Regional Naugatuck River Greenway Routing Study

Town of Beacon Falls, Connecticut

DECEMBER 2010

PREPARED BY:
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IN ASSOCIATION WITH:
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PREPARED FOR:
Council of Governments of the Central Naugatuck Valley

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Cover image: Future greenway trail along rail line north of Toby's Pond

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1. Overview

The Regional Naugatuck River Greenway Routing Study report recommends routing for the Naugatuck River Greenway trail through the Town of Beacon Falls, Connecticut. The routing is the product of a year-long effort to study, analyze and develop routing recommendations for a Naugatuck River Greenway trail along the Naugatuck River in Western Connecticut. As part of this project, greenway routing reports were also created for Thomaston, Watertown and Naugatuck. A routing report was also created for Waterbury, as part of a separate process. The overall goal of these reports is to identify a route for a 22-mile long regional greenway trail in the Central Naugatuck Valley Region. It is envisioned that this greenway will ultimately extend 44 miles from Torrington in the north to Derby in the south.

The two primary goals of the Naugatuck River Greenway (NRG) are:

1) To develop a non-motorized transportation facility for walkers and cyclists.
2) To provide public access to the Naugatuck River.

The NRG will provide Beacon Falls residents with a safe pedestrian and bicycle path that will connect to neighboring municipalities. The NRG will facilitate river access for fishing and small boat launches. The recommended alignment in Beacon Falls remains within viewing distance of the river for almost the entire proposed route. This allows users to appreciate the beauty of the Naugatuck River, even when being directly alongside of it is not possible or practical.

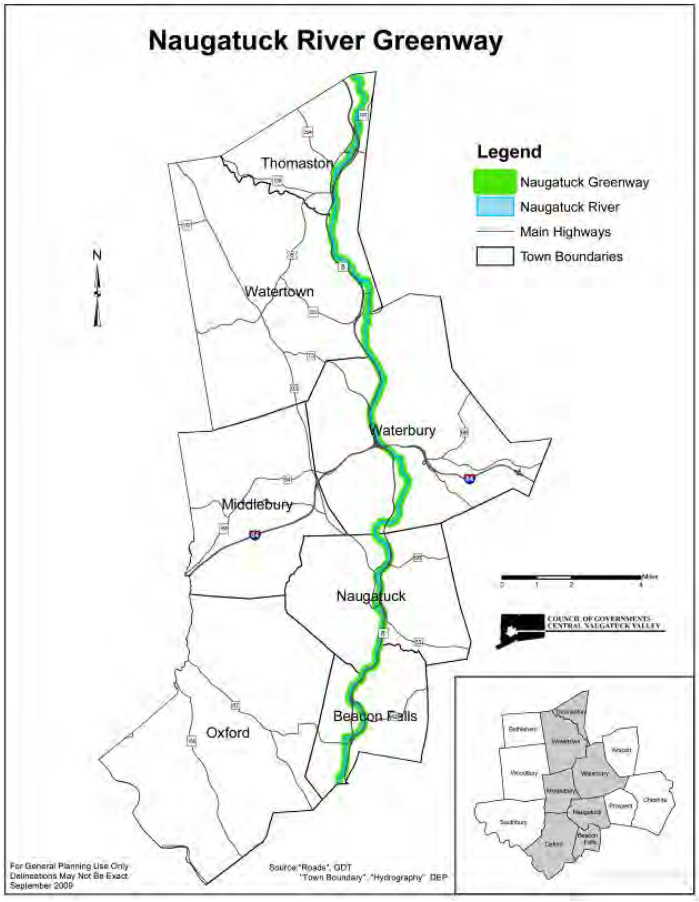


Figure 1: Map showing the five municipalities affected by this Study, though the alignment through Waterbury was determined separately.

In most areas along the length of the alignment, the preferred greenway route was apparent due to the relative ease of developing a trail along one side of the river versus the opposite bank. In a handful of locations, however, routing options were presented and narrowed down after input from the general public, the Regional Naugatuck River Greenway Committee, town officials and Council of Governments of the Central Naugatuck Valley (COGCNV) staff.

For the Study, a greenway is defined as "*a corridor of land that connects people and nature together,*" and a trail is defined as "*a linear facility for non-motorized transportation and recreation.*" The future trail's design will be context sensitive; in some sections it may be a paved, shared-use path for pedestrians and bicyclists, while in others, the trail may be a rustic, natural-surface path amenable to equestrians. The Study also makes recommendations for the trail and related improvements such as trailheads, parking areas, canoe/kayak landings, on-street bike improvements and other spur connections.

The scenic quality of some sections of the Naugatuck River rivals that of rivers nearly anywhere in New England.

Throughout the planning process, care was taken to ensure that recommendations coming from this Study fully considered recommendations from the Waterbury Naugatuck River Greenway Routing/ Feasibility Study as well as the various greenway planning efforts occurring separately in all four municipalities. The Regional Naugatuck River Greenway Routing Study also recommends connections to nearby parks, schools, state forests and town centers along the route.

The Naugatuck River is the Central Naugatuck Valley Region's primary natural resource. While in many stretches the river has an industrial nature, in others it takes on the traits of a wild river running through far less developed areas, such as northern New England or the Berkshires.

Today, there is a new appreciation of the value of this resource in the heart of Western Connecticut. COGCNV recognizes this portion of the Naugatuck River Greenway as the core of an inter-connected greenway system that will eventually connect to Oxford, Middlebury and Southbury via Larkin State Park Trail and to Connecticut Forest and Park's Blue-Blazed hiking trail network. When complete, the Naugatuck River Greenway will:

- Serve as alternative green transportation facility.
- Provide recreation opportunities for residents and visitors.
- Improve the quality of life in local communities.
- Increase property values adjoining the greenway.
- Help retain and attract new businesses and residents.
- Raise awareness and help build appreciation of the value of the Naugatuck River.

Greenway-oriented economic development adjacent to the Sue Grossman Still River Greenway in Torrington. (photo: Peter Kisselburgh)

2. Mission and Goals

The following Mission and Goals provide a measurable set of guidelines for the development of the Naugatuck River Greenway.

Mission: Develop an interconnected greenway trail along the Naugatuck River corridor from Thomaston to Beacon Falls that incorporates existing and planned trails and open spaces, and connects to nearby parks, schools, downtowns, public transportation and other destinations in order to create opportunities for non-motorized transportation and for communities to reconnect with the natural environment along the river.

Goal 1: Connect Thomaston, Watertown, Waterbury, Naugatuck and Beacon Falls with a contiguous multiuse greenway trail. Furthermore, access points and connectivity to commuter and tourist train stations and bus routes are necessary for the proposed trail to be a successful transportation and recreational facility.

Goal 2: Increase the number of people walking and bicycling for transportation and recreation and the number of children walking and bicycling to school in the Central Naugatuck Valley Region, helping to reduce traffic congestion, greenhouse-gas emissions and sedentary lifestyles.

Goal 3: Support each community's economic development efforts by routing the greenway to serve their downtown areas.

Goal 4: Incorporate context-sensitive design in the planning and development of the greenway trail. The trail will be sensitive to local conditions. Individual sections of the trail may be designed as a rustic, natural-surface trail or as a paved, shared-use path based on local conditions. Some stretches could be designed to encourage equestrians, depending on local conditions. Interpretive elements will reflect each community's unique heritage and culture, while a greenway logo will establish a consistent identity along the entire greenway trail.

Goal 5: Reconnect the communities of the Central Naugatuck Valley Region to the Naugatuck River. Provide access to the river for recreational, educational and public safety purposes. Encourage municipalities and residents to better protect the river corridor.

3. Study Methodology

The Regional Naugatuck River Greenway Routing Study followed a methodology that included community workshops, site walks, stakeholder meetings, reviews of relevant planning documents and field observations to identify short-term and long-term alternatives for development of the regional greenway. Planning tools such as GIS-based data analysis and review of aerial photography were employed as well. The mission and goals outlined in the previous section guided the planning process. A series of site walks and meetings with stakeholders in each of the communities occurred throughout the fall of 2009 and continued on an as-needed basis through the summer of 2010. Public workshops for the data-gathering stage were held on November 17 and 18, 2009 in Naugatuck and Thomaston, respectively and on March 23 and 24, 2010 in Beacon Falls and Watertown, respectively. Additionally, the project website (http://www.cogcnv.org/greenway) was maintained throughout the duration of the Study.

Community members discuss greenway planning issues at the March 23 meeting at Woodland High School.

A core element of the Routing Study was to identify gaps in the current greenway system and propose short- and long-term alternatives for closing the gaps and connecting existing or planned sections of the greenway. Gaps were evaluated for:

- Land ownership issues
- User accessibility
- Environmental concerns
- Physical barriers such as topography, major roads and rail lines, etc.
- Permitability, constructability and cost
- Adjacent planned development
- Community support or opposition
- Overall character, including view opportunities
- Adjacency to points of interest
- Potential or lack of access points

After the Gap Evaluation, an analysis of opportunities and challenges within the project corridor was conducted to refine the routing alternatives. Working with COGCNV planners and the Naugatuck River Greenway Committee, the alternatives were narrowed down to a recommended greenway alignment that had the community's support. In conjunction with the routing recommendations, a phasing plan for implementation, along with cost estimates for each phase were developed. The phasing recommendations take into account that greenway planning, design and development often occur over extended periods of time and early successes can help to maintain overall project support, funding and momentum.

The planning and conceptual design of the trail follows appropriate trail-related design guidelines. For example, the typical cross-section for the NRG is based on the AASHTO 1999 *Guide for the Development of Bicycle Facilities,* which recommends a ten foot-wide shared-use path with two-foot soft shoulders (fourteen feet total) with a minimum dimension of eight feet to clear pinch points. This does not preclude, however, the possibility that some sections of the trail may include stretches that are narrower and made of permeable surfaces due to local conditions and other constraints.

4. Study Area

The study area is a 22-mile corridor along the Naugatuck River within the municipalities of Thomaston, Watertown, Waterbury, Naugatuck and Beacon Falls. The corridor is approximately one-half to one mile in width but can vary to allow for a full range of opportunities for consideration, including the potential for trails on both sides of the river or along roads, highways and rail corridors. Recommendations for the greenway alignment extend from the Thomaston Dam in Thomaston to Toby's Pond and Recreational Park in Beacon Falls. Connections further north to Torrington and south to Derby are being coordinated by the Litchfield Hills Council of Elected Officials and the Valley Council of Governments, respectively.

Within the 4.5-mile long river corridor in Beacon Falls, the northern half of the study area for a potential greenway trail was limited to an approximately half-mile wide river corridor between the steeply-sloping hills of the Naugatuck State Forest. Beyond the river corridor, however, on-road bicycle improvements and hiking trail enhancements were studied within in State Forest. On the eastern side of the river valley, lies the current Route 8 Expressway and an abandoned portion of Old Route 8. To the west, there lies the Metro-North Railroad Waterbury Branch and a single land, unpaved access road (Cold Spring Road). There are also a number of Blue-Blazed hiking trails in the Naugatuck State Forest, including the popular High Rock trail on the west side. Limited parking and poor access keep the number of hikers and mountain bikers to a relative minimum on the eastern portion of the State Forest.

The Naugatuck River has retained its natural beauty through much of Beacon Falls

South of State Forest boundary, the study area flattens out considerably and the adjacent land uses become more varied. Flanking the river in this area are residential neighborhoods and small-scale commercial sites on the east bank while industrial users are more prevalent on the west. Despite this, there is still a verdant quality to the river landscape as most buildings are set back from the river and the riverbank retains its natural look. While Route 8 hugs the river through the State Forest, through downtown Route 8 sits away from the edge of the river and does not dominate the river landscape. Route 8 crosses back to the east and the Naugatuck River turns sharply at Riverbend Park. The corridor ends at Toby's Pond and Recreational Park, the southern terminus of the study area.

5. Potential Greenway Routing Analysis

The analysis of Potential Greenway Routes is based on meetings and walking tours with stakeholders, field observations and the examinations of aerial photos and GIS-based maps. This analysis is based on the long-term desire to incorporate a 8-12' wide stone dust or paved trail in close proximity to the Naugatuck River, but a narrower dirt hiking trail or on-street bike lanes in the short term are not precluded. These may be necessary to avoid difficult stretches where property ownership issues, engineering challenges or environmental constraints exist.

The Town of Beacon Falls' Greenway Routing Analysis Map (Figure 2 on page 10) includes:

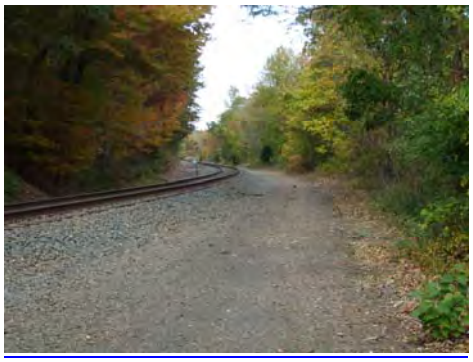
- Identification of cultural and historic destinations and scenic areas that should be connected to the greenway.
- Existing, planned or proposed local greenways.
- Portions of the corridor for which no apparent routing options currently exist, i.e. gaps.
- Identification of potential spurs and loops that connect to other greenways, amenities and destinations

For the latter two bullet points, the map features elements along the river that present existing and potential conditions along the Naugatuck River. Potential conditions and example situations from the region are presented below:

- **No apparent routing option along the river** – typically due to the placement of Route 8 along the edge of the river or very steep hills or cliffs that may present significant challenges (note that this does not preclude the possibility of a narrow, short-term path as mentioned above).

Example: North of the Prospect Street Bridge in Naugatuck where Route 8 runs very close to the river's edge.

- **Potential 'rail with trail' along active rail line** – an active rail line with an adjacent level shelf, unutilized spur or maintenance way that is potentially wide enough to accommodate the greenway trail with an appropriate setback (ideally 20-25' but potentially as low as 10') from the rail line.



Example: The rail corridor through parts of Naugatuck may offer an opportunity for a rail-with-trail greenway section.

- **Potential trail adjacent to the river** – portions of the riverbank where spatial and topographical constraints do not prevent the routing of the trail close to the river's edge.

Example: Portions of the greenway trail within Toby's Pond and Recreational Park are likely to run adjacent to the river.

- **Potential connection along existing access road or street rights of way (ROW)** – areas where the greenway may be able to use an adjacent access road or the portion of an adjacent road ROW with sufficient width to accommodate a trail.

Example: A dirt maintenance roadway that runs between the rail line and Route 8 in Watertown is an opportunity for the trail.

- **Potential spur trail/street improvements** – these are on-road improvements that may involve creating bicycle lanes and improved pedestrian facilities such as sidewalks. These on-road improvements can help to connect the greenway to other trails, schools, cultural destinations and downtown areas.

Example: Streetscape enhancements along Elm Street in Thomaston will improve connections between the future Naugatuck River Greenway and the Clock Walk.

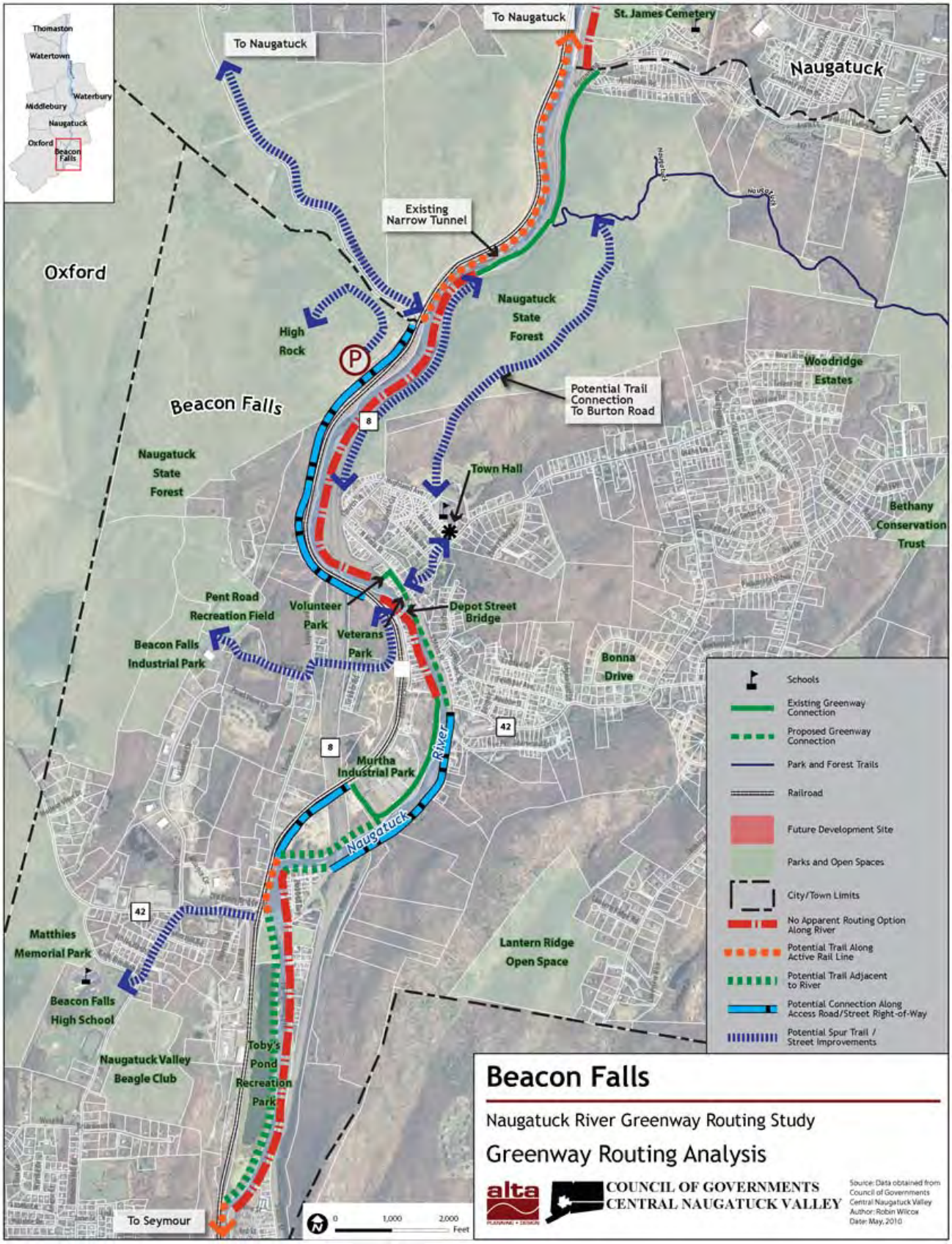


Figure 2: Greenway Routing Analysis in Beacon Falls.

6. Obstacles to Access and Connectivity (Gap Analysis)

Throughout the 4.5-mile corridor in Beacon Falls, there are a handful of obstacles to access and connectivity for a seamless Naugatuck River Greenway trail. The obstacles include the steep slopes of the hills within the Naugatuck State Forest, the presence of Route 8 and the rail line along the river, the Route 42 right of way and numerous privately-owned parcels along the river.

Within the State Forest, the only flat land adjacent to the river is dominated by transportation infrastructure, limiting access to the river. This long gap runs the length of the State Forest on the east side, but parallel access for non-motorized users is possible along the existing road bed of former Route 8, just east of the current Route 8. The road bed allows hiking and mountain bike connectivity to a network of former logging roads and the Blue-Blazed hiking trail within the State Forest. On the west side of the river, the State Forest can be accessed via Hunters Mountain Road and Black Forest Road in Naugatuck and Cold Spring Road in Beacon Falls. The bridge connecting these two roads is currently out of service for cars, but is scheduled to be replaced. The bridge is accessible by those on foot or bicycle. There are Blue-Blazed hiking trails on the west side of Naugatuck State Forest as well.

The railroad tracks that run along the river for the length of the State Forest complicate the ability to place the NRG on the west bank

Obstacles to river access and connectivity continue within Beacon Falls proper, though some portions of the Naugatuck River are accessible to the community. Old Route 8/North Main Street on the east bank provides access along the sidewalk from Volunteer Park to Veteran's Park. South of the Depot Street Bridge, a relatively narrow shoulder of the four-lane road will soon be transformed into a greenway link within the right of way from the bridge to South Main Street's intersection with Route 42. South of this spot, traffic increases and South Main becomes a more significant obstacle for non-motorized movement along the river or from the adjacent neighborhood to the northeast. From Riverbend Park on the east bank south to the town line, a collection of homes and other private property, as well as the Route 8, present obstacles to river access. On the west bank of the river across from the center of Beacon Falls, numerous privately-owned parcels limit connectivity along the river. Railroad Avenue runs parallel to the uses along the west bank of the river. This street brings motorist and hikers to the small parking area that serves the existing hiking trail behind the Murtha Industrial Park and brings hikers back to Railroad Avenue and the Route 8 overpass. South of this point, Railroad Avenue becomes a private road that accesses O&G Industries' wash plant property. This private road runs parallel to the Metro-North Railroad. The private road ends at Toby's Pond and Recreational Park.

7. Affected Property Data

The parcels falling within or adjacent to the study area boundary have been identified and shown on the figures provided in Appendix B. A table with parcel size and property-owner information is also provided in Table 2 in Appendix B. The parcel inventory is intended to facilitate future correspondence between the municipality and affected property owners. The parcel table was developed from the COGCNV GIS parcel database. In some instances the information may be incomplete.

In Beacon Falls, a total of ten parcels have been identified within the study corridor, not including public rights of way. Key parcels of public land within the corridor include:

- CTDOT's Route 8 right of way
- CTDOT-owned property (various segments within town limits)
- Riverbend Park (maintained by Trout Unlimited)
- Volunteer Park
- Veteran's Park
- O&G Industries' hiking trail around the Murtha Industrial Park (privately owned with easement)
- Toby's Pond and Recreational Park

8. General Construction Feasibility and Cost

Experience on other greenway projects can be used to infer a planning level estimate of expected construction cost for the Naugatuck River Greenway in Beacon Falls. For a typical greenway with conventional structure types in a rural setting, expected greenway construction costs for either a 10-12' paved or stone dust path range from $0.75 to $1.25 million per mile. Many factors will affect final cost including construction materials, commodity prices, property impacts of the selected alignment and other undetermined issues.

Costs for a greenway trail along the Naugatuck River corridor, as with most greenway projects, will be largely driven by the requirements of structural components (e.g., bridges, pile-supported walkways, etc.). Completing the entire corridor within Beacon Falls' town limits will require an expensive solution to pass through the Naugatuck State Forest, utilizing either bracketed, cantilevered sections or a large-scale river/Route 8/railroad track bridge crossing. Another expensive component will be a new trail bridge over the Naugatuck River either adjacent to the Pines Bridge or near the Route 42 intersection of South Main Street and Bethany Road. The rest of the NRG in Beacon Falls will rely on the relatively-straightforward development of a trail through existing parks and along road or rail rights-of-way.

9. Brownfields and Environmental Constraints

Land use within Beacon Falls' greenway corridor varies from densely developed industrial and mixed commercial/residential to undeveloped forestland. Each of the various land uses brings its own set of environmental challenges.

In urbanized environments with a history of industry like Beacon Falls, it is common to find sites contaminated with oils or hazardous materials. Older development frequently included use of urban fill materials (e.g., brick, block and asphalt within a soil and ash matrix). Due to the presence of ash and asphalt within the urban fill, it is common to find pollutants such as heavy metals and polycyclic aromatic hydrocarbons (compounds commonly found in petroleum and combustion by-products) within urban fill materials. These concerns will likely complicate the acquisition of parcels for greenway development. As definitive designs for the various greenway segments are developed, the designer should identify parcels

with known or potential historic releases of contaminants. This will allow trail designs to incorporate appropriate mitigation measures.

A first-order assessment of potential contamination can be made by reviewing the Connecticut Department of Environmental Protection's (CTDEP) "List of Contaminated or Potentially Contaminated Sites in Connecticut" and "List of Significant Environmental Hazards Reported to the DEP." As of September 2009 and February 2010, respectively, no sites along the greenway corridor in Beacon Falls were listed by the CTDEP as contaminated. However, these lists are not exhaustive and only provide information about sites that CTDEP is aware of. If warranted, a more detailed evaluation in the form of a Phase I/II Environmental Site Assessment may need to be undertaken.

Constructing portions of the greenway may require disturbing polluted soil. Special consideration should be given to the following:

- *Soil disposal:* If excess soil is generated during the construction of the trail, it may require special handling and disposal due to the presence of pollutants. We recommend that the trail be designed in a manner to reduce the amount of excess soil generated during the project to mitigate the potential for excessive costs associated with polluted soil disposal.

- *Potential for exposure:* Although the greenway may be paved, thereby mitigating the potential for users to come into contact with pollutants directly beneath the trail, soil located along the shoulders of the trail could provide a potential exposure pathway. Surficial soil quality testing may reveal these conditions and permit the designer to incorporate mitigating measures (e.g., separation fabrics, clean fill, etc.).

In less developed areas, environmental constraints relate less to mitigating man-made contamination and more to protecting and managing natural resources. Sensitive resources include: wetlands, flood plains, endangered or threatened species habitat, steep slopes or erosive soils and archeological resources. In these resource areas, a special effort should be made to maintain and/or re-establish riparian buffers adjacent to the river or wetlands. These buffers help protect water quality, lower water temperatures and provide wildlife corridors. Where the greenway is proposed to cross an area identified as a potential endangered or threatened species habitat, a review by the CTDEP should be sought early in the design process. The CTDEP will advise the municipality on appropriate measures to protect the critical habitat. If the CTDEP determines that the proposed project is likely to impact a listed threatened or endangered species, or significant natural communities, department staff will provide recommendations to avoid or minimize impacts to these species and habitats. CTDEP permit analysts reviewing the project environmental permit applications will consider these recommendations during their review and typically incorporate appropriate conditions as part of the permit.

Where appropriate, municipalities are encouraged to work with their design professionals to incorporate low-impact design (LID) principles into the greenway. LID allow for more natural stormwater drainage patterns and promotes groundwater recharge. It helps to decrease the adverse effects of development upon our water resources. Common LID measures include permeable pavements, rain gardens, bio-filtration swales, etc. These measures may not be appropriate, however, in areas where underlying soils are polluted.

10. Safety and Security

Trail safety is a major concern of both trail users and those whose property is adjacent to a greenway trail. Emergency vehicles access to the NRG is paramount and the alignment and access point locations were planned with this in mind. The Town of Beacon Falls should plan for regular security patrols for the section of the trail within its jurisdiction and develop an emergency response plan for police, fire and ambulance service. Creating a safe trail environment goes beyond design and law enforcement, however and should involve the entire community. The most effective and most visible deterrent to illegal activity on the NRG will be the presence of legitimate trail users. Getting as many "eyes on the trail" as possible is the most effective deterrent to undesirable activity. There are several components to accomplish this:

Provide good access to the trail

Access ranges from providing conveniently-located trailheads along the Greenway, to encouraging the development of sidewalks and bike facilities along public roadways that connect to, or intersect, the NRG. Access points should be inviting and signed to welcome the public onto the trail.

Good visibility from adjacent neighbors

Neighbors adjacent to the trail can potentially provide 24-hour surveillance of the trail and can become an ally to the municipalities' police departments. Though some screening and setback of the trail may be needed for privacy of adjacent neighbors, complete blocking out of the trail from neighborhood view should be discouraged. This eliminates the potential of neighbors' "eyes on the trail," and could result in a tunnel effect along the trail.

High level of maintenance

A well maintained trail sends a message that the community cares about the public space. This message alone will discourage undesirable activity along the trail.

Programmed events

Community events along any of the various segments of the Naugatuck River Greenway will help increase public awareness and thereby attract more people to use the trail. Various civic organizations can help organize public events along the trail which will increase support. Events might include a day-long trail cleanup or a series of short interpretive walks led by knowledgeable residents or a naturalist. These events could be coordinated with the Connecticut Forest and Park Trail Manager for the Blue-Blazed hiking trails that lie within the east block of the Naugatuck State Forest.

Community projects

The support generated for the NRG could be further capitalized by involving neighbors and friends of the trail in a community project. Ideas for community projects include volunteer planting events, art projects and interpretive research projects. These community projects create a sense of ownership along the greenway and serve as a strong single deterrent to undesirable activity along the trail.

Adopt-a-Trail Program

Nearby businesses, community institutions and residential neighbors often see the benefit of their involvement in trail development and maintenance. Businesses and developers may view the trail as an integral piece of their site planning and may be willing to take on some level of responsibility for the trail as well. Creation of an adopt-a-trail program should be explored to capitalize on this opportunity and build civic pride in the greenway.

11. Permitting Issues

The construction of the regional greenway along the Naugatuck River will require permits from various agencies. A brief description of each anticipated permit is provided below. It should be noted that each permit may not be required for each individual section of the greenway trail.

Municipal Inland Wetlands and Watercourses Permit for Regulated Activities

Basis: Delegated authority from the State based on Connecticut General Statutes.

Threshold: Any regulated activity within a State regulated wetland, or upland review area. Can also be required if the activity is in an upland area, drains to a regulated wetland area and/or is deemed to have a potential impact on the wetland.

Process: Application must be made to the Municipality and most include a Connecticut Department of Environmental Protection Reporting Form. At the first meeting after application is received, it is formally accepted by the Commission. This begins the time periods as defined in the State Statues. If the proposed activity is deemed to be a potentially significant activity, then a Public Hearing must be held before a decision can be made by the Commission. If the activity is found to have no significant impact, then the Commission may hold a public hearing, if it is found to be in the public good, or may render a decision without holding a hearing. Following the formal publication of the decision, there is a 15-day appeal period.

Time Line: Normally takes three to six months, depending on whether a Public Hearing is required. Application must be submitted prior to or concurrent with the Planning and Zoning Permit, if required.

Municipal Planning and Zoning or Municipal Zoning Department Permit (Site Plan Approval)

Basis: Local authority granted under Connecticut General Statutes, but based on local bylaws and regulations.

Threshold: Any significant earthwork or work requiring a building permit. A Zoning permit may not be required for basic greenway trail projects. This should be discussed with each municipality's Planning and Zoning staff once the corridor and proposed construction methods are sufficiently defined.

Process: Application is made to the Municipality. At the first meeting after the application is received, it is formally accepted by the Commission. This begins the time periods as defined in the State Statues and local bylaws. Certain activities require a special permit which requires a public hearing and must be held before a decision can be made by the Commission. Also, the Commission cannot make a decision until the Inland Wetlands Commission has made a decision. Following the formal publication of the decision, there is a 15-day appeal period. Plans must normally be approximately 70% construction document level in order to contain sufficient information to gain approvals.

Time Line: Normally takes three to six months, following submission, depending on whether a public hearing is required. The permit application cannot be submitted prior to the application for Inland Wetlands, although they can be submitted on the same day.

FEMA Floodplain Development and Conditional Letter of Map Revision

Basis: Federal law with some review authority delegated to the municipality.

Threshold: Any earthwork or construction within a designated flood plain; work over, or in a designated floodway.

Process: A floodplain permit is required before construction begins within any Special Flood Hazard Area (SFHA), or any flood-prone areas if no SFHA has been defined. Permits are required to ensure that the proposed development project meets the requirements of the National Flood Insurance Program and the community's floodplain management ordinance. In Connecticut, this review is usually performed by the Planning and Zoning or Wetlands Commissions. Generally, passive recreation, such as bicycle and pedestrian trails, are allowed as permitted use in flood-prone areas. However, if the proposed construction affects the elevation or horizontal spread of flood waters, the applicant may need to apply for a Conditional Letter of Map Change (CLOMR). Application is made to FEMA with the concurrence of the municipality. The application must demonstrate that the water surface elevation will not increase by more than one foot (cumulatively with other developments) in the flood plain or by any amount in the regulatory floodway through use of hydraulic modeling software. It should be noted that some municipalities have floodplain-management regulation more restrictive than these requirements. Following construction, an application must be made for a Letter of Map Revision (LOMR) depicting actual "as-built" conditions and modeling demonstrating that the data presented in the application is valid.

Time Line: Normally takes twelve to eighteen months for CLOMR.

Connecticut Flood Management Certification (FMC)

Basis: Connecticut General Statutes and CTDEP Regulations.

Threshold: All State of Connecticut actions in or affecting floodplains or natural or man-made storm drainage facilities, including projects undertaken by municipalities with funding provided by the State.

Process: Application is made to the Connecticut Department of Environmental Protection (CTDEP). Upon receipt of a request for CTDEP approval of a state agency's flood management certification, the application is assigned to a project manager and is reviewed for sufficiency. If the application is sufficient, a detailed technical review is initiated. These reviews consist of an evaluation of the technical documentation provided in the application as well as an independent assessment of the site and of the project's consistency with the flood management standards and criteria.

Time Line: Normally processed within three months. If other CTDEP approvals are required, the FMC will be processed concurrently with the other applications.

Stream Channel Encroachment Permit

Basis: State regulation of specific stream channels as defined by Connecticut General Statutes and CTDEP Regulations.

Threshold: Any earthwork within the stream channel encroachment line.

Process: Application is made to the CTDEP. Application must include hydrologic analysis proving that activity does not negatively impact flood water or impede flow within the channel.

Time Line: Normally takes six to twelve months depending upon the nature of the proposed construction.

Connecticut Department of Environmental Protection General Permit for the Discharge of Stormwater and Dewatering Wastewater from Construction Activities

Basis: Connecticut General Statutes and CTDEP Regulations.

Threshold: Compliance with the General Permit is required for all projects that disturb one or more acres of total land area. Projects with five or more total acres of disturbance, regardless of phase must also file a registration with the CTDEP. Projects exceeding ten acres of total disturbance must obtain an approval of registration, including a detailed review of the required Stormwater Pollution Control Plan.

Process: Application is made to CTDEP.

Time Line: Must be submitted at least sixty days prior to the start of construction.

Army Corps of Engineers (ACOE) Permit

Basis: Section 404 of the Clean Water Act

Threshold: There are three categories of ACOE permits based on the total area of disturbance of federally regulated wetlands. The federal definition of wetland is different from the Connecticut definition. Although the limits of both federal and state wetland tend to be the same, there are sometimes differences. ACOE jurisdiction is triggered by any fill-in, or secondary impact to, a federally regulated wetland. If the ACOE has jurisdiction, then the category of permit is decided based on the total direct and secondary impacts to wetlands. Direct impacts include earthwork operations. Secondary impacts can include changes in drainage patterns or groundwater hydrology, clearing/cutting of vegetation, or alteration of shade patterns.

Category I General Permit (less than 5,000 square feet of disturbance)

Category II Programmatic General Permit (PGP) (5,000 square feet to 1 acre of disturbance)

Category III Individual Permit (one acre, or more, of disturbance)

Process: For Category I, there is no application required. For Category II and III permits, application is made to the ACOE. Review is conducted jointly by the ACOE and the CTDEP (see CT 401 Water Quality Permit). Additional review by the U.S. Fish and Wildlife and other federal agencies is conducted for Category II and III permits. Category II permits can be changed to Category III if requested by reviewing agencies based on potential impacts of the wetlands or wildlife habitat.

Time Line: Category II permits normally take six to nine months depending on complexity, quality/function of wetlands, and surrounding habitats. Category III can take one year or more. Category II and III permits cannot be granted until the CTDEP issues a 401 Water Quality Permit.

Connecticut Section 401 Water Quality Certification

Basis: Federal authority, under the Clean Waters Act, delegated to the State of Connecticut.

Threshold: Category II or III ACOE Permit, or any State of Connecticut Project.

Process: Application to the ACOE is jointly reviewed by the Connecticut Department of Environmental Protection (CTDEP). The CTDEP often requires additional information to be submitted which is not required by the ACOE.

Time Line: Normally takes four to six months. This certification must be granted before the ACOE can issue a Category II or III permit.

12. Coordination with Other Studies

Along with the Regional Naugatuck River Greenway Routing Study, other relevant studies have recently been completed or are occurring concurrently. In some cases, some of these studies have had an impact on the routing decisions for the NRG and recommendations from this Study have led to proposal alterations to the other studies. The other studies include:

- The **Route 8 Study** is an active planning effort that is looking at ways to improve traffic flow and motorist safety at exits 22-30 along Route 8 in Seymour, Beacon Falls and Naugatuck. All design recommendations are being classified as near-, medium- or long-term improvements. From north to south, potential projects that are most relevant for the Naugatuck River Greenway in Beacon Falls include:
    - Adding a left-turn pocket to the Depot Street bridge within the existing median along Old Route 8 in Beacon Falls.
    - Suggesting decommissioning traffic lanes along Route 42 in Beacon Falls, making the existing three- and four-lane state highway a two-lane road (with landscaped divider). This potential "road diet" recommendation provides space for a greenway connection along the east bank of the river from Pines Bridge up to South Main Street.
- The **Waterbury and New Canaan Branch Lines Feasibility Study** was a CTDOT managed study to investigate and recommend improvements for two branch lines of Metro-North commuter rail network. The Study's recommendations may impact the routing of the greenway in two ways:
    - Passing sidings are recommended for Beacon Falls in the Naugatuck State Forest and adjacent to Toby's Pond Recreational Park. A passing siding adjacent to Toby's Pond may make it more difficult for connecting the greenway trail to the portion of the greenway proposed as part of the Route 42- Route 67 Connector Road.
    - Full signalization of the branch line to Waterbury is recommended. Signalization may require installation of cables, control boxers, and signal lights along the rail corridor, which could create obstacles for the rails with trails sections of the greenway trail.
- The **Connecticut Bicycle and Pedestrian Transportation Plan** was updated by the Connecticut Department of Transportation in 2009. The effort includes a state-wide plan and detailed map that illustrates the state's policies, existing facilities and future needs for safe and efficient travel by bike or by foot.

- The **Route 42/67 Connector Road Study** is a current study managed by the Valley Council of Governments in cooperation with COGCNV, Beacon Falls, Seymour and CTDOT that is investigating the feasibility of constructing a connector road between Route 42 in Beacon Falls to Route 67 in Seymour, west of the Naugatuck River. The connector road will provide access to land for development in both towns and will be paralleled by the Naugatuck River Greenway. This section of the NRG trail will be an important part of the mixed-used development envisioned for this corridor. The greenway would be designed as part of this connector road, if the project moves into a design phase.

13. Community Input

The Council of Governments of the Central Naugatuck Valley (COGCNV) hosted two pairs of public workshops for the Naugatuck River Greenway Routing Study. A workshop was held in each of the four greenway study municipalities.

Elected officials from Naugatuck and Beacon Falls pose next to NRG analysis maps displayed at the November 2009 public meetings.

The first public workshops were held on November 17 and 18, 2009 in Naugatuck and Thomaston, respectively. The purpose of the first set of workshops was to gather input from all four communities to assist in determining opportunities and challenges along the corridor and potential routing options for the greenway trail. The meeting on the 17th was focused on the issues and routing in both Naugatuck and Beacon Falls, while the next night, discussion focused on the issues and routing in Watertown and Thomaston

The second of the two pairs of public workshops were held on March 23 and 24, 2010 in Beacon Falls and Watertown, respectively. The purpose of these meetings was to gather input from the four communities on the proposed preliminary routing as well as areas where they would like to see additional amenities along the Naugatuck River Greenway.

Overall, the four community meetings, combined with other stakeholder meetings and site walks, provided COGCNV and the consultant team with valuable input on routing recommendations, design options and property-ownership issues. The team also learned of the important local connections to adjacent neighborhoods and commercial areas outside of the corridor. Additional trail spurs and other connections were added to the recommendations as a result. One attendee even suggested the clever idea of using the 22-mile greenway, plus some spurs, as the route for the Naugatuck River Marathon in the future.

Draft routing maps were also posted on the project website. Comments on the greenway routing maps were received at the workshops, via e-mail and by U.S. Mail.

Press releases were published for both sets of workshops in the Republican American and other town newspapers. Articles were written and published on the workshops, including references to the project website. Video of the Thomaston workshop was posted to the Republican American website.

Subsequent to the community meetings, members of the Connecticut Horse Council and the Connecticut Equine Advisory Council investigated key trail connections that currently exist in the Naugatuck River

corridor area. They provided a detailed memo to COGCNV and mapped the connections in a GIS database, some of which helped the consultant team recommend spur-trail links important to equestrians.

A final public meeting was held on September 14, 2010 at COGCNV's offices in Waterbury. The completed draft study was presented to the Regional Planning Commission and members of the public in attendance. Members of the public and RPC commissions voiced support for the greenway study. One member of the public emphasized the importance of designing the greenway to not take away from the beauty of the Naugatuck River.

14. Opportunities and Challenges

Part of the community and stakeholder meetings, field work and analysis during the easy stages of this Study included the documentation and analysis of existing opportunities and challenges to the development of a greenway trail within the Naugatuck River corridor in Beacon Falls. This analysis is shown in the diagrammatic map, Figure 3, on the following page.

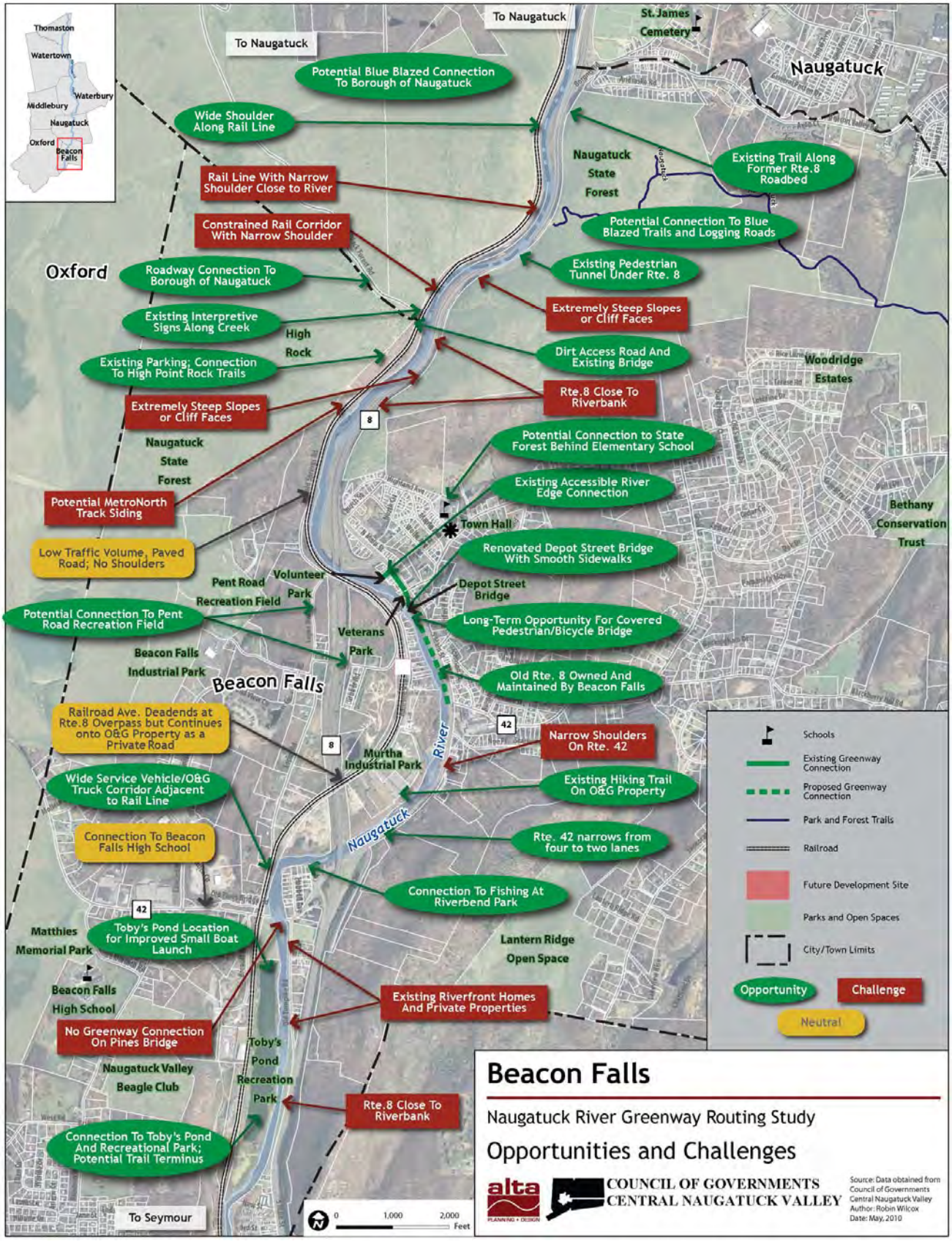
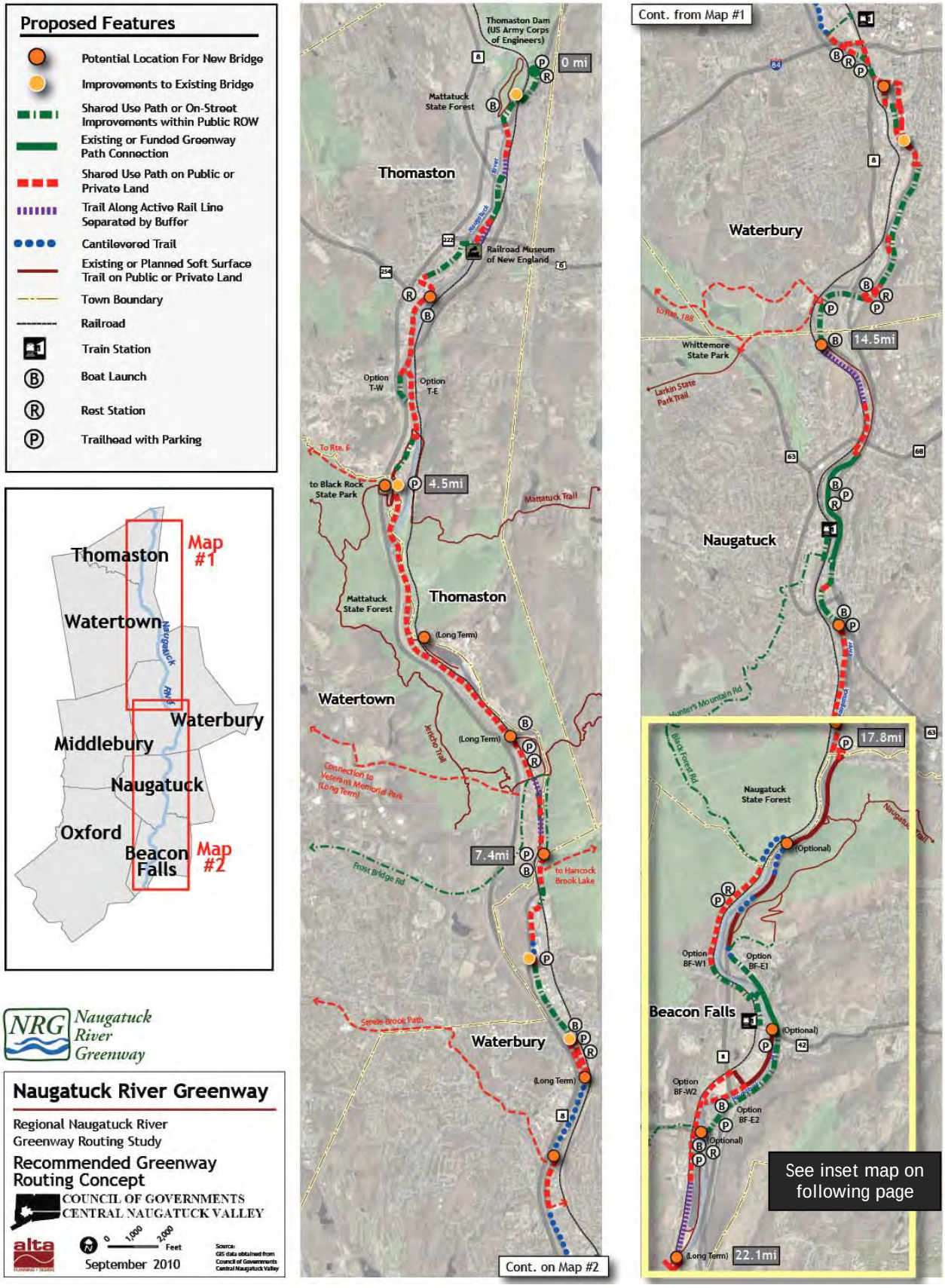


Figure 3: Opportunities and Challenges for Potential Greenway Route in Beacon Falls

15. Recommended Greenway Routing



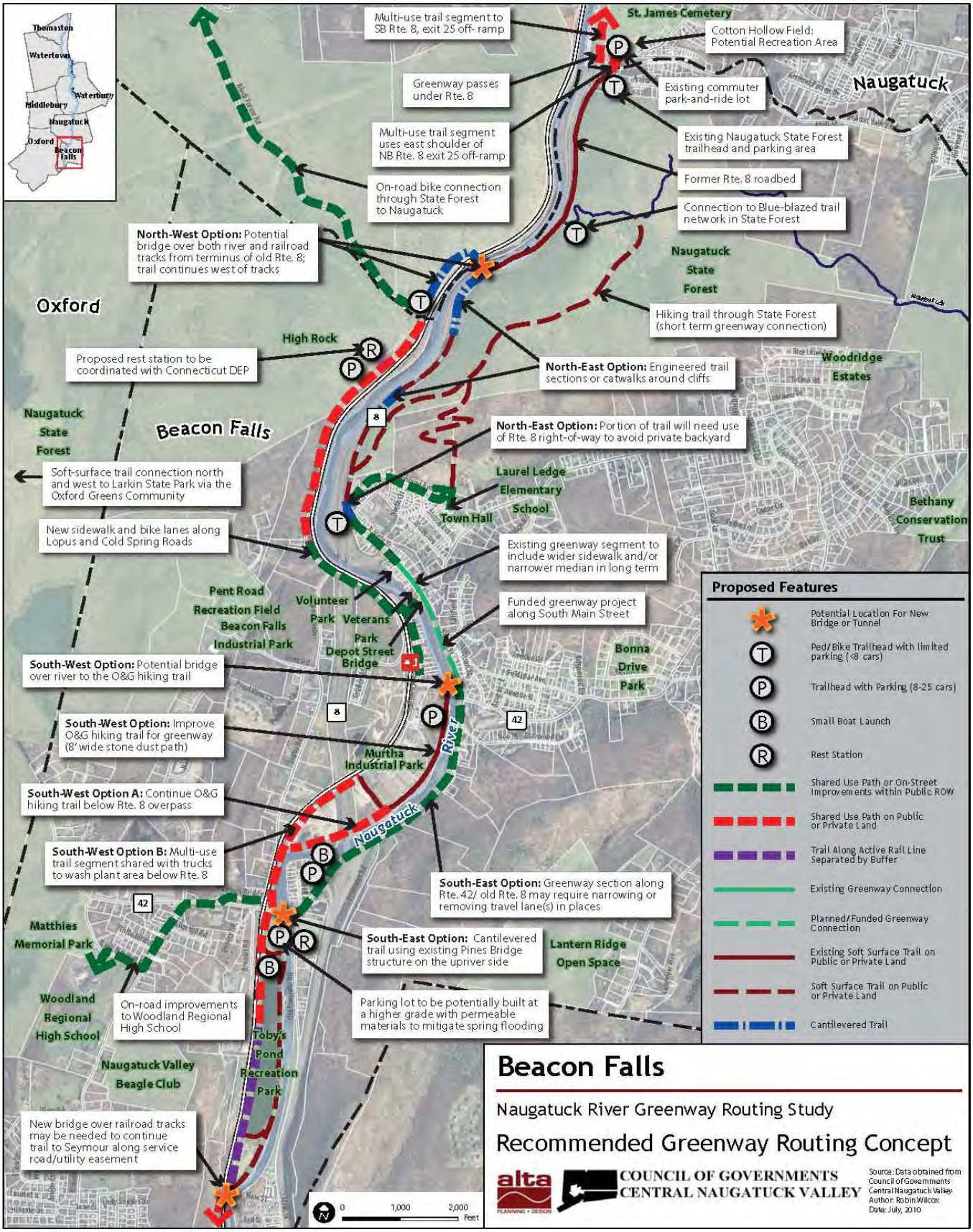


Figure 4: Recommended Greenway Routing Concept in Beacon Falls

The Naugatuck River Greenway in the Town of Beacon Falls will take various forms including a trail set immediately adjacent to existing roadways, soft-surface pathways adjacent to the river, "rail-with-trail" portions, and the long-term possibility of a catwalk-like trail bracketed against rock faces in the Naugatuck State Forest. The route will provide important connections to public open spaces in Beacon Falls, including the State Forest, Veteran's Park, and to Toby's Pond and Recreational Park. Trail-side amenities will be provided along the route including small parking lots, picnic areas, small boat launches (canoes and kayaks), rest stops, water fountains, public art, seating and interpretive signage and kiosks. The 4.3 miles of trail will enhance the quality of life for residents of Beacon Falls and attract new visitors. A half-mile portion of greenway along South Main Street from the Depot Street bridge to Route 42 has been funded. Greenway connections north through the Naugatuck State Forest to the Borough of Naugatuck and south to Seymour will also provide safe corridors for walking and biking and encourage more non-motorized trips in town.

A. Recommended Greenway Trail Alignment

The Naugatuck River Greenway (NRG) trail within Beacon Falls begins at the northern endpoint of the Old Route 8 road bed. This spot at the end of Borgnis Road will include an enhanced trailhead with a handful of parking spaces, a kiosk with trail maps, dog-waste bag dispensers and possibly a port-o-potty or composting toilet. From there, the trail connects north to Naugatuck along a path that runs on the east side of the northbound exit 25 off-ramp from Route 8. The link south to Beacon Falls will incorporate the former road bed for approximately ¾ mile until it terminates near the edge of a steep cliff where a large concrete retaining wall was built when Route 8 was expanded into an expressway in the 1970s. Along the route, a trailhead will provide connections to the system of Blue-Blazed hiking trails in the east side of the Naugatuck State Forest. In the short term, a steep hiking trail connecting to Barton Road or possibly to the rear of the Laurel Ledge Elementary School may be the only east-side link from Naugatuck to Beacon Falls. On the west side of the river, short-term access between the two municipalities will be provided by an on-street bike route along Hunter's Mountain Road in Naugatuck, through the State Forest via Black Forest Road and connecting to Beacon Falls along High Rock Road. There is also a trail connection used primarily by equestrians that links the Chestnut Tree Hill Road area of the State Forest to the Larking State Park Trail to the north, via the Oxford Greens community. Preservation of this connection should be maintained and improved. Ultimately, a more convenient and ADA-accessible route is recommended to pass through the State Forest within the river corridor.

The steep river valley, Route 8 and the railroad tracks (hidden at right) create a significant barrier for trail connectivity between Naugatuck and Beacon Falls.

Section of the blue-blazed trail system within the Naugatuck State Forest.

Creating an ADA-accessible, multi-use trail through the Naugatuck State Forest will require careful planning and significant funds to complete. This mile and a half stretch of the NRG trail is likely to be the most complicated and

expensive along the entire 22-mile corridor from Thomaston to Beacon Falls. This is due to the steep topography on both sides of the river, rocky slopes prone to landslides, and the presence of both Route 8 and the rail line along the narrow stretch of flat land adjacent to the river. The preferred trail alignment along the east side of the river will include catwalk-like sections, cantilevered paths and the cutting of shelves into steep slopes. A secondary option is to develop a dramatic—and potentially very expensive—bridge that spans Route 8, the river and the rail line. These two options are described in more detail in section B below. In the short-term, improvements to the existing trail system through the State Forests (signage, benches, minor regrading, etc.) could accommodate hiking and mountain bike connections.

Route 42 south of Beacon Falls could feature the trail on either the east or west bank of the river.

Both NRG trail options through the State Forest are intended to bring the trail to the downtown area of Beacon Falls. Currently, there is a short stretch of greenway that runs along the west sidewalk of North Main Street, connecting Volunteer Park behind the fire station with Veteran's Park at the Depot Street corner. The unit pavers that comprise this special sidewalk work well for walkers and for ADA access but the overall dimension of this sidewalk is too narrow to accommodate adult cyclists. In the future, this section of sidewalk should either be widened or bike lanes added to the adjacent section of North Main Street. In either scenario, the center median of North Main may need to be narrowed or a travel lane removed to avoid the removal of on-street parking along the west edge of the road. The trail will continue south along the west edge of South Main Street within a corridor currently designed and funded and ready for construction in 2011. This stretch will feature a 10-12' trail along what is currently two south-bound lanes of South Main. In this plan, one lane of south-bound and north-bound traffic will share the eastern half of the right of way. This funded portion of the trail exists only to the Route 42 intersection with South Main Street.

From the Route 42/South Main intersection to Toby's Pond and Recreational Park, there are multiple options to connect downriver to the large open space recently donated to the Town by O&G Industries. Each option maintains a continuous trail but does so within a very different context. The east option will run the trail within the Route 42 right of way from the endpoint of the funded greenway segment to the Pines Bridge. The west option (and sub-option) will incorporate the existing hiking trail on O&G property and extend it downriver to Toby's Pond. In either option—described in more detail in section B below—a seamless connection to Toby's Pond is anticipated. At Toby's Pond, the NRG will be routed along the west side of the pond to the south end of the park. A narrower, non-ADA accessible spur trail will loop around the pond and connect back to the main entry area of the park where parking, a rest station (or port-o-potties) and boat launch will be located. Additionally,

Autumn view of Toby's Pond

from this location, on-street bike improvements and miscellaneous sidewalk enhancements will help to connect the greenway to the Woodland Regional High School. In the long term, the trail is anticipated to continue south to Seymour. To do so, a new bridge or tunnel will be needed to cross over or under the railroad tracks (used by the Metro-North Waterbury branch line) from Toby's Pond to access an existing corridor that is being considered for a connector road between Routes 42 and 67. In lieu of crossing the tracks with a potentially expensive bridge, another option to make the connection to Seymour is to use on-street improvements along Pines Bridge, Breault Road and the unpaved access road that continues south.

B. Greenway Trail Alignment Options

There are two challenging locations along the NRG alignment through Beacon Falls where multiple routing options have been studied. The first pair of options (the "North Options") were developed to bridge the difficult gap within the heart of the Naugatuck State Forest. This section is complex due to the steep slopes along both sides of the river (including cliffs and man-made retaining walls), the presence of Route 8 on the east bank of the river and the active rail line on the west bank. The short term solution to bypass this gap is to improve walking/hiking access through the Blue-Blazed trail system on the east side and to develop an on-street route for cyclists on the west side via Lewis Street, Hunters Mountain Road and Black Forest Road. It is recommended that a longer-term and more expensive connection be pursued for this nearly one-mile gap in order to create a continuous and fully accessible, multi-use trail from Thomaston to Beacon Falls. Of the two options studied, the east option is more favorable, but a western connection—via a long-span bridge—has significant merit as well (see Figure 4 on page 23: Recommended Greenway Routing Concept map for North East and North West option locations). In addition, a third option was considered but ultimately eliminated because of technical problems and the likely high cost. Called the "tunnel option", it studied the potential widening of the existing culvert tunnel below Route 8, provided during the construction of the highway to provide fisherman access to the river from the Naugatuck State Forest. From the west edge of the tunnel, a bridge was then proposed to cross the river and the railroad tracks.

Two of the major obstacles on the east side of the river: the large retaining wall and the scree field immediately adjacent.

North East Option

The preferred North East Option will maintain a fully accessible, multi-use trail connection on the east side of the river, connecting directly into the downtown area that fronts North and South Main Streets. It will not require crossing Route 8 or the river because it will utilize portions of the Old Route 8 road bed. Accommodation of the NRG trail along this alignment will require crossing at least three sections of rock face, concrete retaining wall or loose rock. An engineered solution at relatively significant expense and required permitting will be necessary to bridge over these sections safely. Between these three sections, however, portions of the Old Route 8 road bed

Catwalk Trail in New Mexico's Gila National Forest

are extant and are likely in usable condition.

From the north, the first difficult section is the large concrete retaining wall adjacent to the northbound lanes of Route 8, just south of the termination of the Old Route 8 road bed. The wall is approximately 200' long and cannot be crossed from above because of its 120'+ height. The most appropriate method to get around the wall will be to build a catwalk-like trail section that is 8-10' wide, running approximately 60' above the grade of Route 8. Bracketed against the retaining wall, the trail is likely to look similar to the "Catwalk Trail" through a canyon in New Mexico's Gila National Forest. A few hundred feet south of the wall, the trail will cross a sloping scree field of loose rocks that will require a differently-engineered solution likely to involve deep pilings and tie backs. Between and adjacent to these two barriers are steep, but manageable, slopes that will require the development of a "shelf" to accommodate the trail. A few hundred feet south, another cliff sits adjacent to Route 8 and it will be crossed with a catwalk-like trail bracketed to the rockface. Immediately past this cliff, the Old Route 8 road bed currently continues towards Beacon Falls and discontinues a few hundred feet short of the end of North Main Street. This trail connection will be made by incorporating the NRG (and accompanying security fence) within the Route 8 right of way, allowing the bypass of a residential property along Beacon Street. Along North Main Street, the sidewalk is relatively narrow and space will need to be made for the trail. This could include the removal of a lane of traffic in either or both directions, striped on-street bikes lanes or the narrowing of the existing median that separates traffic on the two-way road.

North West Option

In lieu of the east-side connection, the Naugatuck State Forest gap will be closed in this option by the development of a long-span bridge that springs from the end of the existing Old Route 8 road bed, across Route 8, the Naugatuck River, and rail line and will connect to a small landing on the west bank sitting approximately 30' above the grade of the rail line below (see Figure 5 and 6 at right and on the next page). The bridge has the potential to be a spectacular gateway into the Central Naugatuck River Valley and feature spectacular views. It could provide not just a continuous greenway link but help create access from one side of the State Forest to the other, linking the Blue-Blazed hiking trail system. From the landing on the west side, a shelf will be carved into the steeply-sloped area (including some cliff sections) gradually ramp down to the east end of Black Forest Road, a public right of way in the State Forest. (This shelf would be built adjacent to an active rail corridor so careful planning will be needed to minimize disruption to rail service and provide a safe environment for construction workers and future NRG trail users.) At this spot, existing interpretive signs and a parking area will serve the trail. Within this vicinity, a port-o-potty or composting toilet should be considered as well.

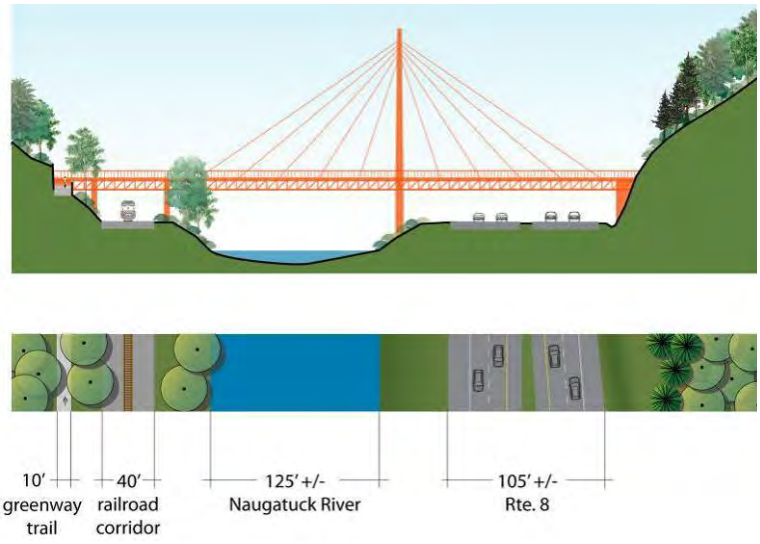


Figure 5: Cross-sectional view of the Naugatuck River Valley illustrating the large span bridge featured in the West Option.

A new bridge over the brook and a series of public roads (High Rock Road on state forest land, Cold Spring Road, Lopus Road and the Depot Street bridge) will make the connection back into downtown Beacon Falls. Opportunities for greenway trail enhancements such as a new sidewalk or bike lanes are

limited along this route due to narrow rights-of-way. Traffic is light however, and the sharing of the roadway is certainly possible, but will not accommodate ADA requirements.

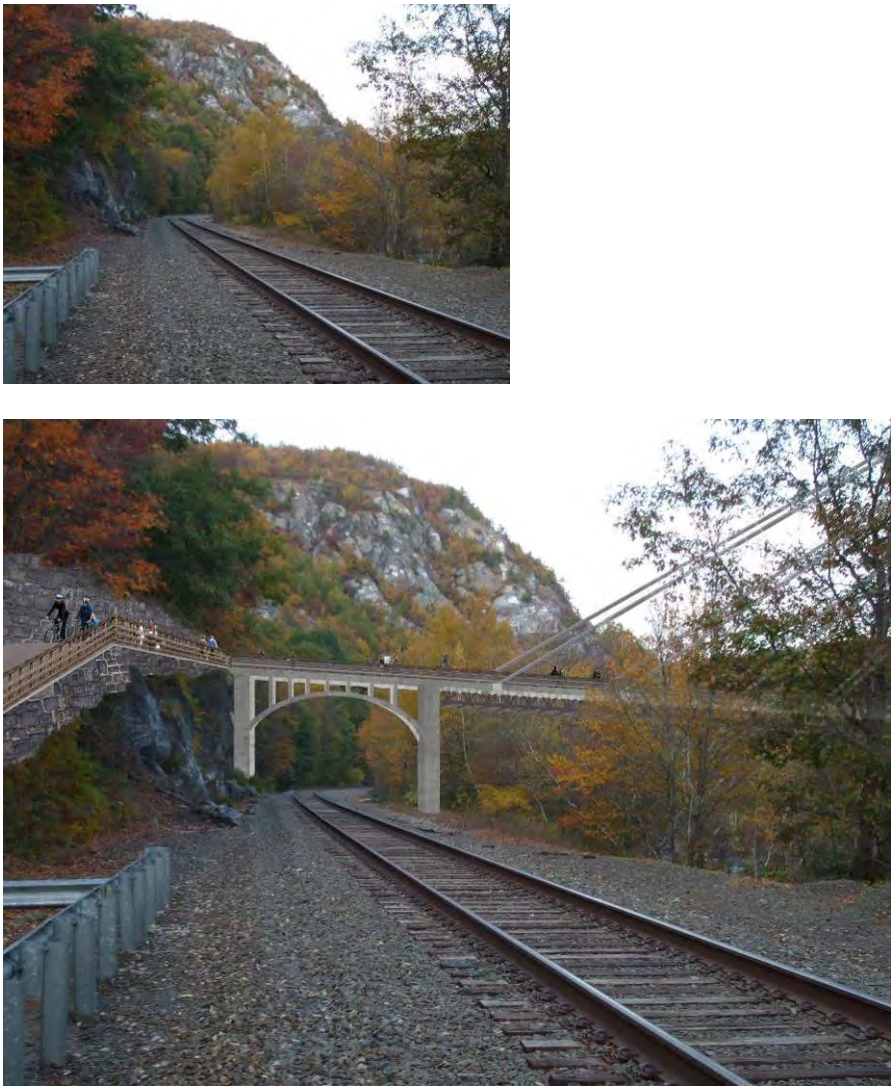


Figure 6: Existing and photo-simulation view of the west end of the long-span bridge over Route 8, the river and the railroad line. The structural piers are configured to accommodate a second track in the future.

Near the south end of the alignment through Beacon Falls, there are two options for connectivity between the downtown area and Toby's Pond and Recreational Park (called "South Options"). One runs along the east side of the river and the other on the west. The South West Option additionally includes a sub-option within the corridor (see Figure 4: Recommended Greenway Routing Concept map for South East and South West option locations).

South East Option

View of Pines Bridge from Toby's Pond with a new parallel trail bridge likely to cross to the north of the existing span (at far left).

The South East Option maintains the NRG trail within CTDOT's Route 42 right of way. This stretch of Route 42 is a remnant of Old Route 8 and has no curb cuts or intersections making it an ideal location for a greenway trail. Currently, there are two south-bound travel lanes from the Bethany Road/South Main intersection that narrow to one travel lane upon the approach to the exit 23 off ramp from north-bound Route 8. This option proposes that a single-lane configuration southbound be considered for the entire stretch from Bethany Road to the Route 8 overpass to accommodate the trail. (This will, of course, require further traffic analysis and discussion with CTDOT to explore its feasibility.) From the overpass to Pines Bridge, the trail will use the shoulder—potentially accompanied by a narrowed median--of the north/west side of Route 42 passing a small residential neighborhood between Route 8 and the river. Here, a short spur trail will connect the NRG trail to Riverbend Park, maintained by Trout Unlimited. To cross the river at Pines Bridge, a parallel trail bridge is recommended to sit adjacent to the existing span on the north side. There are old bridge abutments in this location and their feasibility for use in the new bridge will need to be explored.

South West Option

In the South West Option, the O&G is re-graded and widened to 8'.

The South West Option takes advantage of an existing, publicly-accessible trail network on O&G property behind the Murtha Industrial Park on the west bank of the Naugatuck River. The trail will need to be regraded with a stone-dust surface and widened to 8' to accommodate cyclists and ADA access but maintains its wooded, natural character. To reach the trailhead on the north end, a new bridge will span the river and connect the O&G trail to the end of the previously approved and funded section of greenway along South Main Street. At the south end of the O&G trail, there are two options to link it with the north end of Toby's Pond and Recreational Park, both of which run through O&G's wash plant. South West Option A will maintain a multi-use trail along the river, passing under the Route 8 overpass and along the south side of the wash plant. Option B will continue the NRG trail under Route 8 via the private extension of Railroad Avenue that parallels the Metro-North railroad along the west side of the wash plant. This route is still used occasionally by O&G trucks and space is limited due to the nearby active rail line, so sharing of the corridor will be required. At the southern edge of the wash plant facility, the two sub-options will come together and continue south to Toby's Pond. This quarter-mile segment is within the rail corridor but is a broad dirt road that is used by O&G to access Toby's Pond. The existing dirt road can accommodate a greenway trail/O&G vehicle corridor along with the 25' buffer from the tracks required by CTDOT (see Figure 7 on following page).

Figure 7: Existing and photo-simulation view of the rail corridor adjacent to Lopus Road (at left) between the O&G wash plant (background) and Toby's Pond and Recreational Park.

C. Greenway Trail Characteristics

The primary goal of the NRG is to provide a continuous pathway through Beacon Falls that is accessible to pedestrians, cyclists and, where possible, people using wheelchairs or other accessibility devices. In limited area, access to equestrians is anticipated as well. The dawn-to-dusk pathway will be designed for use as both a transportation corridor (commuting, errands, etc.) and for recreational purposes. Ideally, the trail will be separated from nearby roadways by a five to ten foot landscaped buffer or, at a minimum, a crash barrier set within a three-foot-wide grassy shoulder. This Study recommends the accommodation of

all of these uses for the maximum length of the trail as practicable. Some discrete locations may not accommodate ADA requirements and bicycles, at least for the short term. Ultimately, these narrow pinch points and other spots requiring significant engineering solutions should be designed to accommodate all users safely and comfortably. Through the Naugatuck State Forest, a "single track" hiking trail (part of the Blue-Blazed system) for hiking, mountain biking and/or equestrian use is the best available option in the short term. Water trail or 'blueway' options are also an important consideration so the Naugatuck River can be accessed by canoe and kayak. Currently, there are two existing paddlecraft boat launches and take-out areas in town, one at Riverbed Park and the other at Toby's Pond and Recreational Park.

The permeable portion of the NRG in Beacon Falls could look like this trail in Keene, New Hampshire

Within Beacon Falls, most of the greenway is intended to be a ten foot wide, shared-use asphalt path, with eight foot widths in constrained areas. Two-foot wide soft-surface shoulders (stone dust or packed gravel) will be included with a white shoulder line set eight to twelve inches from the edge of the asphalt. This trail configuration is appropriate for the majority of the greenway through the Town. If conditions permit, a four-to-six foot, soft-surface shoulder should be considered on one side of the trail to facilitate equestrians and runners looking for a more comfortable surface. Locations very close to the river or wetland areas can be a permeable or semi-permeable surface (stone dust or packed aggregate with a binding agent) to reduce storm-water runoff and make for a more "natural" appearance. In Beacon Falls, this condition may occur in portions of the trail on O&G property south of the downtown area. Along portions of North Main Street, the NRG will incorporate the unit-paver sidewalk along the west side of the street. The design of the trail through sections adjacent to the unit-paver sidewalk should incorporate this design detail so that it's a consistent feature through the entire downtown area. An option is to replace the unit pavers with a surface that is more consistent with other stretches of the NRG trail.

D. Access Points and Amenities

The NRG trail includes a number of parking areas and trailheads to provide access to the transportation and recreational corridor. Some existing public parking areas will serve as access points for the NRG, including the commuter park-and-ride lot on Cross Street in Naugatuck, the parking area at High Rock Grove in the Naugatuck State Forest, and at Volunteer Park. Other parking areas are not paved and/or ADA accessible and will need to be improved such as the O&G trailhead off Railroad Avenue and Toby's Pond and Recreational Park, whose parking lot experiences flooding during the spring months. Because of this, rebuilding the latter parking lot at a slightly higher grade and with a fully permeable surface should be considered. All parking lots include trailheads and/or kiosks that feature maps, dog-waste bag dispensers, safety information and environmental and historical interpretive materials. To discourage trail use by ATVs and other motorized vehicles, signs and bollards will be needed at all trailheads as well. Some parking lots are located near existing small boat launches so people can park and carry their canoes and kayaks a short distance to the river. These locations may also work well for fishing access.

Other trail-related amenities will be determined on a case-by-case basis and could include:

Rest Stations
Rest stations that include bathrooms, water fountains and lighting are important amenities that provide a more comfortable environment for greenway users, especially those with young children. A rest station is proposed at Toby's Pond and a composting toilet is recommended at the High Rock parking area in the Naugatuck State Forest.

Interpretive Installations
Interpretive installations and signs enhance the trail experience by providing information about the history of the community. Installations can also discuss local ecology, environmental concerns, and other educational information. Public health can be integrated with 'calorie counter' maps that encourage physical activity along the trail. Recently, interpretive signs have been installed with COGCNV's assistance at High Rock Grove in the Naugatuck State Forest, and at Volunteer and Veteran's Parks downtown.

Pedestrian-scale Lighting.
Pedestrian-scale lighting improves safety at key locations along the NRG route and at trailheads. In Beacon Falls, the stretch of trail along North and South Main should be well lit, especially the Depot Street intersection. Additionally, designated parking areas, rest stations and trailheads should have a modest level of lighting for safety reasons. Lighting fixtures should be consistent with other design elements, possibly emulating a historic or cultural theme.

Seating
Providing benches and seating at key rest areas and viewpoints encourages people of all ages to use the trail by ensuring that they have a place to rest along the way. Benches can be simple (e.g., wood timbers) or more ornate (e.g., stone, wrought iron, concrete, or Adirondack chairs).

Maps and Signage
A comprehensive signing system that is consistent along the entire length of the Naugatuck River Greenway will make the trail network much easier to use. Informational kiosks with maps at trailheads and other key destinations will provide enough information for someone to use the trail system with little introduction – perfect for bike commuters, tourists and local residents alike.

Public Art
Local artists can be commissioned to provide art for the trail system, making the trail unique to its community. Many trail art installations are functional as well as aesthetic, as they may serve as mile markers and places to sit and play. Public art installations along the greenway should be consistent with a design theme, based on the surrounding context. In Beacon Falls, public art should be considered at key locations along the NRG, such as where the trail enters/exits the downtown area along North and South Main Streets and the entrance to Toby's Pond and Recreational Park.

16. Use of Rail Corridor

Throughout discrete portions of the 22-mile Naugatuck River Greenway (NRG), the recommended trail route runs within the state-owned, active rail corridor. In Beacon Falls, the railroad corridor carries the Waterbury branch of the Metro-North Commuter Railroad and occasional freight trains. The NRG trail in Beacon Falls will run within the rail corridor for less than a half mile from the Murtha Industrial Park at the end of Railroad Avenue to Toby's Pond and Recreational Park (see Figure 8 below).

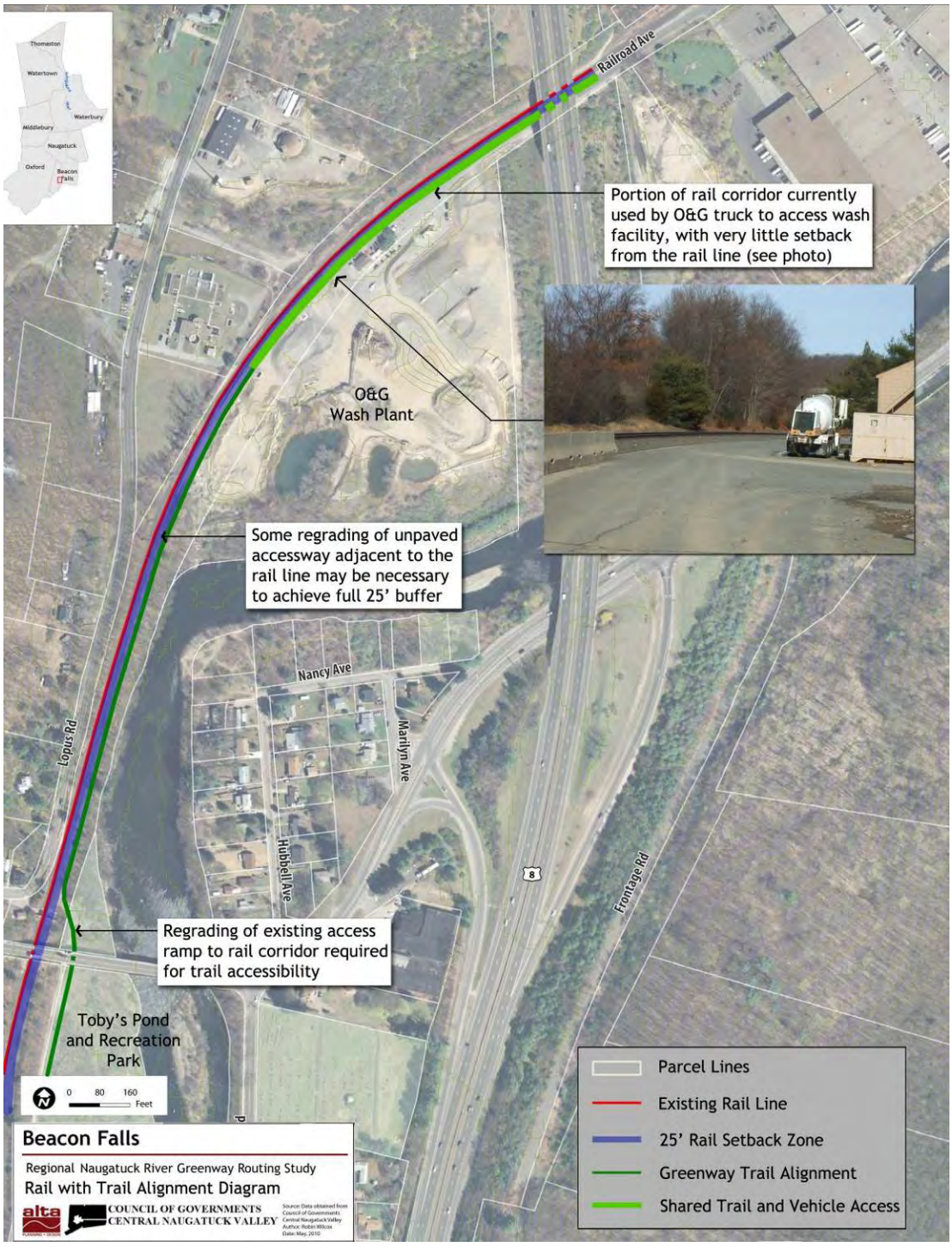


Figure 8: Rail with Trail Alignment Diagram in Beacon Falls.

Because of the use patterns of the rail line, the NRG's alignment will need to be carefully designed so as not to disrupt train service. Early on in the planning process, members of the project team met with rail operations officials from the Connecticut Department of Transportation (CTDOT) in New Haven to better understand their needs for the corridor. According to CTDOT, the agency is open to considering having a greenway trail as long as operations are not disrupted and the following conditions are met:

- A 25 foot setback/buffer from the centerline of the tracks to the edge of the trail to accommodate future double tracking, rail spurs and/or electrification towers (it is important to note, however, that CTDOT's Waterbury/New Canaan Branch Lines Study does not recommend double tracking or electrification because of high costs and limited benefits).
- Unencumbered access for service and emergency vehicles.
- A security fence with intermittent gates for maintenance access.
- A future greenway trail construction schedule that is coordinated with Metro-North's summer maintenance schedule when Waterbury Branch rail service is suspended and replaced with buses.
- Any maintenance of the railroad corridor should be coordinated with future greenway construction for maximum efficiency of time and funding.

Many of these conditions are consistent with research conducted for the U.S. DOT's *Rail-with-Trails: Lessons Learned* document by Alta Planning + Design (see: http://www.fhwa.dot.gov/environment/rectrails/rwt/toc.htm). This document showed that well-designed rail-with-trail projects typically meet the operational needs of railroads. In some locations, the setback/buffer can be as low as 10 feet in constrained areas within rail corridors that have a low frequency and low-speed train service. Regardless of setback distance, the recommended NRG rail-with-trail portion between the O&G Wash Plant facility and Toby's Pond may not fit neatly on to the existing rail bed used by maintenance vehicles. Achieving the 25 foot setback may require the cutting of adjacent trees, re-grading of a portion of the bed and potentially building small retaining walls to accommodate the additional width. In extreme pinch points, the bare minimum setback will need to be at least 12 feet to accommodate maintenance vehicles and other machinery.

Greenway trail in Portland, Oregon whose edge runs within 10-15 feet of the centerline of the adjacent active rail line.

It is also important to recognize, according to the U.S. DOT's report, that the rail-with-trail portions of the greenway can provide benefits to the rail-corridor owner and operator. This includes providing them with a new, well-maintained service corridor adjacent to the tracks (in the form of a greenway trail), and a reduction of illegal track crossings, trespassing and dumping. In addition, towns and cities have seen benefits with increased adjacent property values and enhanced access to the rail corridor by law enforcement and emergency vehicles.

17. Recommended Trail Section Limits

Two separate, but related, questions must be answered in order to develop a recommended sequence of greenway construction. What are the limits of each individual construction phase? What is the best sequence in which to complete these sections? Section limits were determined with an eye toward the following characteristics:

- Connectivity – Individual phases should be useful as stand-alone projects and connect to existing public rights-of-way adjacent to residential neighborhoods or an employment area.
- Funding Availability – The complete greenway program should be broken into reasonably-sized projects likely to attract funding.
- Logical Termini – Since several years may pass between the completion of one section and the beginning of the next, each section should have a logical terminus, such as at an existing public road or park.
- Momentum Building – Greenway sections likely to generate the greatest excitement and enthusiasm in the community should be built first.
- Consistency of Character – Areas in which the character remains consistent from one end to the other.

Using these criteria as a guide, recommended section limits for the Naugatuck River Greenway in Beacon Falls were created and shown in Figure 9.

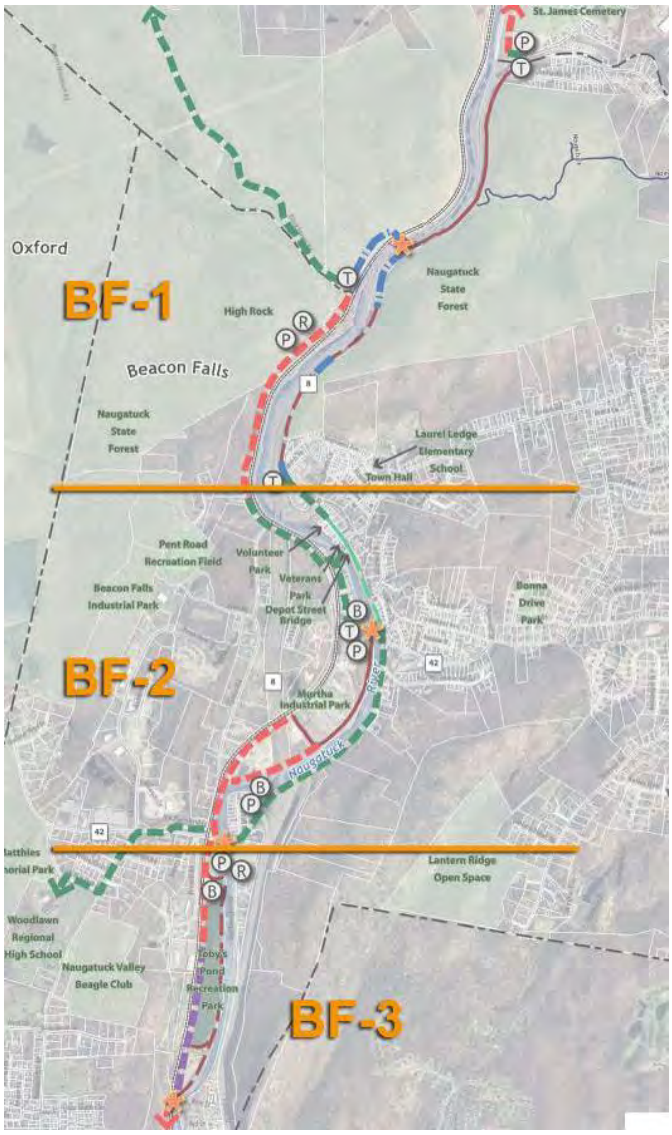


Figure 9: Beacon Falls Greenway Sections

Section	Description	Length (miles)
BF-1	Naugatuck Line to north end of N. Main Street	1.8
BF-2	North end of N. Main Street to Toby's Pond	1.8
BF-3	Toby's Pond to Seymour Line	0.7
TOTAL LENGTH		**4.3**

18. Trail Section Prioritization

Whenever possible, greenway facilities should be developed as single construction projects or use as few phases as possible. This allows project proponents—elected officials, business interests, community groups, etc.—to realize significant cost savings by performing the design, permitting and construction administration more efficiently. However, it is quite likely that financial constraints will require the various sections of the Naugatuck River Greenway to be completed in several phases. For Beacon Falls, a recommended phasing plan was created by weighing seven criteria (relative weighting of each criterion shown in parentheses) with the prioritization matrix shown in Table 1 at bottom:

1. Connectivity (25%) – Does the phase connect to existing or funded portions of the greenway, destinations, or amenities?
2. Permitting Requirements (15%) - Will the phase be easy to permit?
3. Construction Cost (10%) – Will the phase be economical to construct?
4. Ease of Construction (10%) – Will the phase create fewer disturbances to the community?
5. Private Property Impacts (15%) – Does the phase avoid private property or adversely impacting adjacent property owners?
6. Momentum Building (15%) – Will the phase generate excitement and enthusiasm within the community for the overall greenway?
7. Cultural Benefits (10%) – Are there natural, historical, environmental, recreational, or educational resources that will be accessed or protected by the phase?

Criteria	% of Evaluation	Scoring	BF-1	BF-2	BF-3
Connectivity *Prioritize phases that will build the greatest connectivity*	25%	Connects to at least two existing or funded greenway facilities: 2**5** Connects to one existing or funded greenway facility or downtown area: **10-15** Long-term link needed to build regional network: **0**	**10**	**15**	**0**
Permitting Requirements *Favor phases that involve fewer regulatory hurdles*	15%	Can be constructed with only Local Approval: **15** Requires only "General Permits" at the state or federal level: **5-10** Extensive individual state and federal permits required: **0**	**5**	**10**	**10**
Construction Cost *Prefer phases with a lower cost per linear foot of completed trail*	10%	Per Linear Foot cost less than $150: **10** Per Linear Foot cost is between $150 and $250: **5** Per Linear Foot cost exceeds $250: **0**	**0**	**5**	**5**
Ease of Construction *Select phases with less disturbance to local community over more invasive projects*	10%	Can be built with little or no inconvenience to the community: **10** Construction will create only minor inconvenience: **5** Construction will entail significant inconvenience or temporary closure of road/rails: **0**	**0**	**5**	**10**
Property Impacts *Favor projects that require fewer Rights-of-Way on private property*	15%	Phase entails no impacts to private landowners: **15** Phase requires easements or acquisition across 1-3 private properties: **5-10** Phase requires easements or acquisition across >3 private properties: **0**	**15**	**10**	**10**
Momentum Building *Prioritize phases that will generate the greatest excitement and enthusiasm within the community*	15%	Completion is likely to create significant enthusiasm within the community: **15** Completion is likely to create some enthusiasm within the community: **5-10** Phase serves will serve most users only after adjacent connections are made: **0**	**15**	**15**	**0**
Cultural Benefits *Select phases that provide greater access to natural, historical, recreational, archeological or educational resources*	10%	This section contains significant cultural resources: **10** This section contains some cultural resources: **5** This section contains few cultural resources: **0**	**5**	**10**	**0**
Total Score	100%		**50**	**70**	**35**

Table 1: Beacon Falls Trail Section Prioritization Matrix.

19. Cost Estimate

Right-of-Way Acquisition Costs

Payments to owners for the easements and parcels required to construct the greenway vary widely depending up existing land use, size and utility of the portion of a parcel acquired, development potential of the area, and a host of other factors. Based upon recent greenway projects within Connecticut, these costs may range between $40,000 and $100,000 per parcel. In addition to the payments to property owners, the services of a licensed surveyor will be needed during the ROW process. The survey firm will perform boundary surveys and prepare easement maps that must be recorded in the town's land records. These services typically cost $3,000 to $5,000 per easement. Note: this range assumes that easement maps are prepared after survey base maps of the proposed corridor are developed. Finally, legal services will be needed to perform the property transactions. A relatively simple easement transaction will typically cost on the order of $1,500 per transaction if performed by outside counsel.

Engineering Costs

Engineering costs cover a variety of professional services, including:

- Survey (including preparation of easement maps as described above)
- Preliminary, Semi-Final and Final Design
- Public Participation
- Permitting (Local, State and Federal as required)
- Preparation of Construction Documents
- Bid Assistance
- Construction Observation and Contract Administration

Based upon similar project experience and the proposed greenway features, the engineering costs for the greenway are expected to be in the range of 8-12% of the estimated construction cost. However, the actual cost of these services will vary widely depending on project phasing. To a large extent, the cost of permitting, preparing bid documents and administering the construction for a single phase is the same as the cost for the entire project. Similarly, survey and design are more cost effective if done at one time. For this reason, significant cost savings can be realized by developing the greenway as a single project.

Construction Costs

Preliminary estimates of construction costs based upon the recommended greenway sections are described in this report. Important assumptions used to arrive at these estimates include:

- All costs are in 2010 dollars (no adjustments for inflation)
- Costs do not include property acquisition
- Peripheral roadway intersection improvements are not included (e.g., replacing a poorly functioning intersection with a round-about)
- Standard construction methods and materials are used

These estimates were prepared using the latest revisions to the CTDOT's **Preliminary Cost Estimating Guidelines,** dated January 2010. In keeping with CTDOT's cost estimating guidelines, the costs include a number of miscellaneous items that are based on a percentage of construction costs (e.g., maintenance

and protection of traffic (4%), minor items (25%) and incidentals (21%)). These percentages tend to be conservative estimates of actual cost. Where appropriate, adjustments to the typical unit prices were made to reflect current market conditions and the consultant team's experience with other greenway construction projects. The guidelines were supplemented where necessary for atypical items (e.g., pre-fabricated pedestrian bridges, boat launches, etc.).

Since these preliminary estimates are based on a planning-level understanding of trail components, rather than a detailed design, they should be considered "order of magnitude" estimates. ASTM Standard E2620 defines order of magnitude as being accurate to within plus 50% or minus 30% of actual cost. This broad range of potential costs is appropriate given the level of uncertainty in the design at this point in the process. Many factors can affect final construction costs, including:

- Revisions to the design as required by local, state and federal permitting agencies
- Additional requirements imposed by property owners as a condition of granting property rights (e.g., fencing, vegetated buffers, etc.)
- Fluctuations in commodity prices during the design and permitting processes
- Selected construction materials
- Type and quantity of amenities (e.g., benches, lighting, bike racks, etc.)
- Extent of landscaping desired

As the project progresses through preliminary, semi-final, and final design phases, these uncertainties will begin to diminish. With each round of refinement, the range of expected construction costs will become more accurately known.

20. Community Phasing Plans

The following table provides a description of phase limits, phase lengths, recommended construction priority, and estimated cost for each of the greenway trail phases in Beacon Falls. (The detailed cost estimation tables and location map are provided in Appendix C.) The table and appendix are also broken down into "Primary" and "Secondary" portions, i.e. trail elements that are necessary for the completion of the primary portion of the NRG trail vs. secondary elements such as spurs, loops and streetscape improvements that are not integral to the full completion of the trail within the town limits.

Section	Description	Length (miles)	Phase	Total Cost
BF-1	Naugatuck Line to north end of N. Main Street	1.8	2	$2,744,000
BF-2	North end of N. Main Street to Toby's Pond	1.8	1	$1,357,000
BF-3	Toby's Pond to Seymour Line	0.7	3	$681,000
	Total Construction Cost - Primary	**4.3**		$4,782,000
	Total Construction Cost – Secondary*			$910,000

** These secondary items are highlighted on the trail segment cost estimate table on the second page of Appendix C.*

21. Greenway Zoning

Greenway/River Overlay Zoning

A greenway/river overlay zone is a land use regulation established by a municipality for the purpose of protecting a linear corridor for recreational and conservation purposes. These zones have also demonstrated ancillary benefits such as spurring economic development, facilitating redevelopment of underutilized parcels, improving flood management and water quality and preserving critical habitats.

When incorporated into municipal zoning regulations, overlay zones modify the underlying zone's bulk standards and uses. This tool can be used to encourage or dissuade various development scenarios. Relevant to greenway development, overlay zones may be used to:

- Alter setback requirements.
- Provide incentives in the form of higher development density in exchange for public access to a greenway or river corridor.
- Provide incentives for granting easements or providing related amenities for the greenway
- Stipulate landscaping requirements.
- Require construction of greenway segments as a condition of site development.

Excellent examples of the greenway overlay zoning that have served as model ordinances for communities across the nation include:

- Portland, OR - http://www.portlandonline.com/bds/index.cfm?a=53351 (Chapter 33.440 of the Portland Zoning Regulations)
- Davidson, NC - http://www.ci.davidson.nc.us/DocumentView.aspx?DID=1304 (Section 11 of the Town of Davidson Planning Ordinance)

Riparian Habitat Zones

A riparian habitat ordinance is narrowly focused on protecting the unique habitat present along stream channels and wetland areas. Unlike the Greenway and River Overlay zones described above, a riparian habitat zone does not contain specific requirements for public access or accommodation of a greenway and can be used in areas adjacent to the NRG or along tributaries of the Naugatuck River. Elements of effective riparian habitat ordinances include:

- Defines a protected buffer.
- Requires a written plan for the protection of the resource.
- Requires approval of mitigation measures as a condition of project approval.

An example riparian habitat ordinance from Napa, California can be found at the National Center for Appropriate Technology's (NCAT) Smart Communities Network website: www.smartcommunities.ncat.org/codes/napaord.shtml. This site is a clearinghouse for sustainable development and energy conservation ideas.

Complete Streets

Complete streets are designed and operated to enable safe access for all users.[1] The State of Connecticut enacted Public Act 09-154 in June of 2009, "An Act Improving Bicycle and Pedestrian Access". This law requires transportation planners to accommodate all users as "a routine part of the planning, design construction and operating activities of all highways…" This change in focus from *car*-centric to *user*-centric planning helps create safer, healthier, greener and more livable communities. The law also mandates that at least 1% of highway funding be spent on pedestrian and bicycle facilitates.

Many municipalities are choosing to formalize their commitment to include all users in the transportation planning process by adopting Complete Streets ordinances. Whereas the overlay zoning regulations described above focus on protecting undeveloped or underdeveloped corridors, Complete Streets ordinances focus on improving facilities within public rights-of-way. Several excellent examples of successful municipal ordinances can be found at http://www.completestreets.org/webdocs/policy/cs-chart-samplepolicy.pdf

An ideal complete streets policy

- Includes a vision for the community's complete streets.
- Defines 'all users.'
- Encourages street connectivity for all modes.
- Is adoptable by all agencies to cover all roads.
- Applies to both new and retrofit projects.
- Makes exceptions specific and requires approval of exceptions.
- Directs the use of the latest and best design standards.
- Complements the context of the community.
- Establishes performance standards with measurable outcomes.
- Includes specific next steps for implementation of the policy.

Adopted from National Complete Streets Coalition

22. Funding Sources

Generally, greenways are funded through a combination of local, state, and federal sources. Many funding programs require a minimum local match (e.g., 80% federal funds, 20% local). In some instances communities have successfully leveraged grant money from private foundations or state programs as a match for other funding sources. Land donations or town public works crew's labor may be counted as local match under some funding programs.

Community leaders and elected officials from Beacon Falls should pursue a variety of funding sources for land acquisition and greenway construction. Reliance on a single funding source can lead to a boom/bust cycle of construction as funding levels shift with the political winds. The following list gives an overview of the major funding programs:

Municipal Bonds

Municipalities have access to the commercial financial markets via bonds. Use of this funding mechanism is dependent upon strong community support in order to pass the required bond referendum. This is frequently used to obtain the required local match for state and federal funding prog**ram.**

[1] National Complete Streets Coalition, "Complete Streets FAQ." 2009.http://www.completestreets.org/complete-streets-fundamentals/complete-streets-faq/ (accessed May 19, 2010).

Greenway Trust Fund

A strategy used by some communities is the creation of a trust fund for land acquisition and facility operation. These are typically administered by a non-profit group or by a local greenway commission. These trusts can perform a variety of functions such as property acquisition, fund raising, volunteer organization, community outreach and advocacy. Money may be contributed to the trust fund from a variety of sources, including the municipal general funds, e.g., private grants and gifts.

Adopt-A-Trail Programs

These programs are often administered by a local greenway commission and used to fund new construction, renovation, trail brochures, informational kiosks, and other amenities. These programs can also be extended to include sponsorship of trail segments for housekeeping needs.

Federal Transportation Bill

The Congress appropriates funding for federal transportation projects every 5 years. The federal transportation bill has been the primary source for greenways construction money in recent years. Various funding programs within the legislation relate to greenway development, including the High Priority Projects (commonly referred to as "earmarks"), Recreational Trails, and Safe Routes to Schools programs. These funds are administered through the Connecticut DOT and the Connecticut DEP. The current iteration of the federal Transportation Bill, the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) expired on September 30, 2009. Funding has been continued by continuing resolutions until the next federal transportation bill is approved. The next transportation bill is currently being developed by Congress. This presents an opportunity for municipalities to discuss greenway funding under the High Priority Projects program with their representatives in Congress.

Recreational Trails Program

These annual grants are available to government and non-profit agencies, for amounts ranging from $5,000 to $50,000 or more, for the building of trails. It is a reimbursement grant program (sponsor must fund 100% of the project up front) and requires a 20% local match. These grants are authorized by the SAFETEA-LU (reauthorization in progress, see above), and in Connecticut they are administered by the Department of Environmental Protection.

Design Arts Program

The National Endowment for the Arts provides grants to states and local agencies, individuals and nonprofit organizations for projects that incorporate urban design, historic preservation, planning, architecture, landscape architecture and other community improvement activities, including greenway development. Grants to organizations and agencies must be matched by a 50-percent local contribution. Agencies can receive up to $50,000.

23. Next Steps

The Regional Naugatuck River Greenway Routing Study is just the first step in the development of the Naugatuck River Greenway (NRG) in Beacon Falls. The NRG will be a long-term, multi-phase project led by all of the municipalities in the corridor, in cooperation with state and federal agencies. It will require the continued involvement of members of the public, elected officials at all levels of government and community groups in order to support and guide the implementation effort. The following 'next steps' are recommended in order to move the effort forward in a sustainable fashion:

- **Adopt the Study:** The City of Waterbury has recently adopted its plan for the portion of the NRG that runs through the city. Beacon Falls could do the same and amend their Plan of Conservation and Development to incorporate the greenway alignment. The Town could also pursue endorsement of the Study by their Conservation Commission, Planning and Zoning Commission, and Economic Development Commission.
- **Create the Right-of-Way**: This will ensure that the proposed alignment for the trail is gradually assembled and made available for public access. This can be accomplished by using:
    - New zoning regulations to ensure that the greenway is accommodated into redevelopment proposals along the alignment (see Greenway Zoning section of the report for more detail). A greenway overlay district, in particular, can be an effective tool for Beacon Falls to require that trail facilities are integrated into redevelopment projects. A greenway district could also shape the quality of the development by ensuring that only uses compatible to the greenway can be located along side of it.
    - Solicitations of easement or outright ownership should also be considered when key privately-owned parcels are on the market.
    - Begin negotiations with public agencies to ensure that all necessary approvals and permits are completed in order to create an easement across public lands. This can be a lengthy process, especially in areas of environmental sensitivity or at brownfield sites. Due to the recommended changes in the Naugatuck State Forest, Connecticut DEP, in particular, will be a major stakeholder in the next round of design. Stretches of the NRG that permit access to equestrians will need to be considered by the Town as well.
    - Begin negotiations with O&G Industries on greenway-related design recommendations that affect their property. This includes improvements to the existing publicly-accessible parking lot off of Railroad Avenue, widening the existing hiking trail and shared use of the unpaved accessway adjacent to the railroad tracks that connects the wash plant facility to Toby's Pond.
- **Find Project "Champions" to Raise Awareness and Money**: The Town should identify an individual, commission or committee to oversee subsequent steps in the design, funding and implementation process for the greenway. (The involvement of the local business community and/or Chamber of Commerce will be critical as well.) This will ensure continuity of effort even as elected officials or Mayoral administrations change. Fundraising, in particular, is an important component that should begin immediately. Available funding opportunities including: federal transportation funds, regional TIP funding (via COGCNV), economic stimulus grants, national recreational trails grants, and state open space grants should be pursued on an annual basis to ensure success (see Funding Sources section of the report for more detail).

- **Establish a Public-Private-Non-Profit Partnership:** Establishment of a "Friends of the NRG" non-profit organization can be an effective advocate for the project. In conjunction with the project "Champion", this non-profit organization can coordinate volunteers, develop an 'adopt-a-mile' program and raise funds through the sale of trail elements including benches, bridges, trailheads, public art, bike racks and trees.
- **Find "Early Win" Projects:** Support for continued action at the local level will grow out of small successes that move the project or individual pieces of the project forward. Neighborhood cleanups and 'adoption' of future trail sections can help build long-term support. Frequent ribbon cuttings, festivals and events create long-term visibility for the project. Development of maps and other NRG promotional material will help to publicize the future trail and build excitement. Celebrating every opportunity, no matter how small, can be just as important as a major ribbon cutting for the finished project. Some early win projects in Beacon Falls include:
    - Improving parking, signage, maps and access to the Old Route 8 trailhead from Cross Street in Naugatuck will encourage additional use of the Blue-Blazed trail system in the State Forest and open up the possibilities of the full NRG through Beacon Falls in some people's minds.
    - Improving parking, signage, maps and access to the O&G trailhead will encourage greater use of the existing hiking trail that remains a hidden treasure to many residents. Like the Old Route 8 access improvements, this will also open up the possibilities of the full NRG through Beacon Falls in some people's minds. Minor improvements and signage along Railroad Avenue will permit walkers to complete a loop. Wayfinding signs at the Depot Street Bridge and along Railroad Avenue will encourage people to walk from downtown to the O&G trail.
- **Negotiate with CTDOT:** Town officials and future design consultants will need to work closely with the Connecticut Department of Transportation to:
    - Ensure that the needs of the railroad corridor and commuter-rail service are met. In particular, coordination with CTDOT on the federally-mandated Positive Train Control (PTC) Plan will be necessary to ensure that the PTC Plan does not preclude the greenway's routing and incorporates the trail's recommended alignment.
    - Coordinate with the Highway Division on the use of state highway rights of way. The NRG alignment utilizes a portion of the northbound shoulder of Route 8 for a short segment just north of the end of North Main Street and CTDOT will need assurance that greenway users will be prevented from accessing the highway. Additionally, coordination may be required in the event that the proposed greenway option along the west shoulder of Route 42 and across the Pines Bridge is utilized.

With these actions moving forward, the Naugatuck River Greenway will be a significant asset for the Beacon Falls' residents, businesses and visitors. The trail will enhance non-motorized transportation opportunities and bring a recreational amenity that rivals any within the state of Connecticut.

Appendices

Appendix A – Community Input Detailed

A key component of the Council of Governments of the Central Naugatuck Valley (COGCNV) and the consultant team's efforts was community involvement and seeking input on the identification of a feasible greenway routing.

After a number of years of inactivity, the Regional Naugatuck River Greenway Committee (RNRGC) was reconvened to help steer routing study. Representatives on RNRGC included officials from Thomaston, Watertown, Waterbury, Naugatuck and Beacon Falls as well as representatives from state and federal agencies, such as Connecticut DOT and DEP, National Parks Service and the Army Corps of Engineers. Staff members of two U.S. Representatives that represent the Naugatuck River Valley were also on the committee. The committee met every six to eight weeks and all meetings were open to the public. The RNRGC played an important role in guiding the direction of the routing study and in keeping municipalities, government agencies and U.S. Representatives informed about study progress.

Supplementing the RNRGC input was a series of public workshops. One workshop was held in each of the four study communities. The first two public workshops were held on November 17 and 18, 2009 in Naugatuck and Thomaston, respectively. The purpose of the first set of workshops was to gather input from all four communities to assist in determining opportunities and challenges along the corridor and potential routing options for the greenway trail. The meeting on the 17th was focused on the issues and routing in both Naugatuck and Beacon Falls, while the next night, discussion focused on the issues and routing in Watertown and Thomaston.

The second two public workshops were held on March 23 and 24, 2010 in Beacon Falls and Watertown, respectively. The purpose of the meeting was to gather input from the four communities on the proposed preliminary routing as well as areas where they would like to see additional amenities along the Naugatuck River Greenway.

Overall, these four community workshops, combined with other stakeholder meetings and site walks, provided COGCNV and the consultant team with valuable input on routing recommendations, design options and property-ownership issues. The team also learned of the important local connections to adjacent neighborhoods and commercial areas outside of the corridor. Additional trail spurs and other connections were added to the recommendations as a result. One attendee even suggested the clever idea of using the 22-mile greenway, plus some spurs, as the route for the Naugatuck River Marathon in the future.

Draft routing maps and study reports were also posted on the project website which was established at the beginning of the process and maintained until the very end of the process. Comments on the greenway routing maps were received at the workshops, via email, and by U.S. Mail.

Press releases were published for both sets of workshops in the Republican American and weekly town newspapers. Articles were written and published on the workshops, including references to the project website. Video of the Thomaston workshop was posted to the Republican American website.

The second half of each workshop featured a small-group exercise. Using large maps as references, community members were asked to discuss the following questions and mark up the maps with their suggestions, ideas and concerns.

1. What are the key places/destinations that the Greenway trail should connect to?
2. Where are the critical gaps between these places and the Naugatuck River?
3. Where along the river are the best places for amenities *besides* a trail, such as a small boat launch, a picnic area, parking, rest station, etc.
4. What are your comments on the draft recommended routing?
5. Where along the proposed greenway are the best places for amenities besides a trail, such as a small boat launch, a picnic area, parking, rest station, etc.?

Each meeting wrapped up after the smaller groups reported back to the entire group with their comments on local conditions as well as recommendations for potential routing options and the placement and nature of greenway amenities.

Subsequent to the four community workshops, members of the Connecticut Horse Council and the Connecticut Equine Advisory Council investigated key trail connections that currently exist in the Naugatuck River corridor area. They provided a detailed memo to COGCNV and mapped the connections in a GIS database, some of which helped the consultant team recommend spur-trail links important to equestrians.

A meeting was also held with representatives of the Railroad Museum of New England, the operator of the Naugatuck Railroad. They explained their future plans for the museum and support for the greenway project. The museum representatives also explained their safety concerns and maintenance requirements for the rail with trails sections of the greenway route.

After comments were gathered from the workshops and other key stakeholders, draft reports for the four municipalities and the overall region were written and made available for public comment. Printed copies were available at Town Clerks' offices as well as at the Thomaston, Watertown, Naugatuck and Beacon Falls public libraries. The project web site included links to electronic copies of the draft reports.

A fifth and final public meeting was held in Waterbury on September 14, 2010, in conjunction with the monthly meeting of the Regional Planning Commission. This provided a final opportunity for the public to weigh-in on the final draft recommendations of the Greenway Routing Study. During the month of October, public presentations of the final recommendations were made in Thomaston, Watertown, Naugatuck and Beacon Falls. (The alignment for the Naugatuck River Greenway in Waterbury had been determined in an earlier study and adopted in early 2010.) These gave their respective communities and elected officials the opportunity to see the final recommendations in a Powerpoint slideshow format. Simultaneously, electronic copies of the final reports for the individual municipalities as well as the Regional Report and Executive Summary were made available on the project website.

Appendix B – Land Parcel Inventory and Maps

ID	Owner's Name	Parcel Location	Mailing Address	City	State	Zip	Land Use	Map/ Block Lot	Parcel Area (Acres)
1								002-001-0014	39.728
2	O & G INDUSTRIES	RAILROAD AVE	112 WALL ST	TORRINGTON	CT	6790	INDUSTRIAL GENERAL	007-002-0018	35.637
3								009-001-0002&1	0.698
4								003-002-0040	5.998
5	O & G INDUSTRIES	RAILROAD AVE	112 WALL ST	TORRINGTON	CT	6790	INDUSTRIAL GENERAL	007-002-0017	3.043
6	ONE ELEVEN RAILROAD AVENUE	111 RAILROAD AVE	5590 MAIN ST-PUTNEY	STRATFORD	CT	6614	INDUSTRIAL GENERAL	007-002-0016	2.061
7	CONN LIGHT & POWER CO	180 COLD SPRING RD	PO BOX 270	HARTFORD	CT	6141	INDUSTRIAL GENERAL	005-001-0005	9.329
8								007-001-0001	17.364
9								007-001-0001-A	5.366
10	CARROLL GEORGE T	CLARK LN						016-001-0001	105.254
11								016-001-0001-A	25.149
12								002-001-0012	67.950
13								014-001-0061	615.338
14								014-001-0001	0.42
15								014-001-0002	1.42

Table 2: Land Parcel Inventory (see maps on following pages).

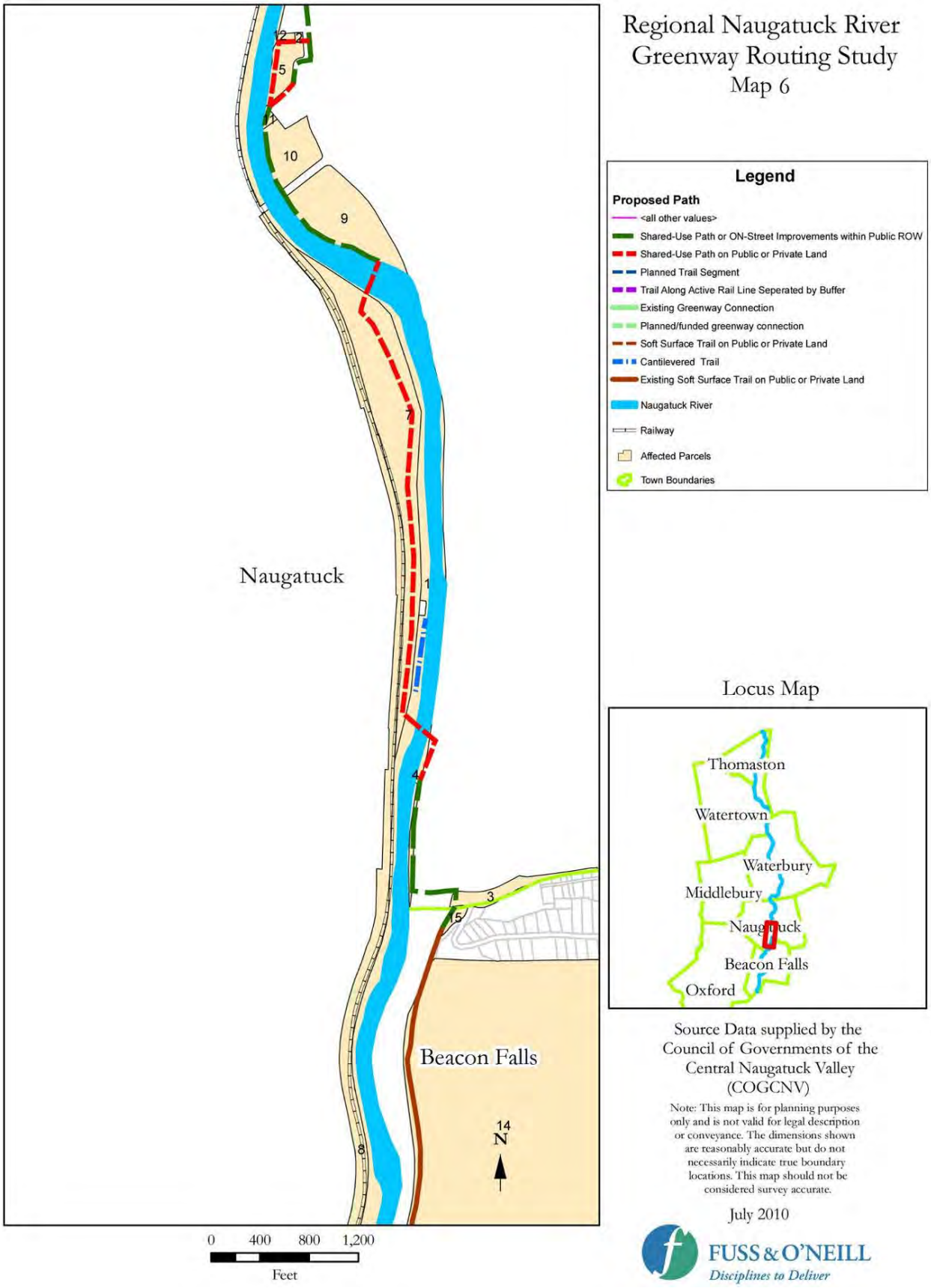


Figure 10: Land Parcel Inventory Map 6 for Naugatuck/Beacon Falls

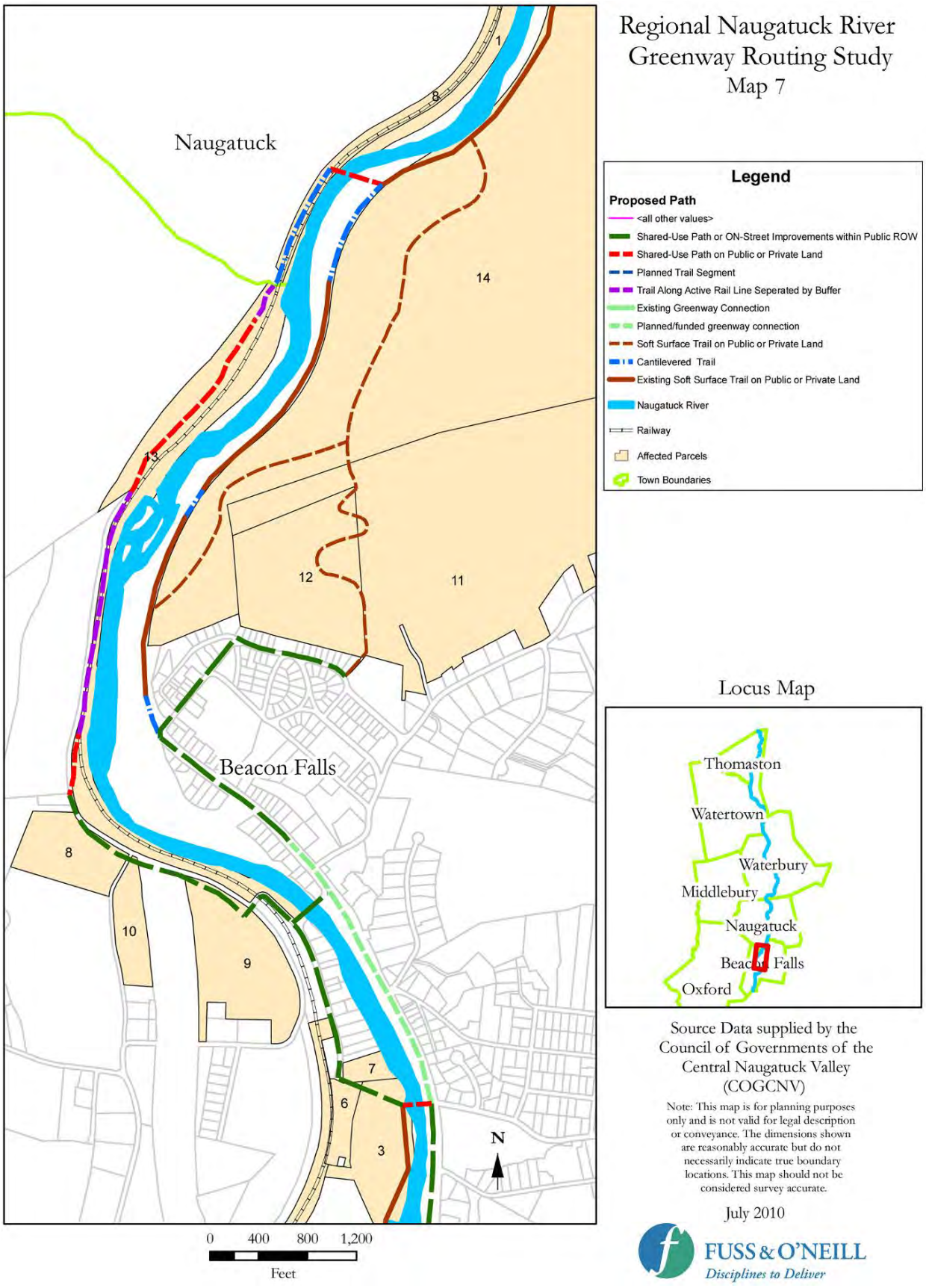


Figure 11: Land Parcel Inventory Map 7 for Naugatuck/Beacon Falls

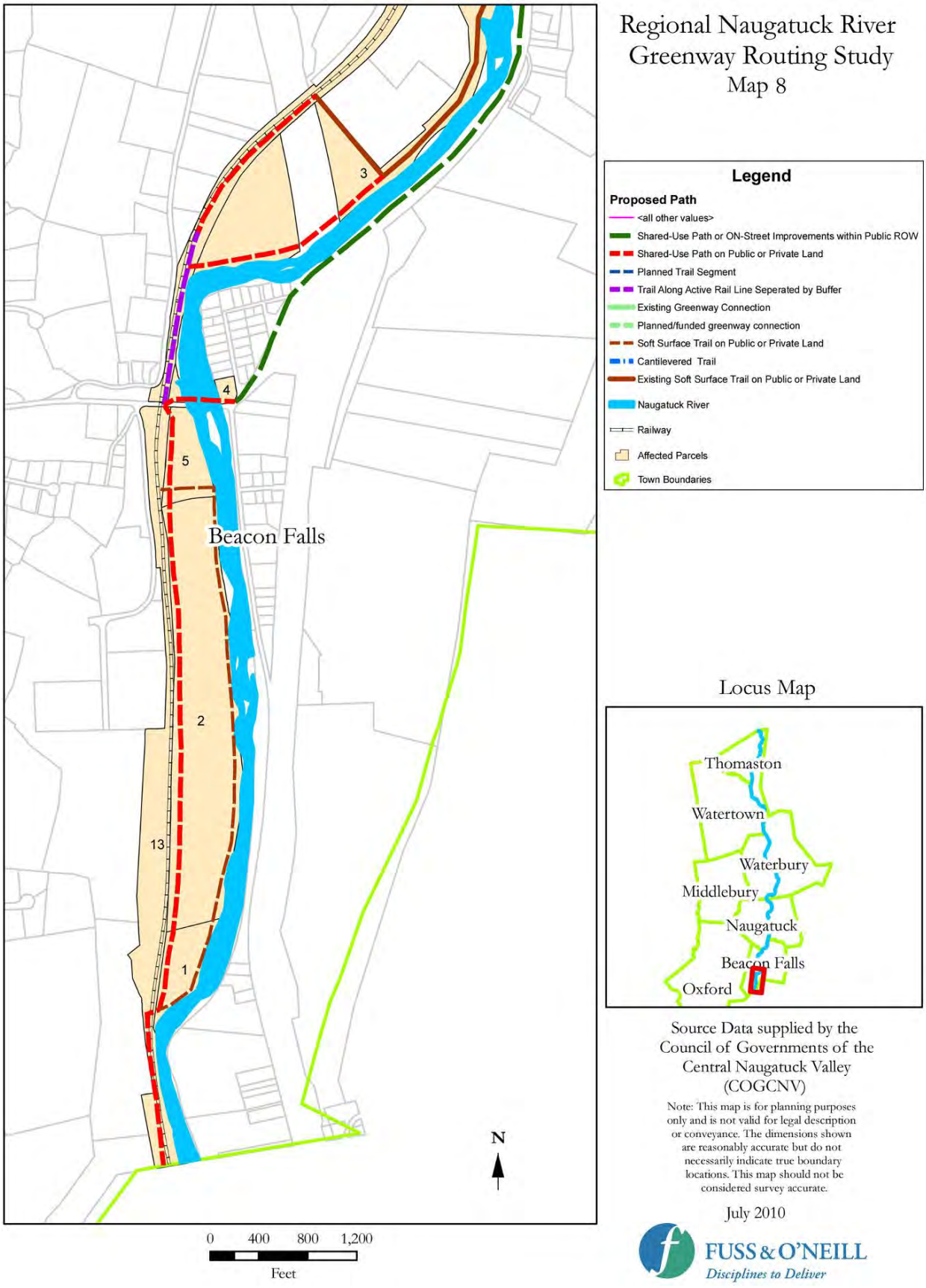


Figure 12: Land Parcel Inventory Map 8 for Beacon Falls

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Appendix C – Detailed Cost Estimate Tables

Preliminary estimates of construction costs based upon the recommended greenway sections are described in this appendix. Important assumptions used to arrive at these estimates include:

- All costs are in 2010 dollars (no adjustments for inflation)
- Costs do not include property acquisition
- Peripheral roadway intersection improvements are not included (e.g., replacing a poorly functioning intersection with a round-about)
- Standard construction methods and materials are used

These estimates were prepared using the latest revisions to the CTDOT's **Preliminary Cost Estimating Guidelines**, dated January 2010. In keeping with CTDOT's cost estimating guidelines, the costs include a number of miscellaneous items that are based on a percentage of construction costs (e.g., maintenance and protection of traffic [4%], minor items [25%] and incidentals [21%]). These percentages tend to be conservative estimates of actual cost. Cost estimates can also be impacted when a local public works department carries out the work. In these cases, some of CTDOT's estimated add-ons would not apply. Where appropriate, adjustments to the typical unit prices were made to reflect current market conditions and the consultant team's experience with other greenway construction projects. The guidelines were supplemented where necessary for atypical items (e.g., pre-fabricated pedestrian bridges, boat launches, etc.).

Regional Naugatuck River Greenway

Routing And Feasibility Study

Town of Beacon Falls, Connecticut

Trail Descriptions of Each Trail Segment
North to South

#	SECTION	SEGMENT	APPROX LENGTH	SEGMENT DESCRIPTION	COST
Beacon Falls - Start (North)					
1	BF-1	Shared-Use Off-Street	650	10' width - Greenway passes under Rt. 8 and uses east shoulder of off-ramp	$ 65,500
2	BF-1	Existing soft-trail surface	4150	Existing trail from Naug./B.F. Townline to tunnel under Rt.8	$ 79,910
3	BF-1	Cantilevered Trail	1230	10' width - East side of Rt. 8 near Naug. State Forest -supported structure sections or catwalks around cliffs and embankment retaining wall	$ 1,336,200
4	BF-1	Soft-trail surface	1330	10' width - East side of Rt. 8 - connects the cantilevered sections for option 3	$ 23,580
5	BF-1	Cantilevered Trail	640	10' width - East side of Rt. 8 near Naug. State Forest -supported structure sections or catwalks around cliffs.	$ 746,700
6	BF-1	Soft-trail surface	1650	10' width - East side of Rt. 8 - connects the cantilevered sections for option 3	$ 7,860
7	BF-1	Cantilevered Trail	300	10' width - East side of Rt. 8 near Naug. State Forest -supported structure will need to use Rt. 8 ROW to avoid private backyard	$ 484,700
8	BF-2	Shared-Use in ROW	1100	10' width - East side or Rt.8 along N.Main St. - down to existing or funded greenway segments	$ 353,700
9	BF-2	Modify Existing Section	2400	10' width - East side or Rt.8 along Main St. - existing greenway segment to include wider sidewalk and/or narrower median in long term	$ 256,760
10	BF-2	New Bridge	50	10' width - bridge over River to the O&G hiking trail	$ 222,700
11	BF-2	Existing soft-trail surface	3400	8' wide stone path - improve existing O&G hiking trail - ends south of Murtha Industurial Park	$ 65,500
12	BF-2	Shared-Use Off-Street	5040	10' width - from industrial park to Toby Pond Rec. Park - contains a multi-use trail	$ 458,500
13	BF-3	Trail Along Active Rail	2960	10' width - East of RR - from Toby's Pond and Rec. Park to new bridge for continuation into Seymour	$ 432,300
14	BF-3	New Bridge	35	10' width - new brige over RR - to connect trail to Seymour along service road/utility ease.	$ 183,400
15	BF-3	Shared-Use Off-Street	700	10' width - trail continues towards Seymour	$ 65,500
16		Soft-trail surface	5250	10' width - trails on East side of Toby's Pond Rec.- spurs an connects back to Greenway trail (SECONDARY)	$ 100,870
17		Soft-trail surface	8750	10' width - Hiking trail through State Forest (short term greenway connection) (SECONDARY)	$ 167,680
18		Shared-Use in ROW	2050	10' width - On-street connection from hiking trail through State Forest (short term greenway connection) (SECONDARY)	$ 183,400
OPTION 2 - NORTH - new cable-stayed bridge across Route 8 and RR option					
19		New Bridge	430	10' width - crosses Rt.8 and RR for trail to continue west of tracks	$ 10,000,000
20		Cantilevered Trail	1620	10' width - supported cantilever structure on embankment west of RR - approaches Naug./B.F. Townline	$ 406,100
21		Shared-Use Off-Street	4750	10' width - west side of RR - from B.F. Townline near High Rock to new bridge location from option 1 (item #7)	$ 432,300
22		Shared-Use in ROW	4000	10' width - along High Rock Rd. - from Lopus and Cold Spring Rd, passed Depot St. Bridge, to RR station	$ 1,270,700
OPTION 2 - SOUTH - option remains East of River, instead of crossing at new bridge near O&G hiking trail					
23		Shared-Use in ROW	5400	10' width - section along old Rt.8 may require narrowing or removing travel lanes in locations - from bridge at RR station to Pines Bridge	$ 1,716,100
24		New Bridge	590	10' width - runs parallel to existing Pines Bridge Structure on upriver side	$ 1,611,300
Beacon Falls - End (South)					
END OF GREENWAY (South)					
		TOTAL LENGTH:	26735	ft	
		(grey segments are not included)	5.06	mi	

	MISC ITEMS	NUMBER REQ	DESCRIPTION	COST
T	Ped / Bike Trailhead	6	Informational Kiosk with maps/branding/parking	$ 91,700
B	Small Boat Launch	1	Walk-in / Walk-out launch for canoes and kayaks	$ 13,100
R	Rest Area	1		$ 13,100
P(L)	Parking (Large)	2	10 Stalls and larger	$ 314,400
TC	Transit Center	1	Various connections to Transit Center near Depot St. Bridge	$ 26,200

Note:
1) Items highlighted in Gray represent optional routing of the trail. These items are not included in the cost summary.
2) Items highlighted in Blue represent "Seconday Loops and Connections" that are not critical to completing the greenway route.

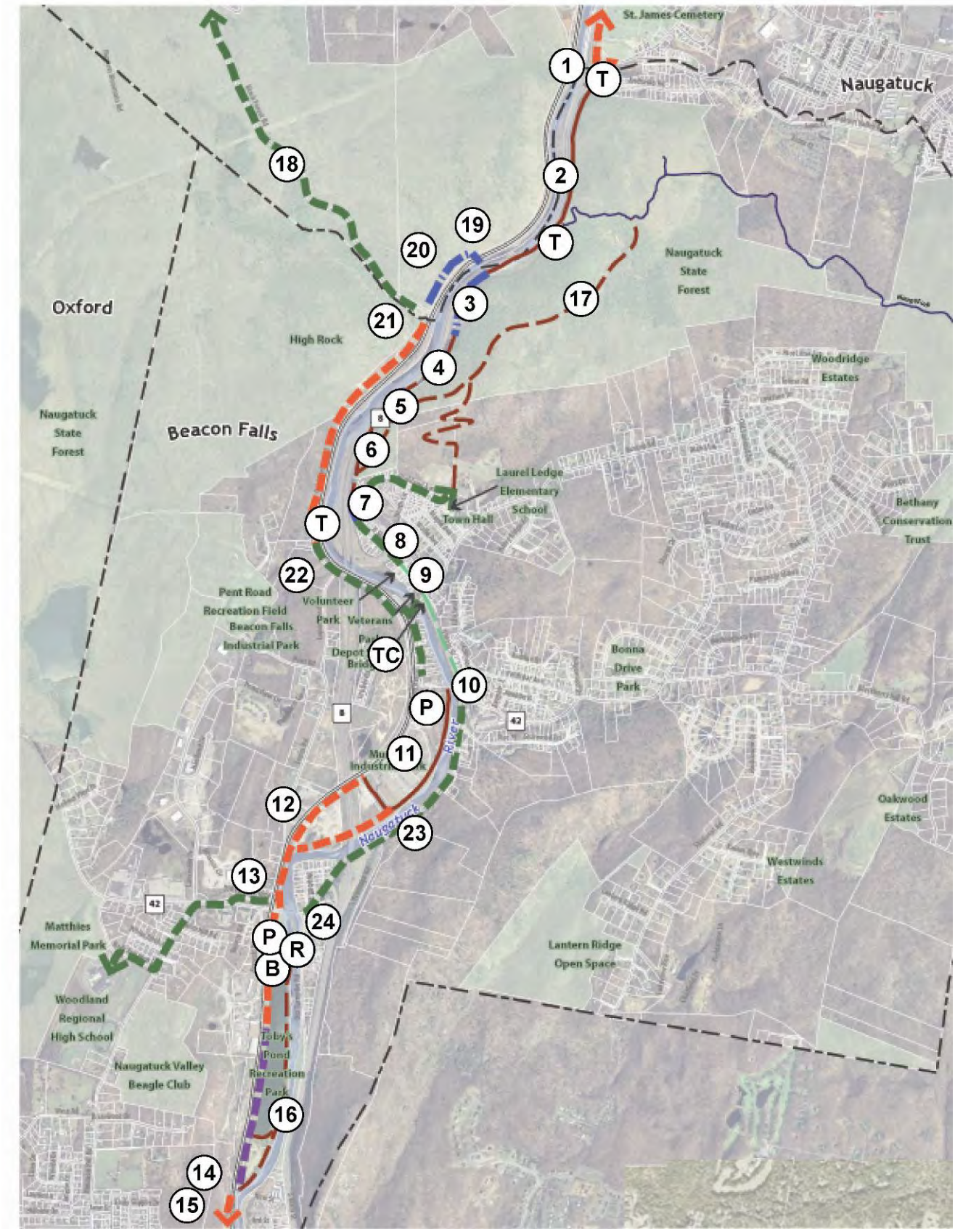

Figure 13: Trail Segment Cost Estimate Location Diagram.

FUSS & O'NEILL

Regional Naugatuck River Greenway

Routing And Feasibility Study

Town of Beacon Falls, Connecticut

Engineer's Order of Magnitude Opinion of Probable Construction Cost
Summary by Recommended Section

Section	Description	Length (Miles)	Total Cost
BF-1	Naugatuck Line to Main Street	1.9	$2,744,000
BF-2	Main Street to Toby's Pond	2.3	$1,357,000
BF-3	Toby's Pond to Seymour Line	0.7	$681,000
	Total Construction Cost Primary Greenway	4.9	$4,782,000
	Total Construction Cost Secondary Loops and Connections		$910,000

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth: **12"**
Type: **Shared-Use Off-Street**
From Sta:
To Sta:
A length of **650** Feet as shown on the plans
Price Base Yr **2010**

Segment No.	Segment Description
#1	10' width - Greenway passes under Rt. 8 and uses east shoulder of off-ramp

Roadway Items	Est. Quant.	Unit	Unit Price	Total
earth excavation	650	LF	$14.00	$9,100
processed aggregate	650	LF	$17.00	$11,050
superpave	650	LF	$20.00	$13,000
Contract Items			**SUBTOTAL**	$33,200
Clearing and Grubbing Roadway		5.0%		$1,700
M & P of Traffic		4.0%		$1,300
Mobilization		7.5%		$2,500
Construction Staking		1.0%		$300
Minor Items (Applied to Roadway Items only)		25.0%		$6,000
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$50,000
INCIDENTALS		21.0%		$10,500
CONTINGENCIES		10%		$5,000
			TOTAL ESTIMATED COST	**$65,500**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth:
Type: **Existing soft-trail surface**
From Sta:
To Sta:
A length of **4,150** Feet as shown on the plans
Price Base Yr **2010**

Segment No.	Segment Description
#2	Existing trail from Naug./B.F. Townline to tunnel under Rt.8

Roadway Items	Est. Quant.	Unit	Unit Price	Total
Stone Screening	4,150	LF	$10.00	$41,500
Clearing and Grubbing	4,150	LF	$3.00	$12,450
Contract Items			**SUBTOTAL**	$54,000
M & P of Traffic		4.0%		$2,200
Mobilization		7.5%		$4,100
Construction Staking		1.0%		$500
Minor Items (Applied to Roadway Items only)		25.0%		$0
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$61,000
INCIDENTALS		21.0%		$12,810
CONTINGENCIES		10%		$6,100
			TOTAL ESTIMATED COST	**$79,910**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth:
Type: **Cantilevered Trail**
From Sta:
To Sta:
A length of **1,230** Feet as shown on the plans

Segment No.	Segment Description
#3	10' width - East side of Rt. 8 near Naug. State Forest - supported structure sections or catwalks around cliffs and embankment retaining wall

Price Base Yr **2010**

Roadway Items	Est. Quant.	Unit	Unit Price	Total
earth excavation	200	LF	$14.00	$2,800
rock excavation	1,230	LF	$44.00	$54,120
processed aggregate	200	LF	$17.00	$3,400
superpave	200	LF	$20.00	$4,000
Class A Conc Slab	1,230	LF	$225.00	$276,750
Class A Conc (new piers / abutt)	50	EA	$1,000.00	$50,000
Railing	1,230	LF	$125.00	$153,750
Driving Steel Piles	1,230	LF	$25.00	$30,750
Rock Anchoring	125	EA	$1,000.00	$125,000
Crane	1	LS	$8,000.00	$8,000
water handling	1	LS	$20,000.00	$20,000
Contract Items			**SUBTOTAL**	$728,600
Clearing and Grubbing Roadway		5.0%		$36,400
M & P of Traffic		4.0%		$29,100
Mobilization		7.5%		$54,600
Construction Staking		1.0%		$7,300
Minor Items (Applied to Roadway Items only)		25.0%		$167,900
Contingencies & Incidentals		**CONSTRUCTION TOTAL**		$1,020,000
INCIDENTALS		21.0%		$214,200
CONTINGENCIES		10%		$102,000
		TOTAL ESTIMATED COST		**$1,336,200**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth:
Type: **Soft-trail surface**
From Sta:
To Sta:
A length of **1,230** Feet as shown on the plans
Price Base Yr **2010**

Segment No.	Segment Description
#4	10' width - East side of Rt. 8 - connects the cantilevered sections for option 3

Roadway Items	Est. Quant.	Unit	Unit Price	Total
Stone Screening	1,230	LF	$10.00	$12,300
Clearing and Grubbing	1,230	LF	$3.00	$3,690
Contract Items			**SUBTOTAL**	$16,000
M & P of Traffic		4.0%		$600
Mobilization		7.5%		$1,200
Construction Staking		1.0%		$200
Minor Items (Applied to Roadway Items only)		25.0%		$0
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$18,000
INCIDENTALS		21.0%		$3,780
CONTINGENCIES		10%		$1,800
			TOTAL ESTIMATED COST	**$23,580**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth:
Type: **Cantilevered Trail**
From Sta:
To Sta:
A length of **640** Feet as shown on the plans

Segment No.	Segment Description
#5	10' width - East side of Rt. 8 near Naug. State Forest - supported structure sections or catwalks around cliffs.

Price Base Yr **2010**

Roadway Items	Est. Quant.	Unit	Unit Price	Total
earth excavation	200	LF	$14.00	$2,800
rock excavation	640	LF	$44.00	$28,160
processed aggregate	200	LF	$17.00	$3,400
superpave	200	LF	$20.00	$4,000
Class A Conc Slab	640	LF	$225.00	$144,000
Class A Conc (new piers / abutt)	30	EA	$1,000.00	$30,000
Railing	640	LF	$125.00	$80,000
Driving Steel Piles	640	LF	$25.00	$16,000
Rock Anchoring	70	EA	$1,000.00	$70,000
Crane	1	LS	$8,000.00	$8,000
water handling	1	LS	$20,000.00	$20,000
Contract Items			**SUBTOTAL**	$406,400
Clearing and Grubbing Roadway		5.0%		$20,300
M & P of Traffic		4.0%		$16,300
Mobilization		7.5%		$30,500
Construction Staking		1.0%		$4,100
Minor Items (Applied to Roadway Items only)		25.0%		$93,900
Contingencies & Incidentals		**CONSTRUCTION TOTAL**		$570,000
INCIDENTALS		21.0%		$119,700
CONTINGENCIES		10%		$57,000
		TOTAL ESTIMATED COST		**$746,700**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth:
Type: **Soft-trail surface**
From Sta:
To Sta:
A length of **1,650** Feet as shown on the plans
Price Base Yr **2010**

Segment No.	Segment Description
#6	10' width - East side of Rt. 8 - connects the cantilevered sections for option 3

Roadway Items	Est. Quant.	Unit	Unit Price	Total
Clearing and Grubbing	1,650	LF	$3.00	$4,950
Contract Items			**SUBTOTAL**	$5,000
M & P of Traffic		4.0%		$200
Mobilization		7.5%		$400
Construction Staking		1.0%		$100
Minor Items (Applied to Roadway Items only)		25.0%		$0
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$6,000
INCIDENTALS		21.0%		$1,260
CONTINGENCIES		10%		$600
			TOTAL ESTIMATED COST	**$7,860**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth:
Type: **Cantilevered Trail**
From Sta:
To Sta:
A length of **300** Feet as shown on the plans
Price Base Yr **2010**

Segment No.	Segment Description
#7	10' width - East side of Rt. 8 near Naug. State Forest - supported structure will need to use Rt. 8 ROW to avoid private backyard

Roadway Items	Est. Quant.	Unit	Unit Price	Total
earth excavation	50	LF	$14.00	$700
rock excavation	300	LF	$300.00	$90,000
processed aggregate	50	LF	$17.00	$850
superpave	50	LF	$20.00	$1,000
Class A Conc Slab	300	LF	$225.00	$67,500
Class A Conc (new piers / abutt)	10	EA	$1,000.00	$10,000
Railing	300	LF	$125.00	$37,500
Driving Steel Piles	300	LF	$25.00	$7,500
Rock Anchoring	30	EA	$1,000.00	$30,000
Crane	1	LS	$8,000.00	$8,000
water handling	1	LS	$20,000.00	$20,000
Contract Items			**SUBTOTAL**	$273,100
Clearing and Grubbing Roadway		5.0%		$13,700
M & P of Traffic		4.0%		$10,900
Mobilization		7.5%		$20,500
Construction Staking		1.0%		$2,700
Minor Items (Applied to Roadway Items only)		25.0%		$45,600
Contingencies & Incidentals		**CONSTRUCTION TOTAL**		$370,000
INCIDENTALS		21.0%		$77,700
CONTINGENCIES		10%		$37,000
		TOTAL ESTIMATED COST		**$484,700**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth: **12"**
Type: **Shared-Use in ROW**
From Sta:
To Sta:
A length of **1,100** Feet as shown on the plans
Price Base Yr **2010**

Segment No.	Segment Description
#8	10' width - East side or Rt.8 along N.Main St. - down to existing or funded greenway segments

Roadway Items	Est. Quant.	Unit	Unit Price	Total
earth excavation	1,100	LF	$14.00	$15,400
Steel-Backed Timber Guide Rail	1,100	LF	$125.00	$137,500
processed aggregate	1,100	LF	$17.00	$18,700
superpave	1,100	LF	$20.00	$22,000
Contract Items			**SUBTOTAL**	$193,600
Clearing and Grubbing Roadway		2.0%		$3,900
M & P of Traffic		4.0%		$7,700
Mobilization		7.5%		$14,500
Construction Staking		1.0%		$1,900
Minor Items (Applied to Roadway Items only)		25.0%		$44,600
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$270,000
INCIDENTALS		21.0%		$56,700
CONTINGENCIES		10%		$27,000
			TOTAL ESTIMATED COST	**$353,700**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth:
Type: **Modify Existing Section**
From Sta:
To Sta:
A length of **2,400** Feet as shown on the plans
Price Base Yr **2010**

Segment No.	Segment Description
#9	10' width - East side or Rt.8 along Main St. - existing greenway segment to include wider sidewalk and/or narrower median in long term

Roadway Items	Est. Quant.	Unit	Unit Price	Total
conc sidewalk	2,400	LF	$40.00	$96,000
processed aggregate	2,400	LF	$17.00	$40,800
Clearing and Grubbing	2,400	LF	$3.00	$7,200
Contract Items			**SUBTOTAL**	$144,000
M & P of Traffic		4.0%		$5,800
Mobilization		7.5%		$10,800
Construction Staking		1.0%		$1,400
Minor Items (Applied to Roadway Items only)		25.0%		$34,200
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$196,000
INCIDENTALS		21.0%		$41,160
CONTINGENCIES		10%		$19,600
			TOTAL ESTIMATED COST	**$256,760**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

Note:

1) This segment potentially is funded, not included in overall estimate.

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth:
Type: **New Bridge**
From Sta:
To Sta:
A length of **50** Feet as shown on the plans

Segment No.	Segment Description
#10	10' width - bridge over River to the O&G hiking trail

Price Base Yr **2010**

Roadway Items	Est. Quant.	Unit	Unit Price	Total
Class A Conc (new piers / abutt)	2	EA	$25,000.00	$50,000
pre-fabricated ped steel truss bridge	50	LF	$1,500.00	$75,000
water handling	1	LS	$20,000.00	$20,000
Crane	1	LS	$8,000.00	$8,000
Contract Items			**SUBTOTAL**	$153,000
Clearing and Grubbing Roadway		2.0%		$3,100
M & P of Traffic		0.0%		$0
Mobilization		7.5%		$11,500
Construction Staking		1.0%		$1,500
Minor Items (Applied to Roadway Items only)		0.0%		$0
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$170,000
INCIDENTALS		21.0%		$35,700
CONTINGENCIES		10%		$17,000
			TOTAL ESTIMATED COST	**$222,700**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

Notes:

1) Cost for bridge may vary widely based on selected materials, structure width, span between supports, etc. This estimate assumes a 10' clear width pre-fabricated truss bridge,with synthetic lumber decking and a single clear span of 50 feet.

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth:
Type: **Existing soft-trail surface**
From Sta:
To Sta:
A length of **3,400** Feet as shown on the plans

Segment No.	Segment Description
#11	8' wide stone path - improve existing O&G hiking trail - ends south of Murtha Industurial Park

Price Base Yr **2010**

Roadway Items	Est. Quant.	Unit	Unit Price	Total
Stone Screening	3,400	LF	$10.00	$34,000
Clearing and Grubbing	3,400	LF	$3.00	$10,200
Contract Items			**SUBTOTAL**	$44,200
M & P of Traffic		4.0%		$1,800
Mobilization		7.5%		$3,300
Construction Staking		1.0%		$400
Minor Items (Applied to Roadway Items only)		25.0%		$0
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$50,000
INCIDENTALS		21.0%		$10,500
CONTINGENCIES		10%		$5,000
			TOTAL ESTIMATED COST	**$65,500**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth: **12"**
Type: **Shared-Use Off-Street**
From Sta:
To Sta:
A length of **5,040** Feet as shown on the plans
Price Base Yr **2010**

Segment No.	Segment Description
#12	10' width - from industrial park to Toby Pond Rec. Park - contains a multi-use trail segment shared with trucks (to wash plant area bekiw Rt.8)

Roadway Items	Est. Quant.	Unit	Unit Price	Total
earth excavation	5,040	LF	$14.00	$70,560
processed aggregate	5,040	LF	$17.00	$85,680
superpave	5,040	LF	$20.00	$100,800
Contract Items			**SUBTOTAL**	$257,000
Clearing and Grubbing Roadway		5.0%		$12,900
M & P of Traffic		4.0%		$10,300
Mobilization		7.5%		$19,300
Construction Staking		1.0%		$2,600
Minor Items (Applied to Roadway Items only)		25.0%		$46,600
Contingencies & Incidentals		**CONSTRUCTION TOTAL**		$350,000
INCIDENTALS		21.0%		$73,500
CONTINGENCIES		10%		$35,000
		TOTAL ESTIMATED COST		**$458,500**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth: **12"**
Type: **Trail Along Active Rail**
From Sta:
To Sta:
A length of **2,960** Feet as shown on the **4** plans
Price Base Yr **2010**

Segment No.	Segment Description
#13	10' width - East of RR - from Toby's Pond and Rec. Park to new bridge for continuation into Seymour

Roadway Items	Est. Quant.	Unit	Unit Price	Total
earth excavation	2,960	LF	$14.00	$41,440
processed aggregate	2,960	LF	$17.00	$50,320
superpave	2,960	LF	$20.00	$59,200
black vinyl chain link fence	2,960	LF	$30.00	$88,800
Contract Items			**SUBTOTAL**	$239,800
Clearing and Grubbing Roadway		5.0%		$12,000
M & P of Traffic		4.0%		$9,600
Mobilization		7.5%		$18,000
Construction Staking		1.0%		$2,400
Minor Items (Applied to Roadway Items only)		25.0%		$49,600
Contingencies & Incidentals		**CONSTRUCTION TOTAL**		$330,000
INCIDENTALS		21.0%		$69,300
CONTINGENCIES		10%		$33,000
		TOTAL ESTIMATED COST		**$432,300**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth:
Type: **New Bridge**
From Sta:
To Sta:
A length of **35** Feet as shown on the plans

Segment No.	Segment Description
#14	10' width - new brige over RR - to connect trail to Seymour along service road/utility ease.

Price Base Yr **2010**

Roadway Items	Est. Quant.	Unit	Unit Price	Total
Class A Conc (new piers / abutt)	2	EA	$25,000.00	$50,000
pre-fabricated ped steel truss bridge	35	LF	$1,500.00	$52,500
water handling	1	LS	$20,000.00	$20,000
Crane	1	LS	$8,000.00	$8,000
Contract Items			**SUBTOTAL**	$130,500
Clearing and Grubbing Roadway		2.0%		$2,600
M & P of Traffic		0.0%		$0
Mobilization		7.5%		$9,800
Construction Staking		1.0%		$1,300
Minor Items (Applied to Roadway Items only)		0.0%		$0
Contingencies & Incidentals		**CONSTRUCTION TOTAL**		$140,000
INCIDENTALS		21.0%		$29,400
CONTINGENCIES		10%		$14,000
		TOTAL ESTIMATED COST		**$183,400**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

Notes:

1) Cost for bridge may vary widely based on selected materials, structure width, span between supports, etc. This estimate assumes a 10' clear width pre-fabricated truss bridge,with synthetic lumber decking and a single clear span of 35 feet.

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth: **12"**
Type: **Shared-Use Off-Street**
From Sta:
To Sta:
A length of **700** Feet as shown on the plans

Segment No.	Segment Description
#15	10' width - trail continues towards Seymour

Price Base Yr: **2010**

Roadway Items	Est. Quant.	Unit	Unit Price	Total
earth excavation	700	LF	$14.00	$9,800
processed aggregate	700	LF	$17.00	$11,900
superpave	700	LF	$20.00	$14,000
Contract Items			**SUBTOTAL**	$35,700
Clearing and Grubbing Roadway		5.0%		$1,800
M & P of Traffic		4.0%		$1,400
Mobilization		7.5%		$2,700
Construction Staking		1.0%		$400
Minor Items (Applied to Roadway Items only)		25.0%		$6,500
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$50,000
INCIDENTALS		21.0%		$10,500
CONTINGENCIES		10%		$5,000
			TOTAL ESTIMATED COST	**$65,500**

Estimated By: VC
Checked By:

Date of Estimate: 05/18/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth:
Type: **Soft-trail surface**
From Sta:
To Sta:
A length of **5,250** Feet as shown on the plans

Segment No.	Segment Description
#16	10' width - trails on East side of Toby's Pond Rec.- spurs an connects back to Greenway trail (SECONDARY)

Price Base Yr **2010**

Roadway Items	Est. Quant.	Unit	Unit Price	Total
Stone Screening	5,250	LF	$10.00	$52,500
Clearing and Grubbing	5,250	LF	$3.00	$15,750
Contract Items			**SUBTOTAL**	$68,300
M & P of Traffic		4.0%		$2,700
Mobilization		7.5%		$5,100
Construction Staking		1.0%		$700
Minor Items (Applied to Roadway Items only)		25.0%		$0
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$77,000
INCIDENTALS		21.0%		$16,170
CONTINGENCIES		10%		$7,700
			TOTAL ESTIMATED COST	**$100,870**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth:
Type: **Soft-trail surface**
From Sta:
To Sta:
A length of **8,750** Feet as shown on the plans

Segment No.	Segment Description
#17	10' width - Hiking trail through State Forest (short term greenway connection) (SECONDARY)

Price Base Yr **2010**

Roadway Items	Est. Quant.	Unit	Unit Price	Total
Stone Screening	8,750	LF	$10.00	$87,500
Clearing and Grubbing	8,750	LF	$3.00	$26,250
Contract Items			**SUBTOTAL**	$113,800
M & P of Traffic		4.0%		$4,600
Mobilization		7.5%		$8,500
Construction Staking		1.0%		$1,100
Minor Items (Applied to Roadway Items only)		25.0%		$0
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$128,000
INCIDENTALS		21.0%		$26,880
CONTINGENCIES		10%		$12,800
			TOTAL ESTIMATED COST	**$167,680**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth: **12"**
Type: **Shared-Use in ROW**
From Sta:
To Sta:
A length of **2,050** Feet as shown on the plans
Price Base Yr **2010**

Segment No.	Segment Description
#18	10' width - On-street connection from hiking trail through State Forest (short term greenway connection) (SECONDARY)

Roadway Items	Est. Quant.	Unit	Unit Price	Total
earth excavation	2,050	LF	$14.00	$28,700
processed aggregate	2,050	LF	$17.00	$34,850
superpave	2,050	LF	$20.00	$41,000
Contract Items			**SUBTOTAL**	$104,600
Clearing and Grubbing Roadway		2.0%		$2,100
M & P of Traffic		4.0%		$4,200
Mobilization		7.5%		$7,800
Construction Staking		1.0%		$1,000
Minor Items (Applied to Roadway Items only)		25.0%		$19,000
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$140,000
INCIDENTALS		21.0%		$29,400
CONTINGENCIES		10%		$14,000
			TOTAL ESTIMATED COST	**$183,400**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth:
Type: **New Bridge**
From Sta.
To Sta:
A length of **430** Feet as shown on the plans
Price Base Yr **2010**

Segment No.	Segment Description
#19	10' width - crosses Rt 8 and RR for trail to continue west of tracks

Roadway Items	Est. Quant.	Unit	Unit Price	Total
Cable-stayed bridge	1	LS	$10,000,000.00	$10,000,000
water handling	1	LS	$20,000.00	$20,000
Crane	1	LS	$8,000.00	$8,000
Contract Items			**SUBTOTAL**	$10,028,000
Clearing and Grubbing Roadway		0.0%		$0
M & P of Traffic		0.0%		$0
Mobilization		0.0%		$0
Construction Staking		0.0%		$0
Minor Items (Applied to Roadway Items only)		0.0%		$0
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$10,030,000
INCIDENTALS		0.0%		$0
CONTINGENCIES		0.0%		$0
			TOTAL ESTIMATED COST	**$10,000,000**

Estimated By:VC
Checked By:

Date of Estimate: 04/14/2010

Notes:

1) Cost for bridge may vary widely based on selected materials, structure width, span between supports, etc.

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth:
Type: **Cantilevered Trail**
From Sta:
To Sta:
A length of **1,620** Feet as shown on the plans

Segment No.	Segment Description
#20	10' width - supported cantilever structure on embankment west of RR - approaches Naug./B.F. Townline

Price Base Yr **2010**

Roadway Items	Est. Quant.	Unit	Unit Price	Total
earth excavation	1,620	LF	$14.00	$22,680
rock excavation	1,620	LF	$44.00	$71,280
processed aggregate	400	LF	$17.00	$6,800
superpave	400	LF	$20.00	$8,000
Class A Conc Slab	0	LF	$225.00	$0
Class A Conc (new piers / abutt)	40	EA	$1,000.00	$40,000
Metal Beam Rail	1,620	LF	$35.00	$56,700
Driving Steel Piles	0	LF	$25.00	$0
Crane	1	LS	$8,000.00	$8,000
water handling	1	LS	$20,000.00	$20,000
Contract Items			**SUBTOTAL**	$233,500
Clearing and Grubbing Roadway		5.0%		$11,700
M & P of Traffic		4.0%		$9,300
Mobilization		7.5%		$17,500
Construction Staking		1.0%		$2,300
Minor Items (Applied to Roadway Items only)		25.0%		$34,900
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$310,000
INCIDENTALS		21.0%		$65,100
CONTINGENCIES		10%		$31,000
			TOTAL ESTIMATED COST	**$406,100**

Estimated By:VC
Checked By:

Date of Estimate: 04/14/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth: **12"**
Type: **Shared-Use Off-Street**
From Sta:
To Sta:
A length of **4,750** Feet as shown on the plans
Price Base Yr **2010**

Segment No.	Segment Description
#21	10' width - west side of RR - from B.F. Townline near High Rock to new bridge location from option 1 (item #7)

Roadway Items	Est. Quant.	Unit	Unit Price	Total
earth excavation	4,750	LF	$14.00	$66,500
processed aggregate	4,750	LF	$17.00	$80,750
superpave	4,750	LF	$20.00	$95,000
Contract Items			**SUBTOTAL**	$242,300
Clearing and Grubbing Roadway		5.0%		$12,100
M & P of Traffic		4.0%		$9,700
Mobilization		7.5%		$18,200
Construction Staking		1.0%		$2,400
Minor Items (Applied to Roadway Items only)		25.0%		$43,900
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$330,000
INCIDENTALS		21.0%		$69,300
CONTINGENCIES		10%		$33,000
			TOTAL ESTIMATED COST	**$432,300**

Estimated By:VC
Checked By:

Date of Estimate: 04/14/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth: **12"**
Type: **Shared-Use in ROW**
From Sta:
To Sta:
A length of **4,000** Feet as shown on the plans
Price Base Yr **2010**

Segment No.	Segment Description
#22	10' width - along High Rock Rd. - from Lopus and Cold Spring Rd. passed Depot St. Bridge, to RR station

Roadway Items	Est. Quant.	Unit	Unit Price	Total
earth excavation	4,000	LF	$14.00	$56,000
Steel-Backed Timber Guide Rail	4,000	LF	$125.00	$500,000
processed aggregate	4,000	LF	$17.00	$68,000
superpave	4,000	LF	$20.00	$80,000
Contract Items			**SUBTOTAL**	$704,000
Clearing and Grubbing Roadway		2.0%		$14,100
M & P of Traffic		4.0%		$28,200
Mobilization		7.5%		$52,800
Construction Staking		1.0%		$7,000
Minor Items (Applied to Roadway Items only)		25.0%		$162,000
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$970,000
INCIDENTALS		21.0%		$203,700
CONTINGENCIES		10%		$97,000
			TOTAL ESTIMATED COST	**$1,270,700**

Estimated By:VC
Checked By:

Date of Estimate: 04/14/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth: **12"**
Type: **Shared-Use in ROW**
From Sta:
To Sta:
A length of **5,400** Feet as shown on the plans
Price Base Yr **2010**

Segment No.	Segment Description
#23	10' width - section along old Rt.8 may require narrowing or removing travel lanes in locations - from bridge at RR station to Pines Bridge

Roadway Items	Est. Quant.	Unit	Unit Price	Total
earth excavation	5,400	LF	$14.00	$75,600
Steel-Backed Timber Guide Rail	5,400	LF	$125.00	$675,000
processed aggregate	5,400	LF	$17.00	$91,800
superpave	5,400	LF	$20.00	$108,000
Contract Items			**SUBTOTAL**	$950,400
Clearing and Grubbing Roadway		2.0%		$19,000
M & P of Traffic		4.0%		$38,000
Mobilization		7.5%		$71,300
Construction Staking		1.0%		$9,500
Minor Items (Applied to Roadway Items only)		25.0%		$218,700
Contingencies & Incidentals		**CONSTRUCTION TOTAL**		$1,310,000
INCIDENTALS		21.0%		$275,100
CONTINGENCIES		10%		$131,000
		TOTAL ESTIMATED COST		**$1,716,100**

Estimated By VC
Checked By:

Date of Estimate: 04/14/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width: **10'**
Depth:
Type: **New Bridge**
From Sta:
To Sta:
A length of **590** Feet as shown on the plans
Price Base Yr **2010**

Segment No.	Segment Description
#24	10' width - runs parallel to existing Pines Bridge Structure on upriver side

Roadway Items	Est. Quant.	Unit	Unit Price	Total
Class A Conc (new piers / abutt)	8	EA	$25,000.00	$200,000
pre-fabricated ped steel truss bridge	590	LF	$1,500.00	$885,000
water handling	1	LS	$20,000.00	$20,000
Crane	1	LS	$8,000.00	$8,000
Contract Items			**SUBTOTAL**	$1,113,000
Clearing and Grubbing Roadway		2.0%		$22,300
M & P of Traffic		0.0%		$0
Mobilization		7.5%		$83,500
Construction Staking		1.0%		$11,100
Minor Items (Applied to Roadway Items only)		0.0%		$0
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$1,230,000
INCIDENTALS		21.0%		$258,300
CONTINGENCIES		10%		$123,000
			TOTAL ESTIMATED COST	**$1,611,300**

Estimated By:VC
Checked By:

Date of Estimate: 04/14/2010

Notes:

1) Cost for bridge may vary widely based on selected materials, structure width, span between supports, etc.

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width:
Depth:
Type: **Ped / Bike Trailhead**
From Sta:
To Sta:
A length of

T

Price Base Yr **2010**

Roadway Items	Est. Quant.	Unit	Unit Price	Total
7 stall parking lot	1	EA	$20,000.00	$20,000
Ped / Bike Trailhead	6	EA	$8,000.00	$48,000
Contract Items			**SUBTOTAL**	$48,000
Clearing and Grubbing Roadway		5.0%		$2,400
M & P of Traffic		4.0%		$1,900
Mobilization		7.5%		$3,600
Construction Staking		1.0%		$500
Minor Items (Applied to Roadway Items only)		25.0%		$12,000
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$70,000
INCIDENTALS		21.0%		$14,700
CONTINGENCIES		10%		$7,000
			TOTAL ESTIMATED COST	**$91,700**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width:
Depth:
Type: **Small Boat Launch**
From Sta:
To Sta:
A length of

B

Price Base Yr **2010**

Roadway Items	Est. Quant.	Unit	Unit Price	Total
Small Boat Launch	1	EA	$5,000.00	$5,000
Contract Items			**SUBTOTAL**	$5,000
Clearing and Grubbing Roadway		5.0%		$300
M & P of Traffic		4.0%		$200
Mobilization		7.5%		$400
Construction Staking		1.0%		$100
Minor Items (Applied to Roadway Items only)		25.0%		$1,300
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$10,000
INCIDENTALS		21.0%		$2,100
CONTINGENCIES		10%		$1,000
			TOTAL ESTIMATED COST	**$13,100**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width:
Depth:
Type: **Rest Area**
From Sta:
To Sta:
A length of

R

Price Base Yr **2010**

Roadway Items	Est. Quant.	Unit	Unit Price	Total
Rest Area	1	EA	$5,000.00	$5,000
Contract Items			**SUBTOTAL**	$5,000
Clearing and Grubbing Roadway		5.0%		$300
M & P of Traffic		4.0%		$200
Mobilization		7.5%		$400
Construction Staking		1.0%		$100
Minor Items (Applied to Roadway Items only)		25.0%		$1,300
Contingencies & Incidentals			**CONSTRUCTION TOTAL**	$10,000
INCIDENTALS		21.0%		$2,100
CONTINGENCIES		10%		$1,000
			TOTAL ESTIMATED COST	**$13,100**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width:
Depth:
Type: **Parking (Large)**
From Sta:
To Sta:
A length of

P(L)

Price Base Yr **2010**

Roadway Items	Est. Quant.	Unit	Unit Price	Total
15 stall parking lot	1	EA	$42,000.00	$42,000
Fill to raise grade in 1 parking lot	1,000	CY	$55.00	$55,000
25 stall parking lot	1	EA	$70,000.00	$70,000
Contract Items			**SUBTOTAL**	$167,000
Clearing and Grubbing Roadway		5.0%		$8,400
M & P of Traffic		4.0%		$6,700
Mobilization		7.5%		$12,500
Construction Staking		1.0%		$1,700
Minor Items (Applied to Roadway Items only)		25.0%		$41,800
Contingencies & Incidentals		**CONSTRUCTION TOTAL**		$240,000
INCIDENTALS		21.0%		$50,400
CONTINGENCIES		10%		$24,000
		TOTAL ESTIMATED COST		**$314,400**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & HIGHWAY OPERATIONS
FUSS & O'NEILL
PRELIMINARY COST ESTIMATE

City of: **Beacon Falls**
Funding:
Project #: **2009303.A10**
Width:
Depth:
Type: **Transit Center**
From Sta:
To Sta:
A length of

TC

Price Base Yr **2010**

Roadway Items	Est. Quant.	Unit	Unit Price	Total
Transit Center	1	EA	$20,000.00	$20,000
Contract Items			**SUBTOTAL**	$20,000
Clearing and Grubbing Roadway		5.0%		$1,000
M & P of Traffic		4.0%		$800
Mobilization		7.5%		$1,500
Construction Staking		1.0%		$200
Minor Items (Applied to Roadway Items only)		25.0%		$0
Contingencies & Incidentals		**CONSTRUCTION TOTAL**		$20,000
INCIDENTALS		21.0%		$4,200
CONTINGENCIES		10%		$2,000
		TOTAL ESTIMATED COST		**$26,200**

Estimated By:VC
Checked By:

Date of Estimate: 05/18/2010

A welcome terminus at the south end of the NRG is Toby's Pond and Recreation Park. (photo credit: Anita Goerig)

alta PLANNING + DESIGN

COUNCIL OF GOVERNMENTS CENTRAL NAUGATUCK VALLEY

TOWN of BEACON FALLS CONNECTICUT

For more information, contact: Council of Governments of the Central Naugatuck Valley

60 North Main Street, 3rd Floor, Waterbury, Connecticut 06702-1403 • 203-757-0535 • www.cogcnv.org

COUNCIL OF GOVERNMENTS
CENTRAL NAUGATUCK VALLEY

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