

# GEORGETOWN BRANCH SHARED-USE PATH FEASIBILITY STUDY



PREPARED FOR THE:  
CITY OF HAVERHILL  
TOWN OF GEORGETOWN  
TOWN OF GROVELAND

MERRIMACK VALLEY PLANNING COMMISSION  
FEBRUARY 2012

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### Preparation

This document was prepared by the Merrimack Valley Planning Commission (MVPC) in cooperation with the Federal Highway Administration and the Massachusetts Department of Transportation (MassDOT). Funding for this Project was provided under Contract #301200 with the Massachusetts Department of Transportation.

### Disclaimer

This document has been prepared in the interest of information exchange. The MVPC assumes no liability for its contents or use thereof.

## **I. Executive Summary**

The Town of Georgetown, the Town of Groveland and the City of Haverhill share an interest in encouraging bicycling and walking as means of transport.

The Georgetown Branch is a railroad right-of-way in the Merrimack Valley communities of Georgetown, Groveland and Haverhill that is presently not used for transportation purposes. The project begins at the eastern end of the Bradford Rail Trail in Haverhill, at the Basiliere Bridge (Route 125) and ends on property adjacent to Moulton Way in Georgetown where it intersects with the Border to Boston Trail. City of Haverhill officials are pursuing development of a shared-use path along the Branch east of Route 125 (South Main Street) and have approached the Towns of Georgetown and Groveland to consider extension of this path along their portions of the Georgetown Branch. Each of the communities has expressed interest in this project through discussion and actions among their respective elected officials, boards, committees and staff. In addition, various groups such as the Essex National Heritage Commission have committed staff time and resources toward trail development in the Merrimack Valley region.

The project has the potential to provide exceptional connectivity to a network of regional trails in development such as the Border to Boston Trail (intersection in Georgetown) and the Merrimack River Trail, which would include the Haverhill Riverwalk and Bradford Rail-Trail now in development.

The project vision is the creation of a multi-modal transportation facility that leverages significant community development and transportation investments. The project will be designed to appeal to a wide variety of users, similar to those trails to which it would connect. Further, the project's ability to use a right-of-way with segments that are municipally owned or subject to long-term easements is positive. Finally, the right-of-way connections to public transportation are potentially exceptional.

A few project challenges exist but are not insurmountable. Negotiating shared use with the utility company is not a unique task, especially for Georgetown. It will be necessary to secure rights in a few locations where detailed analysis will likely show that there will be right-of-way encroachments and prior land sales. Finally, the design challenge will be to determine whether there are project segments that should be aligned with or use portions of road rights-of-ways to maximize safety and ensure greatest connectivity with residential neighborhoods.

Progress in shared-use path development on other rights-of-ways with utilities will benefit this project, simply by demonstrating that such projects are viable. The most likely project segment candidate for this treatment begins in Groveland between Center Street and ends at Georgetown near Trestle Way, due to the presence of the King Street Substation and close spacing of utility poles. If these issues are creatively addressed, the MVPC strongly believes that the project is feasible. One method by which some of these design issues can be addressed is by land swaps, or by routing the project in connection with adjacent roadway and sidewalk upgrades that will be

done incrementally. There will be other opportunities to design and build extensive project segments in Haverhill concurrent with future activity at the Haverhill Paperboard property and during closure of the Haverhill Municipal Landfill, and in Groveland with future use of the Ralph Esty and Sons property. If properly designed, the project can also benefit National Grid, the utility that occupies the former Georgetown Branch.

## II. Introduction

The Merrimack Valley Planning Commission (MVPC), as staff to the Merrimack Valley Metropolitan Planning Organization (MVMPO) is undertaking this Project to determine the feasibility of establishing a non-motorized, shared-use transportation facility utilizing all or a portion of the former Boston and Maine Railroad “Georgetown Branch” railroad right-of-way. The Project will also facilitate travel between several Concentrated Development Centers (CDCs) identified by the MVPC in its 2009 Priority Growth Strategy. It will also address the region’s mobility challenges as detailed in the MVMPO’s 2011 Regional Transportation Plan.

## III. History of the Georgetown Branch

Prior to the development of railroads in New England, boats were the most efficient means of transport in the Merrimack River Valley communities. By the 1840s, steamboat travel on the Merrimack River between Haverhill and Newburyport served many residents and businesses’ needs. Land travel remained difficult. Railroad service into the interior of Essex County through Georgetown, Groveland and Haverhill was promoted by Newburyport business community members seeking to control traffic in the Merrimack Valley. Newburyport business and civic interests were also interested in regaining some of Newburyport’s economic prominence, which had receded over many decades. Other motivation for railroad service into the interior of the Merrimack Valley came from owners of shoe manufacturing businesses in Georgetown in the 1840s; desires among various railroads to interconnect and to capture steamboat customers’ business as well as revenue, and general growth of Haverhill and Lawrence as the region’s emerging centers of employment. It is reported that subscribers in Georgetown were instrumental in getting the (Newburyport) Railroad completed.<sup>1</sup> One or more members of the Tenney family, longtime Georgetown residents, were involved in this enterprise and / or became railroad employees.<sup>2</sup>

The Georgetown Branch Railroad (GBRR), organized to run between Bradford and Georgetown Corner (just east of today’s Georgetown Square), was chartered on March 11, 1844.<sup>3</sup> The GBRR remained undeveloped for several years. It was later developed by a corporation chartered in 1846 that first opened a line from Newburyport on the Eastern Railroad to Georgetown in 1849, and west to the Boston and Maine Railroad at Bradford in 1851. This line was called the Newburyport and Bradford Railroad, and was constructed at a cost of \$225,000 or \$15,000 per mile x 15 miles.<sup>4</sup> This segment interchanged with a second railroad, the Danvers and Georgetown Railroad, or D&GRR (organized in 1851 and opened in 1853) just west of Georgetown Square. By 1860, the Boston and Maine Railroad (B&MRR) leased these two railroads, and combined them with the Danvers Railroad, which connected Danvers with the B&M Western Division at

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<sup>1</sup> Bradlee, Francis Boardman Crowninshield, *The Boston and Maine Railroad; a history of the main road, with its tributary lines*. Salem, MA: The Essex Institute, 1921, p.20.

<sup>2</sup> Bradlee, p. 21.

<sup>3</sup> Bradlee, p. 23.

<sup>4</sup> Bradlee, p. 23.

Wakefield. The line between Newburyport and Bradford became a branch line at that time, as the line from Wakefield to Newburyport became the B&MRR main line.<sup>5</sup> Ultimately, the B&MRR would dominate all railroad service in the Merrimack Valley.

Service on the Georgetown Branch was not known to be well capitalized, equipped or operated and had a reputation for delays.<sup>6</sup> Modest freight and passenger business prevailed on the Branch even during the most expansive years of railroading. The subsequent development of horse-drawn and electric streetcars, and later motor vehicles also competed for passenger business. In particular, the Haverhill, Georgetown and Danvers Street Railway initiated streetcar service between Haverhill and the site that is now Trestle Way in 1896, later constructing the trestle over the Georgetown Branch and extending service to Georgetown Square where it connected with other streetcar services. Streetcars were replaced by bus service in 1930.<sup>7</sup> However, the B&MRR did not start abandoning the Newburyport Railroad until 1941 when service was discontinued from Newburyport to Topsfield. In 1942 the B&MRR abandoned the Georgetown Branch segment between Georgetown and the Haverhill Paperbox Corporation's factory at 100 South Kimball Street. Freight service to the former Haverhill Paperbox Corporation was provided from the B&M's main line until 1982, after which this remaining segment of the Georgetown Branch was abandoned.<sup>8</sup> The Massachusetts Bay Transportation Authority subsequently removed the switch connecting the former Georgetown Branch to its Haverhill Line (former B&MRR Western Division) right-of-way.

MVPC identified and reviewed several data sources to develop a historic perspective of the land uses along the Georgetown Branch right-of-way. Sources included 1884 and 1892 atlases of Essex County, and Sanborn insurance maps that clearly detail railroad facilities, abutting land uses and businesses that received service from the railroad. The Bradford railroad station at 20 Hale Street, maintenance facilities and a turntable between the Merrimack River and South Elm Street lie outside the boundaries of this Project but are associated with the Georgetown Branch.

During the years in which the railroad operated, the majority of the right-of-way traversed agricultural land and wooded areas. Significant clusters of industrial / commercial businesses proliferated in Bradford (Haverhill), South Groveland, and Georgetown Square; many of these businesses were associated with leather goods production, particularly for the shoe industry. Other business along the Branch in each of the communities included lumberyards, coal and oil dealers.

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<sup>5</sup> Karr, Ronald D. (1995). *The Rail Lines of Southern New England - A Handbook of Railroad History*. Branch Line Press. [ISBN 0-942147-02-2](https://www.branchlinepress.com). <http://www.branchlinepress.com> and Karr, Ronald D. (1994). *Lost Railroads New England*. Branch Line Press. [ISBN 0-942147-04-9](https://www.branchlinepress.com). <http://www.branchlinepress.com>. Obtained from Wikipedia.

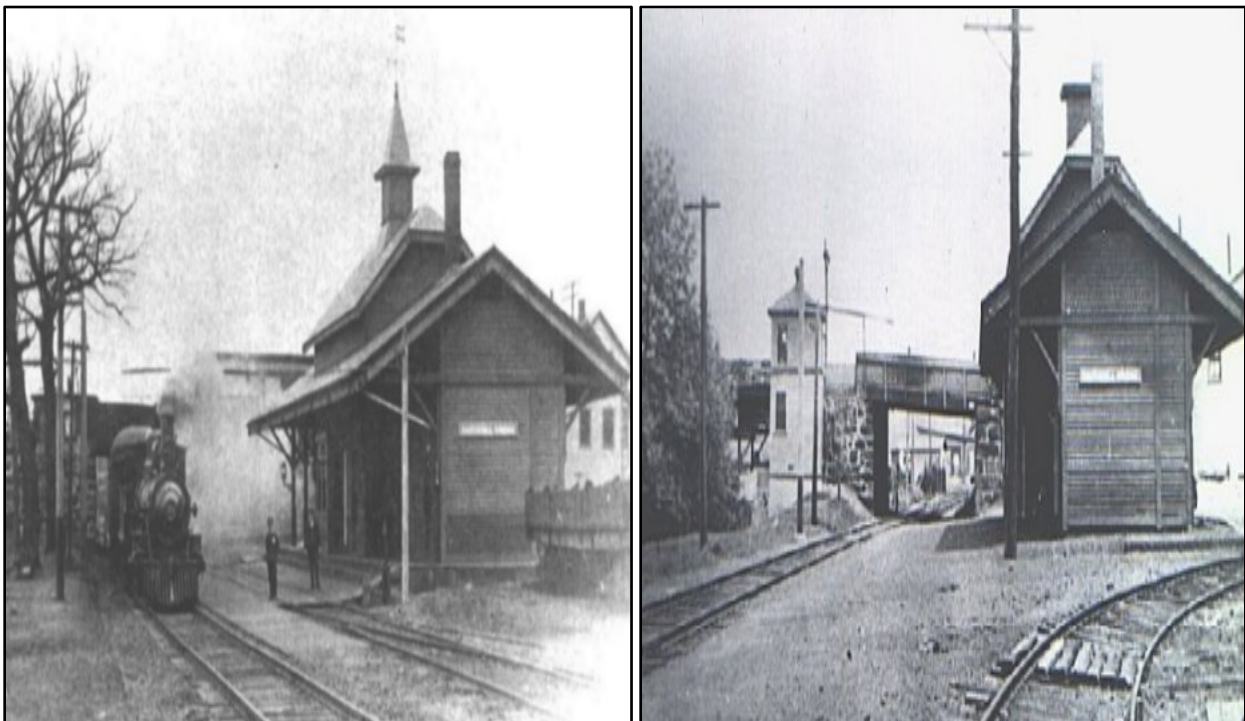
<sup>6</sup> Bradlee, p. 23.

<sup>7</sup> Maina, Gloria. *History of Georgetown*. 1999, Georgetown Historical Society, Inc. [http://www.georgetownma.gov/public\\_documents/georgetownma\\_webdocs/about](http://www.georgetownma.gov/public_documents/georgetownma_webdocs/about)

<sup>8</sup> Bradlee, p. 23.

Station sites were as follows:

1) **“Haverhill Bridge”** – on property just west of Route 125. Both pictures below are taken facing east. The left picture, presumed taken at an earlier date, shows the presence of two tracks within the right-of-way as well as a wooden at-grade passenger platform; indeed, there appear to be passengers waiting to board the train. The picture on the right, presumed taken at a later date, shows that one track and the passenger platform have been removed, as well as the cupola atop the station. Features visible in this picture include a spur track leading to an adjacent coal pocket<sup>9</sup>. A signal or bridge tender tower, a former bridge over the right-of-way (built 1850, reconstructed 1968) and a former Haverhill-Bradford bridge over the Merrimack River are visible in the background.



Source: [www.ldr.com](http://www.ldr.com)

- 2) **“Island Park”** – this station, near the present-day Crescent Park Yacht Club in the Bradford section of Haverhill, was located east of the Haverhill Boxboard (also referred to as the Haverhill Paperboard) property.
- 3) **“Groveland”** was served by a freight house and passenger station. The passenger station was located off Main Street on the property of and/or adjacent to the former Ralph A. Esty and Sons Lumber Company, 441 Main Street.

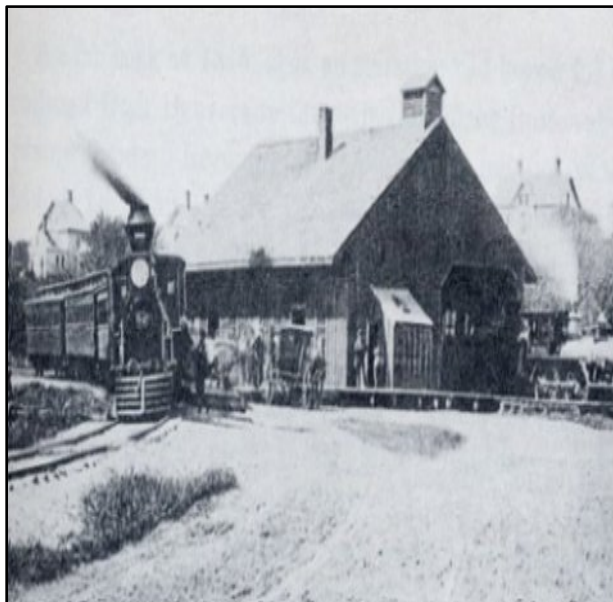
<sup>9</sup> Sanborn Insurance Rate Map updated through 1933. Source: City of Haverhill Engineering Department.

Below is the former “Groveland” passenger station, east façade.



Source: [www.older.com](http://www.older.com)

4) “Georgetown” was served by two successive passenger stations. Previously published information indicates that the first station was constructed in 1850 just west of Prospect Street, and removed when the Newburyport Railroad was extended south to Danvers. The second station was subsequently constructed on the south side of West Main Street between the Georgetown Branch and the Newburyport Railroad, sometime after 1855. The new location permitted the station to serve all three branches of the Newburyport Railroad. Vehicles could access the station by a driveway that connected to Railroad Avenue and Moulton Street.



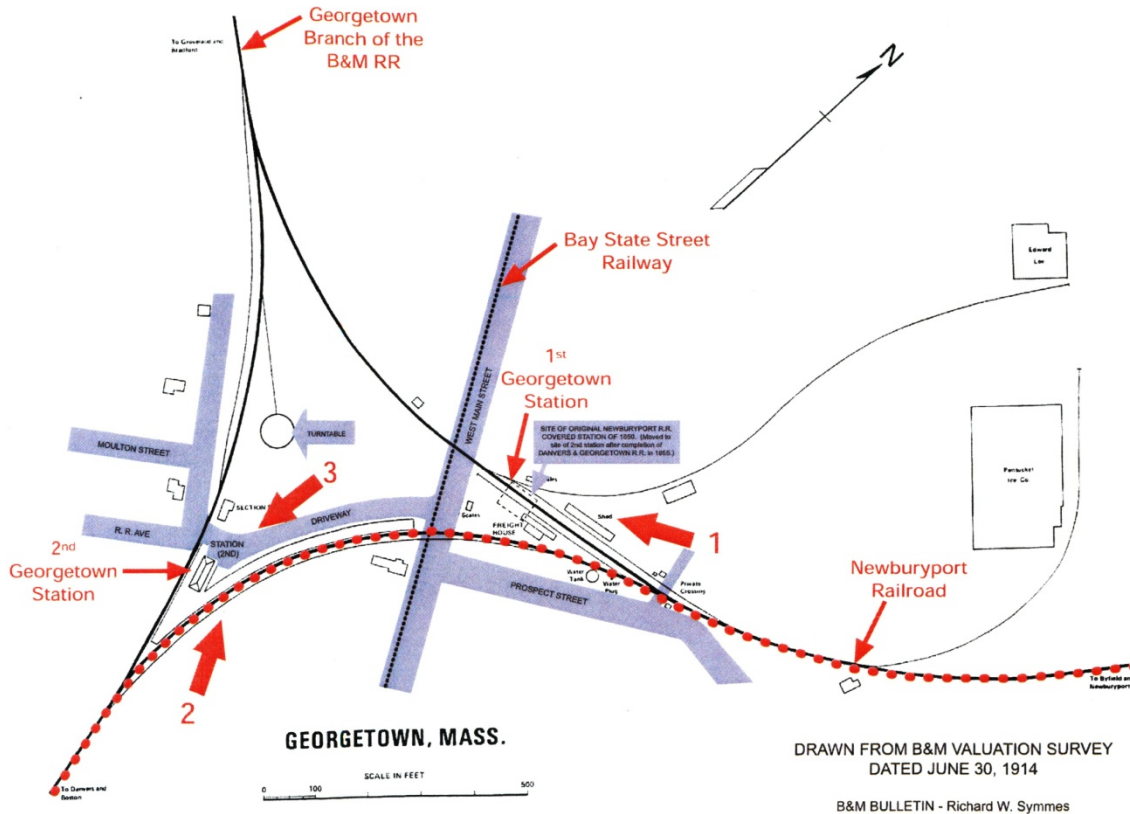
Station #1, Prospect Street  
Source: [www.older.com](http://www.older.com)



Station #2, Railroad Avenue (c.1909)  
Source: [www.older.com](http://www.older.com)



## History of the Railroads in Central Georgetown



ENGINEERS  
**FST** FAY, SPOFFORD & THORNDIKE  
SINCE 1916

Source: Fay, Spofford and Thorndike, Inc., 2007 Border to Boston Feasibility Study for the Town of Georgetown, MA.

### IV. Existing Conditions

The MVPC utilized a variety of data from sources including the: City of Haverhill, Towns of Georgetown and Groveland and their consultants; Boston and Maine Railroad valuation (“val”) maps obtained from the Boston and Maine Railroad Historical Society, and atlases from various years, photographs, and other documents from Internet sites. The MVPC advises that at such time as the project advances beyond this phase, GPS-based field equipment can be used to locate and record the coordinates of various features along the right-of-way, and this information can be retrieved / or stored and analyzed using GIS technology. The MVPC believes that this approach is the most accurate way to prepare the Project for future design and construction.

#### Right-of-Way

The project right-of-way is chiefly used by National Grid for the installation, operation and maintenance of long-distance electrical transmission and distribution facilities. National Grid owns and operates power substations adjacent to the right-of-way just west of Main Street in Groveland, and in Groveland east of King Street. The King Street substation began operations in 1962, and was expanded in 2004<sup>10</sup>. Pictometry data reveals the presence of maintenance equipment and vehicle trails operating within the right-of-way. Access is gated at various street crossings. While there is vegetation and rock outcrops throughout, land features are maintained to certain clearance standards, according to National Grid's 2009-2013 Vegetation Management Plan (VMP).

The project right-of-way is also crossed by local electric, water, gas and telecommunications utilities that follow local roadways. Sewer facilities also cross the right-of-way, principally in Haverhill. It remains to be determined if there are any high-pressure gas lines within the right-of-way.

Portions of the project right-of-way in all three communities are used as driveways and streets, particularly in the neighborhoods west of Georgetown Square.

#### Stations and other railroad – related buildings

The MVPC conducted site visits, reviewed maps and information including the Boston and Maine Railroad Historical Society archives to determine if any former railroad buildings are extant.

The removal of the “Haverhill Bridge”, “Groveland” and “Georgetown” passenger stations has been field verified. The status of the Haverhill Island Park station status is unknown, as aerial photographs indicate that the former station may be part of existing commercial/industrial structures. Also, it is possible that the Groveland freight house may today be among the several buildings that are on the former Ralph A. Esty and Sons’ Company property. Additional field verification and research would be required.

#### Mileposts, Markers and Coordinates

The MVPC researched data compiled by the Boston and Maine Railroad Historical Society to obtain this information. In addition, the MVPC conducted a Pictometry analysis and assigned coordinates to various structures along the right-of-way. The mileposts were unavailable at the time of writing this report; however, the MVPC is committed to obtaining this information for future project work and recommends field verification as one or more mileposts remain within the right-of-way. As previously noted, the MVPC believes that Pictometry coordinate data will be more useful for this and future shared-use path projects.

#### Drainage structures

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<sup>10</sup> National Grid, “Proposed New Electricity Supply Line in Groveland and Georgetown”, 2004.

A number of culverts channel drainage and/or permit water to flow aside as well as underneath the right-of-way. MVPC staff finds that the right-of-way typically drains by sheet flow to the adjacent grades, which convey drainage to a number of ditches, seasonal and year-round tributaries that parallel and/or cross underneath the right-of-way, ultimately draining to the Merrimack River and Ipswich River watersheds. Aerial images indicate that some of the adjacent ditches may have been created for mosquito control, independent of (and after) construction of the railroad.

### Bridges:

#### **Haverhill**

- Route 125 (Bridge Street) over the Georgetown Branch. The current structure was built in 1968 and is within the MassDOT's jurisdiction; it is rated at 50.0 and classified as Structurally deficient. The MassDOT, MVPC and City of Haverhill have discussed the need for its repair and/or replacement. The MassDOT reports that the replacement project is in preliminary design and that construction will begin in Spring 2015. Such work is likely to be coordinated with the proposed reconstruction of the Basiliere Bridge to which it is connected.
- Georgetown Branch over Ferry Street. This bridge conveys the right-of-way over the street that is the legal access to City of Haverhill property serving a public boat ramp and the Crescent Yacht Club. The bridge, track and ties are in place. The bridge is constructed of steel and is supported by granite block wing walls. The street underneath the bridge constitutes a topographical low point, and is poorly drained. Consequently, this roadway is seldom used by the public.
- Georgetown Branch over unnamed stream east of Haverhill Paperbox Company. No structure presently exists at this location.
- Georgetown Branch over Johnson's Creek. Located near the Groveland town line. No structure presently exists at this location.

#### **Groveland**

- Georgetown Branch over Parker River (Rock Pond –Pentucket Pond). The railroad bed is significantly elevated (15' +- above grade) on either side are wetlands. Pictometry aerial views indicate the presence of a deck atop the bridge abutments, which should be field verified.

#### **Georgetown**

- Georgetown Branch under former streetcar line and Route 97. Structural elements remaining from a former trestle over the project right-of-way on the northern edge of Route 97 may remain in place; the presence of any structures relating to this former trestle should be field checked.

Roadway crossings. Power lines on the former right-of-way cross the following roadways:

- 1) Main Street, South Groveland
- 2) Center Street, Groveland
- 3) Route 97, Groveland 50' east of Central Street
- 4) Ashcroft Terrace
- 5) King Street, Groveland
- 6) Old Jacobs Way, Georgetown
- 7) Laurel, Hemlock and Spruce Lanes (Trestle Way development). Note that portions of these streets are 'paper streets', and are therefore unbuilt.
- 8) Route 97, Georgetown (west of Trestle Way).

No at-grade tracks, ties or associated equipment are presently visible at these locations.

### Tracks, Ties and Roadbed

On the Haverhill segment now being developed by the City as part of its Riverwalk Project, tracks and ties were removed in Spring 2011 by Iron Horse Preservation, Inc., a nonprofit organization. There are discontinuous segments of tracks and ties present between the Basiliere Bridge and the Haverhill Paperboard property. Map and Pictometry data reveal no tracks or ties present in the right-of-way east of the Haverhill Paperboard property. This finding should be field verified.

### Maps, survey and ownership / easement information

The MVPC reviewed B&MRR 1914 valuation maps, community Assessors' Department maps, Sanborn Maps and Pictometry data to obtain preliminary information. At the eastern end of the Branch, the right-of-way is now part of Terrace Lane, a residential street in Georgetown. Most of the right-of-way in Georgetown and Groveland is used (and rights presumed owned) by National Grid, east of Haverhill. In Haverhill, much of the right-of-way crosses municipal properties; more research is required to determine what, if any rights are held by other parties including the Massachusetts Bay Transportation Authority or PanAm Railways.

The MVPC was able to view only the valuation maps at the Boston and Maine Historical Society Archives in Lowell, MA. The valuation maps show that the right-of-way was of variable width, approximately 20' to 25'. Important information about roadway crossings, drainage structures and locations of bridges, railroad facilities, etc. is also shown on these maps. The MVPC has contacted the Society to obtain copies of these documents for its records and for future analysis of the Georgetown Branch. The MVPC was unable to obtain track charts with mileposts for this Study; subsequent efforts should be made to obtain that information if it is available.

The MVPC assigned Pictometry coordinates to various features along the right-of-way that are included with this Report (see Attachment D).

## **Potential right-of-way discontinuities and encroachments**

MVPC observed locations at which the project right-of-way appears to be used in part by abutting properties. Most of these locations are in residential areas. In Haverhill, the first two miles of the right-of-way bifurcates several properties, such as the Haverhill Paperboard property and the residences along Railroad and South Water Streets. Segments in Georgetown have been developed as streets. The line appears to have been severed at Trestle Way, a Georgetown Housing Authority property where the Branch crossed underneath Route 97 (and the former Bay State Street Railway Company trolley service) just west of Hemlock, Laurel and Spruce Lanes. The existing Route 97 grading at this location, and review of the B&MRR 1914 valuation maps, confirmed the presence of this crossing. East of this crossing, the right-of-way is now crossed by Lakeshore Drive and serves as the right-of-way for Terrace Lane, where it formerly joined the Danvers and Newburyport Branches of the Newburyport Railroad. The right-of-way subsequently borders several park properties including American League Park (next to Pentucket Pond). It is assumed that the former grade crossings were removed by the railroad, the Commonwealth or the communities.

Further analysis should be undertaken. Field observations should be compared with property data reviews to establish the presence of easements, private grade crossings, utility crossings and purchases of land prior to determining whether abutting properties have encroached upon the right-of-way. Completion of this section will require review of MassDOT records to determine when any U.S. Surface Transportation Board (STB) actions were recorded for the abandonment of the Georgetown Branch, although it appears that most of the right-of-way was disposed of prior to the existence of the current STB process.

## V. Environmental Resources and Considerations

### Environmental Resources

The right-of-way is proximate to or crosses several significant environmental features. A review of the Town of Georgetown's Recreational Path Feasibility and Conceptual Design Study (Fay, Spofford and Thorndike, 2007) indicates the presence of wetland habitats that are related to and/or functionally connected to similar habitats found along the Georgetown Branch. For example, a portion of the right of way is near / adjacent to an area designated by the Commonwealth's Natural Heritage and Endangered Species Program as providing potential wetland habitat for rare wildlife. The Wood Turtle (*Clemmys insculpta*), a species of Special Concern in Massachusetts, is documented as being present in the area. Further, areas along the Parker River near the town boundaries of Georgetown, Boxford and Groveland are identified as habitat for Blanding's Turtle (*Emydoidea blandingii*-Threatened); Spotted Turtle (*Clemmys guttata*-Special Concern), and Wood Turtle. Finally, vernal pools are present on land north of the Parker River between Route 97 and Washington Street; these pools are surrounded by relatively dry, forested uplands. Vernal pools typically lack fresh water supplies; are seasonally dry, and are habitat for amphibians and invertebrates.

The following tables provide an overview of species in the project communities that are classified as E (Endangered); T (Threatened), or SC (Special Concern):

Town	Taxonomic Group	Scientific Name	Common Name	MESA Status	Federal Status	Most Recent Observation
GEORGETOWN	Amphibian	Ambystoma laterale	Blue-spotted Salamander	SC		2008
GEORGETOWN	Bird	Asio otus	Long-eared Owl	SC		1981
GEORGETOWN	Dragonfly/Damselfly	Enallagma laterale	New England Bluet	SC		1998
GEORGETOWN	Fish	Notropis bifrenatus	Bridle Shiner	SC		2007
GEORGETOWN	Reptile	Emydoidea blandingii	Blanding's Turtle	T		2007
GEORGETOWN	Reptile	Glyptemys insculpta	Wood Turtle	SC		1998
GEORGETOWN	Vascular Plant	Cardamine pratensis var. palustris	Fen Cuckoo Flower	T		Historic

GEORGETOWN	Vascular Plant	Eriophorum gracile	Slender Cottongrass	T		Historic
GEORGETOWN	Vascular Plant	Liatris scariosa var. novae-angliae	New England Blazing Star	SC		1874
GEORGETOWN	Vascular Plant	Platanthera flava var. herbiola	Pale Green Orchis	T		1890
GEORGETOWN	Vascular Plant	Senna hebecarpa	Wild Senna	E		1872
GEORGETOWN	Vascular Plant	Sparganium natans	Small Bur-reed	E		1997
Town	Taxonomic Group	Scientific Name	Common Name	MESA Status	Federal Status	Most Recent Observation
GROVELAND	Amphibian	Ambystoma laterale	Blue-spotted Salamander	SC		2004
GROVELAND	Bird	Botaurus lentiginosus	American Bittern	E		1992
GROVELAND	Bird	Ixobrychus exilis	Least Bittern	E		2007
GROVELAND	Bird	Vermivora chrysoptera	Golden-winged Warbler	E		1991
GROVELAND	Fish	Notropis bifrenatus	Bridle Shiner	SC		1998
GROVELAND	Mussel	Ligumia nasuta	Eastern Pondmussel	SC		Historic
GROVELAND	Reptile	Emydoidea blandingii	Blanding's Turtle	T		2009
GROVELAND	Reptile	Glyptemys insculpta	Wood Turtle	SC		2000
GROVELAND	Vascular Plant	Houstonia longifolia	Long-leaved Bluet	E		Historic
GROVELAND	Vascular Plant	Scirpus longii	Long's Bulrush	T		2006
GROVELAND	Vascular Plant	Sparganium natans	Small Bur-reed	E		1957

Town	Taxonomic Group	Scientific Name	Common Name	MESA Status	Federal Status	Most Recent Observation
HAVERHILL	Amphibian	Ambystoma laterale	Blue-spotted Salamander	SC		2004
HAVERHILL	Bird	Haliaeetus leucocephalus	Bald Eagle	E		2006
HAVERHILL	Bird	Ixobrychus exilis	Least Bittern	E		1992
HAVERHILL	Dragonfly/Damselfly	Gomphus vastus	Cobra Clubtail	SC		2004
HAVERHILL	Dragonfly/Damselfly	Neurocordulia obsoleta	Umber Shadowdragon	SC		2004
HAVERHILL	Dragonfly/Damselfly	Stylurus spiniceps	Arrow Clubtail	T		2004
HAVERHILL	Fish	Acipenser brevirostrum	Shortnose Sturgeon	E	E	1991
HAVERHILL	Mussel	Alasmidonta varicosa	Brook Floater (Swollen Wedgemussel)	E		Historic
HAVERHILL	Mussel	Lampsilis cariosa	Yellow Lampmussel	E		1866
HAVERHILL	Mussel	Leptodea ochracea	Tidewater Mucket	SC		1992
HAVERHILL	Mussel	Ligumia nasuta	Eastern Pondmussel	SC		1992
HAVERHILL	Reptile	Emydoidea blandingii	Blanding's Turtle	T		2009
HAVERHILL	Reptile	Glyptemys insculpta	Wood Turtle	SC		2006
HAVERHILL	Vascular Plant	Bidens eatonii	Eaton's Beggar-ticks	E		2004
HAVERHILL	Vascular Plant	Liatris scariosa var. novae-angliae	New England Blazing Star	SC		1932
HAVERHILL	Vascular Plant	Potamogeton vaseyi	Vasey's Pondweed	E		1973
HAVERHILL	Vascular Plant	Trisetum spicatum	Spiked False Oats	E		1914



Source: Massachusetts Division of Fisheries and Wildlife  
[http://www.mass.gov/dfwele/dfw/nhesp/species\\_info/town\\_lists/town\\_g.htm](http://www.mass.gov/dfwele/dfw/nhesp/species_info/town_lists/town_g.htm)

The MVPC recommends that a more detailed review of the project right-of-way and abutting properties be undertaken to determine the occurrence of these species in the field, particular to their occurrence on or near the future project right-of-way.

## **Project Considerations**

### Flood Zones

The Federal Emergency Management Agency (FEMA) maps indicate the presence of specific Flood Zones throughout the project area. While these zones do not preclude the development of this project, its design, construction and operation must follow certain standards and guidelines.

Subsequent project development activities will require delineation of the following flood zones:

- Zone C: Area of minimal flooding
- Zone B: Areas between limits of 100- and 500-year floods
- Zone A14: Areas of 100-year flood

Property-specific FEMA information is available at [www.floodsmart.gov](http://www.floodsmart.gov).

In Haverhill, the right-of-way between the Basiliere Bridge and South Porter Street lies principally within Zones B and A14. From this point east to Johnson's Creek, most of the right-of-way lies within Zones B and C.

The MVPC recommends that a detailed flood zone analysis be undertaken in a subsequent stage of project development.

### Wetlands and Waterways

The Commonwealth of Massachusetts administers the following regulations that appear applicable to the project:

310 CMR 9.00: The Massachusetts Waterways Regulations (Chapter 91) - June 2009  
310 CMR 10.00: The Wetlands Protection Act Regulations - June 2009  
310 CMR 10.57 (4)(a)3 and (b)3: general performance standards for proposed projects  
310 CMR 10.58: Rivers Protection Act, re: Riverfront Areas  
310 CMR 13: Inland wetlands orders  
Wellhead Protection Regulations, annotated - April 2001

Detailed information on the above regulations is available at <http://www.mass.gov/dep/water/laws/regulation.htm>.

All three project communities administer a set of wetlands bylaws. A content example is the Town of Georgetown's wetlands bylaws, updated through 2008 which specify activities that are permitted in specific buffer zones around wetlands and waterways:

No Cut – No Disturb Zone: 50' around wetlands  
Tree Cutting and Brush Removal permitted, 50' – 100'  
Specific resource areas defined in the wetlands regulations - 100'  
Rivers or perennial streams: 200'

The project would require MEPA and local Conservation Commission approvals.

### Surface Waters

Waters of relevance to this project include the Merrimack and Parker Rivers; Argilla, Brindle and Johnson's Brooks, and Mill, Pentucket and Rock Ponds.

### Hazardous waste releases and remediation

The MVPC reviewed the U.S. Environmental Protection Agency's Region I website and the Massachusetts Department of Environmental Protection's site database (<http://db.state.ma.us/dep/cleanup/sites/SearchResults.asp>) to identify documented releases in the vicinity of the Georgetown Branch right-of-way. The MVPC also collected information on the status of these specific releases (see Appendix). Below is a summary of MVPC's research:

- Groveland

MassDEP records indicate that a few small releases of hazardous substances have occurred on or adjacent to the project right-of-way, particularly on the Esty and Sons Lumber property and at National Grid's King Street Substation. These releases have been addressed and response actions completed. However, the most significant release in the area is known of as the Groveland Wells 1&2 Superfund site. It includes the watershed and aquifer supplying two municipal water wells, as well as three properties known to be polluting groundwater and soil in the area. The affected subsurface area was approximately 850 acres, which extended northeast toward the Merrimack River (including groundwater underneath the Project right-of-way). Groveland production wells #1 and #2 were the sole source of drinking water for the town. Both were shut down in 1979 when the State detected Trichloroethylene (TCE) contamination above drinking water maximum contaminant limits (MCLs). The Town of Groveland instituted emergency conservation measures and temporarily obtained water hookups from neighboring communities. The Town developed Well #3 along the Merrimack River in the early 1980's, however the water supply fell short of the town's current and projected needs. The main source of contamination was traced to the former Valley Manufacturing Products Company (VMPC) site located at 641

Washington Street, where metal parts, screws and cable connectors were made from 1963 to 2001. Operators used subsurface disposal systems which dispersed liquids into buried leaching fields and also had a major leak from an underground storage tank (UST) containing Trichloroethylene (TCE). VMPC also routinely dumped hazardous materials on the surface of the ground which eventually leached down to the groundwater. Hazardous substances that were released included cutting oils, mineral spirits, TCE, volatile organic compounds (VOC), and acid bath wastes. (Source: EPA). Review of the latest (2010) EPA Five-Year Review Report does not indicate any issues that would appear to impact the Project.

- Georgetown

There are a few documented releases on properties near to the project right-of-way that appear to have been addressed. Most of these releases occurred at the project's western limit of work, on land that was formerly property of the railroad but is now used for commercial and light industrial purposes. One example is the former Automatic Connector, Inc. site, at 11 Moulton Street, which is in active remediation. Review of a January 2011 Remedy Operation Status Inspection and Monitoring Report for the site indicates that there are groundwater monitoring wells on this site, on adjacent residential properties, and a few on the former Georgetown Branch right-of-way. Releases at the Site are believed to be associated with the former operation of an electronic component manufacturing facility on the property. A former subsurface industrial wastewater disposal system appears to have been the main source of chlorinated Volatile Organic Compounds in groundwater, while former cutting oil and fuel oil underground storage tanks (USTs) and past materials usage/handling at the Site appear to have contributed to petroleum hydrocarbon impacts to shallow Site soil. Identified petroleum hydrocarbon impacts have been mitigated previously under closed RAMs. Dissolved VOCs have been reported in both overburden and bedrock groundwater and are being mitigated (Source, Mabbett & Associates, 2011). The MVPC found no issues that would appear to preclude the Project; however, the Project design would accommodate access to, and the integrity of, existing groundwater wells.

- Haverhill

Several releases are documented for properties along Railroad Avenue, South Kimball Street at the former Haverhill Paperboard Corporation site, and at various locations along South Main Street. Most of these releases occurred a number of years ago, and response actions are recorded.

The most significant environmental issue for the project design in Haverhill is the right-of-way segment crossing the Haverhill Municipal Landfill, a 71-acre former industrial and municipal landfill located off of Old Groveland Road. The site is currently owned by the City of Haverhill and Aggregate Industries. The landfill was opened by the City in 1936 following a major flooding of the City at which time local businesses and residences required a site to dispose of damaged goods, food and other wastes. Municipal and industrial wastes were accepted at the facility until May of 1981. From

1982 until June of 1996, sludge generated from the City of Haverhill wastewater treatment plant and paper beater waste from the Haverhill Paperboard Company were also disposed of at the landfill. Some of the wastes that were disposed of at the landfill included 55-gallon steel drums of unknown materials, tannery and shoe wastes, tires, and flammables such as lacquers, paints, oils, and glues. These materials were either dumped on the surface of the site or deposited into shallow pits, while sludges and liquids were disposed of on a parcel of land near the river to the east.

Groundwater monitoring wells are located throughout the entire area and along the Merrimack River. The long term sampling results have indicated low levels of Volatile Organic Compounds (VOC) like Trichloroethylene, Benzene and Vinyl Chloride.

The site was listed on the U.S. EPA "Superfund" site in June 1986, after seven years of investigation. In 1996, the City covered the landfill with an interim cover until a final site wide closure plan and long term monitoring requirements could be finalized. The City of Haverhill and Aggregate Industries, both of whom are the Responsible Parties for performing groundwater, surface water, air quality sampling activities and final closure of the landfill. The City of Haverhill and Aggregate Industries are responsible for removal of buried 55-gallon drums on the site, and the final grading and capping of the landfill. For additional information, refer to:

[http://yosemite.epa.gov/r1/npl\\_pad.nsf/31c4fec03a0762d285256bb80076489c/5c1c06e8b65c7d6a8525692d00618240!OpenDocument](http://yosemite.epa.gov/r1/npl_pad.nsf/31c4fec03a0762d285256bb80076489c/5c1c06e8b65c7d6a8525692d00618240!OpenDocument)

A 2009 MEPA Certificate required that the City address the feasibility of a trail along the Merrimack River crossing the Landfill. Notably, the City was exploring re-use of the landfill (once capped) for recreational purposes. The MVPC understands that a site re-use plan remains to be finalized.

The City and the other Responsible Parties remain engaged in the closure of the Southern Landfill portion of the site. Following a City procurement process, Boston Environmental and Trucking Corporation of Brockton, MA was hired in Spring 2011 to shape and re-grade the "southern mound" of the landfill. This work is ongoing.

A public meeting was held on June 27, 2011 at which CDM (the City's consultant) presented an overview of site activities to date (Attachment E). Some interest in reusing the site for recreation has been expressed. It remains to be determined whether the landfill closure precludes use of the former Georgetown Branch right-of-way that bisects the Northern and Southern landfill.

#### Land uses within ½ mile of the right-of-way

In Haverhill, the project right-of-way borders the Merrimack River and an urbanized post-industrial community comprised of both small and large commercial properties. Records show that land immediately east of the Basiliere Bridge was occupied by lumber, coal and leather-goods manufacturing. Various buildings, garages and foundations remain in place. The right-of-way crosses the yards of several residences

along Railroad and South Water Streets, City of Haverhill – owned property utilized by the Crescent Yacht Club, and a public landing. It then traverses the former Haverhill Paperboard Company at 100 South Kimball Street (15 acres). The right-of-way then crosses the City’s wastewater plant; agricultural land, and a City-owned municipal landfill. Johnson’s Creek is a prominent natural feature, and its centerline is used as the corporate boundary between Haverhill and Groveland.

Upon entering Groveland the right-of-way crosses woods, a National Grid substation, a former railroad depot site (most recently used as a lumber business, now inactive), a Town-owned pumping station, and transitions to alternately wooded land, wetlands and residences. Most residential properties are single family; however, there is a sizable cluster of townhomes which abut the right-of-way. The closest unit in this development is within 50’ of the right-of-way. Further east, the right-of-way is within ¼ mile of the Dr. Elmer C. Bagnall Elementary School on Route 97. Moving east toward King Street, land uses transition from residential and woodlands to additional National Grid facilities, a commercial sand and gravel operation, and light industrial uses south of the right-of-way.

Wooded areas, wetlands and residential uses are found along the right-of-way in the western end of the Town of Georgetown. Trestle Way (owned by the Georgetown Housing Authority), is a 146-unit housing development. It abuts the right-of-way and Route 97, west of Georgetown Square. It is also the location of a former Bay State Street Railway elevated crossing of the Georgetown Branch. The right-of-way becomes integrated with a residential neighborhood and joins with the commercial uses at the western edge of Georgetown Square.

#### Other structures and uses in the project area

**Well heads and fields.** Historic data shows artesian wells and other wells in the vicinity of Groveland Street in the Bradford section of Haverhill. There are numerous groundwater monitoring wells adjacent to the project right-of-way in both Haverhill and Groveland. A review of documentation for the Valley Manufacturing site in South Groveland and the Haverhill Municipal Landfill indicates that there are some active wells around the project; however, most residences have access to municipal water supplies. The Town of Groveland owns three wells in the vicinity of the project, of which two are known to be used for drinking water while the third is shut down. These wells lie south of the project in the vicinity of Washington Street. There are a number of closed private wells that appear to have served residential properties on Moulton and Monroe Streets, just south and east of the Project right-of-way, in addition to active groundwater wells in these same locations as well as on the former Georgetown Branch. There may be additional wells on property north of West Main Street. The Project’s utilization of former railroad rights-of-way is not expected to impact these facilities, as access to, and the integrity of, existing wells would be maintained. If the Project is designed to reestablish a connection between the former Georgetown Branch and the Newburyport Railroad rights-of-way, the Project would be designed to avoid disruption of the groundwater treatment equipment that is in operation at 11 Moulton Street.

**Drainage and Sewerage.** The right-of-way abuts the northern portion of the City of Haverhill's Wastewater Treatment Facility, and the wastewater treatment facility associated with the former Haverhill Paperboard facility. There are drainage outfalls in the project area; a new drainage outfall is to be constructed just west of the project as part of the South Main Street Reconstruction Project in Haverhill. Facilities in Groveland and Georgetown exist, but are less extensive given the development context. None of these facilities appear to preclude development of the project; at such time as it advances beyond this Study, additional investigation should be conducted, particularly to determine the details of a Town of Georgetown drainage project that is utilizing a portion of the right-of-way. Any structures related to these facilities within the right-of-way would be located in a detailed survey.

**Historic sites and properties.** MVPC reviewed documentation for these resources using Commonwealth of Massachusetts online data, and the Border-to-Boston Trail Feasibility Study prepared for the Town of Georgetown by Fay, Spofford and Thorndike (2007). As previously noted, available data indicates that most of the Georgetown Branch's assets have been sold or removed. Within one mile of the right-of-way, the MVPC identified the Clark-Adams House on Route 97 in Georgetown. Additional information for this topic can be found in Attachment C. At such time as the project advances beyond this Feasibility Study, a detailed historic / cultural resources inventory should be undertaken.

## VI. Overview of Trail Components

The Project is defined as a shared-use path in accordance with the following guidance:

<p>AASHTO Bicycle Facilities Guide <a href="http://design.transportation.org/Documents/DraftBikeGuideFeb2010.pdf">http://design.transportation.org/Documents/DraftBikeGuideFeb2010.pdf</a></p>	<p><i>A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way. Shared use paths may also be used by pedestrians, skaters, wheelchair users, joggers, and other non-motorized users.</i></p>
<p>U.S. Department of Transportation, Federal Highway Administration <a href="http://www.fhwa.dot.gov/environment/bikeped/freeways.htm">http://www.fhwa.dot.gov/environment/bikeped/freeways.htm</a></p>	<p><i>The term "shared use path" means a multi-use trail or other path, physically separated from motorized vehicular traffic by an open space or barrier, either within a highway right-of-way or within an independent right-of-way, and usable for transportation purposes. Shared use paths may be used by pedestrians, bicyclists, skaters, equestrians, and other non-motorized users.</i></p>

Source: <http://www.access-board.gov/sup/anprm.htm>

The project is proposed to be designed for non-motorized transportation connecting neighborhoods in three communities. It will connect several of the MVPC region's

concentrated development centers, and will provide recreational opportunities and access to several environmentally significant areas. The Project is intended also to connect the future Border to Boston and Merrimack River Trails.

The combination of potential user groups requires that the Project accommodate users with a wide range of abilities and interests. The Project's context also requires adequate means of access, and in some segments where properties are either unavailable or their future uses undetermined, MVPC proposes that the Project's feasibility as a combination of off- and on road segments be analyzed. Notably, some of the former right-of-way has been converted to public streets – particularly at its eastern end in the Town of Georgetown.

The ability to consider alternative path alignments depends upon the context of properties abutting the Project right-of-way, which predictably vary in size, ownership and use. The Project segment within Haverhill is perhaps the least fragmented, owing to its location along the Merrimack River; the continued existence of large land parcels abutting the right-of-way, and relatively few roadway crossings. The City's ownership of several of these properties, i.e. the Crescent Yacht Club, the Wastewater Treatment Plant, and the Municipal Landfill are advantages. The major Project challenge at the Municipal Landfill site will be to determine if and how the Project can be integrated with the landfill's closure. Accordingly, the City of Haverhill is exploring the feasibility of 'land swaps' at some locations, to maximize the trail's physical and visual connections to the Merrimack River. One or more of these land swaps would also benefit abutters whose properties are presently bisected by the right-of-way.

The project's path surfaces and amenities should compliment or match connecting facilities. MVPC recommends that the path be surfaced with bituminous concrete. A shared-use path can be flexibly designed; on average, a 12' wide bituminous concrete paved travel surface marked for bi-directional travel. This surface will be installed with sufficient protection to safeguard against edge raveling, and will be sloped in one direction (not crowned) to facilitate drainage. The path will provide for amenities including benches, lighting and signage, waste receptacles, way-finding and interpretive information, and security / safety equipment. Path at-grade crossings will be required, plus gates / bollards to prevent unauthorized vehicles from entering / exiting the path. Guardrails will be required in some locations to protect trail users where there are obstructions or steep slopes adjacent to the trail. The MVPC recommends that project stakeholders consult sample design cross-sections that are available in various studies including the 2007 FS&T study prepared for the Town of Georgetown. Excerpts of general guidelines can be found in Appendix F of this Study.

In all three communities, the project will require maintenance, restoration and/or replacement of certain bridges and/or culverts crossing small waterways. The MVPC reviewed information for other active shared-use trail projects in the Commonwealth, but was unable to find specific technical or cost data to prepare estimates within the scope of this Study. It appears that any bridge or culvert will be required to meet H-20 design standards, as was projected in the 2007 FS&T Town of Georgetown Study.

## Access Points

The shared-use path should be accessible from adjacent streets and public facilities, to maximize Project utility and public safety. The right-of-way is perpendicular to number of streets in all of the Project communities, which lead to residential, employment and transportation nodes:

- Haverhill: Ferry, Railroad, South Mill, South River Streets, Yemma Road
- Groveland: Ashcroft and Baldwin Terraces; Federal Way, Hampshire and Old Jacobs Roads, King, Main and Salem Streets
- Lakeridge Drive; Laurel Lane; Moulton, Pond and Prospect Streets.

MVPC proposes to work with the project communities in later project phases to analyze and determine the number and location of local access points.

## Trail and Roadway Crossings

The project would require the construction of several roadway crossings in Groveland, most of which require reworking of former at-grade railroad crossings. The Groveland crossings at Center Street and Route 97 west of the Bagnall School are perhaps the most challenging given existing approach geometry. If the project is designed to follow the existing right-of-way between Center Street in Groveland and Trestle Way in Georgetown, a grade-separated crossing permitting the path to cross under Route 97 at Trestle Way in Georgetown would likely be desirable due to roadway geometry, sight distances, travel speeds and projected shared-use path user characteristics. The MassDOT Design Guidebook advises that trail underpasses typically require a path vertical clearance of 8 to 12 feet. The Guidebook advises further that “there are no clear warrants” that mandate grade separation; therefore, it will be up to the project designer, the communities and other stakeholders to decide whether to grade-separate the path.

## Parking

MVPC staff finds that there is potential for development of limited parking along the Georgetown Branch right-of-way that will serve Trail users. Locations that could be considered include:

- MBTA Bradford Station lot
- Crescent Yacht Club Lot, Haverhill
- Haverhill Municipal Landfill, Old Groveland Road
- Main Street, Groveland near former Esty and Sons Lumber site
- Moulton Way or adjacent street (near former Georgetown Station). Such a facility could be developed to serve this Project and the future Border-to-Boston Trail.



## Projected Facility Users

Consistent with other feasibility studies, it is essential to identify the types of bicyclists and other users that the facility will accommodate. One solution to this challenge is to start with the concept of “design cyclist” put forth by the FHWA (*Selecting Roadway Design Treatments to Accommodate Bicycles*, Publication No. FHWA-RD-92-073, January 1994):

**Group A: Advanced Bicyclists** - Experienced riders who can operate under most traffic conditions. Such bicyclists require direct access to destinations; Operate at maximum speed with minimum delays. Group A riders require sufficient roadway space or shoulder so that bicyclists and motorists can pass without altering their line of travel.

**Group B: Basic Bicyclists** - Casual or new adult and teenage riders who are less confident of their ability to operate in traffic without special provisions for bicycles. These bicyclists require comfortable access to destinations; a direct route to one or more destinations, but on low-speed, low traffic-volume streets or designated bicycle facilities; well-defined separation of bicycle and motor vehicles or separate bike paths.

**Group C: Children** - Pre-teen riders whose roadway use is initially monitored by parents. These riders require: access to schools, recreation facilities, shopping, or other residential areas; residential streets with low motor vehicle speed limits and volumes; well-defined separation of bicycles and motor vehicles or separate bike paths; establishment and enforcement of speed limits; implementation of traffic calming; provision of wide outside lanes in urban settings and usable shoulders in rural settings.

A future Georgetown Branch shared-use path will most likely be used by Groups B and C, with some use by Group A bicyclists; pedestrians; in-line skaters, and persons utilizing approved mobility devices. When joined with other shared-use facilities now in development, the project is expected to be particularly attractive to bicyclists. Further, the project’s potential for shared use of existing roadways in some locations renders these rider classifications even more relevant.

## Activity Centers To Be Served

The project would directly connect with Bradford Village and downtown Haverhill via the Riverwalk Project; residential areas in South Groveland, the Bagnall School in Groveland, and with residential areas on Route 97, the Trestle Way public housing development and mixed uses in Georgetown Square.

### Right-of-Way Requirements

The approximate Project distance is 5.5 miles. A project right-of-way that is sufficiently wide enough to accommodate a 15' average cross-section is presumed; a scan of the B&MRR 1914 track valuation maps showed that the right-of-way typically ranged from 20' to 25' wide. There will be instances where the right-of-way will prove ample as well as constrained owing to natural features due to its present use as a utility corridor. Please refer to Appendix F for sample shared-use path design guidelines.

### Right-of-Way Ownership and Control

The MVPC's understanding is that most of the right-of-way is owned and/or controlled by National Grid according to whatever rights it acquired from the former Boston and Maine Railroad. To-be determined segments of the right-of-way in Haverhill between the Basiliere Bridge and the Haverhill Paperboard Company's eastern property line are reportedly owned by either the Massachusetts Bay Transportation Authority or PanAm Railways (a corporate successor of the Boston and Maine Railroad); by Haverhill Paperboard, or other private parties. The MVPC recommends that a comprehensive title search and property report be performed by a qualified real estate professional. This work will be required to fully understand the status of the project right-of-way, including assignment of rights and tasks required.

### Project Development Cost Estimates

The MVPC sampled several recent reports for other rail-to-trail projects to begin developing some project cost information, as follows:

<b>Activity</b>	<b>Estimated Cost</b>
Due Diligence	\$100,000- \$200,000
Design (+-10% of construction cost)	\$550,000
General path construction	\$5.5 - \$6.0 million

Due diligence activities are assumed to include property documentation research, and development of information required to secure necessary rights. The MVPC assumed an average construction cost assumption: approximately \$1,000,000 per mile construction cost (excluding bridges, lighting and drainage structures). For bridges, a controlling design factor will be the structural load rating required (H-20 v. H-10, whereby H-10 is suitable for path maintenance vehicles and H-20 can accommodate heavier construction and emergency vehicles ), width of crossing, and field conditions including any existing abutments or structures. Use of prefabricated bridges may be a cost-effective option for this project. Each of the project communities will need to determine what types of amenities to be programmed into the project, i.e. street furniture, art, lighting.

## Project Maintenance Responsibilities

The MVPC anticipates that once constructed the project will be maintained by the City of Haverhill and the towns of Georgetown and Groveland. This is consistent with the Haverhill Riverwalk and Border to Boston Trail. The municipalities would be responsible for maintenance activities including routine inspections, public safety monitoring and response, and provision of lighting in some segments (if included). At such time as the project enters the design phase, a maintenance plan should be developed with short, medium and long term requirements for each of the municipalities. There would be opportunities for the communities to organize a 'friends of the shared-use path' organization or to utilize their recreation or trail committees, or similar groups to commit time and resources toward maintaining the path. This approach has worked very well for other shared-use path projects including the nearby Bruce Freeman Bikepath in the Northern Middlesex MPO region.

Good information is available to aid development of a project maintenance plan. For example, the Rails-to-Trails Conservancy (R2TC) in 2005 released an updated version of its report, Rail-Trail Maintenance & Operation in which R2TC surveyed 100 trails on primary management and design topics including liability, surfaces, drainage, amenities, signs, bridges and budgets. The report is available for download at: [http://www.railstotrails.org/resources/documents/resource\\_docs/maintenance\\_operation\\_s-report.pdf](http://www.railstotrails.org/resources/documents/resource_docs/maintenance_operation_s-report.pdf)

## **VII. Project Implementation Plan**

The project can be implemented in multiple phases as a series of discrete tasks. For example, the City of Haverhill has purchased and is preparing for path development a 3,700' segment of the Georgetown Branch east of this project. It acquired that segment from PanAm Railways with MassDOT funds, and its development as a shared-use path was approved by MassDOT's Project Review Committee in 2009. Iron Horse Preservation, a non-profit rails-to-trails advocacy group, removed the tracks in Spring 2011. The path (also referred to as the Bradford Rail Trail) is currently in design. When completed, the path will begin near the junction of the Georgetown Branch and the "Western Division" main line near the MBTA Bradford Station and end at the Basiliere Bridge (Route 125 over the Merrimack River). A linear park and interpretive elements are planned as well as several gateway entrances and parking.

### **Project Stakeholder Roles and Responsibilities**

Project communities will hold additional preliminary discussions with participation of residents and City or Town officials. The City has informally discussed the project's potential with interested parties in the towns of Georgetown and Groveland as well. The communities are responsible for securing right-of-way required to construct and operate the project. The communities will also be responsible for preliminary design,

maintenance and outreach to build long-term project support and stewardship. The project communities will also be responsible for investigating whether opportunities exist to reclaim track, ties and other former railroad equipment along the right-of-way. The MVPC's Pictometry data indicates that such infrastructure east of the Haverhill Paperboard property was removed long ago. Tracks and ties exist on the Haverhill Paperboard property and behind several residences on South Water Street, and much of the infrastructure is intact at the Ferry Street underpass.

If the project utilizes federal or Commonwealth of Massachusetts transportation funds, the MassDOT would be responsible for review of the Project's design from 25% to completion; advertising the Project for construction, and selecting and managing the contractor. MassDOT would ensure that the project is developed to meet all applicable federal and Commonwealth of Massachusetts standards, thus qualifying the project as eligible for federal and state funds.

MVPC is preparing this Project Feasibility Study and will incorporate work required to undertake later phases of the Project into future years of its Unified Planning Work Program (UPWP). It will assist its member communities in advancing the Project through the design/engineering and construction process.

National Grid must participate in the project's development process, agree to use of its right-of-way for the project, and work cooperatively with property owners and the host communities to establish use and maintenance protocols.

## **Design**

The MVPC notes that the federal Architecture and Transportation Barriers Access Board in Summer 2011 issued an Advance Notice of Proposed Rulemaking (ANPRM) to develop accessibility guidelines for shared-use paths. The final guidelines are to include technical provisions for making newly constructed and altered shared use paths covered by the Americans with Disabilities Act of 1990 (ADA) and the Architectural Barriers Act of 1968 (ABA) accessible to persons with disabilities. At such time as the Project enters the design phase, its designer should consult these and any subsequent guidelines to ensure the Project's conformity with all applicable design guidelines and standards. As previously noted, if the project utilizes federal or Commonwealth of Massachusetts transportation funds, the path design would be required to comply with MassDOT policies and requirements. It is also likely that the MassDOT would assume responsibility for the design and construction process. In any case, the Consultant would be required to consult the MassDOT Highway Design Guidebook, particularly at Chapters 6 (Intersection Design) and 11 (Shared Use Paths and Greenways). Excerpts of design guidelines from federal sources can be found in Appendix E of this Study.

The design will be coordinated to match connecting trail projects at either terminus of the Georgetown Branch: the Border-to-Boston Trail in Georgetown, and the Riverwalk Trail in Georgetown. MVPC anticipates that identical design standards will be applied to future connecting trails, i.e. the Merrimack River Trail.

The MVPC proposes the following design considerations for a later project phase:

- No motorized vehicle use excepting emergency vehicles.
- A single treadway. The treadway is likely to be paved with bituminous concrete. The surface should match surfaces that are used on the Border-to-Boston and Bradford trails. This treatment would be preferable given crossings of properties with documented contamination issues. It would also be the practical choice for transportation use.
- Wayfinding signage should be consistent throughout the Georgetown Branch path. It can be coordinated with the Haverhill project; does not have to match Border to Boston Trail or Merrimack River Trail, but should work well with those projects' signage.
- Path integration with utilities: the separation of the Path from energy transmission facilities will be a key design parameter for this project. Overhead transmission lines are found throughout the project right-of-way. The project may present an opportunity to improve right-of-way access for utility maintenance in some locations.
- Portions of the shared-use path may be developed along roadways, particularly in the South Water Street area (Haverhill); from Center / School Streets in Groveland to Trestle Way in Georgetown, and along Terrace Lane approaching Georgetown Square. The purpose of integrating the shared-use path with local roads would be to promote security and visibility; maximum connectivity with adjacent land uses, and separation from utility infrastructure in constrained former railroad right-of-way segments.

## **Permitting**

The project proponents (City of Haverhill, Towns of Georgetown and Groveland) and/or their consultants would first prepare a Project Environmental Notification Form (ENF).

Review of MEPA documentation for the abutting Haverhill-Merrimack River Walkway Project (including the first half-mile of the Georgetown Branch) indicates that this project will likely require MEPA review based upon the following thresholds:

- A potential M.G.L. Chapter 91 License from the MassDEP
- Orders of Conditions from Haverhill, Georgetown and Groveland Conservation Commissions
- Actions involving Endangered Species pursuant to the Massachusetts Endangered Species Act (310 CMR 10.00), and Issuance of a Conservation and Management Permit from the MA Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program (NHESP)

- Work in the 200' Riverfront Area buffer, and potential work in Bordering Land Subject to Flooding.

The Secretary of Environmental Affairs' MEPA Certificate for the Haverhill Riverwalk Project (October 10, 2007) recommended the following actions which are relevant to this Feasibility Study:

1. Use of porous pavement on the Georgetown Branch property to reduce runoff;
2. Develop appropriate measures to minimize any impacts to habitat for Shortnose Sturgeon and Bald Eagles, which are found within the project boundary;
3. Coordination with the NHESP for any projected entries of equipment (including machinery) into waterways;
4. Review of the Walkway Project's archaeological survey (requirements under 950 CMR 70) and the Massachusetts Historical Commission's findings;
5. Employ MA DEP's Best Management Practices for Controlling Exposure to Soil during the Development of Rail Trails, <http://www.mass.gov/dep/cleanup/laws/railtrail.doc> and
6. Consultation with the National Marine Fisheries Service to determine if the Project construction schedule will require any restrictions, i.e. project shutdowns, limits on areas of work, etc. The particular species of concern is the Short-Nose Sturgeon.

### **Cost and Benefit**

The MVPC's project preliminary construction cost range is \$5.5 - \$6.0 million, exclusive of bridges and lighting. It is anticipated that the constructed project has an economic life of twenty years, but practically speaking it will be a permanent facility with a far longer effective life. Its benefits are expected to include:

- capping and reuse of a portion of the Haverhill Municipal Landfill with a durable, hard-surfaced path that will benefit users and prevent exposure;
- provision of new access to the Merrimack River waterfront;
- restoration or improvement of water flows from repair and maintenance to culverts and other structures, plus removal of debris;
- increased access to key properties, i.e. Haverhill Paperboard, Esty and Sons, and
- increased walking and bicycling to/from residential neighborhoods and business / employment centers.

The project can, if properly designed, also improve access for the utility companies to maintain, repair and regulate the use of their facilities. Each of the communities will benefit by a new walking and bicycling option with future regional connections. The project would also create local economic opportunities, i.e. support for small businesses catering to path users.

The MVPC found two resources to aid future development of a detailed project benefit / cost analysis:

1. Benefit-Cost Analysis of Bicycle Facilities. Sponsored by the National Cooperative Highway Research Program, the Minnesota Department of Transportation, and the Midwest Regional Transportation Center <http://www.bicyclinginfo.org/bikecost/>, and
2. NCHRP Report 552: Guidelines for Analysis of Investments in Bicycle Facilities. Washington, DC: Transportation Research Board, 2006  
[http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_552.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_552.pdf)

In subsequent work, information will be generated that can inform preparation of a detailed project benefit / cost analysis.

## **Funding**

There are several project funding options that the communities and the MVPC can jointly pursue. For example, the MVMPO has programmed \$467,313 in FFY 2013 federal Congestion Mitigation Air Quality (CMAQ) funds for construction of the adjacent Haverhill Riverwalk path segment between Bradford Station and the Basiliere Bridge. The MVPC anticipates that it will work with the project communities toward securing CMAQ funds for path construction in a future federal fiscal year, once the design advances and sufficient CMAQ funds are made available. Federal Transportation Enhancements (TE), Safe Routes to Schools (SRTS) funds, and federal non-transportation funds (i.e. Brownfields, Community Development Block Grant) also have been used to develop facilities similar to this project. The Rails-to-Trails Conservancy provides excellent on-line information for project development at [http://www.railstotrails.org/ourWork/trailBuilding/toolbox/informationSummaries/funding\\_financing.html](http://www.railstotrails.org/ourWork/trailBuilding/toolbox/informationSummaries/funding_financing.html)

The Town of Georgetown through its designated Community Preservation Committee may elect to use some of its Commonwealth of Massachusetts Community Preservation Act (CPA) funds to design its segment of the project. The CPA, established in 2000, allows communities to create a local Community Preservation Fund to raise money through a surcharge of up to 3% of the real estate tax levy on real property for open space protection, historic preservation and the provision of affordable housing.

The MVPC Transportation Program Unit will continuously scan for other sources of project grants and provide that information to the project host communities.

Finally, during subsequent project phases the municipalities should consult with organizations interested in reclaiming former railroad infrastructure to determine if salvage value could leverage clearing or other interim path development work.

## **VIII. Appendices**

- A. Historic data
- B. Pictometry data
- C. Haverhill Municipal Landfill PowerPoint slides
- D. Sample path design guidelines
- E. Sample path / roadway crossing treatments
- F. Sample path treatments within utility easements
- G. Bibliography

Note: the following additional Project materials are available at the MVPC:

### **Assessors' Maps**

Atlas maps for Georgetown, Groveland and Haverhill (sources listed in A, below)

B&MRR 1914 Railroad Valuation ('val') Maps

FEMA Flood Rate Maps – City of Haverhill



## **Appendix A: Historic Information and Project Resources**

### **Historic Properties in Project Vicinity**

Source: <http://www.LandmarkHunter.com/ma/essex;>

<http://www.google.com/images?imgurl=http://LandmarkHunter.com/photos/51/13/511371-T.jpg>

#### **Georgetown**

1. Adams-Clarke House, 93 West Main Street. Single dwelling, built 1725  
National Register of Historic Places, 03/09/90 reference #90000211  
42.72815, -70.99543

#### **Groveland**

1. George Hopkinson House, 362 Main Street. Single dwelling, built 1716  
National Register of Historic Places, 03/09/90 reference #90000220  
42.75946, -71.03585

#### **Haverhill**

1. Buttonwoods-Saltonstall-Duncan Homestead. Single dwelling, now museum, built 1800  
National Register of Historic Places, 06/08/05, reference #05000560  
42.77245, -71.06702
2. Hazen-Spiller House, 8 Groveland Street. Single dwelling, built 1724  
National Register of Historic Places, 03/09/90, reference #90000226  
42.77037, -71.06351
3. Peabody School, 170 Salem Street. Municipal building, built 1895  
National Register of Historic Places, 10/23/86 reference #86002900  
42.76328, -71.07032

### **Historic districts in project vicinity**

#### **Haverhill**

1. Main Street Historic District. Ten buildings, one contributing site, thirteen contributing objects, one contributing structure and other buildings/structures, built 1750-present.  
National Register of Historic Places, 05/09/03 reference #03000383
2. Washington Street Shoe District. Includes Wingate, Emerson, Railroad and Washington Square. 52 buildings built 1856-1924.  
National Register of Historic Places, 10/14/76, #76000257  
42.77348, -71.084441

## Appendix A: Historic Information and Project Resources

### Recommended information contacts

City of Haverhill, Towns of Groveland and Georgetown – historic pictures  
Fay, Spofford & Thorndike – 2007 Border to Boston Feasibility Study for the Town of Georgetown.

Ken Ackerboom,

[http://trainguy.dyn.dhs.org/bmrrhs/archives/Sanborn\\_Index\\_Web\\_Page/sanborn\\_bm\\_sheets\\_mass.html](http://trainguy.dyn.dhs.org/bmrrhs/archives/Sanborn_Index_Web_Page/sanborn_bm_sheets_mass.html)) – also consult Haverhill, Groveland and Georgetown to see if they have the Sanborn sheets.

Scott Currier (a member of the Boston and Maine Railroad Historical Society) maintains a railroad archaeology page. See [www.older.com/index/gtown.htm](http://www.older.com/index/gtown.htm). Also [www.older.com/bradmap1.jpg](http://www.older.com/bradmap1.jpg). Contact Scott at [scott\\_currier@hotmail.com](mailto:scott_currier@hotmail.com).

### Data Sources

1. Beers, D. and Company, 1893 Atlas of Essex County, Massachusetts. Walker, George H. and Company. 1884 Atlas of Essex County, Massachusetts.
2. Sanborn Map Company. City of Haverhill has map book updated through 1936; pages cannot be copied, but can be photographed onsite with a digital camera. Maps applicable to Project: 57, 60, 63-64, 68, 71-73.
3. [www.floodsmart.gov](http://www.floodsmart.gov). Site provides FEMA flood information for properties by address.

### Properties of Specific Interest

Haverhill

Taylor, Goodwin and Company. Lumber and coal dealer. Business operated on land between South Main Street and Railroad Avenue; the Georgetown Branch bisects the property. Buildings on the property were burned and reconstructed several times, notably twice in 1903 alone.<sup>11</sup> While the property is currently vacant; various building foundations remain on-site.

Haverhill Paperboard Corporation, 100 South Kimball Street. Opened in 1902 and closed on August 29, 2008. As of June 2008, the plant had 174 employees. The property is 15 acres, with buildings totaling 375,000 sq. ft. The City of Haverhill in 2008 valued the property at \$7.6 million, with taxes of \$130,824.

Former Essex Brewing Company, 60 Railroad Street. Established 1902, closed by 1937. In 1942, auctioned to the Hoyt and Worthen Tanning Corporation and the brewery itself was used for storage space until demolished in 1968. The Hoyt and Worthen Tanning Corporation (founded after WWI by Aaron Hoyt of Haverhill) manufactured leather goods at this site. Merchandising and administrative offices remained in Haverhill, along with a 6,000 square foot warehouse until 2003. The company no longer operates at the site, but is incorporated as Hawtan

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<sup>11</sup> The Portsmouth Herald, *Fires Come Fast In The Plant of Taylor, Goodwin And Company*. 28 February 1903. Transcribed by Linda Horton. [www.ancestry.com](http://www.ancestry.com), posted October 29, 2007  
<http://www3.gendisasters.com/massachusetts/1694/haverhill%2C-ma-lumber-fire%2C-feb-1903>

## **Appendix A: Historic Information and Project Resources**

### **Haverhill (continued)**

Leathers, with offices in Newburyport, MA (Sources: DiGrazia and Hawtan Leathers).

### **Groveland**

Ralph Esty and Sons Lumber Company, 441 Main Street. Site of former Groveland railroad station.

King Street Substation. Property of National Grid.

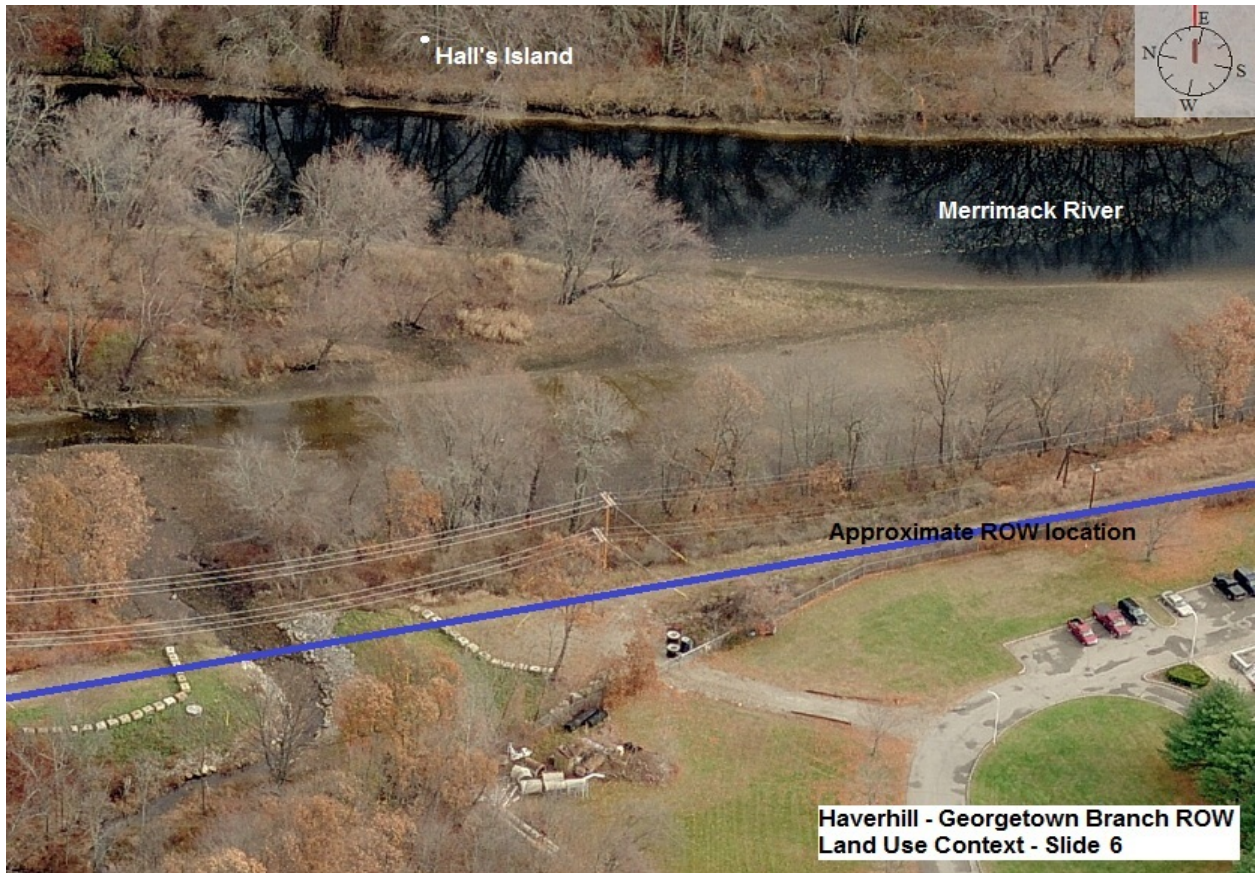
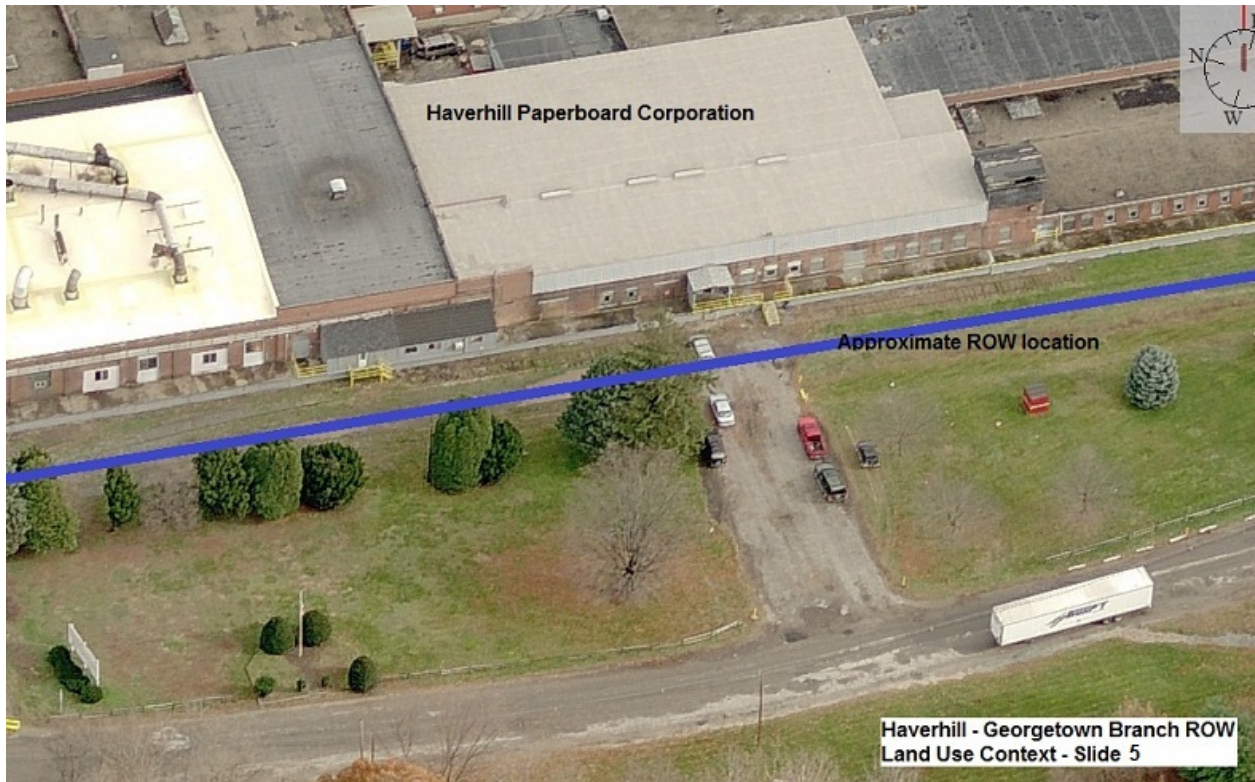
### **Georgetown**

Trestle Way (Georgetown Housing Authority). Interior roadways are named Hemlock, Laurel and Spruce Lanes. 146 units. Portions of these lanes are paper streets.

## Appendix B: MVPC Pictometry Data (Basilere Bridge East to Georgetown Square)



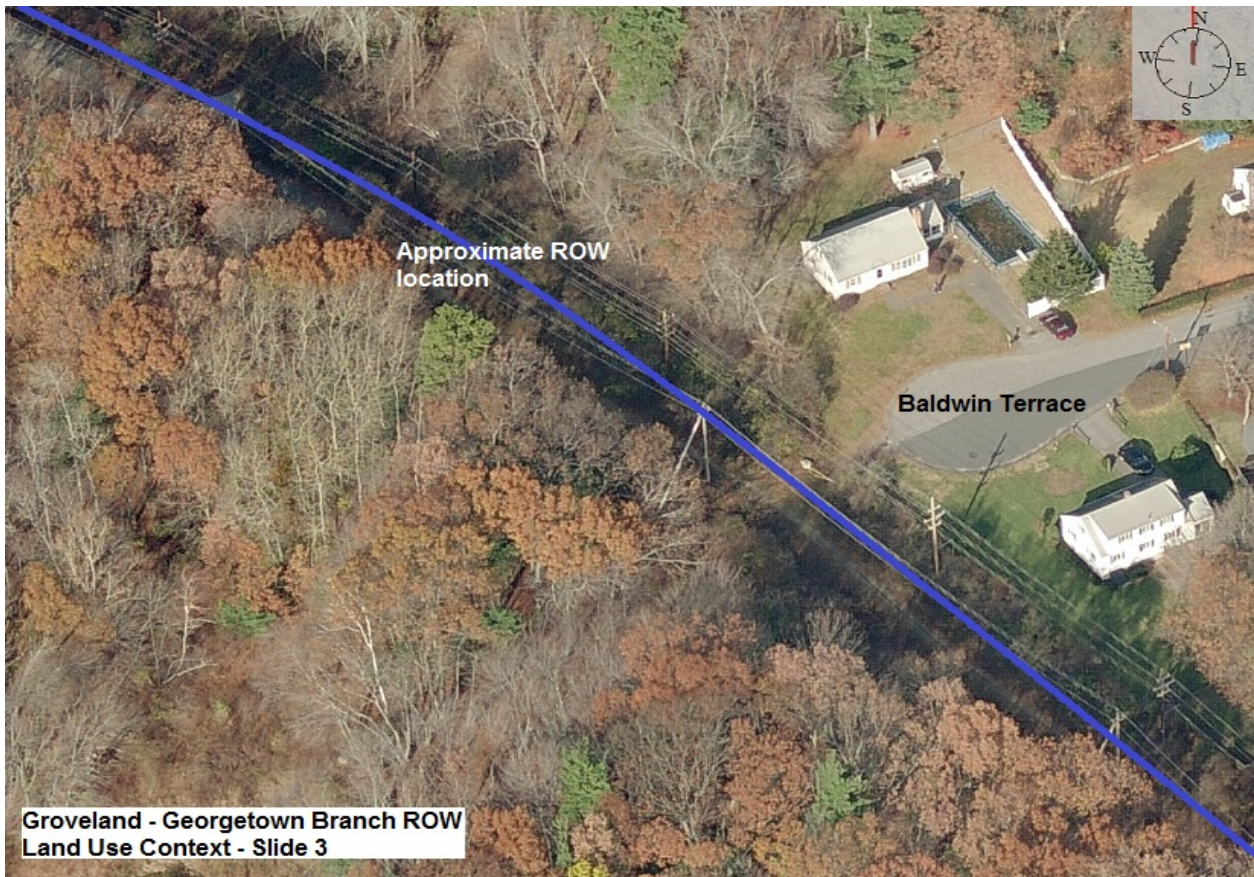


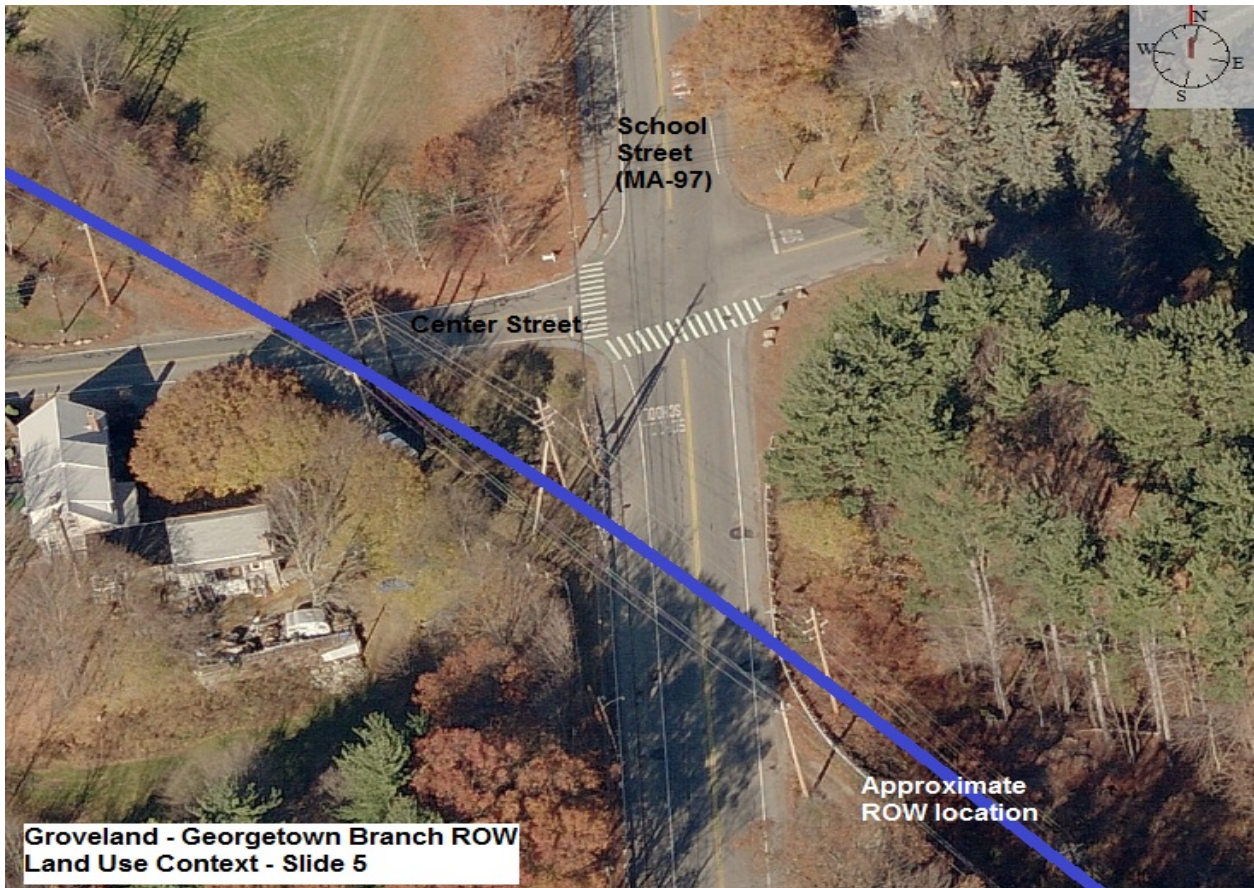


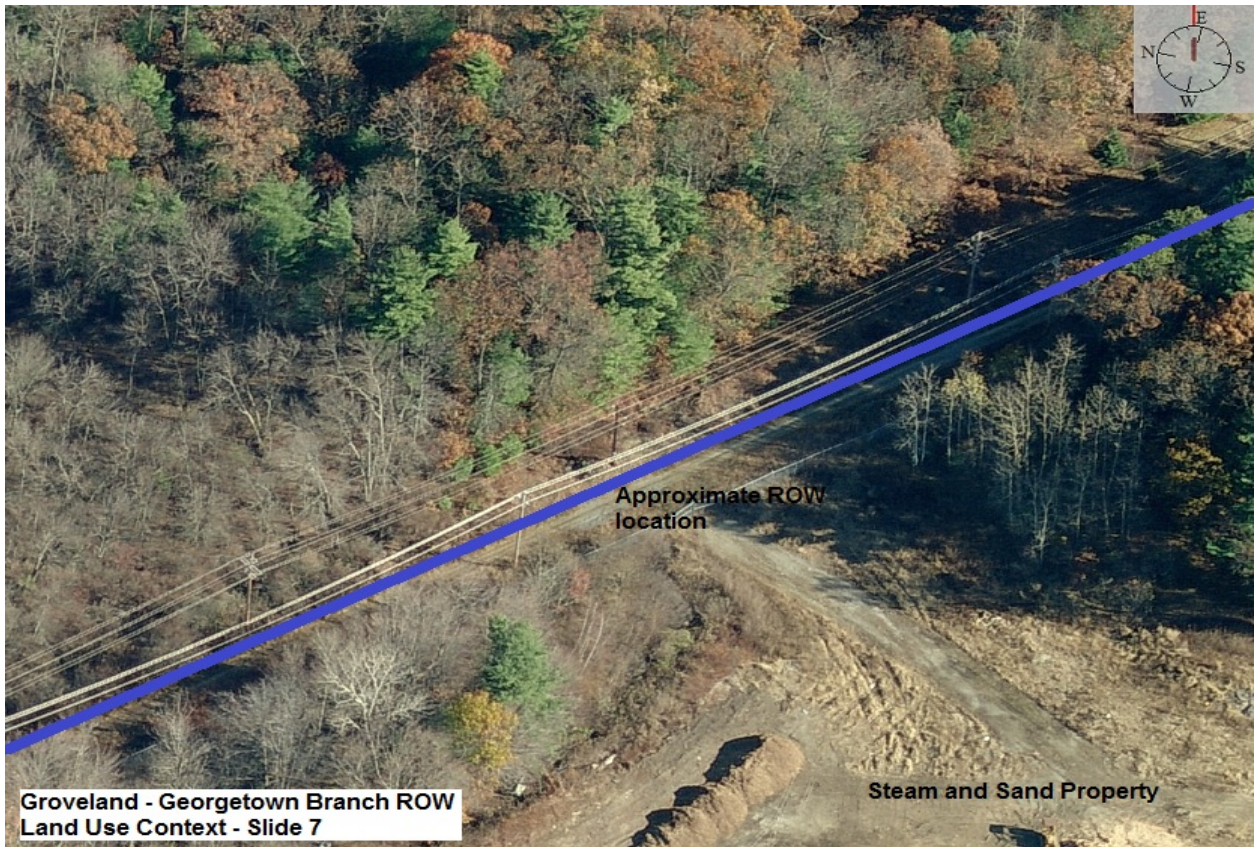
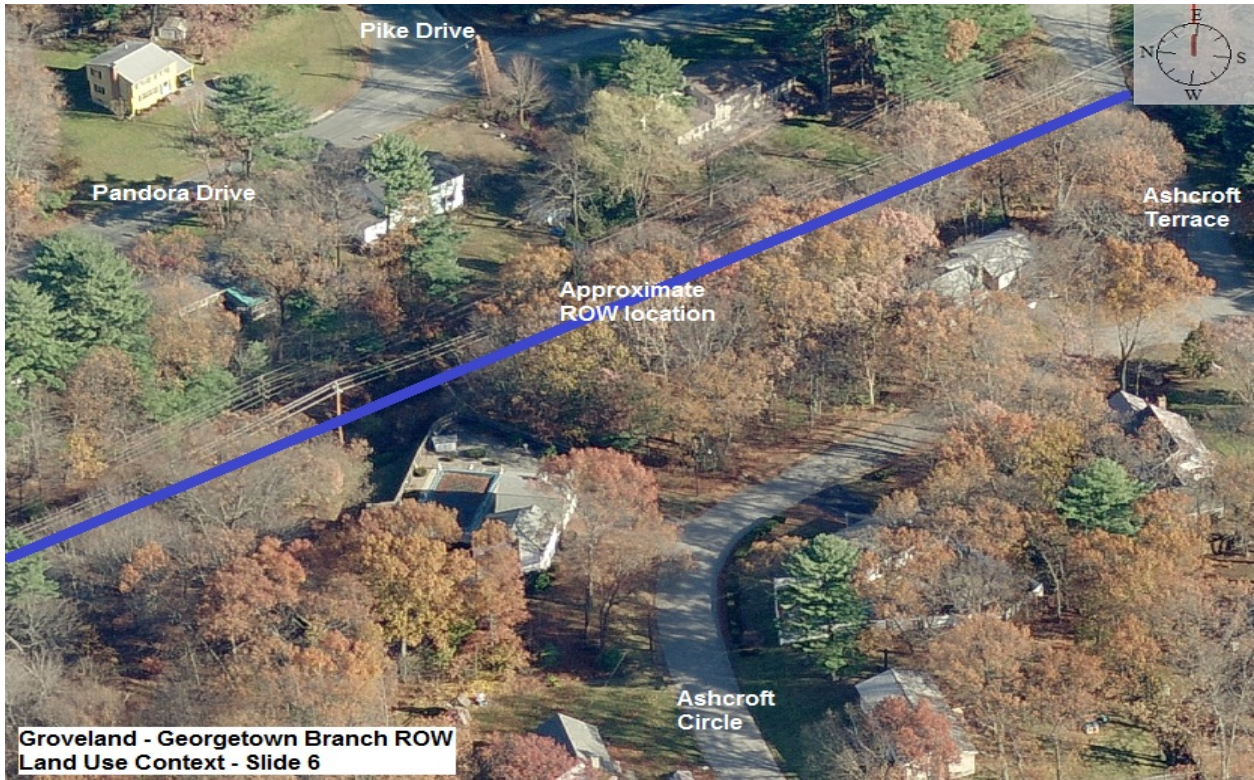


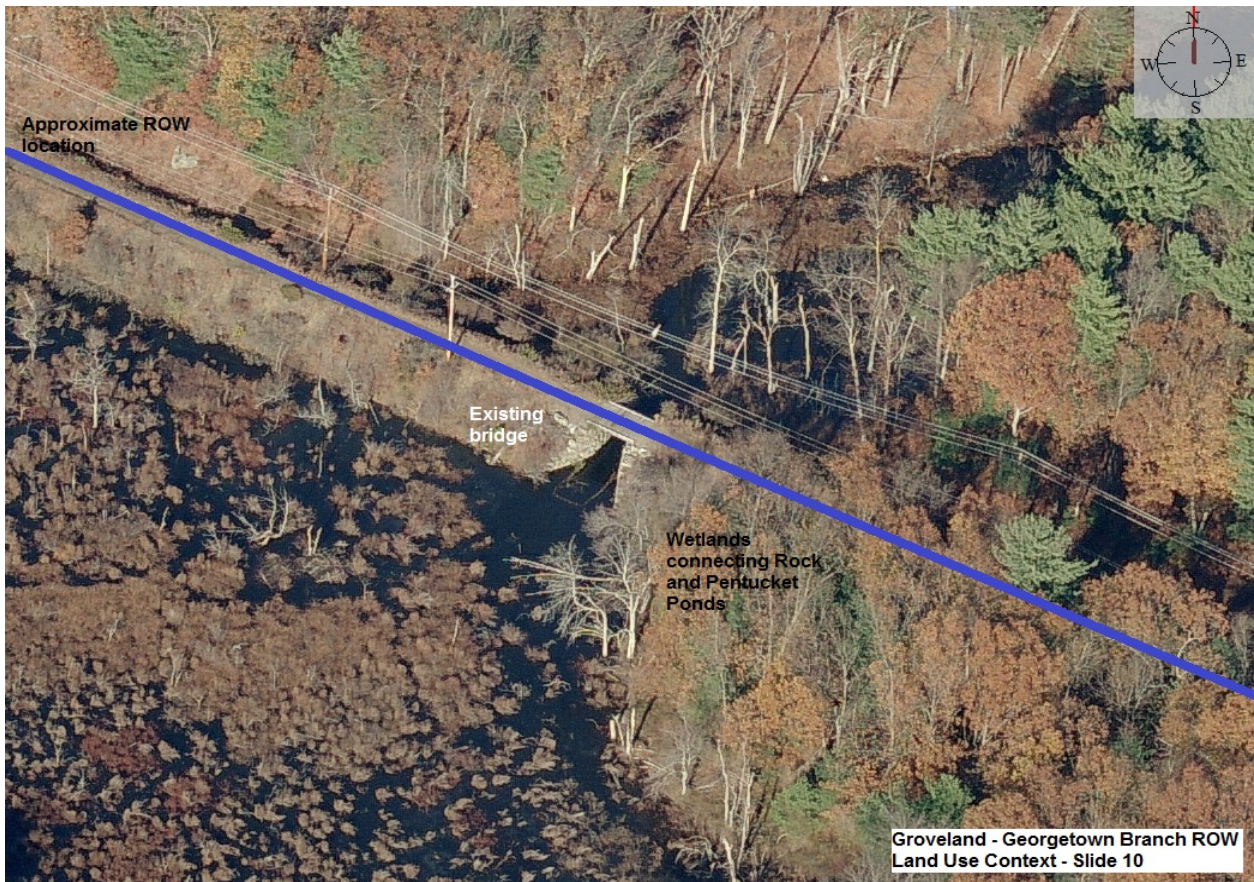
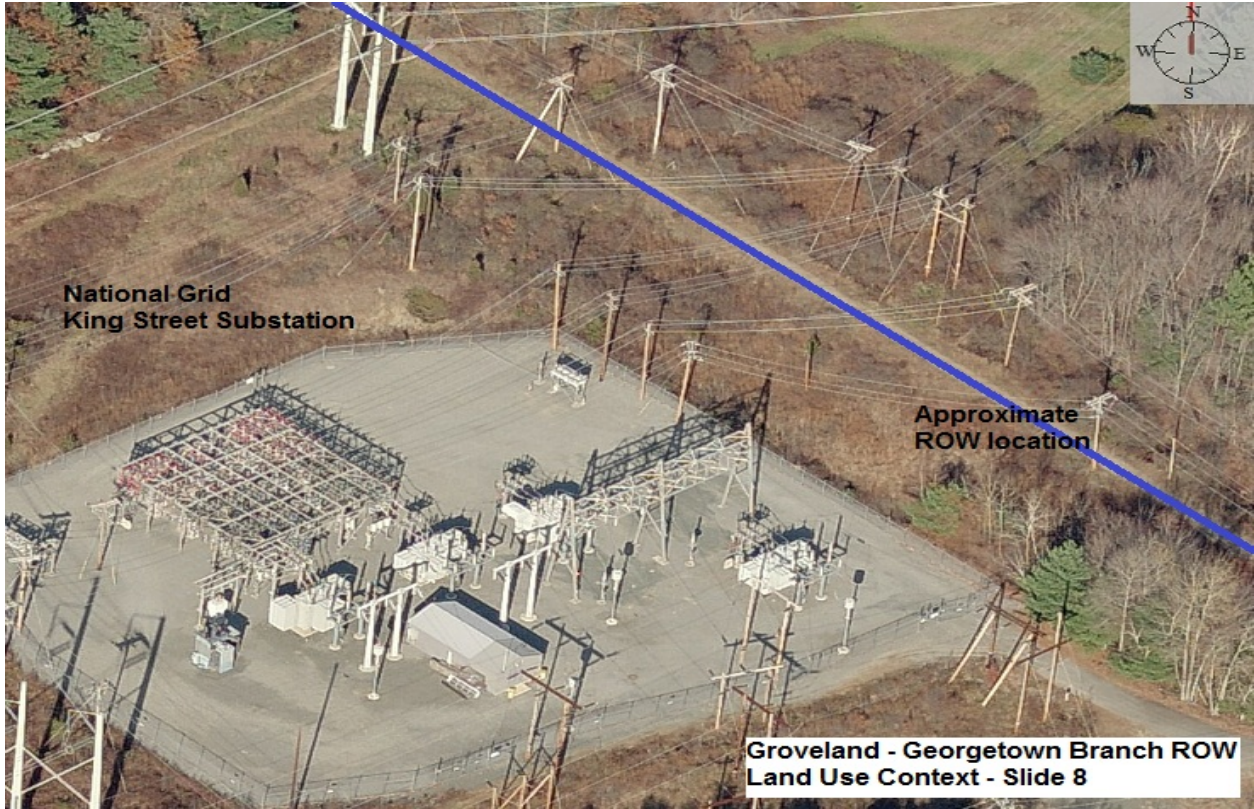


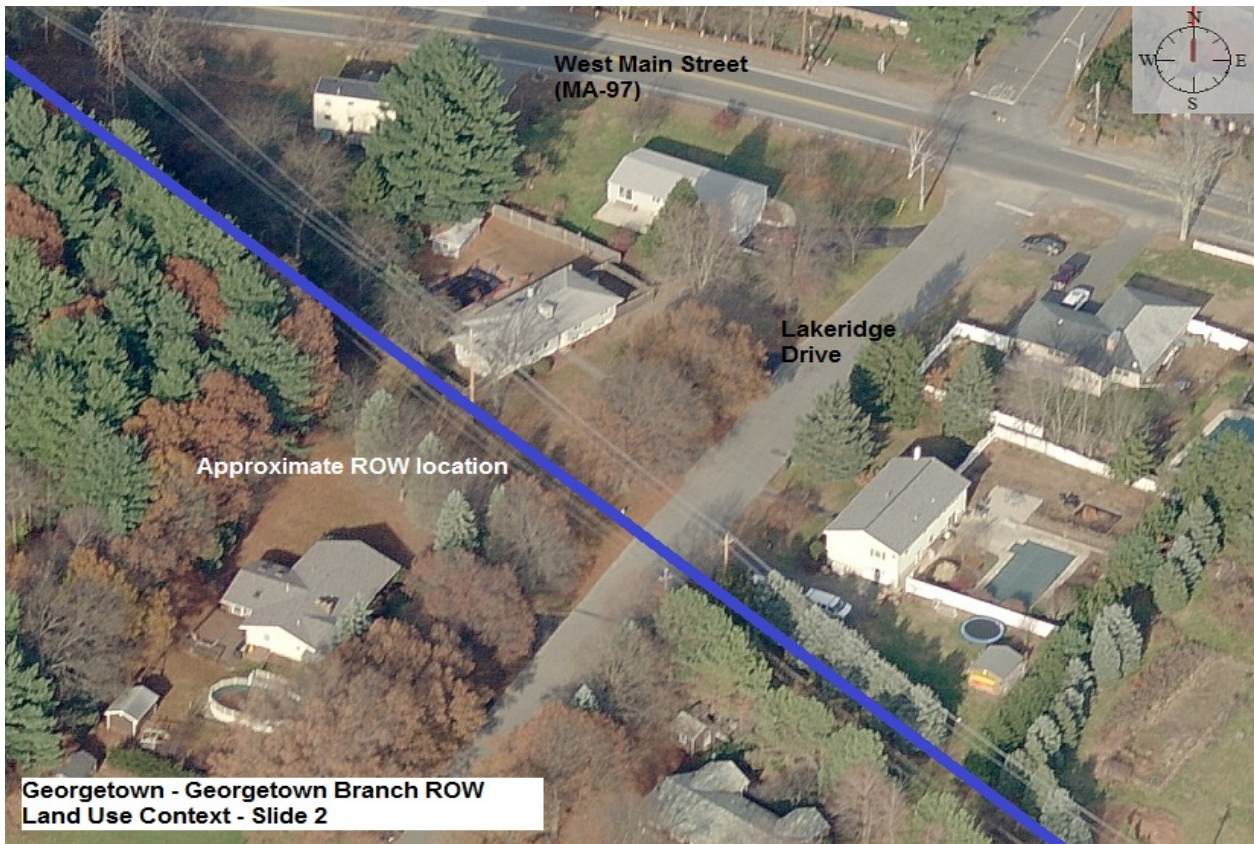


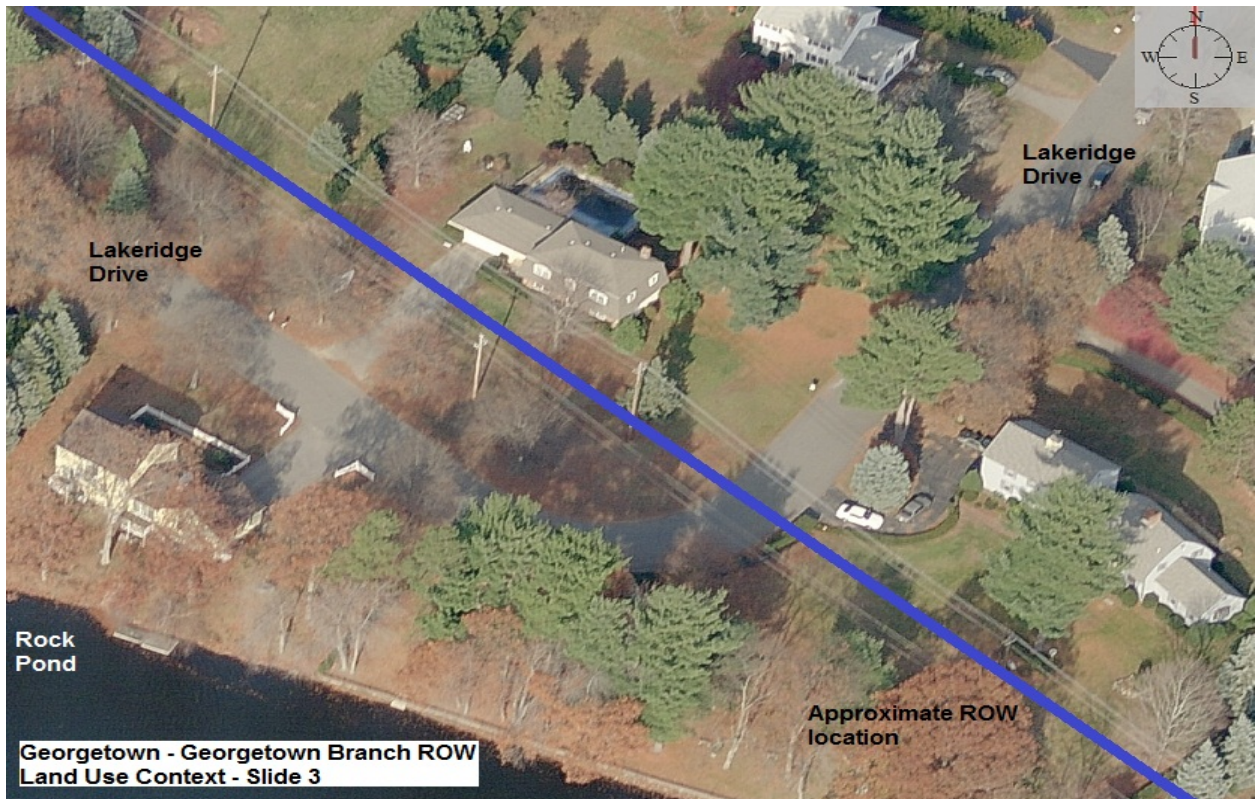




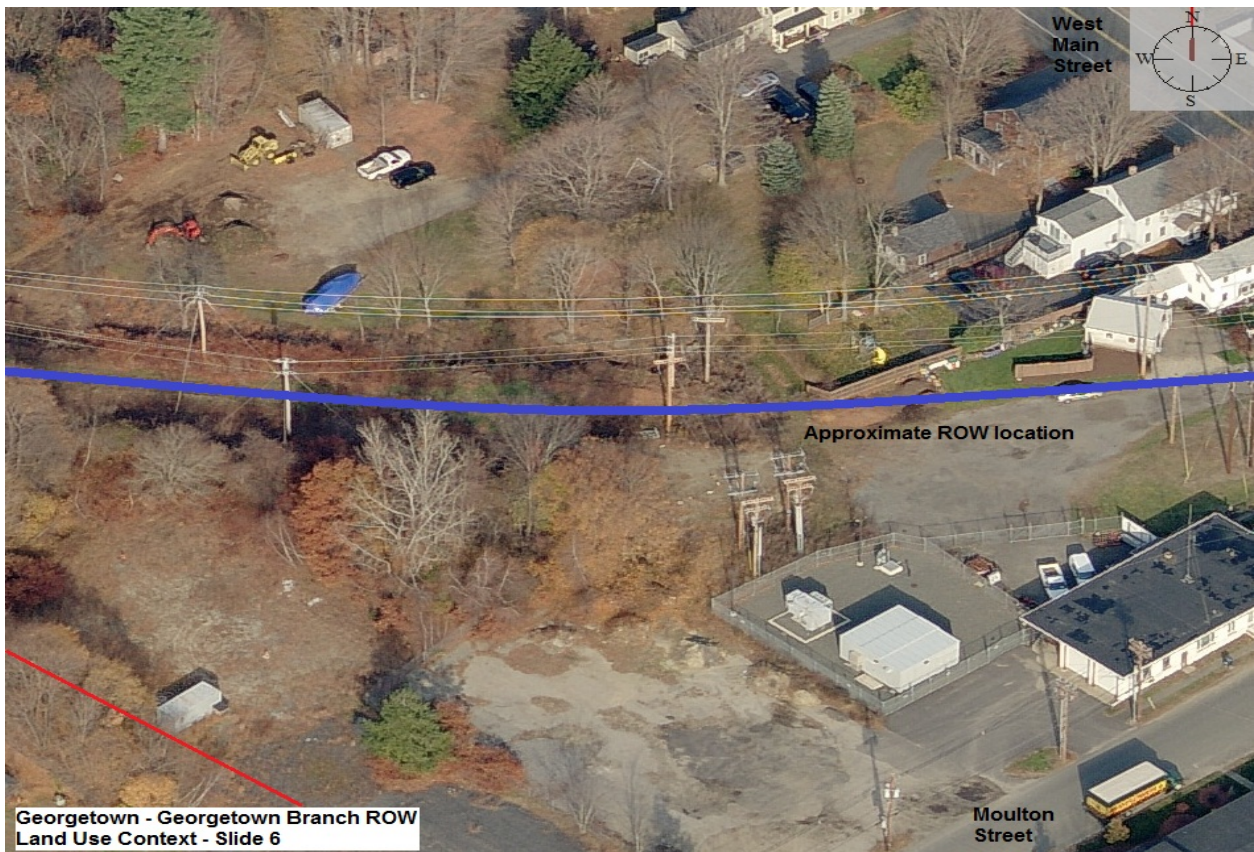
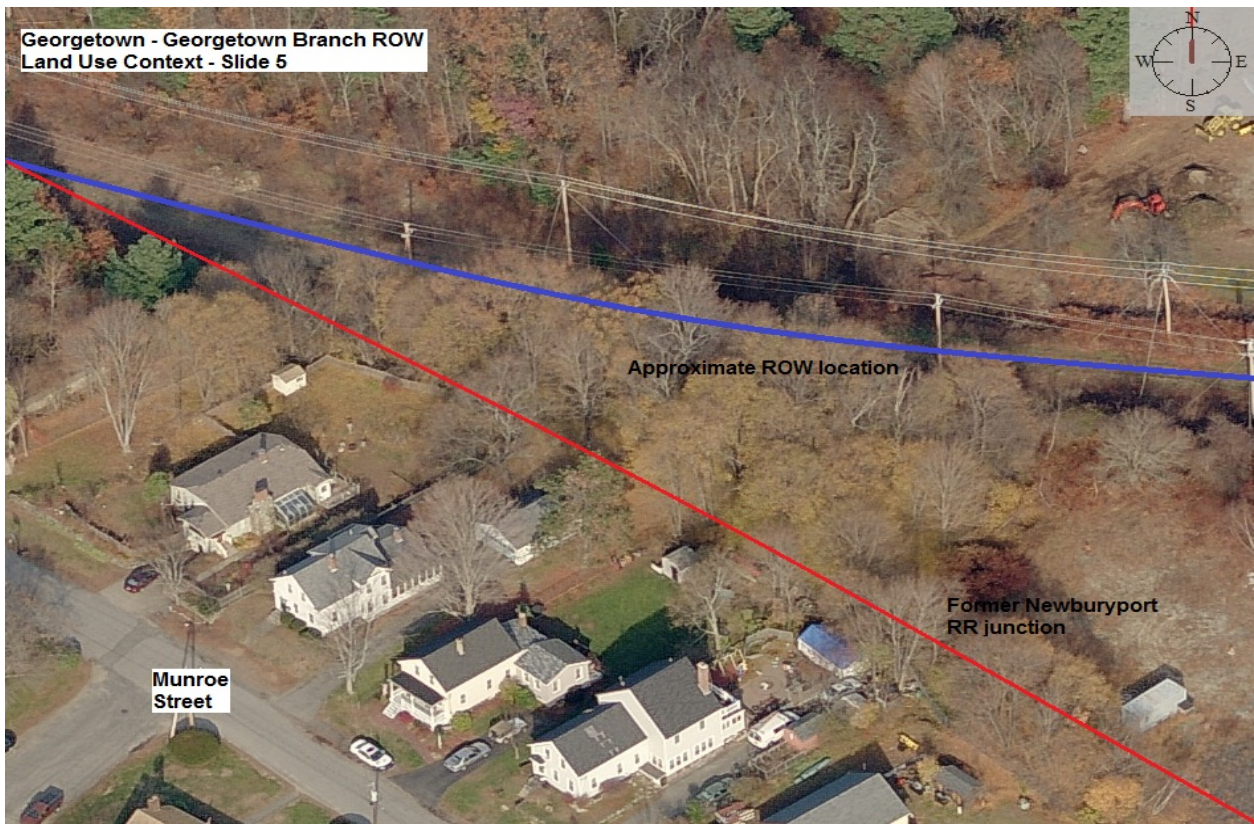




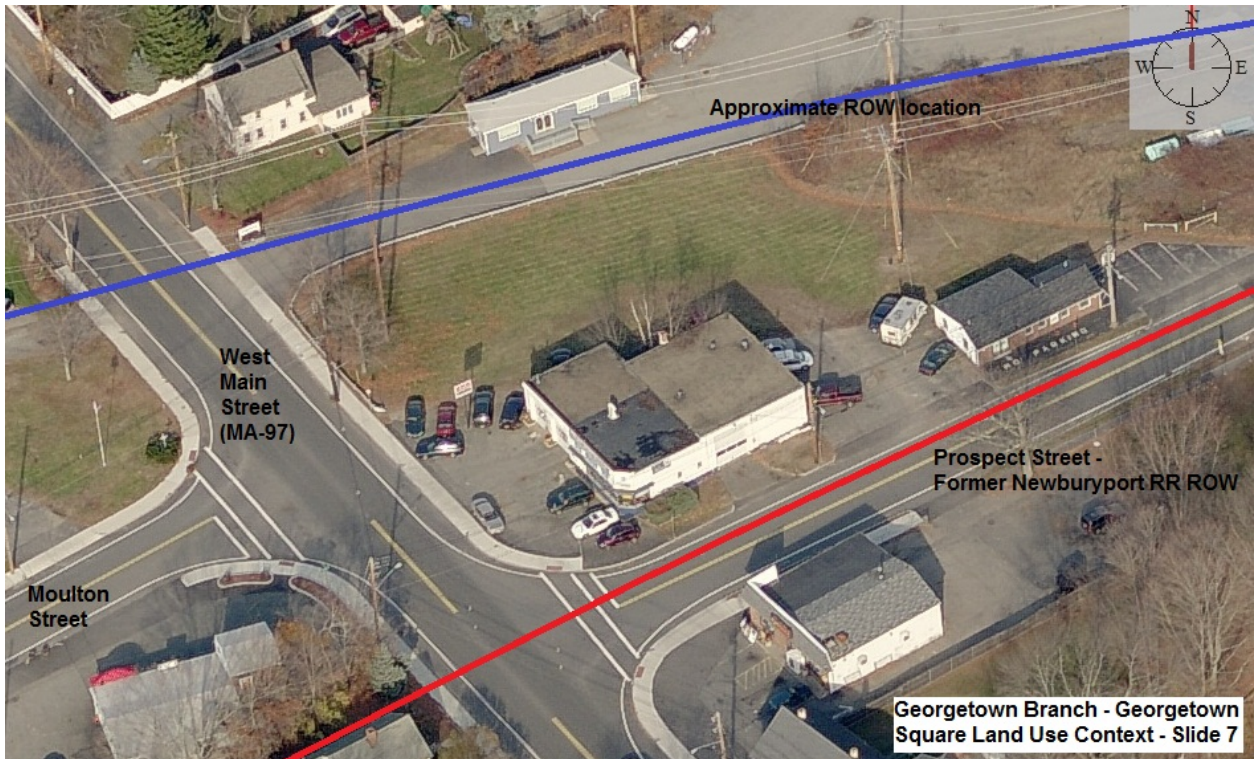




Georgetown - Georgetown Branch ROW  
Land Use Context - Slide 5



Georgetown - Georgetown Branch ROW  
Land Use Context - Slide 6





# Appendix C: Haverhill Municipal Landfill PowerPoint Slides

**CDM**  
**Public Meeting  
 Haverhill Landfill  
 Update on Closure**  
 June 27, 2011



**Outline**

- ◆ Background
- ◆ Closure Process
- ◆ Status/ Schedule
- ◆ Construction Impacts and Controls
- ◆ Post-Closure Use Considerations
- ◆ Summary

**Background**

- ◆ 71 acre site
- ◆ Owners: City of Haverhill, Aggregate Industries, and National Grid
- ◆ Administrative Consent Order between City / Aggregate and MassDEP signed in 1999
- ◆ NPL Listing/ Superfund Site




**Steps to Close a Landfill**

- ◆ Environmental Assessment
- ◆ Evaluate Closure Alternatives
- ◆ Closure Design & Permitting
- ◆ Construction



**Haverhill Landfill Closure – In Process**

	Northern Mound	Southern Mound
Site Environmental Assessment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
"Hot Spot" Investigation	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Drum Removal	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Interim Monitoring	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Grading and Shaping Project	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Evaluate Closure Alternatives	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MEPA Compliance	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Wetlands Permits	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Closure Design	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Construction	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Complete   
  In Process   
  Not Applicable

### "Hot Spot" Investigation (Assessment Phase)

- Completed April 2007
- Historic Aerial Photos
- Electromagnetic Survey
- Test pits located drum clusters
- Total 6,676 drums removed




### Haverhill Landfill Closure – In Process

	Northern Mound	Southern Mound
Site Environmental Assessment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
"Hot Spot" Investigation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Drum Removal	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Interim Monitoring	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Grading and Shaping Project	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Evaluate Closure Alternatives	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MEPA Compliance	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Wetlands Permits	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Closure Design	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Construction	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Complete     In Process     Not Applicable

### Soil Grading and Shaping Project (Pre-Construction Phase)

- Ended March 31, 2011
- Accepted ~500,000 cubic yards of historic fill soil on the Southern Mound
- Grading and shaping for potential future re-use
- Raise revenues




### Haverhill Landfill Closure – In Process

	Northern Mound	Southern Mound
Site Environmental Assessment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
"Hot Spot" Investigation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Drum Removal	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Interim Monitoring	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Grading and Shaping Project	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Evaluate Closure Alternatives	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MEPA Compliance	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Wetlands Permits	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Closure Design	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Construction	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Complete     In Process     Not Applicable

### Current Closure Schedule

Year	Southern Mound	Northern Mound
2011		Alternative Analysis
2012	Construction	Design / Permitting
2013		
2014		Construction
2015		
2016		

### Southern Mound Closure



### Purpose of Landfill Capping

- ◆ Minimize water through waste and into groundwater
- ◆ Stabilize slopes and minimize erosion
- ◆ Control stormwater run-off
- ◆ Allow for long-term maintenance and continued environmental monitoring
- ◆ Control landfill gases



### Landfill Gas Controls

- ◆ Required of all landfill closures
- ◆ Prevent landfill gas migration
- ◆ Decline in methane emissions over time
- ◆ Passive venting system
- ◆ Solar Ignited vent flares to reduce Greenhouse Gas Emissions



### Construction Phase – Southern Mound

- ◆ Contractor: E. T. L. Corp.
- ◆ Engineer: CDM
- ◆ Regulatory Oversight: MassDEP, EPA, Haverhill Conservation Commission
- ◆ Coordination with National Grid



### Concerns during Construction

- ◆ Minimize
  - ◆ Noise
  - ◆ Dust and air emissions
  - ◆ Traffic
- ◆ Minimize impact to surrounding communities to the extent possible



### Good Neighbor Practices

- ◆ Hours of Operation: 7 A.M. to 4 P.M.
- ◆ "Open door" policy
- ◆ Street sweeping and truck wash minimizes dust and dirt on public roads
- ◆ Compliance with:
  - truck trip limits
  - approved routes



### Good Neighbor Practices (cont'd)

- ◆ Truck Route Signage in place
- ◆ No "jake brakes" (noise reduction)
- ◆ Obey posted speed limits
- ◆ Be aware of schools, playgrounds, bus stops, etc.
- ◆ No idling (noise & air emission reduction)

### Stormwater and Erosion Controls

- ◆ Erosion and stormwater controls in place and monitored
- ◆ Wetland Restoration Plan
- ◆ Stormwater Pollution Prevention Plan (SWPPP)
- ◆ Permit Compliance



### Successful Post-Closure Use Projects

- ◆ Involve the public
- ◆ Ensure public health and safety
- ◆ Identify needs and funding sources
- ◆ Plan for reuse – before mapping
- ◆ Design an innovative solution
- ◆ Control environmental impacts
- ◆ Obtain approvals and permits



### Post-Closure Use at the Haverhill Landfill

- ◆ Post-Closure Use Task Force
- ◆ Options considered:
  - Solar Array for Energy Generation
  - Active Recreation - Fields
  - Passive Recreation - Bikeways/Trails
- ◆ Task Force preference: Solar Array



### Questions and Answers



### Please Contact Us!

If you have further comments or questions please feel free to contact us

Andrew Miller  
CDM  
[millers@odm.com](mailto:millers@odm.com)  
817 - 452-8000

Robert Ward  
City of Haverhill  
[ward@cityofhaverhill.com](mailto:ward@cityofhaverhill.com)  
878 - 374-2382

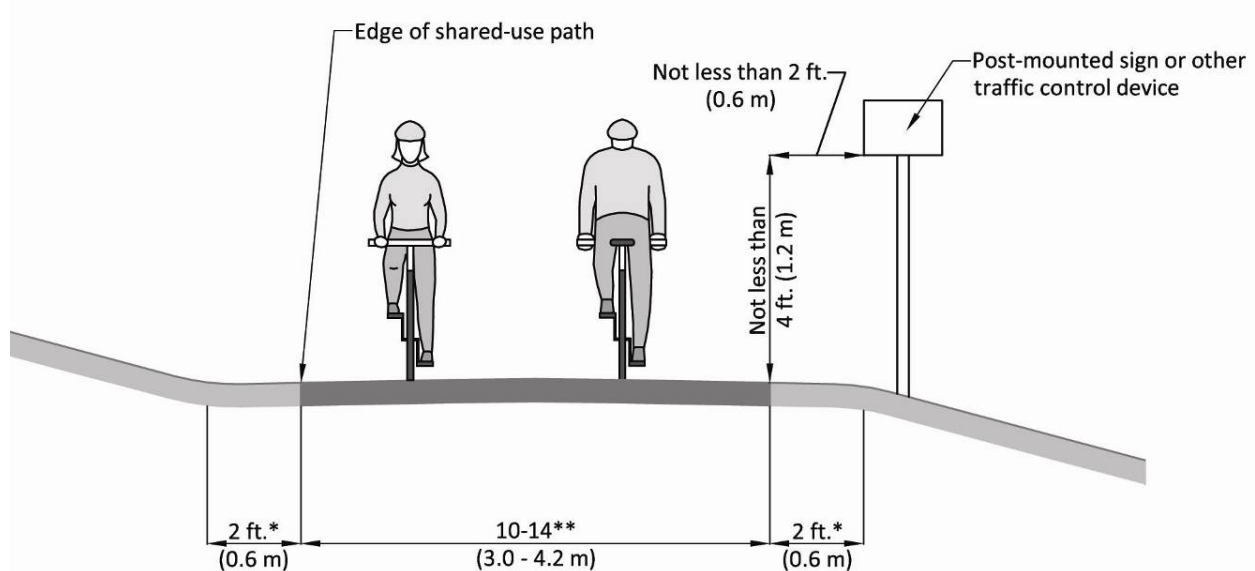
Scott Monroe  
CDM/ On-Site Engineer  
[monroe@odm.com](mailto:monroe@odm.com)  
817-591-7418

## Appendix D: Sample Shared-Use Path Design Guidelines

### 1. Width and Clearance

**Source:** American Association of State Highway and Transportation Officials (AASHTO), February 2010 Draft Guide for the Planning, Design, and Operation of Bicycle Facilities,  
<http://design.transportation.org/Documents/DraftBikeGuideFeb2010.pdf>

The usable width and the horizontal clearance required for a shared use path are primary design considerations. Figure 1 below is the typical cross section of a shared use path. The appropriate paved width for a shared use path is dependent on the context, volume, and mix of users. The minimum paved width for a two-directional shared use path is 10 feet (3.0 m). Typically, widths range from 10 – 14 feet (3.0 – 4.3 m), with the wider values applicable to areas with high use and/or a wider variety of user groups.



\*6:1 Maximum Slope (typ.)

\*\* More if necessary to meet anticipated volumes and mix of users, per the Shared Use Path Level of Service Calculator (4)

Figure 1: Typical Shared-Use Path Cross Section

## Appendix D: Sample Shared-Use Path Design Guidelines (continued)

### 2. Sloped Areas adjacent to the shared-use path

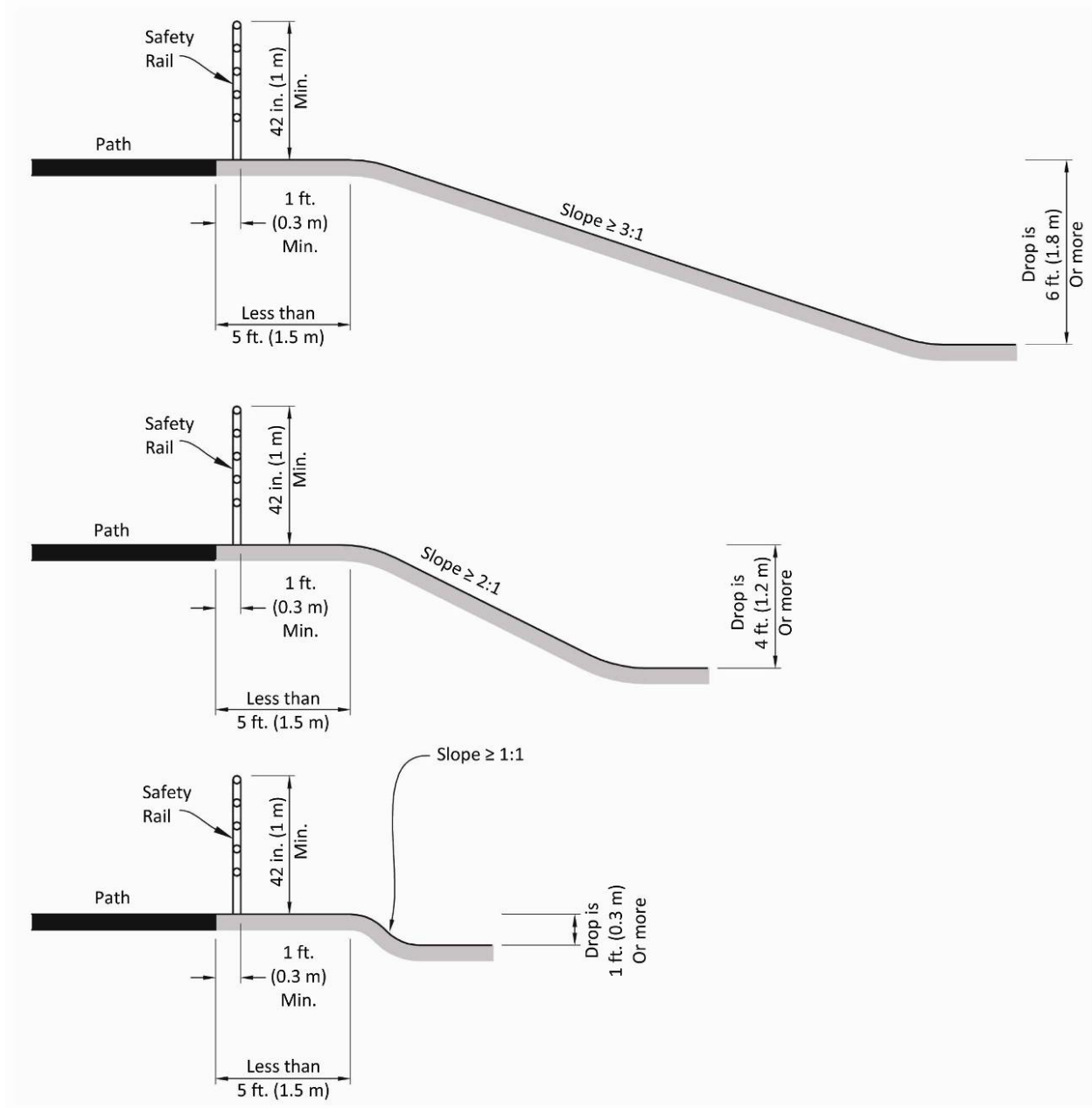
**Source:** American Association of State Highway and Transportation Officials (AASHTO), February 2010 Draft Guide for the Planning, Design, and Operation of Bicycle Facilities,  
<http://design.transportation.org/Documents/DraftBikeGuideFeb2010.pdf>

A graded area (shoulder) at least 3 – 5 feet (0.9-1.5 m) wide with a maximum cross-slope of 6:1 should be maintained on each side of the pathway. At a minimum, a 2-foot (0.6 m) graded area with a maximum 6:1 slope should be provided for clearance from lateral obstructions such as bushes, large rocks, bridge piers, abutments, and poles. Where "smooth" features such as bicycle railings or fences are introduced with appropriate flaring end treatments (as described below), a lesser clearance (not less than 1 ft) is acceptable. If adequate clearance cannot be provided between the path and lateral obstructions, then warning signs, object markers, or enhanced conspicuity and reflectorization of the obstruction should be used. Where a path is adjacent to parallel water hazards or downward slopes equal to or steeper than 3:1, a wider separation should be considered. A 5-foot (1.5 m) separation from the edge of the path pavement to the top of the slope is desirable. Depending on the height of the embankment and condition at the bottom, a physical barrier, such as dense shrubbery, railing, or fencing may be needed. This is an area where engineering judgment must be applied, as it is necessary to compare the risk for an errant bicyclist that swerves off the path to the risk of the rail itself. Where a recovery area (i.e., distance between the edge of the path pavement and the top of the slope) is less than 5 feet (1.5 m), physical barriers or rails are recommended in the following situations:

- Slopes 1:1 or steeper, with a drop of 1 foot (0.3 m) or greater;
- Slopes 2:1 or steeper, with a drop of 4 feet (1.2 m) or greater;
- Slopes 3:1 or steeper, with a drop of 6 feet (1.8 m) or greater, and
- Slopes 3:1 or steeper, adjacent to a parallel water hazard or other obvious hazard

The barrier or rail should begin prior to and extend beyond the area of need. The lateral offset of the barrier should be at least 1 foot (0.3 m) from the edge of the path. A diagram illustrating this design element is viewable on the following page:

## Appendix D: Sample Shared-Use Path Design Guidelines (continued)



### Sloped Areas adjacent to the shared-use path

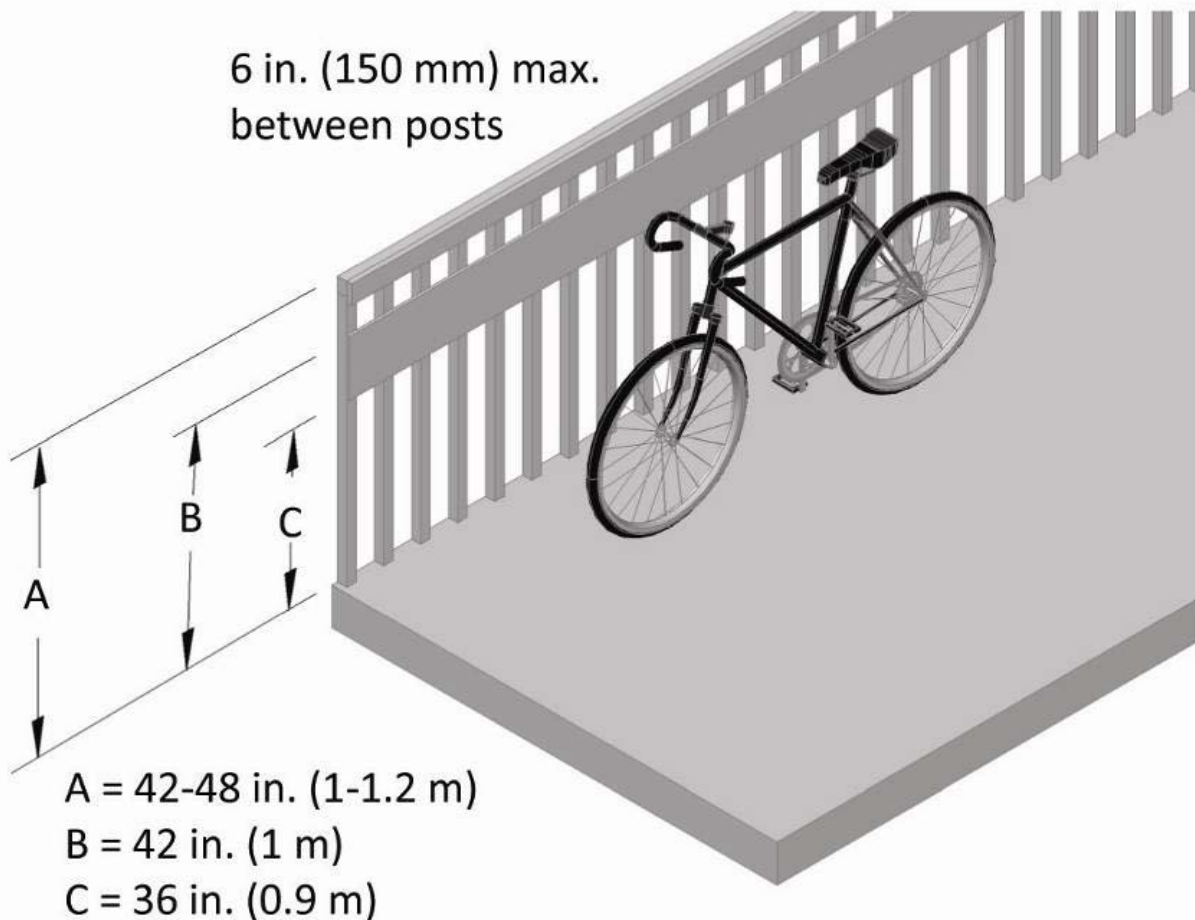
## Appendix D: Sample Shared-Use Path Design Guidelines (Continued)

### 3. Shared-Use Paths Utilizing Bridges

**Source:** American Association of State Highway and Transportation Officials (AASHTO), February 2010 Draft Guide for the Planning, Design, and Operation of Bicycle Facilities,

<http://design.transportation.org/Documents/DraftBikeGuideFeb2010.pdf>

Bridges should be designed for pedestrian live loadings. Where maintenance and emergency vehicles may be expected to cross the bridge, the design should accommodate them. On all bridge decks, special care should be taken to ensure that bicycle-safe expansion joints are used, and that decking materials are not slippery when wet.





## Appendix D: Sample Shared-Use Path Design Guidelines (Continued)

**Source: Architectural and Transportation Barriers Compliance Board, 36 CFR Chapter XI, Shared Use Path Accessibility Guidelines, <http://www.access-board.gov/sup/anprm.htm>.**

Source: <http://www.bicyclinginfo.org/engineering/paths-details.cfm>

### Preventing motor vehicle use of paths

In some locations, shared use paths may be mistaken for motor vehicle roads or may suffer from illegal or unauthorized motorized use. At intersections with roadways, therefore, the path should be clearly signed, marked and/or designed to discourage or prevent unauthorized motorized access. A variety of alternatives exist to achieve this:

- a. Bollards. Probably the most common device is the bollard, often lockable, collapsible or removable to allow for authorized access to the trail. Great care should be used in locating the bollard to ensure that they are visible, allow trail users through, and are not placed so as to channel both directions of trail users towards the same point in the trail. If bollards are to be used, they should be retro-reflective, brightly colored, and have pavement markings around them. On a ten foot trail, one bollard should be used in the center of the trail. If more than one bollard is necessary, there should be five feet between them.
- b. Splitting the trail in two. Many manuals suggest the option of splitting a ten foot trail into two five foot approaches to an intersection, with a planted triangle between them. This may increase maintenance costs.
- c. Medians. The Florida DOT manual notes that "curbing with tight radii leading up to the roadway can often prevent motorists from attempting to enter the path. Medians should be set back from the intersection 25 feet (8m) to allow bicyclists to exit the roadway fully before navigating the reduced pathway width.

### Gates and Barriers

*Clear Width.* Where gates or other barriers are provided, openings in gates and barriers shall provide a clear width of 32 inches (815 mm) minimum.

*Gate Hardware.* Gate hardware shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate operable parts shall be 5 pounds (22.2 N) maximum. Operable parts of such hardware shall be 34 inches (865 mm) minimum and 48 inches (1220 mm) maximum above the finish surface or ground. The draft technical provisions for gates and barriers are based on the Board's ADA and ABA Accessibility Guidelines and Trails Guidelines. Gates or barriers often are wider than 32 inches to allow for the safe passage of bicycles and other authorized users of shared use paths. The Board is proposing to require a 32 inch minimum clearance to address the rare circumstance where gate or barrier openings are deliberately narrow and could restrict access by wheelchair users unless a minimum

## **Appendix D: Sample Shared-Use Path Design Guidelines (Continued)**

width applies. A 32 inch wide clear opening provides the minimum clearance necessary to allow passage of an occupied wheelchair or other mobility device. The operation and location provisions for gate hardware are necessary to ensure that individuals with disabilities can operate the hardware.

## Appendix E: Sample Path / Road Crossing Treatments

### Source: Paths & Trails Element

City of Vancouver (WA) Walking & Bicycle Master Plan, January 2004

[http://www.cityofvancouver.us/parks-recreation/parks\\_trails/trails/pdfs/1Intro&DesignGuidelines.pdf](http://www.cityofvancouver.us/parks-recreation/parks_trails/trails/pdfs/1Intro&DesignGuidelines.pdf)

### Basic Crossing Prototypes

• Type 1: **Unprotected/Marked Crossings.** Unprotected crossings include mid-block crossings of residential, collector, and sometimes major arterial streets. Includes installation of crosswalks at all locations. Standards for use include:

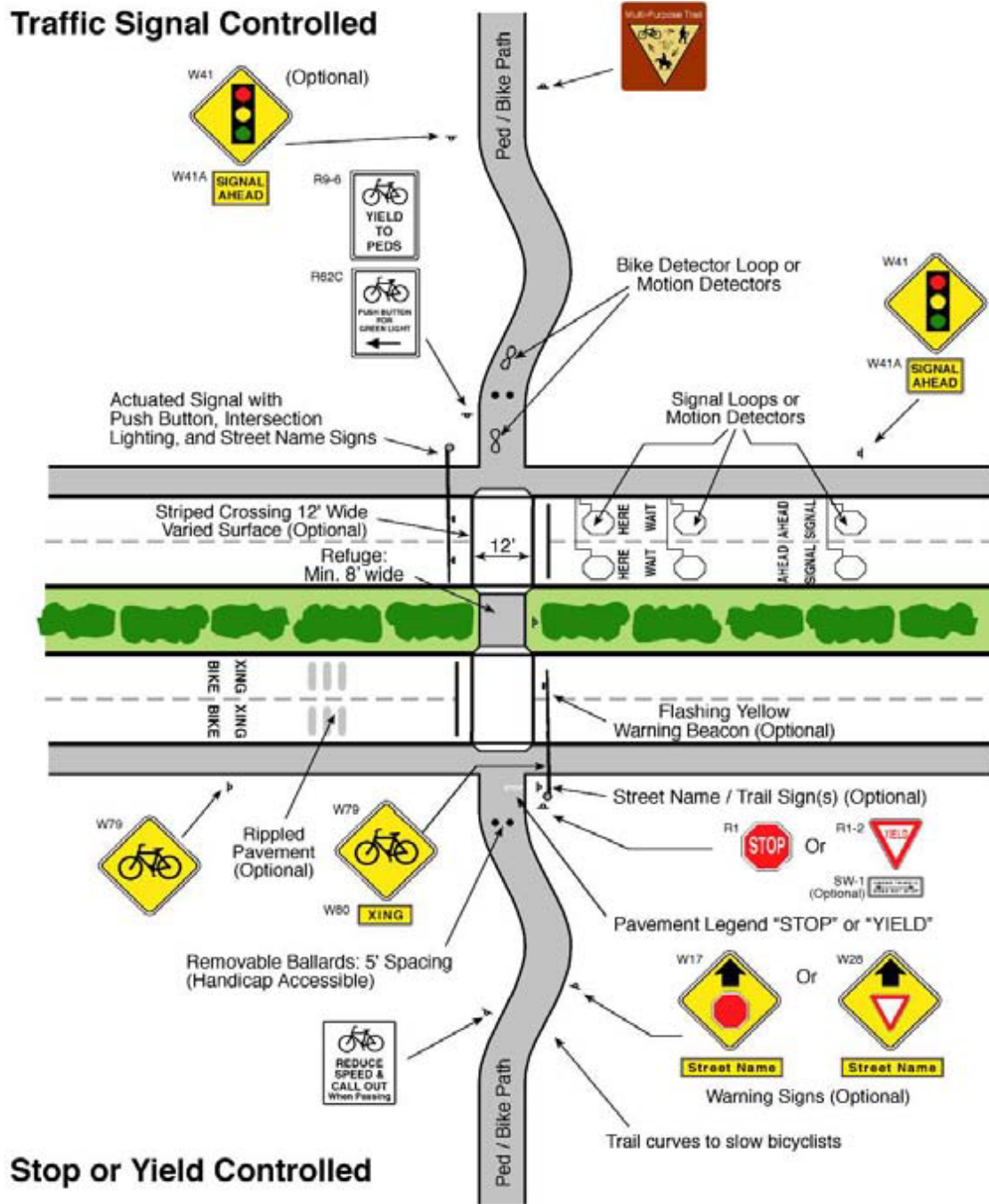
Roadways with:

- maximum traffic volumes of 10,000-15,000 average daily traffic (ADT), and / or 1,000-1,500 vehicles in peak hour
- maximum 85th percentile speeds: 35-45 mph
- maximum trail user volumes: 50-75 per hour, 300-400 per day
- maximum street width: 60 feet (no median)
- minimum line of sight: 25 mph zone: 100 feet; 35 mph zone: 200 feet; 45 mph zone: 300 feet

• Type 2: **Divert Users to Existing Intersection.** Bikeways which emerge near existing intersections may be routed to these locations.

• Type 3: **Signalized/Controlled Crossings.** New signalized crossings are recommended for crossings more than 250 feet from an existing signalized intersection and where 85th percentile travel speeds are 45 mph and above and/or ADT's exceed 15,000 vehicles. Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity, and safety. Trail signals are normally activated by push buttons, but also may be triggered by motion detectors. The maximum delay for activation of the signal should be two minutes, with minimum crossing times determined by the width of the street and trail volumes. The signals may rest on flashing yellow or green for motorists when not activated, and should be supplemented by standard advanced warning signs. Typical costs for a signalized crossing range from \$75,000 to \$150,000.

## Appendix E: Sample Path / Road Crossing Treatments (Continued)



### Type 1 or 3 Crossing Prototype (depending on presence of signal)

- Type 4: **Grade-separated**: Bridges or under crossings provide the maximum level of safety but also generally are the most expensive and have right of way, maintenance, and other public safety considerations.

## Appendix E: Sample Path / Road Crossing Treatments (Continued)

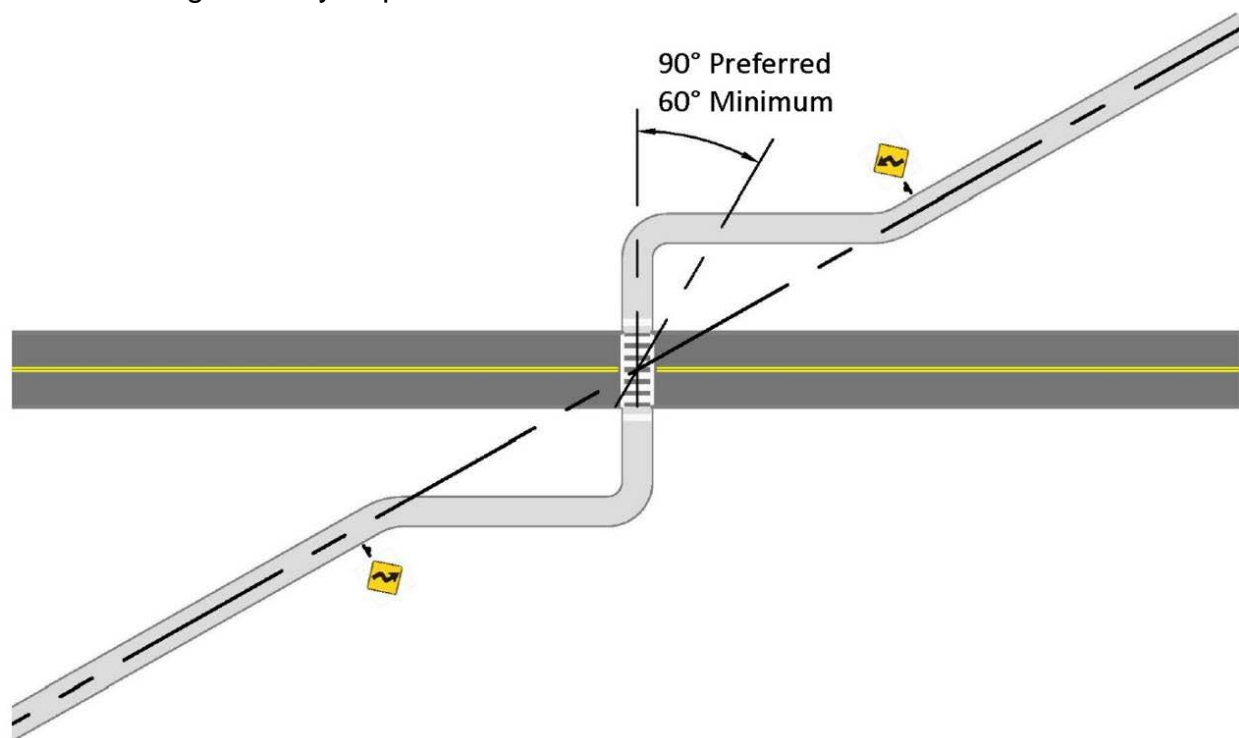
### Geometric Design Issues at Crossings

**Source:** American Association of State Highway and Transportation Officials (AASHTO), February 2010 Draft Guide for the Planning, Design, and Operation of Bicycle Facilities,

<http://design.transportation.org/Documents/DraftBikeGuideFeb2010.pdf>

The design approach for the intersection of a shared use path with a roadway is similar to the design approach used for the intersection of two roadways in the following ways: The intersection should be conspicuous to both road users and path users. Sight lines should be maintained to meet the requirements of the traffic control provided.

Intersections and approaches should be on relatively flat grades. Intersections should be as close to a right angle as possible, given the existing conditions. The least traffic control that is effective should be selected. It is preferable for midblock path crossings to intersect the roadway at an angle as close to perpendicular as practical, so as to minimize the exposure of crossing path users and maximize sight lines. A crossing skewed at 30 degrees is twice as long as a perpendicular crossing, doubling the exposure of path users to approaching motor vehicles, and increasing delays for motorists who must wait for path users to cross. Retrofitting skewed path crossings can reduce the roadway exposure for path users. Exhibit 5.14 depicts a path realignment to achieve a 90-degree crossing. A minimum 60-degree crossing angle may be acceptable to minimize right-of-way requirements.



## Appendix F: Bibliography

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