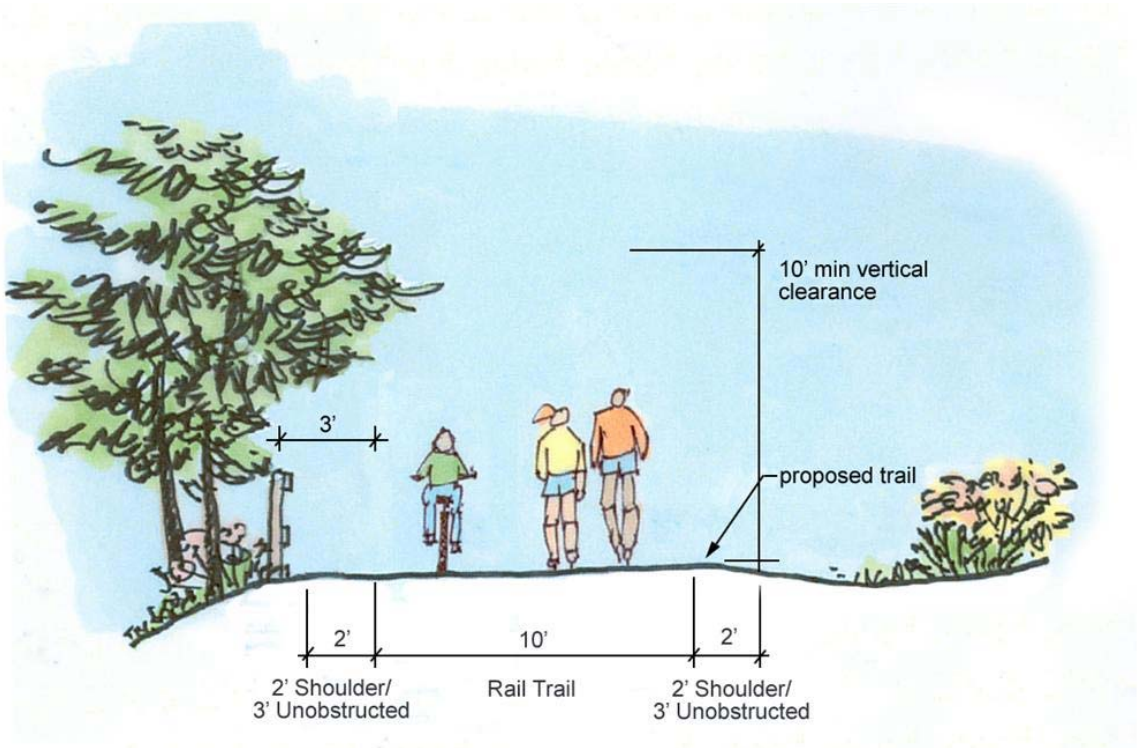


Figure 28-A: Typical 10-Foot Trail Section in Fill

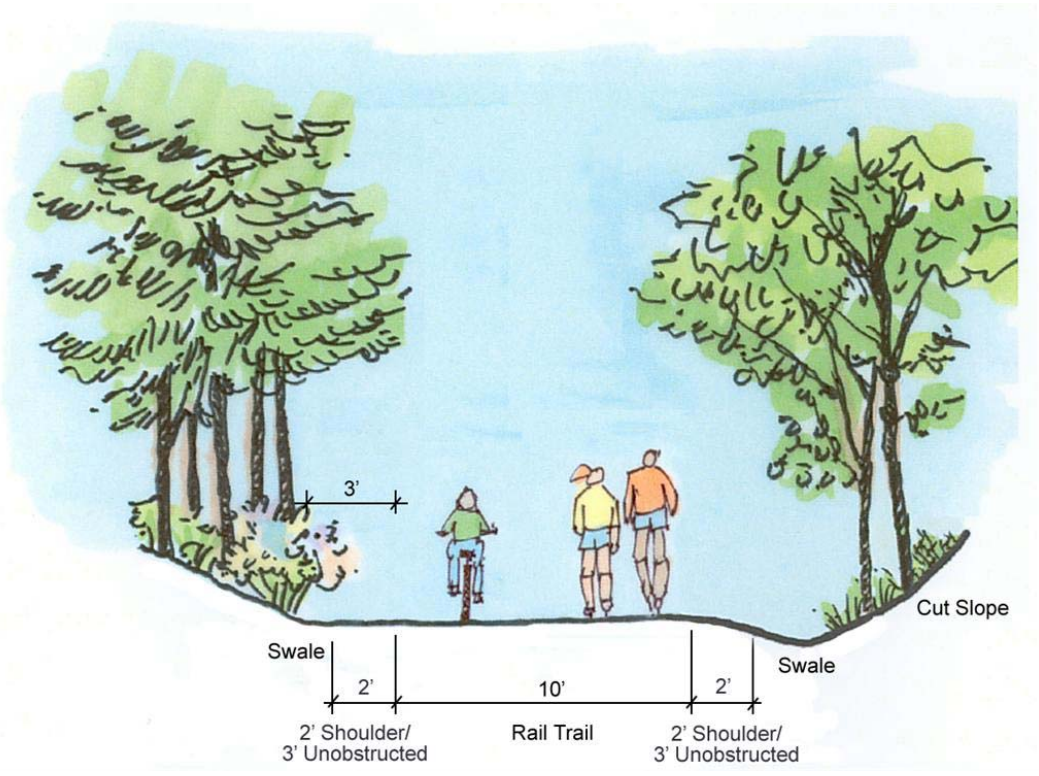


Figure 28-B: Typical 10-Foot Trail Section in Cut

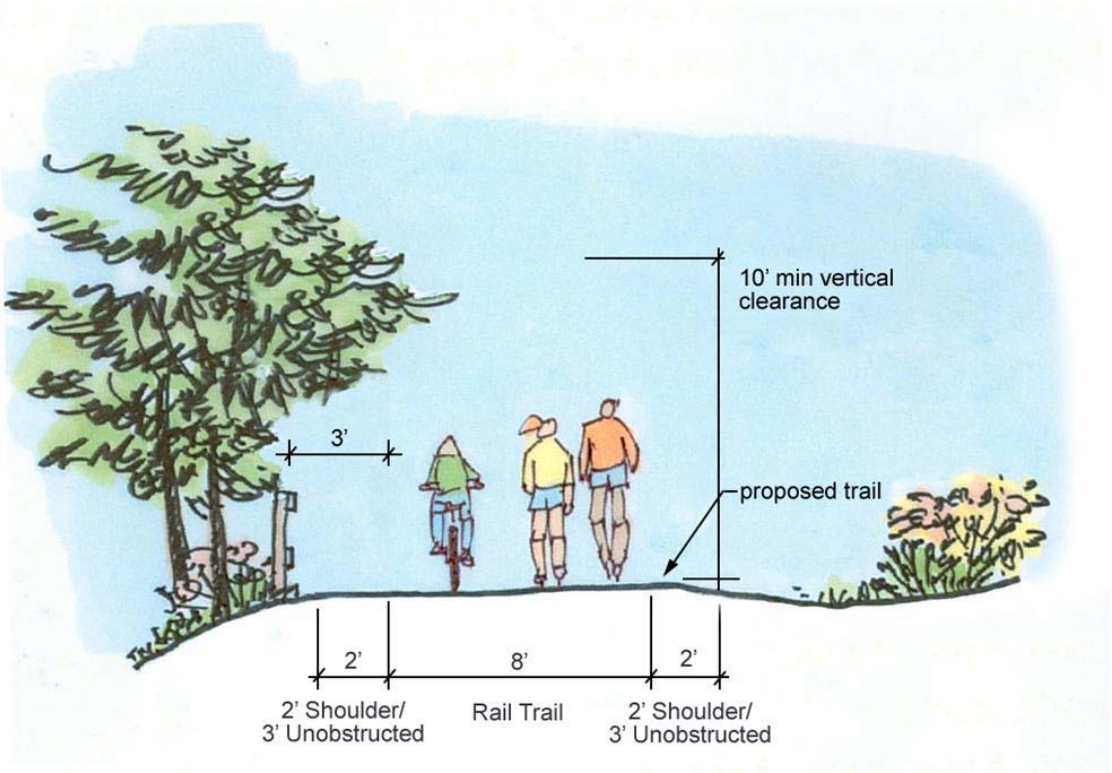


Figure 29-A: Typical 8-Foot Trail Section in Fill

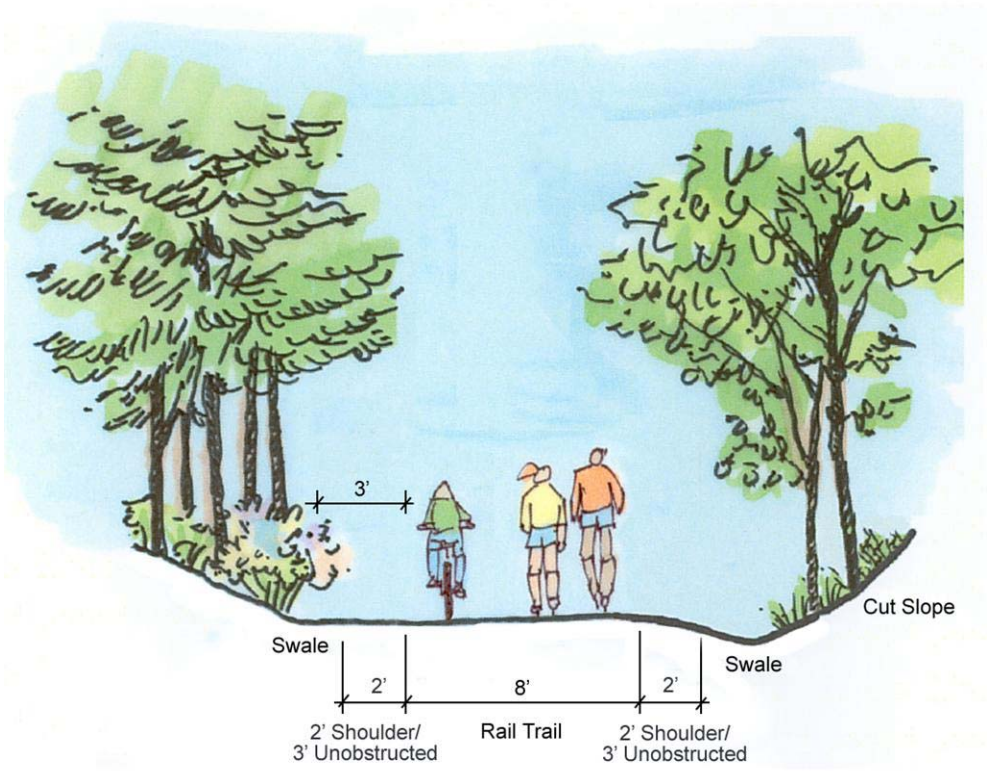


Figure 29-B: Typical 8-Foot Trail Section in Cut

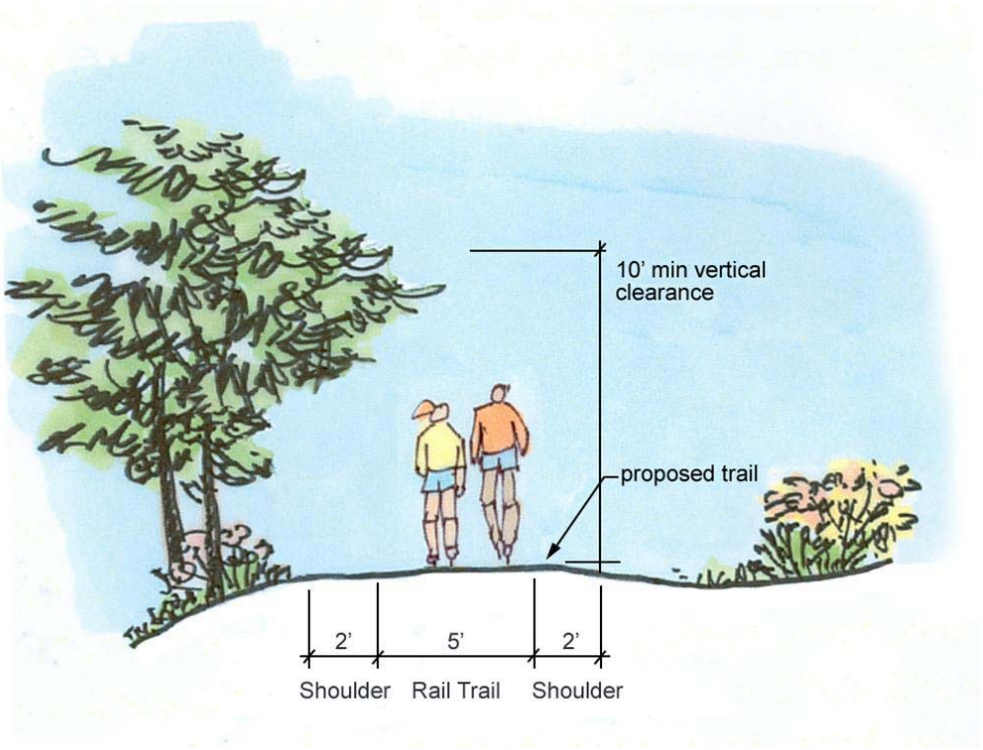


Figure 30-A: Typical 5-Foot Trail Section in Fill

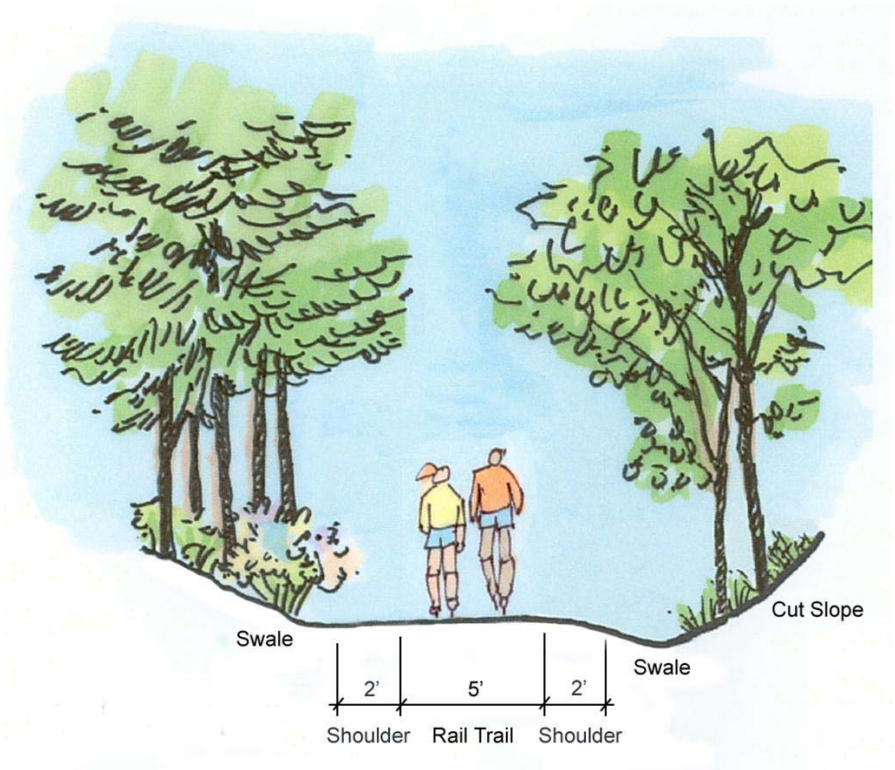


Figure 30-B: Typical 5-Foot Trail Section in Cut

10 Trail Surface Material

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."

10.1 Materials

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

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.

10.1.1 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 (e.g. Assabet River Rail Trail, Nashua 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.

Porous Asphalt Pavement: The performance and service life of porous asphalt pavement is similar to that of standard asphalt pavement. However, porous pavement functions as a pervious as opposed to an impervious surface. Porous pavement allows water to drain through the pavement surface into a stone recharge bed, thereby reducing runoff and providing groundwater recharge. The void content of porous pavement ranges from 15% to 25% whereas conventional pavement has a typical void content of 4% to 7%. Obtaining the correct air void content in the mix design is critical to the proper performance of the pavement in the field. The underlying stone bed must have an adequate depth so that the water infiltrates into the soil and never rises into the asphalt. This depth will be determined based on a drainage study of the area. Porous pavement is typically 10 to 15% more expensive than a conventional asphalt surface.

Crushed Stone Chip Seal: Crushed stone chip and seal is a surface treatment in which an asphalt pavement is covered with aggregate and rolled. The use of a chip seal wearing surface can provide a historic appearance, without the ongoing maintenance requirements of a crushed stone surface. Chip seal materials can be selected to match a desired color and texture. A chip seal results in a coarse surface texture.

10.1.2 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, crusher 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.

10.1.3 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 the DCR Upper Charles River trail. When dry, a stabilizer granular surface is firm and when it becomes wet, the top ¼" of the surface softens.

10.2 Cost Comparison

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

Figure 31: Surface Material Cost Comparison

Surface Material	Unit Price per Square Foot (Installed)	Notes
Hot Mix Asphalt	$3.00	3.5" Asphalt 8" Gravel borrow
Porous Asphalt	$3.60	3.5" Asphalt 2" Choker stone 8" Stone recharge bed 2 layers of geotextile fabric for separation
Hot Mix Asphalt w/ Stone Chip Seal	$3.40	Single lift chip seal 3.5" Asphalt 8" Gravel borrow
Granular (Stone Dust)	$2.00	4" Stone Dust Geotextile fabric for separation 6" Gravel borrow
Stabilized Granular Surface	$4.50	4" Stabilized Stone Dust (3" nominal compacted) Geotextile fabric for separation 6" 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, steel edging, etc.

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

11 At-Grade Intersections

The purpose of this section is to discuss the engineering design issues that need to be taken into consideration where the rail corridor crosses roadways and driveways at-grade.

Along the rail corridor, there are a total of 11 at-grade roadway / driveway crossings which consist of the following:

- 6 public roads
- 5 commercial access drives

The creation of a rail trail crossings at each of these locations presents operational and safety issues for both vehicles and users.

11.1 Design Considerations

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

11.1.1 Alignment

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

Considering site constraints and the characteristics of the intersecting roadway, two alternate alignment options should be considered at each rail trail / roadway intersection.

- Type 1: Reverse Curve Alignment
- Type 2: Straight Alignment

Type 1 Alignment: This alignment option introduces short, reverse curves (e.g. 'S' curve) to divert the rail trail from the current track alignment and reposition the user at the preferred crossing location. At all skewed crossings, it is recommended that a short section of rail trail be realigned in advance of the intersection to create as close to a 90 degree crossing as possible while maintaining minimal disturbance to the existing railbed and surrounding areas. Benefits of such a realignment include a shortened crossing and increased awareness by users of a change in conditions (e.g. an approaching intersection). This short alignment change requires bicyclists to reduce speed. 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 rail trail. Therefore, while the Type 1 Alignment is the preferred treatment for safety reasons, it must be weighed against the visual impact upon the Town's local roads and abutting properties.

Type 2 Alignment: This alignment option keeps the rail trail along the current track alignment. This option should only be used where realigning the rail trail may not be feasible or necessary. These are primarily locations where either site constraints are too restrictive (e.g. proximity of wetland resource areas or private property) or where the cross street is a low volume/speed roadway or driveway. At these locations, a Type 2 Alignment is recommended.

11.1.2 Approach

The alignment options discussed above 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 have been considered along this corridor.

- Type A: Widened Approach Treatment
- Type B: Gateway Approach Treatment

Type A: This approach treatment involves the introduction of a flush, 2-foot wide divisional island on the approach to the intersection. The flush island can consist of textured pavement (e.g. Imprint) in a brick pattern, for example, or simply pavement markings. The island in effect splits the rail trail into two, one-way routes, a measure that also tends to reduce the speed of bicyclists approaching the intersection. This treatment requires minimal widening beyond the proposed typical section and is well suited for applications where site constraints restrict the extent to where the trail can be realigned.

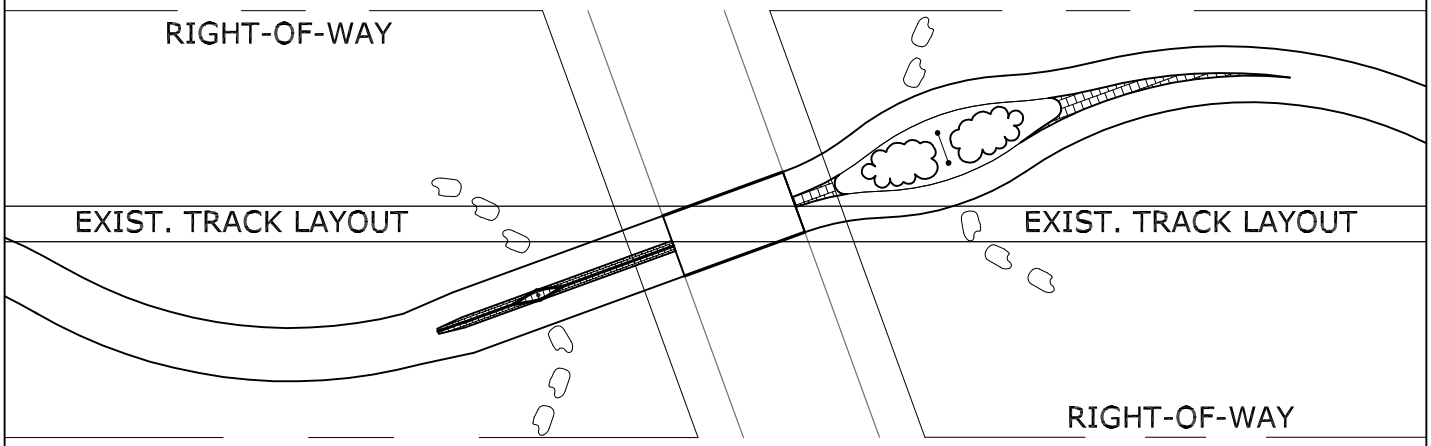
Type B: This approach treatment consists of replacing a narrow flush island with a wider landscaped island and/or gate, where site conditions are less restrictive. Only low-lying vegetation should be planted in the island such that it will not impair sight distance. This "gateway" treatment functions similar to the flush island (Type A) but offers an additional opportunity to further enhance the appearance of the rail trail.

The surface material, texture and color of the trail entrance (approach) can vary from the typical trail section to better complement the character of the roadway.

When the alignment options and approach treatments are combined together, there are a total of four intersection designs that can be considered at each at-grade crossing:

- 1-A: Reverse Curve Alignment - Widened Approach Treatment
- 1-B: Reverse Curve Alignment - Gateway Approach Treatment
- 2-A: Existing Alignment - Widened Approach Treatment
- 2-B: Existing Alignment - Gateway Approach Treatment

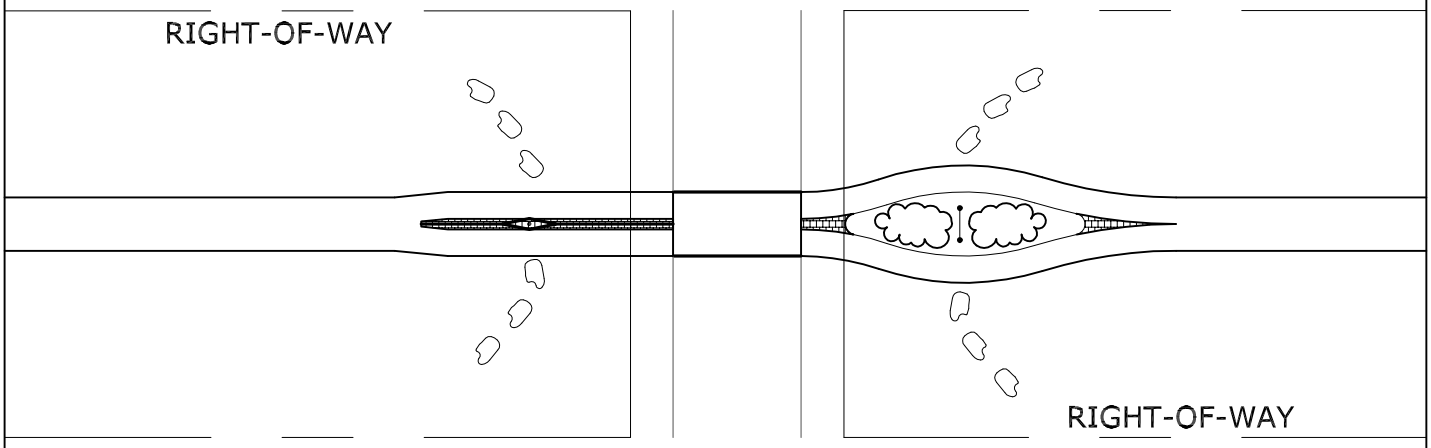
A conceptual plan of each design option / treatment is included on the following page.



1-A TRAIL WIDENING OPTION

1-B TRAIL GATEWAY OPTION

REVISED ALIGNMENT



2-A TRAIL WIDENING OPTION

2-B TRAIL GATEWAY OPTION

EXISTING ALIGNMENT

FIGURE 32:
RAIL TRAIL / ROADWAY INTERSECTION

NOT TO SCALE

BRUCE FREEMAN RAIL TRAIL
TOWN OF SUDBURY, MASSACHUSETTS

FAY, SPOFFORD & THORNDIKE, LLC
ENGINEERS · PLANNERS · SCIENTISTS
BURLINGTON, MA

11.1.3 Sight Distance

Sight distance is the length of roadway visible to a motorist and in this case, also a rail 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 (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 rail trail user to verify that the roadway / driveway is clear.

Vegetative clearing will 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). The clearing limits at the crossing will call for the selective clearing and thinning of vegetation approximately 8 feet back along the rail trail in order to provide a 200 foot stopping distance from the center of the travel lane on the intersecting roadway. This distance will vary depending on the curvature of the roadway and speed of the approaching vehicle. A detail of these clearing limits is included on the following page. The cutting of five (5) or more living public shade trees of 14 or more inches in diameter at breast height will exceed MEPA thresholds for the filing of an ENF (see Section 6.2). The impacted trees must be located within the public right-of-way to be protected under MEPA.

Old Lancaster Road, Morse Road, Haynes Road and Pantry Road are all designated under Sudbury's Scenic Roadway Bylaw pursuant to M.G.L. Ch. 40, Sec. 15C (The Scenic Roads Act). The purpose of this Bylaw is to protect the scenic quality and character of Town roads This bylaw governs the cutting or removal of trees, or the tearing down or destruction of stone walls during the repair, maintenance, reconstruction, paving, or other alteration of roads that have been designated as a scenic road by the Town. Under local bylaws, such alterations require an open Public Hearing and Planning Board approval for the portion of work performed within the public right-of-way.

The Town's Historical Commission is very concerned about the visual impact of removing foliage and trees where the trail crosses these scenic roads. In particular, they are concerned about the Hudson Road (Route 27) crossing, as it is located within the Town Center historic district. The design of these intersections should strive to balance maximum sight lines and associated impacts.

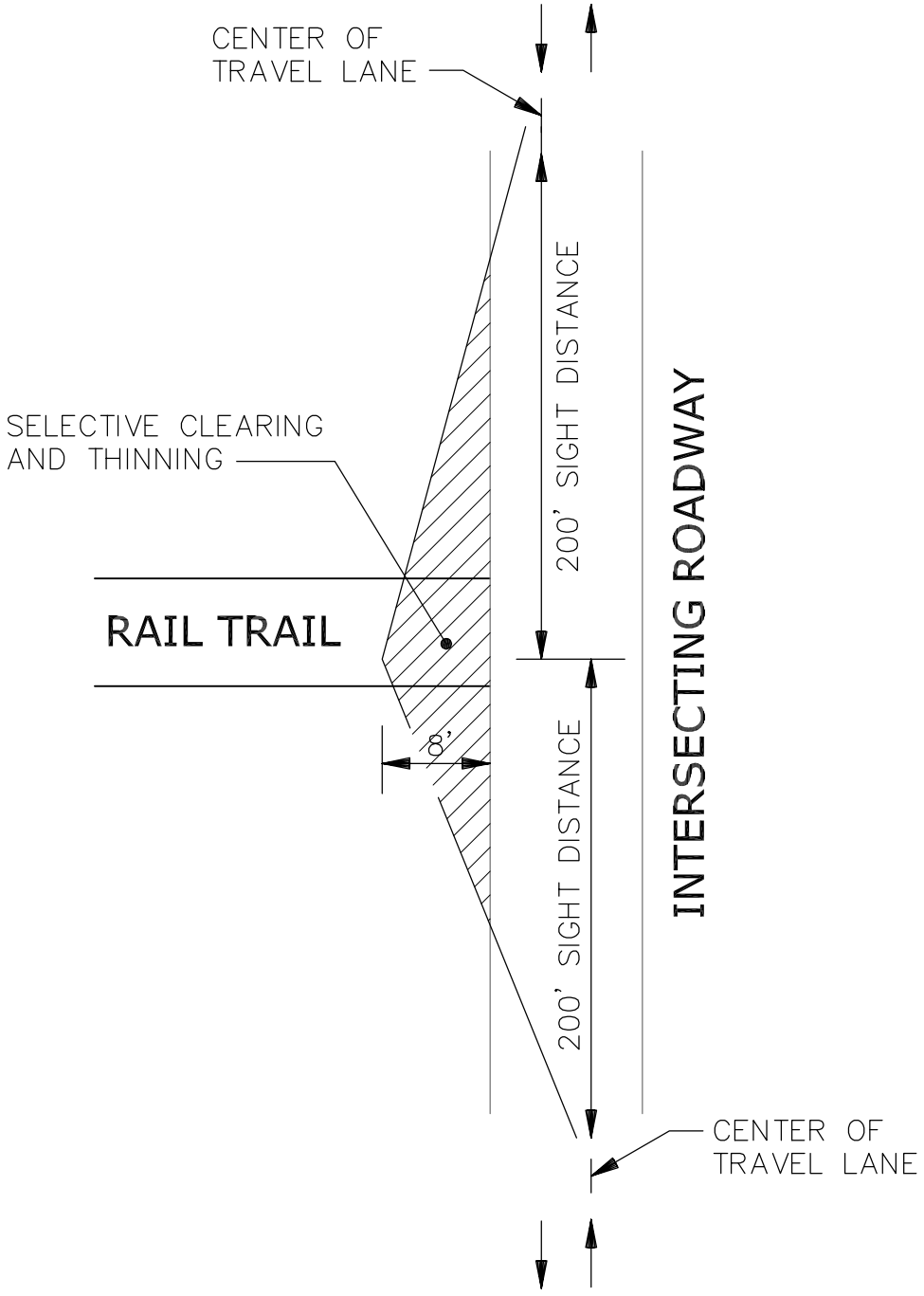


FIGURE 33:
CLEARING LIMITS ALONG INTERSECTING ROADWAY

NOT TO SCALE

11.1.4 Access

Physical barriers to prevent access by motor vehicles can be installed at various locations along a trail including:

- Major and minor roadway crossings
- Commercial access drives
- Trailheads
- Parking areas
- Informal crossings where unauthorized access may pose a problem

These physical barriers typically consist of a bollard or gates, which can be opened / removed for emergency access. At roadway intersections, these barriers need to be placed outside of the vehicle clear zone and at an adequate offset to permit a maintenance/emergency vehicle to pull off the intersecting roadway (25 feet recommended). Boulders are often used to supplement these barriers.

The Town's Historical Commission recommends the use of natural colored bollards and/or gates, as opposed to the bright yellow bollards, to better complement the rural character of the Town.

Bollards are typically yellow in order to draw attention to their location in the center of the trail. Use of a natural colored bollard would not provide sufficient contrast within the existing landscape, and therefore may pose a safety concerning for approaching bicyclists. Based on this information, it is recommended that the Town consider use of a natural wooden gate, where feasible, to prevent access.

11.1.5 Signage & Pavement Markings

Proper warning and regulatory signage and pavement markings will be utilized to improve safety conditions for both path users and drivers as outlined in the MUTCD. It is recommended that rail trail users be required to stop prior to crossing the intersecting roadway at each at-grade intersection along the corridor.

11.1.6 Traffic Control

A traffic control system improves the safety of an intersection by providing additional warning of the approaching intersection to both vehicles and rail trail users. As noted in the MassHighway Project Development & Design Guide, traffic signals shall be considered where a rail 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.

Two roadway crossings along the rail corridor likely approach or exceed 10,000 vehicles per day and warrant consideration for a traffic signal include Hudson Road (Route 27) and North Road (Route 117). North Road operates under significantly higher speeds than Hudson Road.

The other roadways / driveways along the corridor exhibit lower volumes and speeds and therefore were not considered for signal installation.

The following types of traffic control systems shall be considered at each crossing:

- Intersection control beacon
- Cross Alert system
- Push button actuated traffic signal

These devices supplement the proper warning and regulatory signage and pavement markings along the rail trail and roadway approach.

A typical intersection control beacon consists of a four way, single section traffic signal head supported over the center of a roadway on a mast arm. The signal flashes yellow for the vehicles approaching on the roadway and red for rail trail approaches. One drawback of a flashing beacon is that motorist become desensitized to its constant flashing. Standard installation of beacons requires a continuous power source to maintain a flashing indication at all times. Installation costs are approximately $25,000 per location.

A Cross Alert system is an alternative to a traditional beacon installation. This system runs on solar power and flashes roadside signals only when an approaching bicycle/pedestrian is detected. This system offers a benefit in terms of reduced energy costs. However, one drawback is that it does not offer the same visibility for approaching motorists of an overhead mounted signal. Installation costs are approximately $25,000 per location. This system was recently installed along the Cape Cod Rail Trail and on bike paths in Rhode Island.

A push button actuated traffic signal consists of two signal heads for each roadway approach, typically supported on a mast arm, and pedestrian signals for the rail trail approach. The signal would display green (solid or flashing) for the vehicles approaching on the roadway and red for rail trail approaches. When a rail trail user reached the crossing, s/he would press the pedestrian button to change the signal to green for users and red for vehicular traffic.

In order to install a signal, a traffic signal warrant analysis needs to be conducted and one or more of the warrants satisfied. The justification for a traffic signal will be based on the volumes processed by the intersection (both rail trail users and vehicles) and the number of gaps available in the traffic stream that will allow users to safety cross the roadway. If it is determined that a sufficient number of gaps in vehicle traffic will not be available for rail trail users to cross the roadway, consideration should be given to installing a push button actuated traffic signal at the crossing. As the trail is not yet constructed, rail trail user counts could be based on use at a similar facility (e.g. Assabet River Rail Trail).

In the past, MassHighway District 3 recommended that a Town first apply for crosswalk permit and then revisit the need to install a signal once the rail trail had been constructed. However, recent conversations with MassHighway indicated the agency's recognition of need to develop a standardized approach to addressing traffic control as part of the preliminary design phase.

11.2 Accident Data

As a part of assessing the safety of the rail trail / roadway crossings, accident data records retained by the Sudbury Police Department were reviewed for the past five years. Data was reviewed to identify accidents at or near rail trail crossings involving pedestrians or bicyclists. Over the five-year period, there was one pedestrian accident in December 2003. This accident occurred in the crosswalk at the intersection of Morse Road and Concord Road. A pedestrian ran into the side of the car, but no injuries were reported.

11.3 Separation

Emergency and maintenance vehicle access would be provided at each roadway / driveway crossing along the corridor. The approximate separation distance between roadway / driveway crossings is shown in Figure 34.

In addition to these access points, the Town should work with emergency response personnel to determine the need for additional access points along the longer segments of trail, such as between Hudson Road (Route 27) and Morse Road (0.8 miles) and between Morse Road and Haynes Road (1.1 miles).

Such access points could be provided on existing Town-owned property or by securing an easement from a private property owner. The need for and location of such access points should be considered based on the input of the Town's emergency response staff.

Figure 34: Approximate Separation Between Roadway / Driveway Crossings

Roadway / Driveway	Approx. Distance in Feet (in Miles)
25 – 33 Union Avenue	--
64 Union Avenue	900 (0.2)
Codjer Lane	750 (0.2)
Old Lancaster Road	2,700 (0.5)
Hudson Road (Route 27)	3,250 (0.6)
36 Hudson Road	--
Morse Road	4,050 (0.8)
Haynes Road	5,900 (1.1)
Pantry Road	900 (0.2)
North Road (Route 117)	2,300 (0.4)
206 North Road	1,200 (0.2)
Concord Town Line	2,000 (0.4)
Williams Road, Concord	7,500 (1.4)

11.4 Intersection Improvements

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

Data presented in this Section was compiled from the Commonwealth of Massachusetts Office of Transportation Planning Road Inventory Database (2005) and supplemented with field observations.

Information on access drives is based on meetings held between the Town, Consultant and each major business owner whose access drive crossed or closely paralleled the rail corridor. The purpose of these meetings were to:

- Discuss the business owners' concerns about a rail trail crossing at their access drive
- Gain an understanding of the businesses' day-to-day operations (e.g. work hours, traffic volumes, types of vehicles)
- Discuss possible measures to mitigate the owners' concerns

In follow-up to this meeting, each company was encouraged to submit a formal letter to the Town documenting their concerns. These letters are included in Appendix C.

11.4.1 Rail Trail Terminus at Union Avenue

Source: Microsoft Windows Live Local

Description: Union Avenue connects the busy commercial area along Route 20 to Sudbury center. The section of Commonwealth of Massachusetts owned right-of-way ends at the access drive to 25 – 33 Union Avenue (Chiswick Park). The portion of corridor south of this access drive is privately owned by CSX Corporation and is not part of this Assessment. Therefore, rail trail users attempting to reach Route 20 will likely travel along Union Avenue to reach their destination.

Type of Roadway:	Rural major collector
Posted Speed:	35 mph
Jurisdiction:	Town
Est. Volume (ADT):	13,600 vehicles
Surface Width:	29 feet
Sidewalk:	None
Road ROW Width:	40 feet
Crossing Angle:	n/a

Issues

- Union Avenue does not include facilities for bicycles or pedestrians
- Requiring users to cross Union Avenue may warrant installation of a traffic signal

Recommendations

- Evaluate opportunities to provide additional linkage to points of interest in South Sudbury
- Construct a widened sidewalk along the west side of Union Avenue to connect people from the trail to the existing traffic signal at Sudbury Plaza; This alignment will not require users to cross Union Avenue
- Install signage indicating end of rail trail

11.4.2 25 – 33 Union Avenue

Source: Microsoft Windows Live Local

Description: Paris Trust LLC owns the commercial access drive to 25 -33 Union Avenue. The drive connects Union Avenue to Boston Post Road (Route 20). The driveway is currently used by tenants of Chiswick Park, Sudbury Lumber Co. and AAA Limousine. The section of Commonwealth of Massachusetts owned right-of-way ends at the privately owned access drive to 25 – 33 Union Avenue.

Type of Roadway:	Access drive
Posted Speed:	n/a
Jurisdiction:	Private
Est. Volume (ADT):	Unknown
Surface Width:	25 feet +/-
Sidewalk:	None
Road ROW Width:	n/a
Crossing Angle:	90 degrees

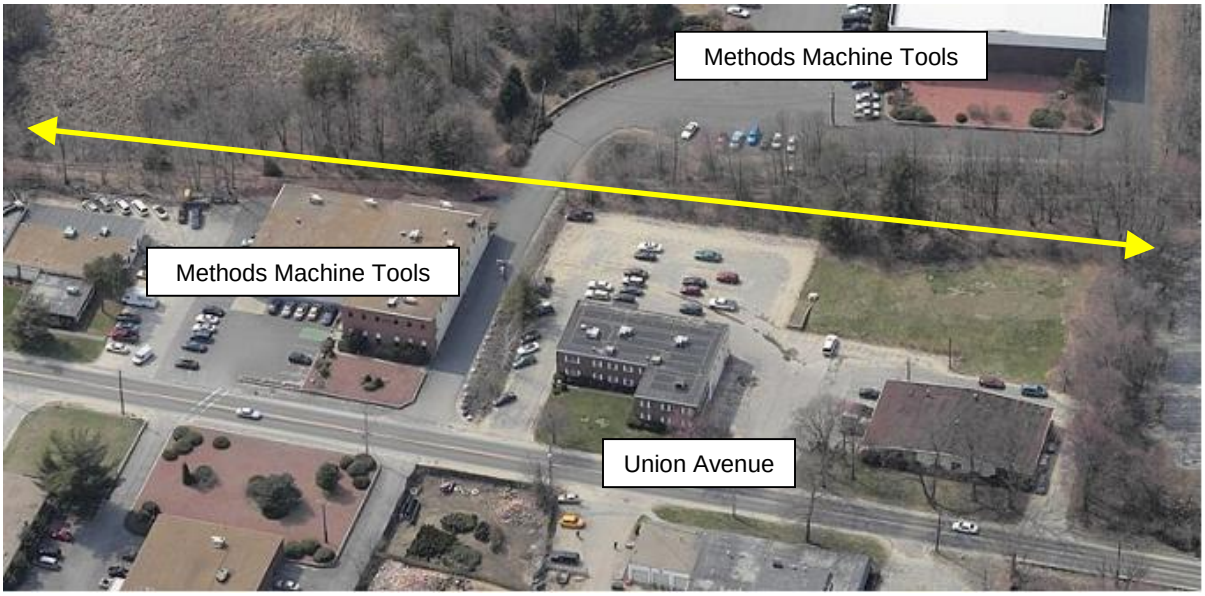
Issues

- Trucks regularly use this access drive, especially to travel between the two Sudbury Lumber Co. buildings located on either side of Union Avenue
- Need to deter users from parking along the access drive
- Rail trail section under study terminates on private property (access drive owned by Paris Trust LLC)

Recommendations

- Signs directing rail trail users east to Union Avenue will be needed
- Install advance signs and pavement markings along the access drive
- Coordinate with MBTA for use of its railroad right-of-way to connect the rail trail to Union Avenue without requiring users to travel along access drive

11.4.3 64 – 65 Union Avenue



Source: Microsoft Windows Live Local

Description: Methods Machine Tools, Inc. owns the commercial access drive at 64 – 65 Union Avenue. The company campus includes facilities on both sides of the rail corridor. The access drive connects these two facilities and perpendicularly crosses the rail corridor.

Type of Roadway:	Access drive
Posted Speed:	n/a
Jurisdiction:	Private
Est. Volume (ADT):	200 vehicles
Surface Width:	30 feet +/-
Sidewalk:	None
Road ROW Width:	n/a
Crossing Angle:	80 degrees

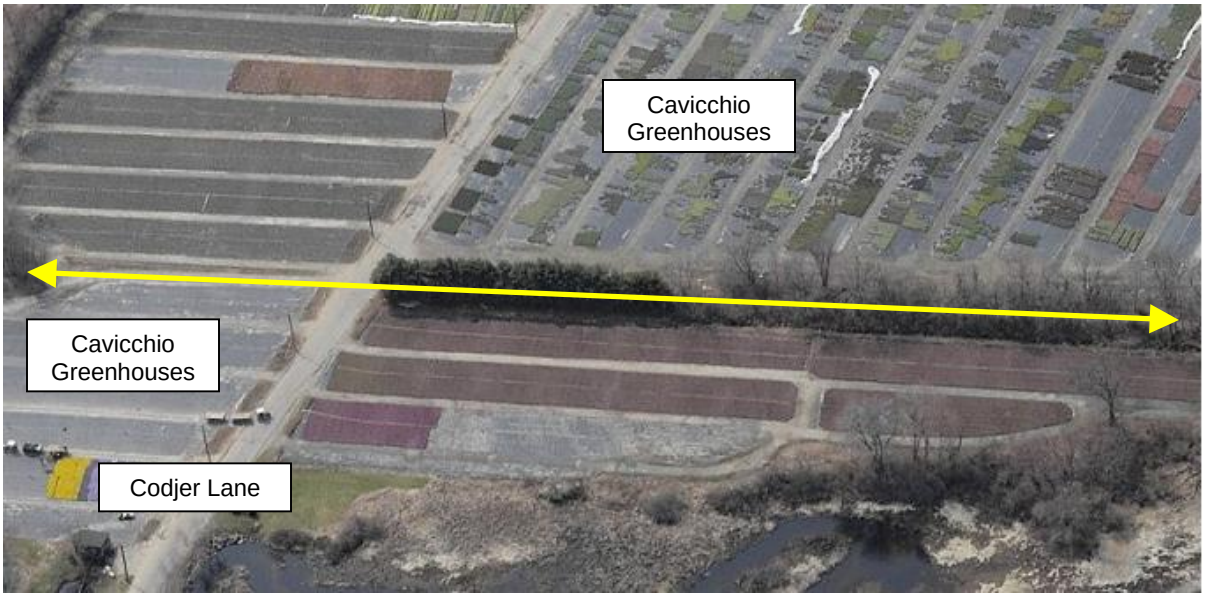
Issues

- Crossing is located at a blind spot for vehicles entering / exiting the access drive from the two facilities.
- Need to deter rail trail users from parking and trespassing on the company's campus

Recommendations

- Clear vegetation to increase sight lines for rail trail users and truck traffic
- Require rail trail users to stop prior to crossing the driveway
- Post signage to instruct users not to trespass on campus property
- Install advance signs and pavement markings along the access drive

11.4.4 Codjer Lane



Source: Microsoft Windows Live Local

Description: Codjer Lane is a private road that is used exclusively as a commercial access drive to Cavicchio Greenhouses, Inc. As a private road, the company is responsible for maintenance. Codjer Lane intersects Union Avenue and perpendicularly crosses the rail corridor. The company owns agricultural fields on both sides of the rail corridor.

Type of Roadway:	Private / Access drive
Posted Speed:	n/a
Jurisdiction:	Private
Est. Volume (ADT):	2,500 vehicles
Surface Width:	24 feet
Sidewalk:	None
Road ROW Width:	40 feet
Crossing Angle:	75 degrees

Issues

- Commercial trucks and farm tractors / equipment use this access drive on a continual basis throughout the day
- Need to deter rail trail users from parking along Codjer Lane or along any portion of adjacent rail corridor.

Recommendations

- Require rail trail users to stop prior to crossing the driveway
- Plant trees or install wood rail fence to keep users on rail trail
- Post signage to instruct users not to trespass on private property / drive
- Install advance signs and pavement markings along the access drive
- Consider realigning trail to use existing row of pine trees as a barrier

11.4.5 Old Lancaster Road

Source: Microsoft Windows Live Local

Description: Old Lancaster Road travels through a residential and connects Concord Road with Hudson Road. Old Lancaster is a designated Scenic Road under the Town bylaws. Mature trees encroach upon the traveled way, often requiring vehicles to stop in order to let a vehicle in the opposite direction pass. The rail corridor crossing is located at a straight, level section of Old Lancaster Road.

Type of Roadway:	Rural minor collector
Posted Speed:	30 mph
Jurisdiction:	Town
Est. Volume (ADT):	3,000 vehicles
Surface Width:	26 feet
Sidewalk:	Northbound Side
Road ROW Width:	28 feet
Crossing Angle:	80 degrees

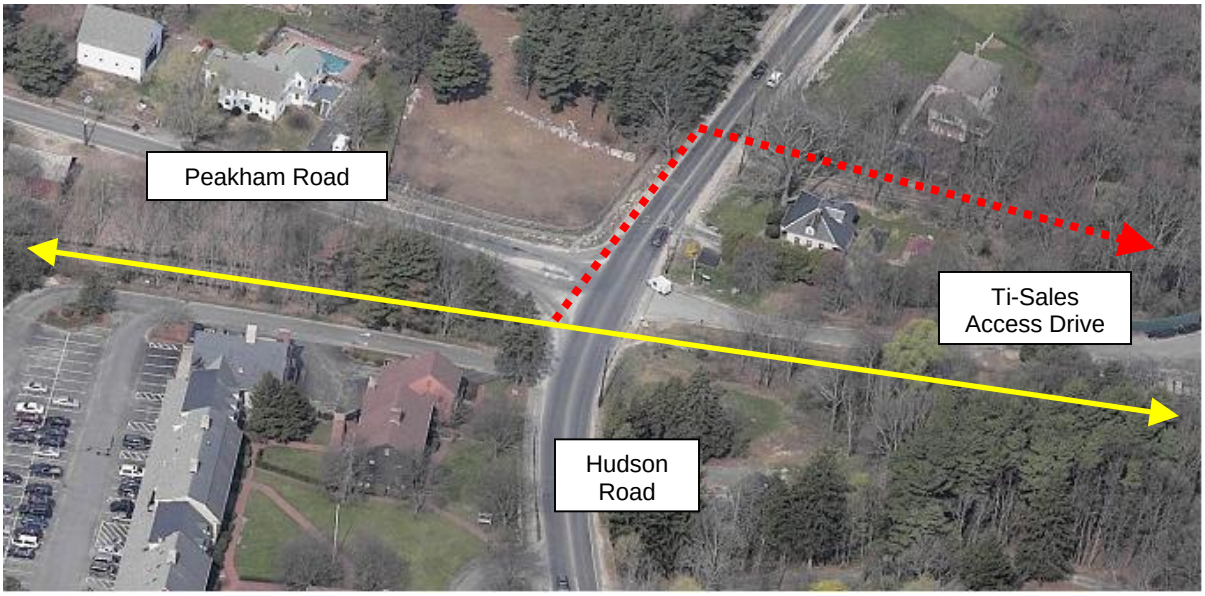
Issues

- Mature trees along roadside restrict sight lines and impose width constrictions
- Rail corridor in close proximity to nearby residences
- Rail corridor densely vegetated on roadway approach

Recommendations

- Selectively clear and thin existing vegetation to provide sufficient sight distance and visibility of crossing on roadway approaches
- Install advance pavement markings and signage along roadway
- Use a textured surface treatment (e.g. Imprint) between the crosswalk lines as a traffic calming measure, which also complements the roadway character

11.4.6 Hudson Road (Route 27)



Source: Microsoft Windows Live Local

Description: Hudson Road (Route 27) is a main thoroughfare through Sudbury, which linearly connects Sudbury with its neighboring communities. Various collector roads intersect Hudson Road and connect neighborhoods north and south of the Town Center. The rail corridor crossing is located approximately 800 feet west of the Town Center, adjacent to Peakham Road and across the street from the Ti-Sales access drive. This commercial access drive essentially serves as a leg in a four-way intersection. The company's access drive is directly adjacent and parallel to the rail corridor. The crossing is located within the northwest quadrant of the Town Center Historic District.

Type of Roadway:	Rural minor arterial
Posted Speed:	30 mph
Jurisdiction:	Town
Est. Volume (ADT):	11,800 vehicles
Surface Width:	29 feet
Sidewalk:	Southbound Side
Road ROW Width:	50 feet
Crossing Angle:	100 degrees

Issues

- Existing conflict point due to traffic volumes along Hudson Road and turning movements at Peakham Road and the Ti-Sales access drive
- Appear to be a significant number of vehicles turning at Peakham Road
- Vehicles stopped at the end of Peakham Road restrict sight lines at crossing
- Vehicles taking a right hand turn out of Peakham Road only look for approaching vehicles along Hudson Road

Issues (cont'd)

- Vehicles traveling westbound along Hudson Road use the narrow shoulders to pass vehicles waiting to turn into Peakham Road
- Rail corridor located 800 feet from existing signalized intersection

Recommendations

- Consider installing a push button actuated traffic signal to be coordinated with the signal in the Town Center
- Recommended traffic control system should be compatible with the recommendations made by the Consultant team working on the Sudbury Centre Improvement Project
- Tighten up the turning radius on Peakham Road to reduce the speed of right turning vehicles
- Selectively clear and thin existing vegetation to provide sufficient sight distance and visibility of crossing on roadway approaches
- Install advance signs and pavement markings on Hudson Road and Peakham Road
- Consider alternative alignment to bring the rail trail across Peakham Road and then cross Hudson Road (Option shown in red on the graphic above)
    - Would require upgrading the existing driveway / Town easement to Ti-Sales field
    - Rail trail would reconnect to the rail corridor at the southern end of the field
- Use a textured surface treatment (e.g. Imprint) between the crosswalk lines as a traffic calming measure, which also complements the roadway character

11.4.7 Morse Road

Source: Microsoft Windows Live Local

Description: Morse Road is a local roadway that connects Concord Road with the neighborhoods north and south of Marlboro Road. Morse Road is a designated Scenic Road under the Town bylaws. This section of Morse Road is relatively undeveloped, being bordered by open space and agricultural land.

Type of Roadway:	Rural minor collector
Posted Speed:	25 mph
Jurisdiction:	Town
Est. Volume (ADT):	700 vehicles
Surface Width:	22 feet
Sidewalk:	Southbound side
Road ROW Width:	40 feet
Crossing Angle:	75 degrees

Issues

- Crossing is located at a low point in the roadway profile
- Roadway relatively straight which leads to an increase in vehicular speeds
- Visibility of the crossing is severely restricted by roadside vegetation and topography

Recommendations

- Selectively clear and thin existing vegetation to provide sufficient sight distance
- Install advance signs and pavement markings on Morse Road
- Use a textured surface treatment (e.g. Imprint) between the crosswalk lines as a traffic calming measure, which also complements the roadway character

11.4.8 Haynes Road

Source: Microsoft Windows Live Local

Description: Haynes Road is a low volume, low speed local roadway. Haynes Road is a designated Scenic Road under the Town bylaws.

Type of Roadway:	Rural minor collector
Posted Speed:	25 mph
Jurisdiction:	Town
Est. Volume (ADT):	3,000 vehicles
Surface Width:	21 feet
Sidewalk:	None
Road ROW Width:	32 feet
Crossing Angle:	115 degrees

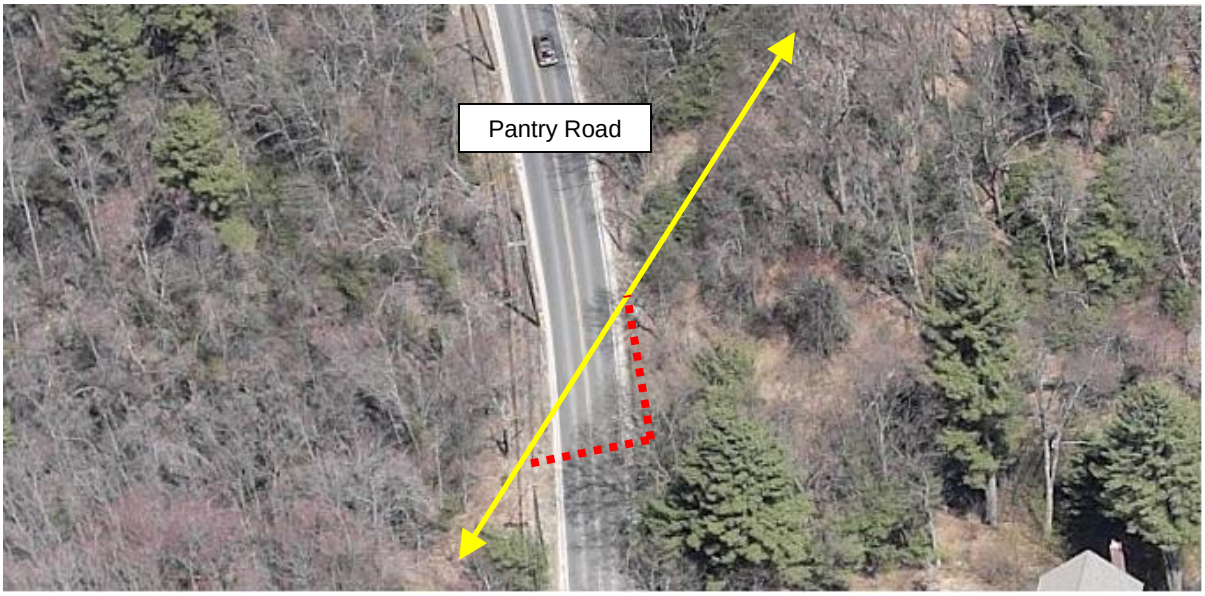
Issues

- Visibility of the crossing is severely restricted by roadside vegetation and horizontal curvature
- Wetlands located on south side of rail corridor

Recommendations

- Realign the crossing as close to 90 degrees as possible given environmental site constraints
- Selectively clear and thin existing vegetation to provide sufficient sight distance
- Install advance signs and pavement markings on Haynes Road
- Use a textured surface treatment (e.g. Imprint) between the crosswalk lines as a traffic calming measure, which also complements the roadway character

11.4.9 Pantry Road



Source: Microsoft Windows Live Local

Description: Pantry Road connects locations north of Route 117 (North Road) with Concord Road. Pantry Road is a designated Scenic Road under the Town bylaws.

Type of Roadway:	Rural minor collector
Posted Speed:	30mph
Jurisdiction:	Town
Est. Volume (ADT):	3,000 vehicles
Surface Width:	23 feet
Sidewalk:	None
Road ROW Width:	35 feet
Crossing Angle:	25 degrees

Issues

- Skewed crossing with wetlands located on both sides of rail corridor
- Visibility of the crossing is severely restricted by roadside vegetation
- Crossing location presents what motorists would likely perceive as an unexpected midblock crossing
- Crossing located at low point along a straightaway approach

Recommendations

- Realign the crossing as close to 90 degrees as possible given environmental site constraints (Option shown in red on the graphic above)
- Selectively clear and thin existing vegetation to provide sufficient sight distance
- Install advance signs and pavement markings along Pantry Road
- Use a textured surface treatment (e.g. Imprint) between the crosswalk lines as a traffic calming measure, which also complements the roadway character

11.4.10 North Road (Route 117)

Source: Microsoft Windows Live Local

Description: North Road (Route 117) is a major thoroughfare that connects Maynard and points west with Waltham and the Route 128/95 corridor.

Type of Roadway:	Rural major collector
Posted Speed:	40 mph
Jurisdiction:	Town
Est. Volume (ADT):	10,000+ vehicles
Surface Width:	30 feet
Sidewalk:	None
Road ROW Width:	48 feet
Crossing Angle:	120 degrees

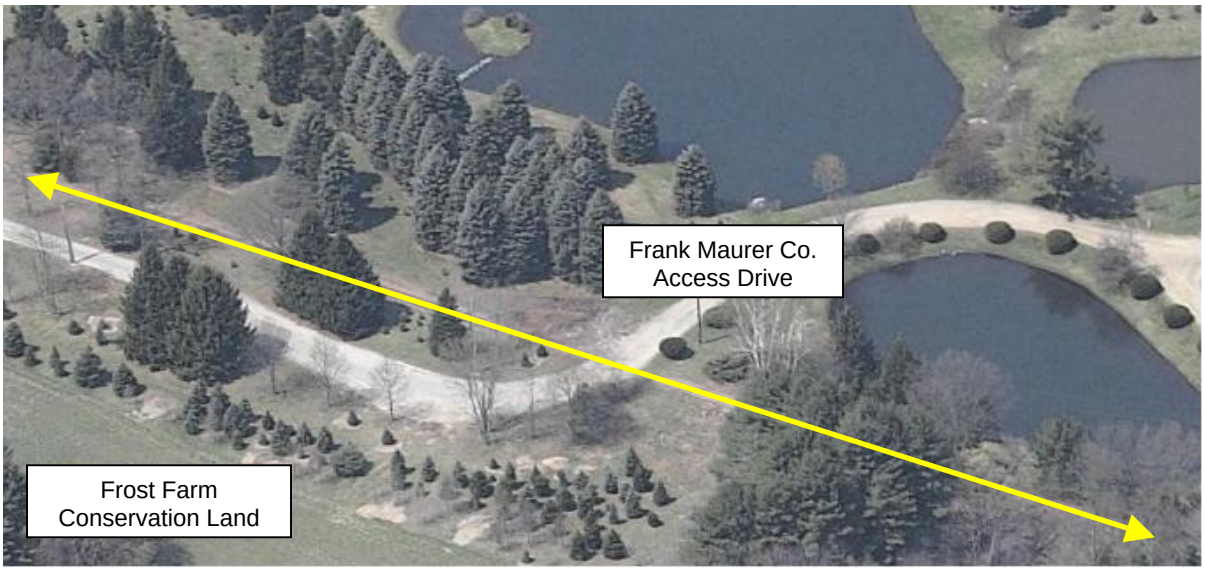
Issues

- High speeds and traffic volumes on North Road
- Crossing located at low point along a straightaway approach
- Crossing location presents what motorists would likely perceive as an unexpected midblock crossing

Recommendations

- Realign the crossing as close to 90 degrees as possible
- Consider installing a push button actuated traffic signal
- Selectively clear and thin existing vegetation to provide sufficient sight distance
- Paint a bright color (e.g. blue as currently used in Town) between the crosswalk lines to raise awareness of the crossing

11.4.11 206 North Road



Source: Microsoft Windows Live Local

Description: Frank Maurer Company Inc. is located at 206 North Road (Route 117). The company's access drive parallels the rail corridor for approximately 1,200 feet and then perpendicularly crosses the corridor to enter their campus. This 32-acre campus contains a number of commercial and residential use buildings.

Type of Roadway:	Access drive
Posted Speed:	n/a
Jurisdiction:	Private
Volume (ADT):	Unknown
Surface Width:	25 feet +/-
Sidewalk:	None
Road ROW Width:	n/a
Crossing Angle:	90 degrees

Issues

- Heavy equipment and trucks regularly use this access drive
- People illegally park along their drive to access Town land. No trespassing signs have been ineffective in deterring this use.
- Need to deter rail trail users from trespassing on their campus given the attractiveness of their private ponds
- Potential for people to use the drive as an alternative/shortcut to the rail trail

Recommendations

- Maximize the separation between the rail trail and parallel access drive
- Require rail trail users to stop prior to crossing the driveway
- Plant trees or install wood rail fence to keep users on rail trail
- Post signage to instruct users not to trespass on private property / drive
- Install advance signage along the access drive

12 Structures

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 existing railroad structures along this corridor:

Figure 35: Hop Brook Trestle

Bridge No. 20.51 over Hop Brook

- Span length of 30± feet
- I-Beams
- Granite cut stone abutments appear to be in good condition

Figure 36: Pantry Brook Trestle

Bridge No. 18.71 over Pantry Brook

- Span length of 20± feet
- I-Beams
- Granite cut stone abutments exhibit some movement

A visual assessment of bridge structures and abutments was conducted along the corridor. Both of the bridges are of similar construction with short spans and good vertical and horizontal geometry.

12.1 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: Path widths under consideration include a 5-foot, 8-foot and 10-foot surface. 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.

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). The clear width dimensions (distance between railings) area shown in Figure 37. Variations from these dimensions are typically considered in the Type Study Report prepared as part of the MassHighway 25% Design.

Figure 37: Bridge Width

Trail Width (Feet)	Bridge Minimum Clear Width (Feet)
5	10*
8	12
10	14
* Minimum width for emergency, patrol and maintenance vehicle access.	

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 axel 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 per bridge for abutment rehabilitation is included as part of the construction cost estimate. The additional cost of resetting the granite stones in mortar at Bridge No. 18.71 over Pantry Brook is also included. Graffiti would need to be removed from the wingwalls and abutments and an anti-graffiti coating applied.

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.

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.

12.2 Structure Types

Four of the most commonly used pedestrian / bikeway bridge types were considered at each location, as appropriate:

- Alternative 1 - Reuse of Steel Stringers
- Alternative 2 - Prefabricated Bridge
- Alternative 3 - Prestressed Concrete Bridge
- Alternative 4 - Concrete Deck Bridge on Steel Stringers

Each alternative makes use of the existing railroad abutments. During the project development and design process, a Type Study report would need to be prepared to further detail the various bridge design alternatives and recommend a preferred structure type for implementation. Pending MassHighway review and approval, bridge sketch plans would then be prepared for each bridge in accordance with the MassHighway Bridge Manual.

Alternative 1 - Reuse of Steel Stringers
Alternative 1 consists of reusing the existing steel stringers and installing a new concrete deck. A wood rail fence can be mounted to the concrete deck. 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.

Testing for lead paint on the steel stringers was not completed as part of this study. 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.

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 is expensive and requires strict compliance with worker and environmental protection regulations. Improper lead containment and disposal has resulted in large fines by regulatory agencies. This cost 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.

Again, testing for lead paint on the steel stringers was not completed as part of this study. 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 38: Alternative 1 Cost Estimate

			Bridge No. 20.51 Hop Brook		Bridge No. 18.71 Pantry Brook	
Work Description	**Unit**	**Unit Price**	**Quantity**	**Cost**	**Quantity**	**Cost**
Concrete Deck and Curb	CY	$1,200	17	$20,400	11	$13,200
Clean and Paint Steel	LS	-	1	$50,000	1	$35,000
Resetting Granite Stones	CY	$300	-	-	45	$13,500
Wood Railing	LF	$60	60	$3,600	40	$2,400
		Subtotal		$74,000		$64,100
		Contingencies (20%)		$14,800		$12,800
		Total		$88,800		$76,900
		Budget		$90,000		$80,000
Note: These costs assume a 12-foot wide structure.						

Alternative 2 – Prefabricated Bridge

Alternative 2 consists of the most widely used type of bridge, a prefabricated truss-type steel bridge. This type of bridge more closely replicates an old railroad bridge. Typically, a timber rub rail can be mounted on the truss. Periodic repainting of the steel members will be required. Weathering steel, which does not require painting, may also be used. There are a variety of truss types and materials available, with some styles being slightly more expensive than others. The truss and web member styles vary by manufacturer. Example manufacturers include Continental, Steadfast and Wheeler Bridges.

Most prefabricated bridges come in 10-foot and 12-foot widths, with special widths available upon request. Additional width can add significant costs to a bridge. The additional width can also require the bridge to be transported in two pieces and assembled on site.

These bridges come completely fabricated for easy installation, thereby reducing the time required for installation. The bridges are transported via truck and set on the existing abutments using a crane. The bridge site plays a significant role in ease of installation and extent of temporary environmental impacts. Bridge installation of this size will require truck crane access, sufficient maneuverability and a staging (i.e. lay down) area.

Figure 39: Alternative 2 Cost Estimate

			Bridge No. 20.51 Hop Brook		Bridge No. 18.71 Pantry Brook	
Work Description	**Unit**	**Unit Price**	**Quantity**	**Cost**	**Quantity**	**Cost**
Prefabricated Bridge	LS	-	1	$60,000	1	$40,000
Railroad Bridge Demolition	LS	$10,000	1	$10,000	1	$10,000
Modify Abutment	CY	$1,500	1	$1,500	1	$1,500
Resetting Granite Stones	CY	$300	-	-	45	$13,500
Wood Railing	LF	$60	60	$3,600	40	$2,400
		Subtotal		$75,100		$67,400
		Contingencies (20%)		$15,000		$13,500
		Total		$90,100		$80,900
		Budget		$91,000		$81,000
Note: These costs assume a 12-foot wide structure.						

Alternative 3 - Prestressed Concrete Bridge

Alternative 3 consists of butted prestressed concrete box beams. The 12-inch deep concrete beams are laid lengthwise, supported on the existing granite abutments and secured on a concrete seat. The concrete beams can be quickly erected. Placement of the beams will require truck crane access, sufficient maneuverability and a staging (i.e. lay down) area. A wood rail fence can be mounted to the concrete beams. This type of bridge also has low maintenance requirements.

Figure 40: Alternative 3 Cost Estimate

			Bridge No. 20.51 Hop Brook		Bridge No. 18.71 Pantry Brook	
Work Description	**Unit**	**Unit Price**	**Quantity**	**Cost**	**Quantity**	**Cost**
Prestressed Deck Beams	LF	$150	120	$18,000	80	$12,000
Modify Abutment	CY	$1,500	1	$1,500	1	$1,500
Resetting Granite Stones	CY	$300	-	-	45	$13,500
Railroad Bridge Demolition	LS	$10,000	1	$10,000	1	$10,000
Wood Railing	LF	$60	60	$3,600	40	$2,400
		Subtotal		$33,100		$39,400
		Contingencies (20%)		$6,600		$7,900
		Total		$39,700		$47,300
		Budget		$40,000		$50,000
Note: These costs assume a 12-foot wide structure.						

Alternative 4 - Concrete Deck Bridge on Steel Stringers
Alternative 4 consists of a concrete deck constructed on steel stringers. This bridge type is similar to a highway bridge with the concrete deck supported by steel I-beams. Placement of the I-beams will require truck crane access, sufficient maneuverability and a staging (i.e. lay down) area.

Figure 41: Alternative 4 Cost Estimate

			Bridge No. 20.51 Hop Brook		Bridge No. 18.71 Pantry Brook	
Work Description	**Unit**	**Unit Price**	**Quantity**	**Cost**	**Quantity**	**Cost**
Concrete Deck and Curb	CY	$1,200	17	$18,000	11	$13,200
Steel Stringers	LB	$2	5,400	$10,800	3,600	$7,200
Modify Abutment	CY	$1,500	1	$1,500	1	$1,500
Resetting Granite Stones	CY	$300	-	-	45	$13,500
Railroad Bridge Demolition	LS	$10,000	1	$10,000	1	$10,000
Wood Railing	LF	$60	60	$3,600	40	$2,400
		Subtotal		$46,300		$47,800
		Contingencies (20%)		$9,300		$9,500
		Total		$55,600		$57,300
		Budget		$56,000		$60,000
Note: These costs assume a 12-foot wide structure.						

12.3 Photo Simulations

A photo simulation technique was used to illustrate the conceptual design alternatives for each bridge type. The simulations on the following pages show design options, recognizing that there are various other combinations of structure types and railing systems that can be used. Each of the alternatives utilizes the existing granite cut stone abutments. Alternative 4, Concrete Deck on Steel Stringers, would look similar to Alternative 1, Reuse of the Existing Steel Stringers.

Figure 42: Existing Condition

Figure 42-A: Alternative 1 - Reuse of Existing Bridge Structure

Figure 42-B: Alternative 2 – Prefabricated Bridge

Figure 42-C: Alternative 3 – Prestressed Concrete Bridge

12.4 Recommendation

The detailed costs estimates shown in Figure 43 assume a 12-foot wide structure for each of the two bridges. In comparison, the cost for a 10-foot width would be a few thousand dollars *less* and the cost for a 14-foot width would be a few thousand dollars *more*.

Figure 43: Cost Comparison Summary

Alternative Structure Types		Bridge No. 20.51 Hop Brook 30' ± Span	Bridge No. 18.71 Pantry Brook 20' ± Span
1	Reuse of Existing Bridge	$90,000	$77,000
2	Prefabricated Bridge	$91,000	$81,000
3	Prestressed Concrete Bridge	$40,000	$50,000
4	Concrete Deck Bridge on Steel Stringers	$56,000	$58,000

The variations in cost between the bridges can be attributed to the following factors:

- The granite abutment stones need to be reset in mortar on Bridge No. 18.71 (Pantry Brook) at a cost of approximately $13,500.
- Bridge No. 20.51 is approximately 10 feet longer than Bridge No. 18.71 (Pantry Brook).

As shown in the cost comparison summary, the variation in price is not significant. The final selection of a structure type will depend on cost, aesthetic and long-term maintenance. The extent of impacts resulting from crane access, maneuverability and staging will vary depending upon the selected bridge type alternative. Construction costs will also increase based on site constraints and restrictions on construction methods. The Town should take all these factors into consideration when deciding which type to use. The bridge structure will be subject to review and approval during the formal MassHighway design review process.

13 Trail Access and Parking

The purpose of this Section is to evaluate locations where rail trail users would likely access or park to use the trail.

13.1 Access

The primary access points will be located where the rail trail crosses local roadways and abuts Town owned land.

There are a total of six (6) at-grade roadway crossings along the rail corridor. These roadways include:

- Old Lancaster Road
- Hudson Road (Route 27)
- Morse Road
- Haynes Road
- Pantry Road
- North Road (Route 117)

Old Lancaster Road, Hudson Road and Morse Road are the only roadways with existing sidewalks that could be used by residents to reach the rail trail. Each crossing is discussed in further detail in Section 11.

Figure 44: Featherland Park Complex

There are two (2) Town-owned recreational facilities which directly abut the rail corridor. These facilities are discussed in more detail below. These facilities include:

- Ti-Sales Field
- Featherland Park Complex

Figure 45: David Farm Conservation Land

A review of the Town Conservation Area maps revealed that existing footpaths on three (3) properties currently connect to the rail corridor. Maps of these properties are included in Appendix D. The properties include:

- Barton Farm Conservation Land
- Davis Farm Conservation Land
- Frost Farm Conservation Land

Figure 46: Frost Farm Conservation Land

13.2 Parking

Trailhead parking provides points of access for 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 expressed that they would likely walk or bike to the trail from their homes, it can be anticipated that many people would choose to drive to the rail trail.

13.2.1 Town Facilities

Preliminary efforts were focused on evaluating the availability of parking at existing Town facilities to negate the need to construct new parking areas. Consideration was also given to expanding existing parking areas to handle an increase in use. Only if these facilities are unable to handle additional demand is it recommended that new parking areas be developed along the corridor.

Town facilities with existing parking areas along the corridor include:

- Ti-Sales Recreational Fields
- Featherland Park Complex
- General John Nixon Elementary School
- Davis Farm Conservation Land
- Davis Field

Should the rail trail be extended south of Route 20, parking could be provided at the Town-owned Mahoney Farm property adjacent to the rail corridor.

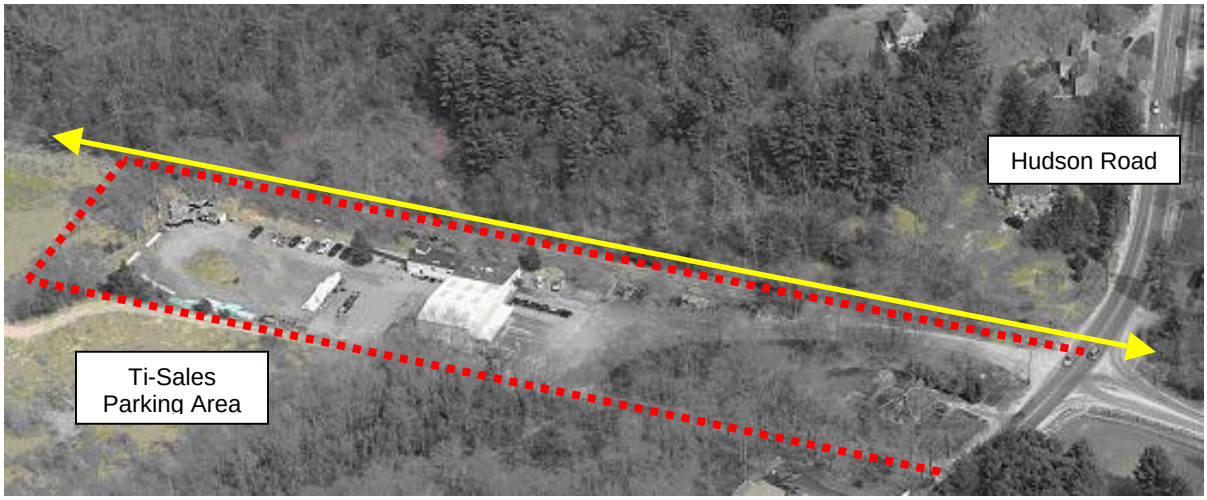
Ti-Sales Field: The Ti-Sales Field is located off Hudson Road (Route 27), behind the Ti-Sales company. Access to the field is currently provided via a dirt access drive (easement) diagonally across from Peakham Road and west of the rail corridor. This field does not support excessive demand and is typically used as a practice field for Lincoln-Sudbury High School teams. The rail corridor abuts the entire length of the fields. The existing, unimproved parking lot at the Ti-Sales Field has an estimated capacity for 60 vehicles. The parking area is constructed of sand and hard packed dirt with no marked spaces.

Figure 47: Ti-Sales Field Parking Lot

Figure 48: Access Drive on West Side of Ti-Sales

Figure 49: Rail Corridor on East Side of Ti-Sales

It is recommended that the Ti-Sales Field lot be improved to support rail trail parking. The Town should consider developing a one-way circulation pattern to the parking lot using the access driveway (Figure 48) and a portion of the rail corridor right-of-way (Figure 49) to loop around the rear of Ti-Sales and connect to the field. This one-way pattern, as shown by a red dashed line in Figure 50, would preclude the need to widen the existing dirt access driveway, which could potentially impact an adjacent wetland resource area. It is recommended that the parking area be re-graded and stabilized or paved. The surface area and whether it is considered impervious will vary depending upon whether the Town decides to pave and/or expand this parking area. Additional warning, regulatory and directional signage and pavement markings will be needed to safely direct rail trail users to the parking lot from Hudson Road. Use of this parking area will need to be coordinated with the recommended rail trail / roadway crossing improvements at this location.



Source: Microsoft Windows Live Local

Figure 50: Potential Access Drive to Ti-Sales Parking Area

Featherland Park Complex: The Featherland Park Complex is located at the corner of Morse Road and Concord Road. The complex is open year round but experiences high seasonal demand in the spring and summer. There are softball and little league baseball fields and tennis courts on this property. In the winter, one of the parking lots is flooded and used for ice skating. The complex is typically used on weekdays and weekends in April through mid-August.

The Upper Featherland parking lot is informally used as overflow parking for Lincoln-Sudbury High School students during weekday school hours (7am – 3pm).

Figure 51: Lower Featherland Parking Lot

Figure 52: Upper Featherland Parking Lot

In September and October the facilities are typically used only on weekends. During these times, the parking lots are full. Depending on the type of event (e.g. practice, game, tournament) and spacing of events, parking sometimes overflows to Concord Road and the General John Nixon Elementary School across Concord Road, and occasionally to St. Elizabeth's Church on Morse Road. There are approximately 150 parking spaces in the Upper Featherland lot and 60 spaces in the Lower Featherland lot for a total of 210 parking spaces. The parking areas are paved with marked spaces.

Given the existing parking demand at this facility, it is <u>not</u> recommended that these lots be used for rail trail parking during the peak season.

General John Nixon Elementary School: The Nixon Elementary School is located off Concord Road, across the street from the Featherland Park Complex and Morse Road. As noted above, overflow parking occasionally spills into the school lot, primarily during tournaments. The school property is used on weekdays when school is in session. However, the lot is unused during weekends year round and on weekdays over school breaks. There are approximately 60 parking spaces at the school. The parking area is paved with marked spaces.

Figure 53: Nixon Elementary School Parking Lot

It is recommended that this facility be considered for rail trail parking on weekends and over the summer months. However, use of school property will need to be discussed with the Town's School Committee. Using this lot for rail trail use will require improvements on Concord Road and at the Featherland Park. These improvements will be in the form of upgrades to the existing roadway crossing and improved pedestrian / bicyclist connections through Featherland Park. Additional warning, regulatory and directional signage and pavement markings will be needed to safety connect users to the rail corridor.

Figure 54: Existing Crosswalk at Concord Road / Morse Road

Davis Farm Conservation Land: The Davis Farm Conservation Land is located south of the North Road (Route 117) crossing and adjacent to the rail corridor. There is a small, unimproved parking area off North Road with capacity for approximately 5-8 vehicles. The parking area is constructed of hard packed dirt with no marked spaces. Wetland resource areas surround the lot thereby precluding its suitability for possible expansion.

Figure 55: Davis Farm Conservation Land Parking Lot

Based on the spatial limitations of this parking area and its intended use for access to the conservation lands, it is <u>not</u> recommended that this lot be used for rail trail parking.

Davis Field: The Davis Field property is located off North Road (Route 117), east of the rail corridor. The fields abut the Davis Farm Conservation Land. There are two large multi-purpose fields on this property with an existing, unimproved parking lot with an estimated capacity for 80 vehicles. The parking area is constructed of sand and hard packed dirt with no marked spaces. Over past seasons, this field experienced excessive demand due to the fact that the Lincoln-Sudbury High School football fields were under construction. With construction completed, Davis Field is scheduled for use by school soccer teams on the weekdays and "Little Mites" soccer on the weekends.

Figure 56: Davis Field Parking Lot

It is recommended that the Davis Field parking lot be improved to support rail trail parking. Detailed survey will be required to determine whether this lot could be expanded to support additional capacity. The surface area and whether it is considered

impervious will vary depending upon whether the Town decides to pave and/or expand this parking area.

Figure 57: Looking West Along North Road (Route 117) at Wetland Area

Figure 58: Looking East Along North Road (Route 117) at Frost Farm Conservation Land

Use of this parking area will need to be coordinated with the recommended rail trail / roadway crossing improvements at this location. A separated, spur connection would be required along North Road (Route 117) to connect users to the rail trail. The length of this spur trail would be approximately 450 linear feet. Providing this connection on the south side of North Road will require additional study due to the location of utility poles along the roadway edge and proximity of wetland resource areas. Another alternative is to construct a spur connection through Frost Farm Conservation Land on the north side of North Road. Regardless, any spur connection will require the adequate separation and proper protection of users from approaching vehicles. Given its accessibility and size, Davis Field could become the primary trailhead location for people wishing to use the rail trail. This option would address the Historical Commission's concern about developing parking areas along the Town's scenic roads.

13.2.2 Private Property

In some cases, private businesses are willing to negotiate a public access agreement, recreational easement or land gift with restrictions with the Town. However, the Town and Consultant met with the major business owners abutting the corridor and they indicated that they would not allow rail trail parking on their properties. Letters from these owners are included in Appendix C.

13.2.3 Proposed Parking

Based on a preliminary assessment, it does not appear that the construction of new parking areas will be needed along the rail corridor given the opportunities for expansion of existing Town facilities.

Rather it is recommended that improvements be made to the existing parking lots at Ti-Sales Field, General John Nixon Elementary School and Davis Field, as discussed above. These lots will need to be further explored once more detailed survey is available in order to further assess lot size, feasibility, practicality, permitability and safety issues.

14 Mitigation Measures

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

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

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.

Potential locations for signage include:

- Commercial properties located at rail trail / driveway crossings
- Farmland / open hillside on the east side of Pantry Brook
- At locations requested by abutters

Fencing: The installation of a 3.5-foot high wood rail fence or post and rail fencing along the corridor would serve a number of purposes. Fencing will be required in certain locations for the safety of rail trail users (See Section 9.3). Beyond the requirements, fencing can be installed to 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 chain link fences would provide a physical barrier between the trail and adjacent property but are unattractive in comparison to more natural looking materials. The locations of chain link fence would need to be considered in conjuntion with known wildlife corridors.

Figure 59: Farmland Near Pantry Brook

Potential locations for non-safety related fencing include:

- Commercial properties located at rail trail / driveway crossings
- Along Ti-Sales Field property (to separate uses)
- Farmland / open hillside on the east side of Pantry Brook
- At sensitive wetland resource areas proximate to the railbed
- At locations requested by abutters

Vegetation: A rail trail design goal is to maintain the natural vegetative buffer between the railbed and abutting properties. However, in areas where there is limited vegetation, additional landscaping can serve to further retain the privacy of adjacent uses. Enhancing the vegetative buffer with additional trees can help address abutters concerns about maintaining privacy.

Potential locations for vegetative plantings include:

- Residential areas near Old Lancaster Road (Gerry and Meadow Drives)
- Residential home located between Haynes and Pantry Roads
- At sensitive wetland resource areas proximate to the railbed
- Residential home located on Frank Maurer Company property / North Road
- At locations requested by abutters

Figure 60: Residential Home Near Old Lancaster Road

Figure 61: Residential Home On Maurer Property

The need for and exact location of such mitigation will be determined during the preliminary design phase.

The Town and abutters typically request mitigation measures during the public outreach process which are then shown on the design plans and included as part of the construction cost estimate. 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.

15 Trail Enhancements

The purpose of this Section is to discuss opportunities to enhance the corridor through the proper siting of trailside elements.

Overall visual quality and user enjoyment are an important part of the rail trail experience. Clear, appropriate and consistent trailside elements along a rail trail corridor provide some of the strongest visual connections. Trail amenities, furnishings, interpretive graphics, and informational & directional signage can help create an identity for the rail trail.

The design and location of any rail trail enhancements should complement the project setting, while maintaining the safety and mobility of users.

15.1 Trailside Amenities

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

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

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

These amenities should be strategically placed in areas along the corridor where the Town specifically wants people to gather. Due to the context of this corridor, it is recommended that rail trail amenities be placed at the parking lots recommended for improvements -- Ti-Sales Field and Davis Field – as discussed in Section 13.2.

With proper planning and design, Davis Field could become the key trailhead location. Public restrooms, if deemed necessary, should only be considered at this location. It can be anticipated that rail trail uses would begin/end their trip from this location due to its accessibility.

15.2 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 historical, cultural and natural resources.

One of these areas is at the junction of the two railroad lines at the South Sudbury Railroad Station. This location would be an appropriate location along the trail for an interpretive exhibit on the history of the two Sudbury rail lines and to draw users attention to specific railroad items found along the corridor (e.g. whistle posts).

Another location is on and near the Hop Brook Railroad Trestle where views to the marsh areas and over the waterway are quite beautiful. This is a natural place to locate an overlook on grade under the trees if topography permits. There are a number of other locations along the corridor where a scenic overlook would help draw users attention to the natural setting without disturbing the sensitive environmental context.

At the northern end of the Ti-Sales Field would be an appropriate location to educate users about the ecological functions of natural communities. It could highlight the assemblages of plant and animal species that occur along the rail corridor and the importance of land conservation.

Another appropriate location for interpretation is along the portion of corridor which abuts the Davis Farm Conservation Land. This location would provide an opportunity to highlight the agricultural past of many of Sudbury's conservation lands.

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

15.3 Lighting Assessment

Lighting can be used to improve safety and aesthetics but must be done with maintenance and abutter issues in mind. This rail trail will be managed as a dawn to dusk facility and therefore should not be lighted. Lighting the corridor would encourage night usage, cause light pollution in residential areas and result in additional maintenance responsibilities and costs to be incurred by the Town.

15.4 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 rail 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 in South Sudbury.
- 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. Screening is further discussed in Section 14.
- 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.

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.

16 Cost Estimates

The purpose of this Section is to provide a budgetary estimate of anticipated construction and project development costs for a 4.6-mile rail trail in Sudbury, as well as outline typical funding responsibilities.

16.1 Construction Costs

The preliminary construction cost estimates are 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 estimates presented below consider both a 10-foot and 5-foot surface width for the following types of trail surfaces:

- Paved surface (hot mix asphalt)
- Granular surface (stone dust)
- Stabilized granular surface (Stabilizer Solutions©)

The construction cost for each surface width and material assumes:

- Construction of 2-foot shoulder along each side of the rail trail surface
- Use of prefabricated bridges at Hop Brook and Pantry Brook crossings (See Section 12 of this report)
- Installation of a new concrete box culvert at the stream crossing located south of Hudson Road
- Implementation of recommended intersection improvements (See Section 11 of this report)
- Implementation of recommended parking area improvements (See Section 13 of this report)
- Root barrier is needed along *approximately* 50% of the 4.6-mile rail trail alignment or 12,200 linear feet
- Removal of existing tracks and ties by others

A 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 (3%) and compounded annually to estimate for expected increases in the cost of construction before the rail trail may actually be built (a five year timeframe was assumed).

Each construction cost estimate has been broken down by major items of work and presented in tabular form. This estimate is based on 2006 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.

As shown in each construction estimate table, many of the major work items do not vary depending on the surface material or trail width including, for example, bridge construction, signal installation, wood rail fence locations, etc.

Figure 62: Paved Surface Construction Cost Estimate

				10 Foot Width		5 Foot Width	
Item	**Work Description**	**Unit**	**Unit Price**	**Quantity**	**Cost**	**Quantity**	**Cost**
1	Clearing and Grubbing	Acre	$15,000	3.3	$49,500	2.7	$40,500
2	Excavation	CY	$20	14,000	$280,000	8,000	$160,000
3	Gravel Borrow for Shoulders (8")	CY	$30	4,400	$132,000	3,000	$90,000
4	Hot Mix Asphalt Surface (3.5") with Gravel Borrow Base Material (8")	SF	$3.00	240,000	$720,000	120,000	$360,000
5	Prefabricated Bridge Over Hop Brook	LS	$91,000	1	$91,000	1	$91,000
6	Prefabricated Bridge Over Pantry Brook	LS	$81,000	1	$81,000	1	$81,000
7	Concrete Box Culvert at Stream Crossing	LS	$35,000	1	$35,000	1	$35,000
8	Pedestrian Signal at Hudson Road [1]	LS	$65,000	1	$65,000	1	$65,000
9	Pedestrian Signal at North Road (Route 117)	LS	$50,000	1	$50,000	1	$50,000
10	Roadway Intersection Improvements [2]	EA	$17,000	6	$102,000	6	$102,000
11	Driveway Intersection Improvements [3]	EA	$9,000	4	$36,000	4	$36,000
12	Parking Lot Improvements at Ti-Sales Field	LS	$200,000	1	$200,000	1	$200,000
13	Parking Lot Improvements at Davis Field	LS	$300,000	1	$300,000	1	$300,000
14	Wood Rail Fence	LF	$30	19,000	$570,000	19,000	$570,000
15	Root Barrier	LF	$5	12,200	$61,000	12,200	$61,000
16	Loam Borrow for Shoulders (4")	CY	$40	2,200	$88,000	1,500	$60,000
17	Drainage	LS	$20,000	1	$20,000	1	$20,000
18	Landscaping & Amenities	LS	$100,000	1	$100,000	1	$100,000
19	Wetlands Protection	LS	$30,000	1	$30,000	1	$30,000
	Subtotal				$3,010,500		$2,451,500
	Contingencies (15%)				$452,000		$370,000
	Inflation Adjustment (5 years)				$551,500		$449,500
				Total	$4,014,000	Total	$3,271,000
				SAY	**$4.0M**	**SAY**	**$3.3M**

Notes:

1. This cost includes coordination with the Town Center signal. The cost of installing a full intersection signal at Peakham Road (including coordination with the Town Center) is estimated to be $135,000.
2. The roadway intersection improvement cost includes a wooden access control gate, Imprint© approach treatment, Imprint© crosswalk, signs and pavement markings and barrier boulders.
3. The driveway intersection improvements cost includes a wooden access control gate, Imprint© approach treatment, signs and pavement markings and barrier boulders.

Figure 63: Granular Surface (Stone Dust) Construction Cost Estimate

				10 Foot Width		5 Foot Width	
Item	**Work Description**	**Unit**	**Unit Price**	**Quantity**	**Cost**	**Quantity**	**Cost**
1	Clearing and Grubbing	Acre	$15,000	3.3	$49,500	2.7	$40,500
2	Excavation	CY	$20	14,000	$280,000	8,000	$160,000
3	Gravel Borrow for Shoulders (6")	CY	$30	3,300	$99,000	2,200	$66,000
4	Stone Dust Surface (4") with Gravel Borrow Base Material (6")	SF	$2.00	240,000	$480,000	120,000	$240,000
5	Prefabricated Bridge Over Hop Brook	LS	$91,000	1	$91,000	1	$91,000
6	Prefabricated Bridge Over Pantry Brook	LS	$81,000	1	$81,000	1	$81,000
7	Concrete Box Culvert at Stream Crossing	LS	$35,000	1	$35,000	1	$35,000
8	Pedestrian Signal at Hudson Road [1]	LS	$65,000	1	$65,000	1	$65,000
9	Pedestrian Signal at North Road (Route 117)	LS	$50,000	1	$50,000	1	$50,000
10	Roadway Intersection Improvements [2]	EA	$17,000	6	$102,000	6	$102,000
11	Driveway Intersection Improvements [3]	EA	$9,000	4	$36,000	4	$36,000
12	Parking Lot Improvements at Ti-Sales Field	LS	$200,000	1	$200,000	1	$200,000
13	Parking Lot Improvements at Davis Field	LS	$300,000	1	$300,000	1	$300,000
14	Wood Rail Fence	LF	$30	19,000	$570,000	19,000	$570,000
15	Root Barrier	LF	$5	12,200	$61,000	12,200	$61,000
16	Loam Borrow for Shoulders (4")	CY	$40	2,200	$88,000	1,500	$60,000
17	Drainage	LS	$20,000	1	$20,000	1	$20,000
18	Landscaping & Amenities	LS	$100,000	1	$100,000	1	$100,000
19	Wetlands Protection	LS	$30,000	1	$30,000	1	$30,000
	Subtotal				$2,737,500		$2,307,500
	Contingencies (15%)				$411,000		$347,000
	Inflation Adjustment (5 years)				$501,500		$423,000
				Total	$3,650,000	Total	$3,077,500
				SAY	**$3.7M**	**SAY**	**$3.1M**

Notes:

1. This cost includes coordination with the Town Center signal. The cost of installing a full intersection signal at Peakham Road (including coordination with the Town Center) is estimated to be $135,000.
2. The roadway intersection improvement cost includes a wooden access control gate, Imprint© approach treatment, Imprint© crosswalk, signs and pavement markings and barrier boulders.
3. The driveway intersection improvements cost includes a wooden access control gate, Imprint© approach treatment, signs and pavement markings and barrier boulders.

Figure 64: Stabilized Granular Surface Construction Cost Estimate

				10 Foot Width		5 Foot Width	
Item	**Work Description**	**Unit**	**Unit Price**	**Quantity**	**Cost**	**Quantity**	**Cost**
1	Clearing and Grubbing	Acre	$15,000	3.3	$49,500	2.7	$40,500
2	Excavation	CY	$20	14,000	$280,000	8,000	$160,000
3	Gravel Borrow for Shoulders (6")	CY	$30	3,300	$99,000	2,200	$66,000
4	Stabilized Stone Dust Surface (4") with Gravel Borrow Base Material (6")	SF	$4.50	240,000	$1,080,000	120,000	$540,000
5	Prefabricated Bridge Over Hop Brook	LS	$91,000	1	$91,000	1	$91,000
6	Prefabricated Bridge Over Pantry Brook	LS	$81,000	1	$81,000	1	$81,000
7	Concrete Box Culvert at Stream Crossing	LS	$35,000	1	$35,000	1	$35,000
8	Pedestrian Signal at Hudson Road [1]	LS	$65,000	1	$65,000	1	$65,000
9	Pedestrian Signal at North Road (Route 117)	LS	$50,000	1	$50,000	1	$50,000
10	Roadway Intersection Improvements [2]	EA	$17,000	6	$102,000	6	$102,000
11	Driveway Intersection Improvements [3]	EA	$9,000	4	$36,000	4	$36,000
12	Parking Lot Improvements at Ti-Sales Field	LS	$200,000	1	$200,000	1	$200,000
13	Parking Lot Improvements at Davis Field	LS	$300,000	1	$300,000	1	$300,000
14	Wood Rail Fence	LF	$30	19,000	$570,000	19,000	$570,000
15	Root Barrier	LF	$5	12,200	$61,000	12,200	$61,000
16	Loam Borrow for Shoulders (4")	CY	$40	2,200	$88,000	1,500	$60,000
17	Drainage	LS	$20,000	1	$20,000	1	$20,000
18	Landscaping & Amenities	LS	$100,000	1	$100,000	1	$100,000
19	Wetlands Protection	LS	$30,000	1	$30,000	1	$30,000
	Subtotal				$3,337,500		$2,607,500
	Contingencies (15%)				$500,000		$392,000
	Inflation Adjustment (5 years)				$612,000		$478,000
				Total	$4,449,000	Total	$3,477,500
				SAY	**$4.5M**	**SAY**	**$3.5M**

Notes:

1. This cost includes coordination with the Town Center signal. The cost of installing a full intersection signal at Peakham Road (including coordination with the Town Center) is estimated to be $135,000.
2. The roadway intersection improvement cost includes a wooden access control gate, Imprint© approach treatment, Imprint© crosswalk, signs and pavement markings and barrier boulders.
3. The driveway intersection improvements cost includes a wooden access control gate, Imprint© approach treatment, signs and pavement markings and barrier boulders.

The following table provides a magnitude of construction cost comparison summary of each surface material and trail width option.

Figure 65: Construction Cost Comparison Summary

Surface Material		10 Foot Width	5 Foot Width
1	Paved Surface	$4.0 Million	$3.3 Million
2	Granular Surface (Stone Dust)	$3.7 Million	$3.1 Million
3	Stabilized Granular Surface	$4.5 Million	$3.5 Million

16.2 Maintenance Costs

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 rail 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.

16.3 Project Development Costs

The engineering design 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 bridges and extent of required permitting. A ballpark design fee for the entire 4.6-mile rail trail is $550,000.

Assuming a MassHighway design process is followed, a 25% MassHighway Design (preliminary design) is typically about 40% of the total design fee. Therefore, the 25% Design fee for the Sudbury Bruce Freeman Rail Trail would be approximately $220,000. 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 2006 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 rail trail. Based on this information, it is possible to determine the extent of actual impacts, if any, that a rail 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, the project will advance to the final design phases (75% Design → 100% Design → Final Plans, Specifications & Estimates) and secure the necessary permits before going out to bid for construction. The fee for final design of the Sudbury Bruce Freeman Rail Trail would be approximately $330,000.

Additional tasks to be completed as part of the project development process include a corridor title review and a wildlife study. The costs of these items have been estimated to be an additonal $15,000 and $25,000, respectively. These tasks, in addition to this Environmental & Engineering Assessment report ($25,000) can count towards the Town's 10% local funding match as they are directly related to and necessary for the proposed project. This topic is discussed further in Section 16.3.

16.4 Funding

Once the Town is committed to moving the project forward, 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 Boston Metropolitan Planning Organization (MPO) and the Metropolitan Area Planning Council (MAPC) for their files. The PNF can be prepared by the Town with or without the help of a consultant. A town official, such as the planner, engineer, or administrator, should take the lead and act as the principal point of contact for the project. 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 available funding sources.

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 MAPC Transportation Enhancement Selection Committee. The Committee 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 Town should have completed or subtantially completed the 25% Design phase; or the Town shall have commited 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. In some instances, the state has funded the entire 20% match. However, most commonlly, Towns are required to provide 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.

If the Town decides to seek 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.

According to the MAPC, most rail trail projects proceed through the TE Program, but sometimes end up being funded under CMAQ depending upon the availability of state and federal funding.

17 Project Schedule

The purpose of this Section is to outline a proposed project schedule (implementation timeline) should the Town commit to advance the project forward.

This Assessment report documents the environmental and engineering feasibility of developing the rail trail based on existing conditions along the corridor, anticipated project impacts and design and constructability related issues.

Based on information presented in the Assessment, the Town can assess its willingness, readiness and fiscal ability to proceed with the rail trail 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.

On the following page is a list of next steps the Town needs to complete (or coordinate) in order to move forward with the project. This framework will assist the Town to carry out the critical next steps in the process. Some tasks will need to be completed during certain phases of the project whereas others can be ongoing activities. Some tasks will produce tangible results whereas others involve continued coordination and representation to ensure the project progresses in a timely manner.

If the Town is going to seek state/federal funding, all the MassHighway related activities will apply, including the provision for 10% matching funds. A corridor title review, securing a property agreement with the EOT, and survey and permitting related activities apply to any corridor conversion.

The Town will need to establish a realistic timeframe over which to advance the project and assign responsibilities and resources to carry out the necessary tasks. Tasks should be undertaken based on their potential to impede the project in the future and then further prioritized based on available fiscal funds and the required Town staff resources to support each activity.

Figure 66: Next Steps to Advance Rail Trail Project

Phase	Activity / Task	Responsible Party **
Post-Study	Submit Project Need Form (PNF) to MassHighway, Boston Metropolitan Planning Organization (MPO) and Metropolitan Area Planning Council (MAPC)	Town
	Evaluate municipal financial outlook to provide 10% matching funds	Town
	Conduct a full title review of the corridor in coordination with EOT	Town, Consultant
	Conduct a wildlife habitat assessment as requested by RTCAC and Conservation Coordinator	Town, Consultant
	Contact NHESP to discuss rare species issues and request field analysts visit the project site	Town
	Discuss terms of property agreement with the EOT	Town
	Begin discussions with property owners utilizing the rail corridor to access their property	Town, EOT
	Develop public outreach and participation program	Town
	Continue working with the EOT regarding extension of trail from South Sudbury to Framingham	Town
	Work with state and regional planning entities to ensure that the project is given full consideration in the Boston Metropolitan Planning Organization (MPO) programming process	Town
Pre-Design	Gain consensus on rail trail conceptual design (e.g. surface, width) through public outreach and participation	Town
	Submit Project Initiation Form (PIF) to MassHighway, Boston Metropolitan Planning Organization (MPO) and Metropolitan Area Planning Council (MAPC)	Town
	Enter into property agreement with the EOT for use of the rail corridor (trail design, construction and maintenance)	Town
	Secure municipal funds for design phase	Town
	Hire engineering design consultant	Town
Design	Hold early local issues meeting / visioning workshop	Consultant
	Develop corridor base map (field survey and environmental resource delineation)	Consultant
	Initiate early environmental coordination with state / federal agencies with jurisdiction over the project (e.g. MHC, NHESP)	Consultant
	Prepare engineering plans and documents in accordance with MassHighway design process and standards	Consultant
	Hold public outreach meetings	Consultant
	Apply for state / federal funding	Town
Construction	Rail trail construction	MassHighway
Ongoing	Meet with MassHighway (as needed)	Town, Consultant
	Coordinate with municipal officials in adjacent communities to jointly approach rail trail related issues	Town

** The 'Town' as responsible party means a Town staff member, committee or board, as determined by the Selectmen.

Appendix A – Corridor Base Mapping

Data Source: The *Office of Geographic and Environmental Information (MassGIS) Commonwealth of Massachusetts Executive Office of Environmental Affairs* and the *Town of Sudbury, Massachusetts Department of Public Works*

0 150 300 600
Feet

Legend

- Rail Trail Alignment (FUTURE)
- State Owned Rail Corridor
- Parcel Boundary
- Easement
- Town Conservation Land
- Town Park & Recreation Land
- Other Town Owned Land
- School Property
- Conservation Trust

BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

Corridor Base Map

Figure A-1

Data Source: The *Office of Geographic and Environmental Information (MassGIS) Commonwealth of Massachusetts Executive Office of Environmental Affairs* and the *Town of Sudbury, Massachusetts Department of Public Works*

0 150 300 600
Feet

Legend

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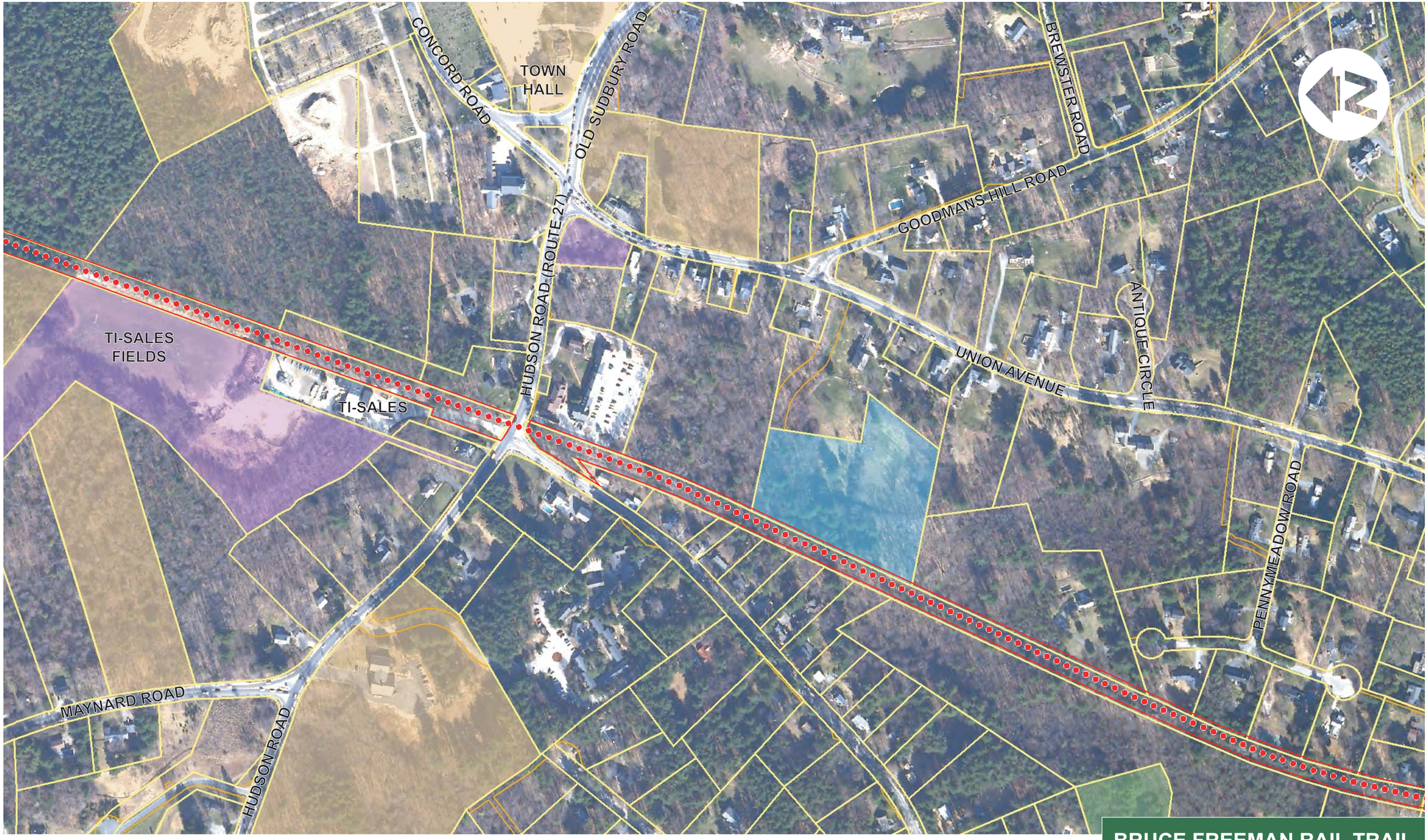
- Other Town Owned Land
- School Property
- Conservation Trust

BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

Corridor Base Map

Figure A-2



Data Source: The *Office of Geographic and Environmental Information (MassGIS)* and the *Commonwealth of Massachusetts Executive Office of Environmental Affairs*
Town of Sudbury, Massachusetts Department of Public Works

0 150 300 600
Feet

Legend

- Rail Trail Alignment
- State Owned Rail Corridor
- Parcel Boundary
- Easement
- Town Conservation Land
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- Other Town Owned Land
- School Property
- Conservation Trust

BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

Corridor Base Map

Figure A-3

Data Source: The *Office of Geographic and Environmental Information (MassGIS)* and the *Commonwealth of Massachusetts Executive Office of Environmental Affairs*
Town of Sudbury, Massachusetts Department of Public Works

0 150 300 600 Feet

Legend

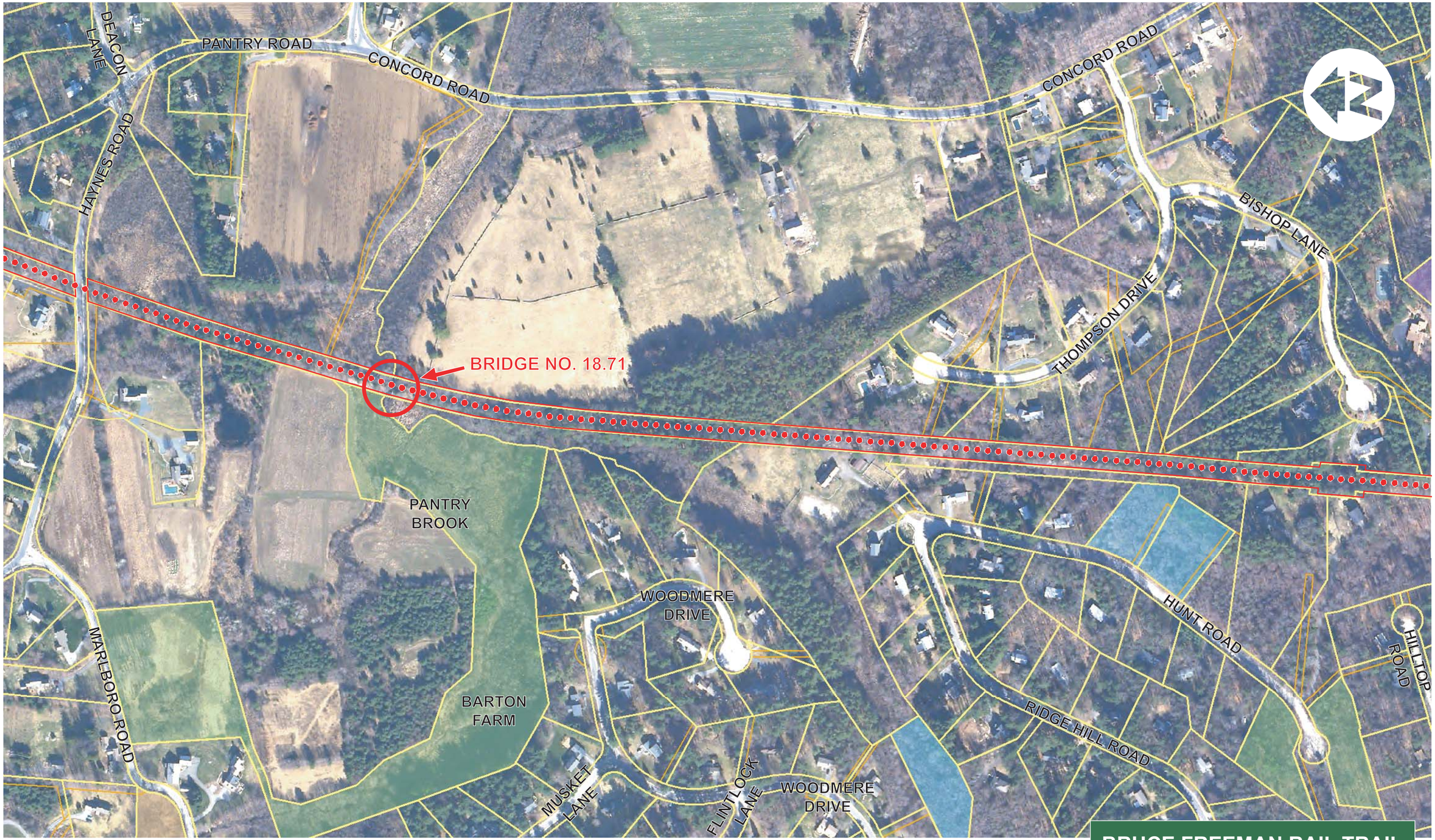
- Rail Trail Alignment
- State Owned Rail Corridor
- Parcel Boundary
- Easement
- Town Conservation Land
- Town Park & Recreation Land
- Other Town Owned Land
- School Property
- Conservation Trust

BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

Corridor Base Map

Figure A-4



Data Source: The *Office of Geographic and Environmental Information (MassGIS) Commonwealth of Massachusetts Executive Office of Environmental Affairs* and the *Town of Sudbury, Massachusetts Department of Public Works*

0 150 300 600
Feet

Legend

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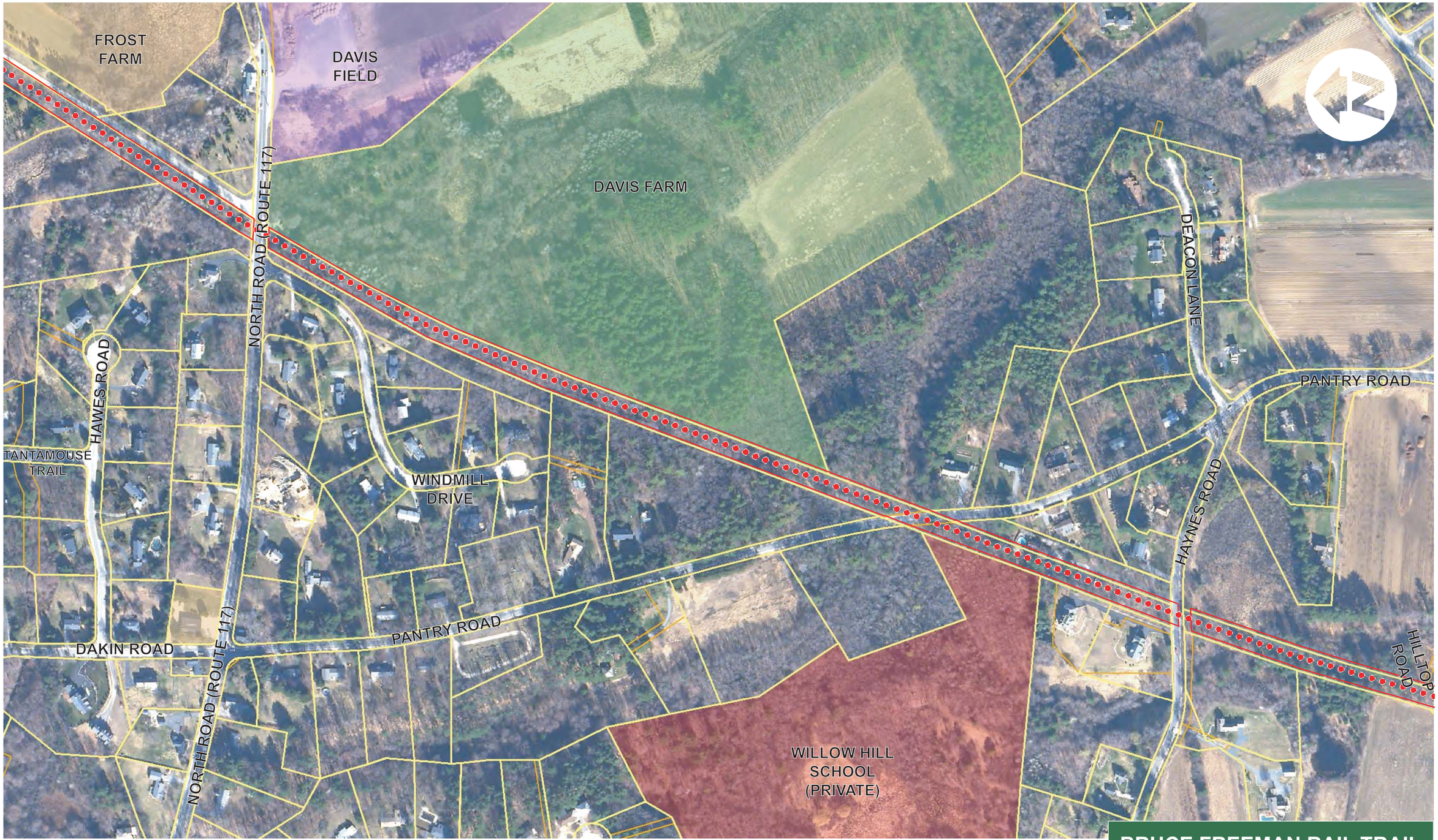
- State Owned Rail Corridor
- Parcel Boundary
- Easement
- Town Conservation Land
- Town Park & Recreation Land
- Other Town Owned Land
- School Property
- Conservation Trust

BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

Corridor Base Map

Figure A-5



Data Source: The *Office of Geographic and Environmental Information (MassGIS) Commonwealth of Massachusetts Executive Office of Environmental Affairs* and the *Town of Sudbury, Massachusetts Department of Public Works*

0 150 300 600
Feet

Legend

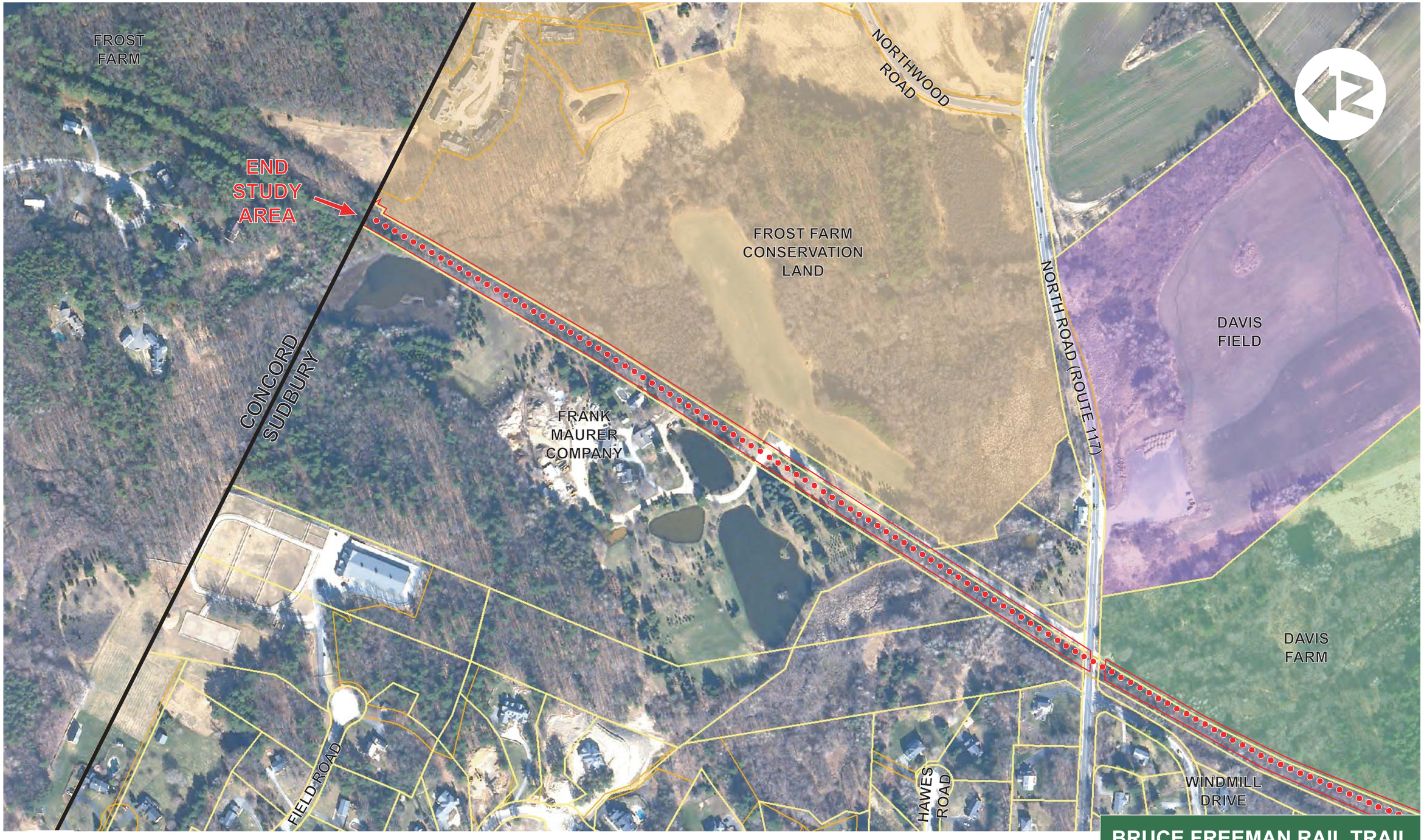
- Rail Trail Alignment (FUTURE)
- State Owned Rail Corridor
- Parcel Boundary
- Easement
- Town Conservation Land
- Town Park & Recreation Land
- Other Town Owned Land
- School Property
- Conservation Trust

BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

Corridor Base Map

Figure A-6



Data Source: The *Office of Geographic and Environmental Information (MassGIS) Commonwealth of Massachusetts Executive Office of Environmental Affairs* and the *Town of Sudbury, Massachusetts Department of Public Works*

0 150 300 600 Feet

Legend

- Rail Trail Alignment (FUTURE)
- State Owned Rail Corridor
- Parcel Boundary
- Easement
- Town Conservation Land
- Town Park & Recreation Land
- Other Town Owned Land
- School Property
- Conservation Trust

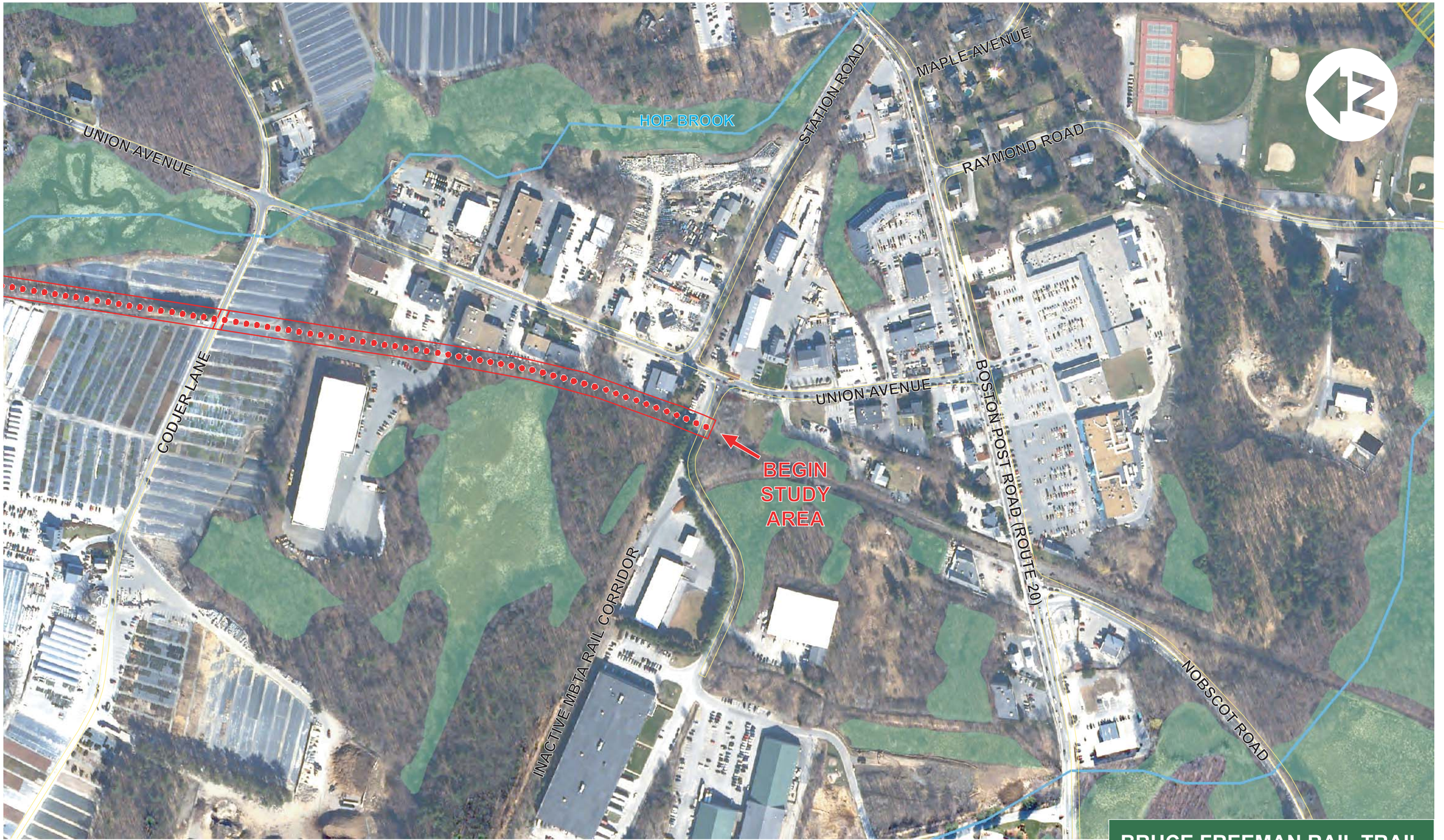
BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

Corridor Base Map

Figure A-7

Appendix B – Natural Resources Base Mapping



Data Source: The *Office of Geographic and Environmental Information (MassGIS) Commonwealth of Massachusetts Executive Office of Environmental Affairs* and the *Town of Sudbury, Massachusetts Department of Public Works*

0 150 300 600 Feet

Legend

- Rail Trail Alignment (FUTURE)
- State Owned Rail Corridor
- Roadway
- Wetlands
- Open Water
- Stream
- Priority Habitat of Rare Species
- Certified Vernal Pool

BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

Natural Resources Base Map

Figure B-1

Data Source: The *Office of Geographic and Environmental Information (MassGIS) Commonwealth of Massachusetts Executive Office of Environmental Affairs* and the *Town of Sudbury, Massachusetts Department of Public Works*

0 150 300 600
Feet

Legend

- Rail Trail Alignment (FUTURE)
- State Owned Rail Corridor
- Roadway
- Wetlands
- Open Water
- Stream
- Priority Habitat of Rare Species
- Certified Vernal Pool

BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

Natural Resources Base Map

Figure B-2

Data Source: The *Office of Geographic and Environmental Information (MassGIS) Commonwealth of Massachusetts Executive Office of Environmental Affairs* and the *Town of Sudbury, Massachusetts Department of Public Works*

0 150 300 600
Feet

Legend

- Rail Trail Alignment (FUTURE)
- State Owned Rail Corridor
- Roadway
- Wetlands
- Open Water
- Stream
- Priority Habitat of Rare Species
- Certified Vernal Pool

BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

Natural Resources Base Map

Figure B-3

Data Source: The *Office of Geographic and Environmental Information (MassGIS) Commonwealth of Massachusetts Executive Office of Environmental Affairs* and the *Town of Sudbury, Massachusetts Department of Public Works*

0 150 300 600 Feet

Legend

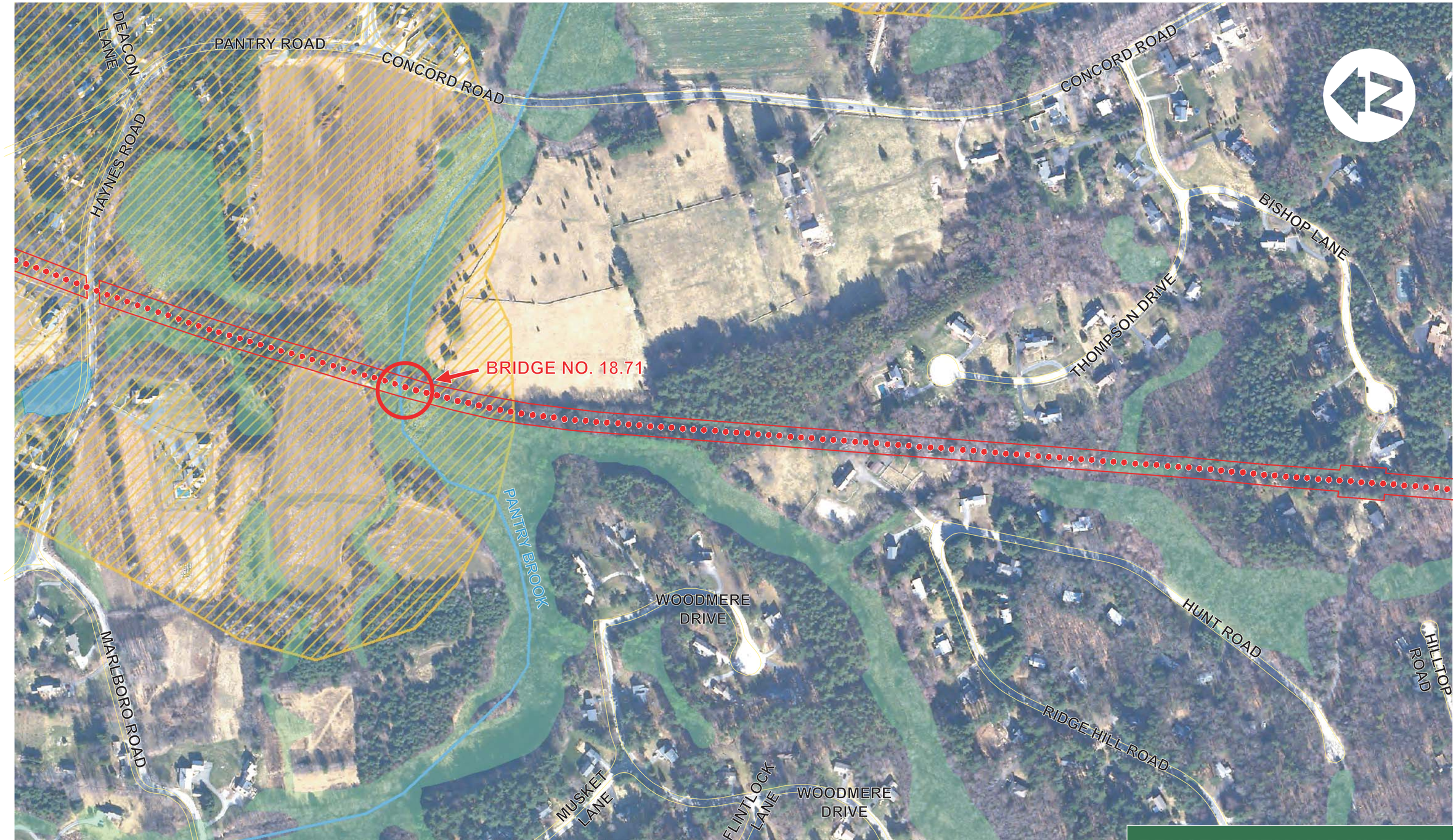
- Rail Trail Alignment (FUTURE)
- State Owned Rail Corridor
- Roadway
- Wetlands
- Open Water
- Stream
- Priority Habitat of Rare Species
- Certified Vernal Pool

BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

Natural Resources Base Map

Figure B-4



Data Source: The *Office of Geographic and Environmental Information (MassGIS) Commonwealth of Massachusetts Executive Office of Environmental Affairs* and the *Town of Sudbury, Massachusetts Department of Public Works*

0 150 300 600
Feet

Legend

- Rail Trail Alignment (FUTURE)
- State Owned Rail Corridor
- Roadway
- Wetlands
- Open Water
- Stream
- Priority Habitat of Rare Species
- Certified Vernal Pool

BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

Natural Resources Base Map

Figure B-5

Data Source: The *Office of Geographic and Environmental Information (MassGIS) Commonwealth of Massachusetts Executive Office of Environmental Affairs* and the *Town of Sudbury, Massachusetts Department of Public Works*

0 150 300 600
Feet

Legend

- Rail Trail Alignment (FUTURE)
- State Owned Rail Corridor
- Roadway
- Wetlands
- Open Water
- Stream
- Priority Habitat of Rare Species
- Certified Vernal Pool

BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

Natural Resources Base Map

Figure B-6

Data Source: The *Office of Geographic and Environmental Information (MassGIS) Commonwealth of Massachusetts Executive Office of Environmental Affairs* and the *Town of Sudbury, Massachusetts Department of Public Works*

0 150 300 600
Feet

Legend

- Rail Trail Alignment (FUTURE)
- State Owned Rail Corridor
- Roadway
- Wetlands
- Open Water
- Stream
- Priority Habitat of Rare Species
- Certified Vernal Pool

BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

Natural Resources Base Map

Figure B-7

Appendix C – Letters from Businesses

PARIS TRUST LLC
COMMERCIAL REAL ESTATE DEVELOPMENT
490-B BOSTON POST ROAD, SUITE 201
SUDBURY, MASSACHUSETTS 01776
(978) 440-9262 • FAX (978) 440-7864

November 6, 2006

Bill Place
Sudbury Town Engineering
c/o Dept. of Public Works
275 Old Lancaster Road
Sudbury, MA 01776

Bill:

First of all, I would like to thank you and Jennifer Shemodat for taking the time to meet with me regarding the proposed Rail Trail through Sudbury. I feel I have a better understanding of the proposed route.

As a resident of Sudbury, I think it would be a nice addition to the Town. As you know, the Rail Trail would not only travel directly behind one of our commercial properties on Union Avenue, but also end at one of our commercial properties as well. The big concern I have, Bill, is the parking. Because we are at the end of the Trail, it would be a very inviting place for people to park their cars and then walk or bike, leaving their vehicles behind for the duration of their stay. At this time, we have very limited parking in this area for our tenants only, and I am afraid any additional cars would max out the space available to them. I believe you had mentioned this was a concern of other businesses in the area and that the Rail Trail Association was trying to come up with a solution. Please let me know how things progress.

Best regards,

Ted

Ted Pasquarello

par

65 UNION AVENUE I PO BOX 382 I SUDBURY, MA 01776-0003 I TEL: (978) 443-5388 I FAX: (978) 443-7466

Methods
Machine
Tools Inc

August 15, 2006

Mr. I. William Place
Sudbury Director of Public Works/Town Engineer
275 Old Lancaster Road
Sudbury, MA 01776

Subject: Sudbury Rail Trail

Dear Mr. Place,

Methods Machine Tools, a business resident in Sudbury for 50 years, strongly opposes the implementation of the Bruce Freeman Rail Trail in Sudbury.

The rail trail as proposed will have a disastrous impact on Method's business operations in Sudbury. The trail will cross the driveway entrance to our manufacturing and engineering facility off Union Avenue. The traffic in and out of this facility is very heavy. It is primarily large truck traffic, Methods' employee parking, and customer parking. We estimate 200 crossings a day during normal business hours.

Our building at 65 Union Avenue is very close to the existing railroad track and causes a blind spot for entering truck traffic seeing potential rail trail users traveling north on the proposed rail trail behind the building.. The creation of a trail across this entranceway is just waiting for an accident or worse to occur. Trucks and small children do not mix!

If experience holds similar to existing rails, the close proximity of the trail to our existing building at 65 Union Ave will result in trash, vandalism, and graffiti on the walls of the building. Cleaning this mess will be a costly waste of Methods Machine Tools employee time.

Methods will not allow parking for the rail trail at any of our lots on Union Ave. With that said, and the way people obey signs today, we will be relegated to becoming parking attendants and calling the police department to remove illegally parked cars. This is another waste of Methods employee's time.

The bisecting of our major entry drive to the facility, automatically devalues this piece of industrial property. Much as been said about how residential values remain the same or rise next to RT. This will seriously devalue this property for industrial lease or sale, as the property comes with a high risk of potential accident or death.

Today we allow no one on our property unless they are related to our business. With the close proximity of the RT we will experience people wandering around our property and into our building. We have historically left our doors unlocked for easy access of our employees traversing between buildings. Now we will need to secure all entrances to keep out undesirable traffic.

Methods sells to industries that require heavily mandated safety in the products and services we provide. This RT crossing our campus is setting up a situation where safety will be very seriously at risk.

Very truly yours,
Methods Machine Tools Inc.

Scott McIver
Chairman

CAVICCHIO
GREENHOUSES, INC.
A PAUL CAVICCHIO COMPANY

RECEIVED AUG 31 2006

Dear Mr. Place,

Cavicchio Greenhouses, Inc. is apposed to the implantation of the Bruce Freeman Rail Trail.

Our operation borders 1000 feet of the rail bed where we grow our plants on both sides of the rail bed beginning in April through October. We are very cautious when using chemicals and therefore are concerned how this will affect our chemical spray schedules. With the trail in place there is the likelihood that people will be using the trail throughout the day, which will make it very difficult to spray our crops.

About 2500 cars, trucks and farm tractors throughout the day use our driveway, which crosses the rail bed. We are very concerned about the safety of the people on the trail and the possible liabilities that might arise. Trespass issues are also a concern for us from the rail bed to our property. Skimobiles and cross-country skies could inadvertently travel over our plants in the winter months.

I have decided to use the land for farming and not for development. For this I feel that I will be punished in the future if the value of my land decreases and if my privacy is invaded.

Thank you,

Paul Cavicchio

Paul Cavicchio, Jr., President
Cavicchio Greenhouses, Inc.

110 Codjer Lane Sudbury, MA 01776 Tel (978) 443-7177 Fax (978) 443-5440
www.cavicchio.com

Ti-SALES INC.

WATER and WASTEWATER SUPPLIES
36 Hudson Road (Route 27)
Sudbury, Massachusetts 01776-2097
Phone: **(978) 443-2002**
Fax: **(978) 443-7600**
Toll Free: **(800) 225-4616**
Internet: **www.tisales.com**

September 15, 2006

Mr. William Place
Sudbury DPW
Old Lancaster Road

Sudbury, MA 01776

Reference: Rail Trail

Dear Bill:
Per your request I am sending you some thoughts.
Although the proposed rail trail may sound great to some people it provokes many serious concerns for Ti-SALES.

1. I think it is terribly important to provide protection by banning all motorized traffic.

2. We need secure barricades at each highway crossing inclluding provision against "going around" the barricades from the sides.

3. Ti-SALES needs help in preventing parking that could clog our driveway 24/ 7 because we do sometimes have night time emergency pickups of repair items for water departments. We need " NO Parking at any time " signs.

4. We do think it is very important to have a surface without paving which would be conducive to
family type walking which would reduce the use of the walkway by all vehicles except wheelchairs.

5. The walkway should only be wide enough to prevent overcrowding by large groups who might gather to play games etc.

6. There should be strict enforcement of rules to prevent unusal noise because of nearby housing.

As a point of information my wife and I bought the house at 40 Hudson Road to help prevent problems with neighbors so we hope you can appreciate our concerns.

Very truly yours,

Bert Tighe

Bert Tighe

cc: Sudbury Board of Selectmen

Frank Maurer Company Inc. Owner of property since approximately 1958
206 North Road Sudbury, MA 01776
978-369-9505 Phone
MaurerCompany@aol.com

August 30, 2006

Dear Mr. Bill Place,

After our meeting we felt strongly that we should write to the town to let them know how this project would affect us as a resident of Sudbury, a taxpayer and as a business owner.

This project would demolish our privacy, our sense of security we have being secluded out here; it will also change the look and feel of our land. This rail trail on any level will have a ripple affect if created, the natural landscape will be affected, wetlands touched and changed, wildlife interrupted, the way we use our property will also be affected. Our house is approximately 4 feet or less away from the actual railroad track. If the trail was created we could easily stick our hand out of our bedroom window and touch someone using the trail. Would you leave your child's bedroom window open on the first floor knowing the trail is right there and you are on the other side of your house? Our pool is also extremely close to the trail approximately 30 feet from the actual tracks maybe less, no one likes to swim with strangers looking at them.

If the trail was created the thought of letting our kids play on our property while we turn our back for a moment will be something that could never happen since strangers will be going through our property at all hours of the day. Who knows how many of those strangers have criminal backgrounds. Everyone knows dawn to dusk doesn't work on a rail trail, go to any of them and someone will be on the trail after dusk, which is a fact.

It's easy for someone to say put up a fence, set time limitations on the trail, it will be patrolled once a day, trash will be picked up every day, we won't let people park on your property. It's another thing to live it, to see it. Once a trail is created and we have problems, who will make the solutions, who will fix the problems?

We challenge everyone to look out their bedroom windows and see if they would support something within arms length of their house that will have strangers passing and looking in their windows everyday. To us the rail trail is equivalent to someone coming onto your

Frank Maurer Company Inc. Owner of property since approximately 1958
206 North Road Sudbury, MA 01776
978-369-9505 Phone
MaurerCompany@aol.com

dead end street and saying we are going to make this now a main road for a cut through. There is a reason why a person buys a house on a dead end street, same for us.

Why should we have to look both ways as we drive around our property? Why should we have to have strangers walking around, looking around? Why should we have to lock our doors every time we go outside if we chose to go for a walk on our grounds?

We would never have bought this property if there was a rail trail going through it or near it. You buy a piece of land like this for the security, privacy and the beauty and there is nothing that can be done to keep all the reasons why we love it here and have a rail trail, it's impossible. Gates, strangers, signs, trash, change the beauty, and people that are not invited to our property. Onlookers, our property is a natural magnet with the ponds, what if someone goes swimming and the unthinkable happens, whose fault is it? Who will keep people on the trail, we can't even keep people from doing it now and it is simply overgrown track.

We also feel like our rights as a land owner are being walked upon. A vote decides whether the trail happens? Aren't there more Sudbury residents that don't live on the trail compared to the number that do? We feel like this is a losing battle. Shouldn't people on the trail's pass have more rights than those off? It's easy for someone say a trail is "a great idea as long as it's not near/in my back yard." Well it is for us. If something negative happens if the trail is created, something horrendous, like our children are harmed/ taken, our house broken into, a rape to one of us, how is anyone going to fix that? Would the trail be closed, would sorry be enough? No! It's a risk to our family, to our business, to our property, to our liability and we are not in the risk taking business.

Statistics on burglary's, rapes, crimes against children on or near a rail trail does not apply to us. We are secluded out here. Most trails (Bedford to Alewife) houses are next to one another, if you scream someone will hear you, the police are close by. That is not the case with our land. Many people don't even know we are here. We feel like a target, words, promises and statistics are not good enough, tell the women who were raped on the Bedford to Alewife trail a few years ago that statistics on rape occurring at that part of the trail where so low, it was unlikely. See if that takes all the pain away and the trauma. It maybe took many years before violence like that occurred on the trail, but is it worth the risk? Not to us.

How is any of this fair? Why should we have to change the way we live, our routines, our grounds, our sense of security so that strangers can have a nice place to ride their bike or walk. Why don't they go any use the trails that already exist?

Frank Maurer Company Inc. Owner of property since approximately 1958
206 North Road Sudbury, MA 01776
978-369-9505 Phone
MaurerCompany@aol.com

Thank you for your time. We could go on forever but the bottom line is our livelihood, liability, safety, wetlands and wildlife and preserving our property's beauty, impossible if a trail is created.

We have listed other issues on the following pages:

Sincerely,

Bruce D. Maurer
F. Jeffrey Maurer
Pamela Maurer
Phyllis Maurer
Marianne Maurer
Samantha Maurer
Candace Maurer
Meagan Maurer
Shana Quinn
Matthew Ouellette
Steven Ouellette Jr.
Timothy Robey

Frank Maurer Company Inc, its owners and the entire Maurer Family are 100% against this trail occurring in Sudbury and Concord Massachusetts.

Our Major Concerns/ Issues are as follows:

1. Liability- with our heavy equipment, vehicles, ponds (4 ponds), dogs (3), our pool (approximately 4 feet from the actual tracks), our homes and office

2. Safety/ Loitering- to ourselves, our children under age 4 (four of them), our dogs (3), our equipment, our grounds ponds, our homes, our office. We are fearful of the large amounts of people being aware of our location, wondering, possibly breaking onto our homes or equipment and sexual predators. We actually used to bike the path from Bedford to Alewife and I stopped once women started getting raped in the day light by Alewife and I have not been back since). We have such a desolate property- it is an attraction for crime, who would help us, we have no neighbors?

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3. Vandalism/ Destruction/ Garbage- to our equipment, homes and grounds

4. Privacy- our main house is approximately 4 feet from the tracks, our bedrooms are on that side of the tracks, our pool is there, there is nothing separating us from the tracks besides a small chain link fence surrounding the pool area.

5. Trespassing- Last summer we had numerous people trespassing on our property walking the trails using our driveway to walk so they did not have to walk through the brush. When there are Pop Warner games at Davis Farm the overflow of parking trickled down to about 30 cars parking in our driveway, we called the police numerous times, we had to put up new signs stating no trespassing, no parking, that did not work until the police came down to the Pop Warner field and told the people there they would be towed.

6. Leash Laws- need to be enforced at all times if there was a trail we have young children and dogs of our own who run freely and have since we moved onto this property back in approximately 1958.

7. Hunting- people hunt around here during the winter near our property, you can hear the gun shots as clear as day, no one stops them. If a trail was created people would realize the land out here and the large amounts of wildlife and might try and harm them. We are 100% supporter for protecting wildlife.

Questions:

1. If there is already no parking left at Davis Field due to the Pop Warner games and practices, and Frost Farm does not want more people parking there to join the trail, where are these cars going to park? We do not want any on our property.
2. How wide is the proposed path?
3. Is it going to be paved or dirt?
4. Who will protect the wetlands, we are a huge supporter of protecting wetlands?
5. Who will protect the wildlife, we pride ourselves that we let the wildlife run freely on our property and fences that would need to be installed for liability and safety issues if the trail occurred would hinder the wildlife's lifestyle. We have large numbers of Deer, coyotes and Wild Turkeys in our yard on a daily basis.
6. Who will compensate us for the decrease in our property's value if the trail happens? A trail would substantially decrease the value of our property.
7. The trail would run through swamp land, how will that be protected?

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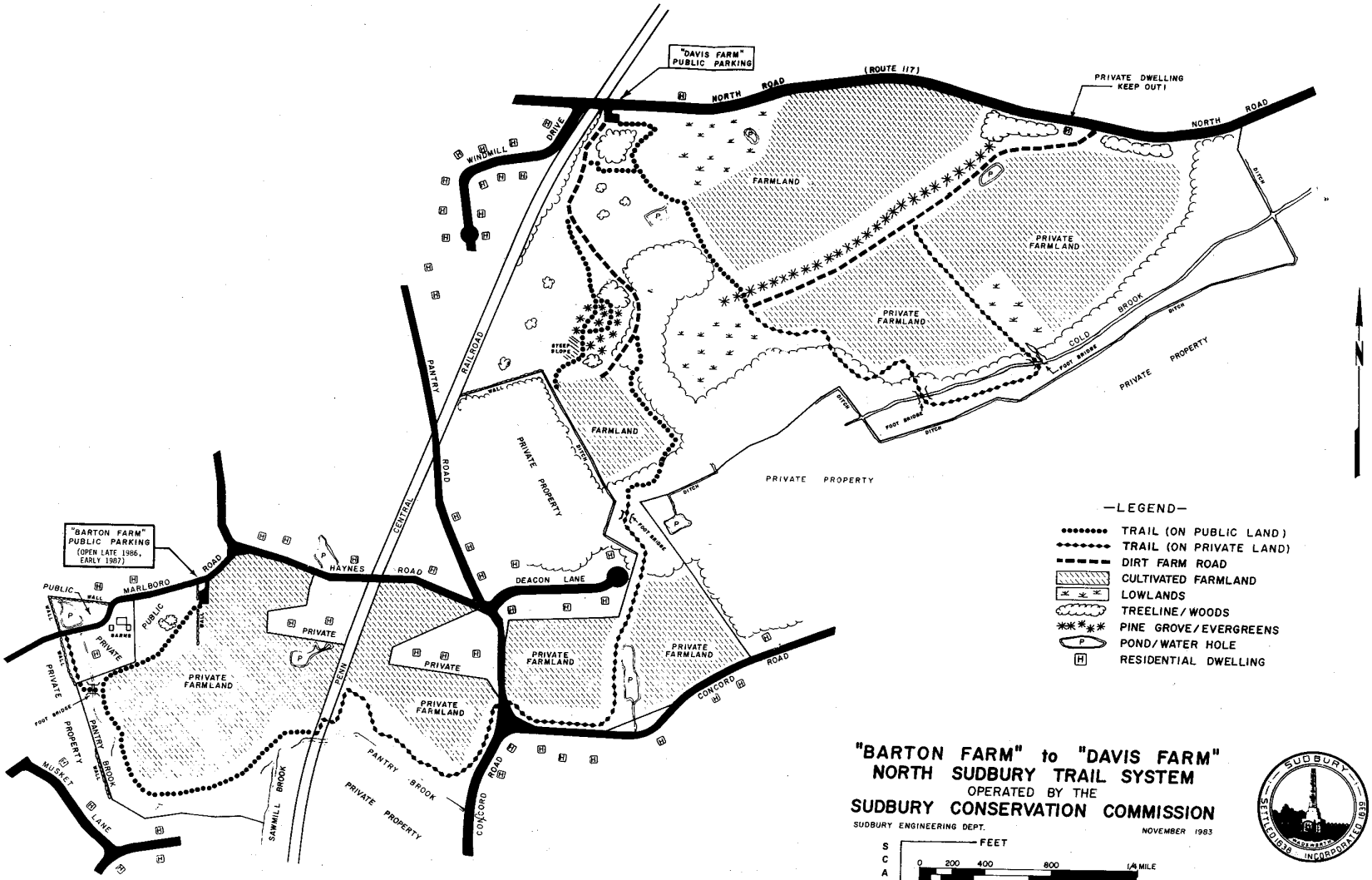
8. How can any trail touching or going through the wetlands be justified? The extremely strict wetland laws do not even let someone park near them and now a trail will be okay to run through them? That makes no sense.
9. As tax payers what are our rights, why would we have to help pay for something that we are 100% against that will put us at risk for safety, liability and privacy? We bought this property for the privacy and safety of our family, we would never have purchased this property if there was a trail already here in the 1950's, why should we have this thrown at us and make us feel like we have no rights?
10. Who will compensate us for the number of trees that would have to be moved or cut down off our property to accommodate this trail? We are a tree farm and we plant and sell trees as part of our livelihood and that would be a determinant if our trees were touched or harmed or moved?
11. If anything does happen to us or our property or equipment or our animals who is responsible, who would we sue? Who will take responsibility?
12. When we are spraying our trees for pests and people are using the trail and the spray touches them, who is responsible?

Past Experiences:

1. 1960's to 1970's we owned approximately 500' feet of White's Pond we took extreme measures to keep people off of that property (it was private-ours) We installed heavy wire cables- trespassers used a torch to burn them down, we installed large boulders, somehow the trespassers moved them, trespassers cut down all our trees on our property, so much trash 9including glass we used to have to rake up) was left each summer that we personally removed 2 tractor trailer loads of trash each year. People used to drive through our property here at 206 North Road and park out back on our property and walk to White's pond and leave their vehicles on our property- no one would help us get them removed on our private property, signs were posted, a trespasser on our White's Pond property pulled a knife on our Father, trespassers set the White's pond property on fire, they used to have Bon Fires there, check the Police and Fire logs. We finally sold the property to the White's Pond Association. No one helped us then that was when times were safer and look what happened. We do not want that ever again.
2. Recently- this month and last month- people have been parking at Frost Farm and using the trail there to get to White's Pond and so many people trashed the place that the Town of Concord banned swimming there. If trash and trespassing isn't going to be a problem as people are saying why did this just happen??? How will it be enforced because it's not working there right now? That makes us even more concerned. Talk to Frank Chiodo at Frost Farm.

Appendix D – Town Conservation Area Maps



—LEGEND—

- TRAIL (ON PUBLIC LAND)
- TRAIL (ON PRIVATE LAND)
- DIRT FARM ROAD
- CULTIVATED FARMLAND
- LOWLANDS
- TREELINE/WOODS
- PINE GROVE/EVERGREENS
- P POND/WATER HOLE
- H RESIDENTIAL DWELLING

"BARTON FARM" to "DAVIS FARM"
NORTH SUDBURY TRAIL SYSTEM

OPERATED BY THE

SUDBURY CONSERVATION COMMISSION

SUDBURY ENGINEERING DEPT.

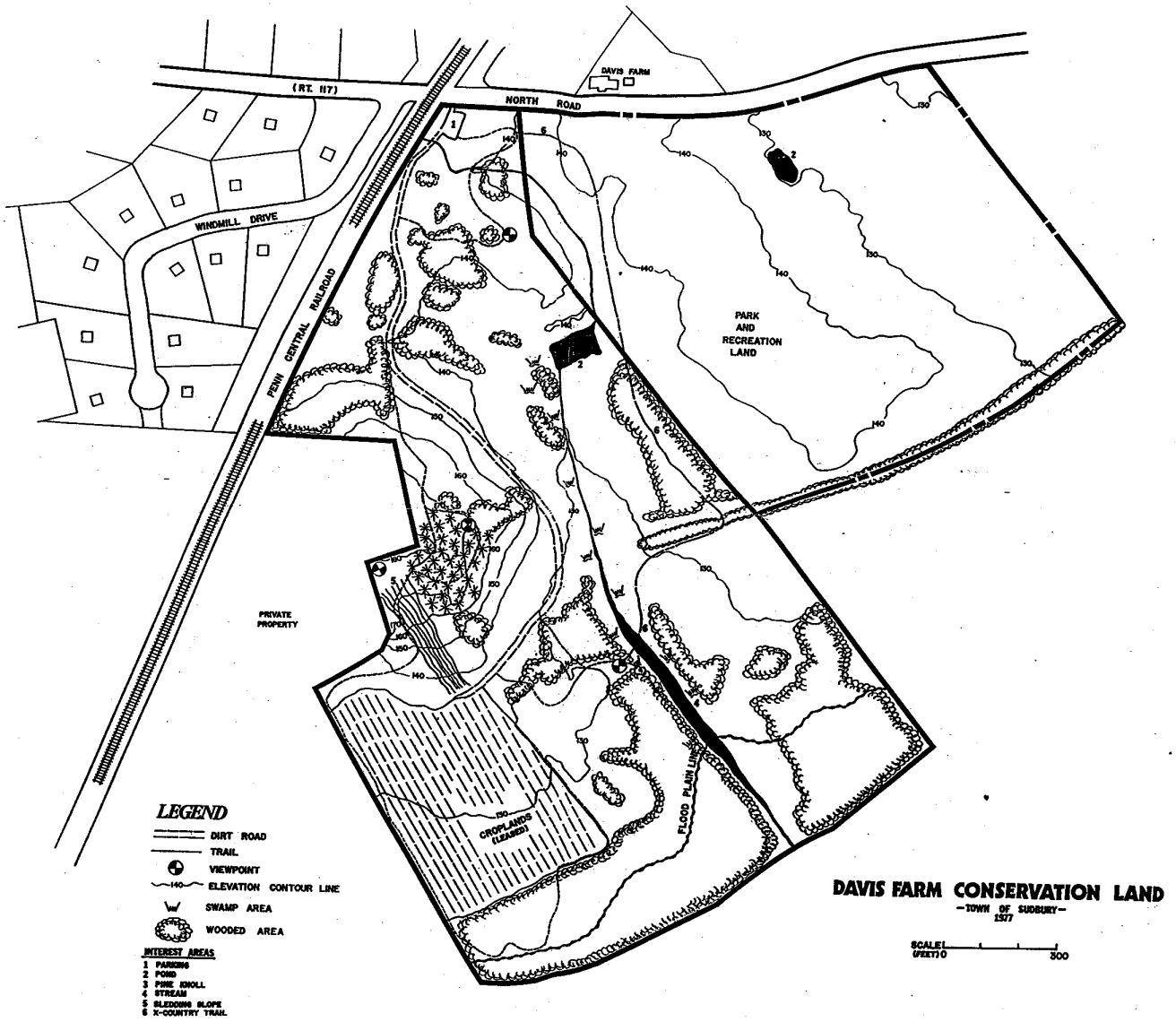
NOVEMBER 1983

SCALE
FEET: 0, 200, 400, 800, 1/4 MILE
METERS: 0, 40, 100, 200, 400

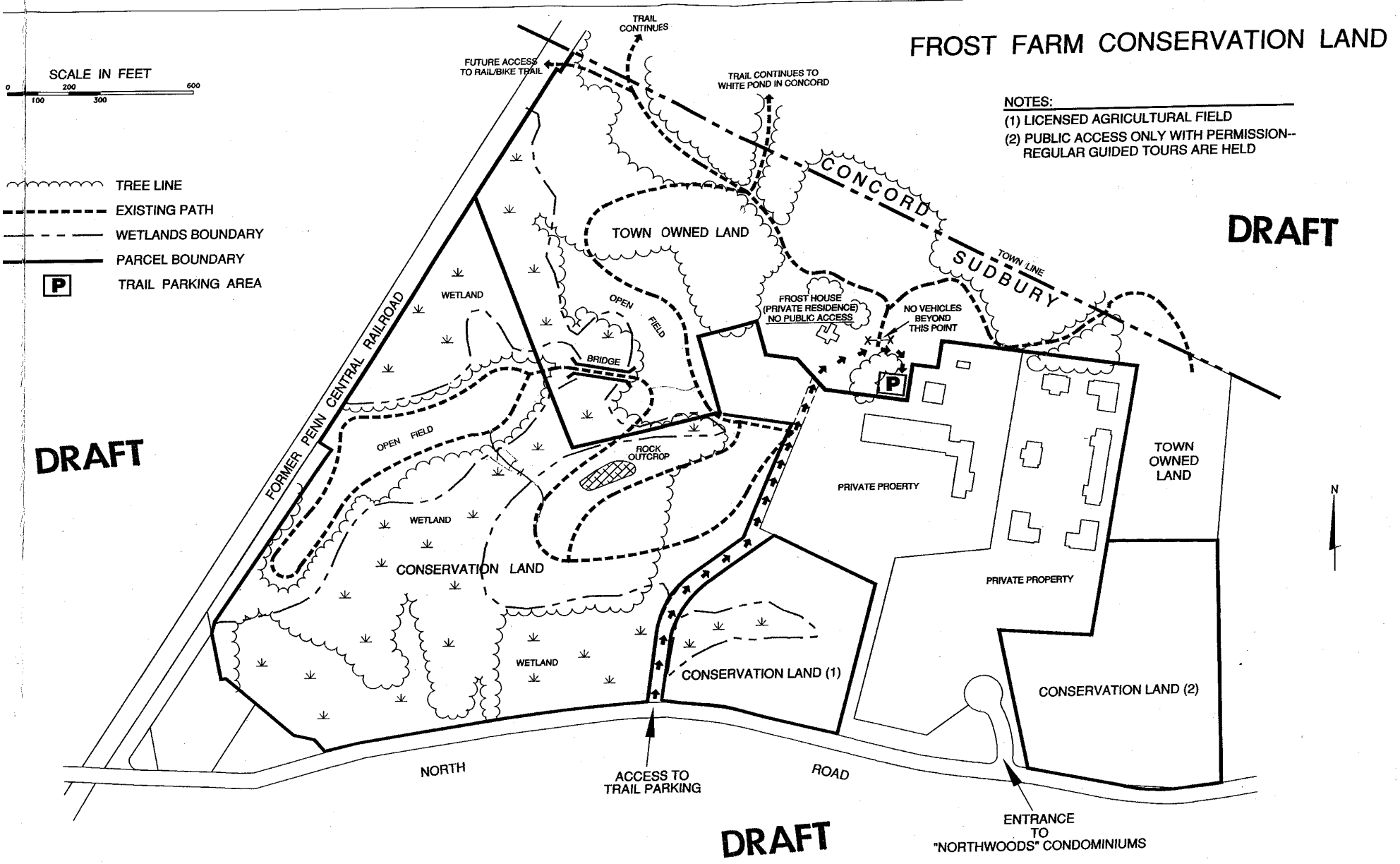
SUDBURY — SETTLED 1638 INCORPORATED 1639 — MASSACHUSETTS

CAUTION: SECTIONS OF TRAIL CROSS ONTO PRIVATE PROPERTY. PLEASE STAY ON MARKED TRAILS IN THESE AREAS!

TRAILS ON PUBLIC LAND ARE IDENTIFIED BY YELLOW MARKERS WITH A RED LOGO.
TRAILS ON PRIVATE LAND ARE IDENTIFIED BY YELLOW MARKERS WITH A BLUE LOGO.


(RT. 117)
NORTH ROAD
DAVIS FARM
WINDMILL DRIVE
PENN CENTRAL RAILROAD
PARK AND RECREATION LAND
PRIVATE PROPERTY
CROPLANDS (LEASED)
FLOOD PLAIN LINE
LEGEND
DIRT ROAD
TRAIL
VIEWPOINT
ELEVATION CONTOUR LINE
SWAMP AREA
WOODED AREA
INTEREST AREAS
1 PARKING
2 POND
3 PINE KNOLL
4 STREAM
5 SLEDDING SLOPE
6 X-COUNTRY TRAIL
DAVIS FARM CONSERVATION LAND
—TOWN OF SUDBURY—
1977
SCALE (FEET) 0
300

FROST FARM CONSERVATION LAND



NOTES:

(1) LICENSED AGRICULTURAL FIELD

(2) PUBLIC ACCESS ONLY WITH PERMISSION-- REGULAR GUIDED TOURS ARE HELD

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DRAFT

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Appendix E – List of Acronyms

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

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
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
CMR	Code of Massachusetts Regulations
Conrail	Consolidated Rail Corporation
CTPS	Central Transportation Planning Staff
CY	Cubic Yard
DCR	Commonwealth of Massachusetts Department of Conservation and Recreation
DEP	Department of Environmental Protection
DPS	Downgradient Property Status
EA	Each
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
F&L	Framingham and Lowell
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FST	Fay, Spofford & Thorndike (Consultants)
LB	Pound
LF	Linear Foot
LS	Lump Sum

List of Acronyms (Cont'd):

LSP	Licensed Site Professional
LUWB	Land Under Water Body
LUWW	Land Under Wateway
MA	Massachusetts
MA DEP	Massachusetts Department of Environmental Protection
MassGIS	Massachusetts Geographic Information Systems
MAPC	Metropolitan Area Planning Council
MBTA	Massachusetts Bay Transportation Authority
MCP	Massachusetts Contingency Plan
MEPA	Massachusetts Environmental Policy Act
MGL	Massachusetts General Laws
MHC	Massachusetts Historical Commission
MPH	Miles Per Hour
MPO	Metropolitan Planning Organization
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
OHM	Oil or hazardous material
PH	Priority Habitat for Rare Species
RAO	Response Action Outcome Statement
REMOPS	Remedy Operation Status
RFA	Riverfront Area
RTCAC	Town of Sudbury Rail Trail Conversion Advisory Committee
SAFETEA	Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2003
SF	Square Foot
SWPPP	Stormwater Pollution Prevention Plan
USGS	United States Geological Survey
UST	Underground Storage Tank
WH	Estimated Habitats for Rare Wildlife
WPA	Wetlands Protection Act