



FEASIBILITY STUDY MERRIMACK RIVER GREENWAY PATH - CONCORD, NH

CENTRAL NEW HAMPSHIRE REGIONAL PLANNING COMMISSION
THE INITIATIVE FOR A 2020 VISION FOR CONCORD NEW HAMPSHIRE

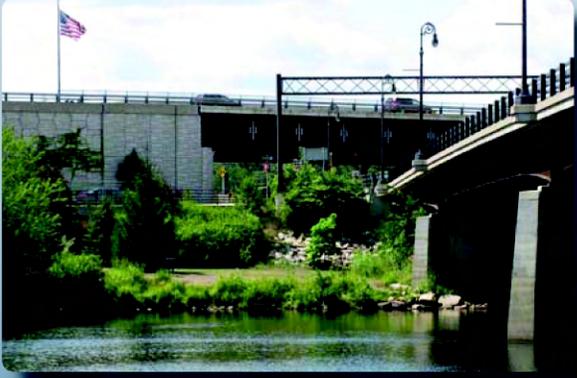


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Executive Summary

This Merrimack River Greenway Path Feasibility Study was intended to determine the feasibility and identify a preferred route for a paved, shared-use path in Concord from Canterbury/Boscawen in the north to Pembroke in the south, roughly following the Merrimack River. The document is an addendum to the City of Concord Bicycle Master Plan. The purpose and need statement for the path is as follows:

The Merrimack River Greenway Path is envisioned as a continuous, off-street path, roughly following the Merrimack River in Concord, connecting the eventual terminus of the “Northern Rail Trail” at the Boscawen Town Line to the proposed “Salem to Concord Bikeway” at the Pembroke Town Line. The path is intended to be a 4-season paved facility, meeting the definition of a “shared use path” given by AASHTO, to serve bicyclists, pedestrians, skiers, snowshoers and other non-motorized users, and to be universally accessible to the extent practicable.

It is intended the Path serve both transportation and recreation purposes, connecting villages, providing access to the Merrimack River and adjacent open space, and providing safe and inviting health and fitness opportunities. The Path will provide river views as well as access to the River when possible, and it will follow a somewhat direct north-south route to facilitate transportation use. It is consistent with the Concord 2030 Master Plan and Concord’s Vision for 2020 by connecting neighborhoods and re-connecting Concord to the River.

The project is intended to be developed in phases using a variety of strategies and funding sources, and the plan is a useful tool to assist in the further planning and development of each phase. The document:

- Outlines and maps a preferred route, an alternative route, and an on-street option
- Identifies areas where a right of way should be created or preserved
- Highlights opportunities for the Department of Transportation to accommodate the path in any planned transportation improvements
- Highlights opportunities for planned or future private development to accommodate the path
- Identifies environmental permitting issues that may need to be addressed
- Provides detailed explanations for choosing the preferred route
- Documents points of interest and scenic vistas
- Provides conceptual level engineering and cost estimates for each segment of the proposed path
- Provides the required background needed for applications for funding, including Transportation Enhancement grants.

The document was produced by consulting engineer Fay, Spofford, Thorndike and the Central New Hampshire Regional Planning Commission, under close guidance from the Steering Committee consisting of representation from the Planning Division, the Engineering Division, the Conservation Commission, Concord 2020, the Transportation Policy Advisory Committee, and the Central New Hampshire Regional Planning Commission. The document was funded with Federal funds, through Concord 2020, with the CNHRPC match funded by the Unified Planning Work Program (UPWP) from the NH Department of Transportation.

1. Introduction

The Central New Hampshire Planning Commission (CNHRPC) hired Fay, Spofford and Thorndike Engineers (FST) to perform a feasibility study for a shared use path roughly following the Merrimack River in Concord from the Boscawen/ Canterbury line in the North to the Pembroke line in the South (hereinafter referred to as “the Merrimack River Greenway Path”) including a priority segment on the east side of the Merrimack River from Manchester Street to Loudon Road. During September and October 2010, FST worked closely with a Steering Committee (the Committee) comprised of representatives from groups including Concord 2020, the CNHRPC, the Transportation Policy Advisory Committee (TPAC), City of Concord Planning/Engineering, Conservation Commission, and Trails Committee. Together, we performed detailed field reconnaissance and data review for the entire study area. This document (hereinafter referred to as the “Study”) is a compilation of findings to date, including a discussion of the preferred route and why it most closely meets the purpose and need established by the Committee. The Study includes a breakdown of each path segment, listing issues with R.O.W. and property ownership, scenic value and points of interest, technical issues, environmental issues and cost factors. Appendices include illustrative maps and graphics (showing the locations of existing conditions photos, points of interest, technical and miscellaneous issues, R.O.W. and ownership and flood information) and other information along with environmental documentation and conceptual level cost data. The intent of this Study is to show a feasible route and supporting documentation for a shared use path through Concord that is part of a broad regional alternative transportation plan and can be readily utilized in support of future funding and grant applications for implementation.

2. Purpose/Need Statement

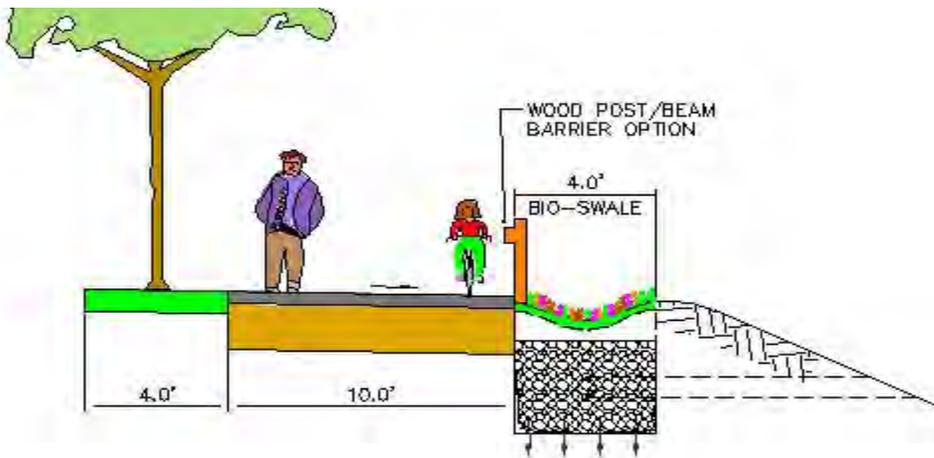
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It is intended the Path serve both transportation and recreation purposes, connecting villages, providing access to the Merrimack River and adjacent open space, and providing safe and inviting health and fitness opportunities. The Path will provide river views as well as access to the River when possible, and it will follow a somewhat direct north-south route to facilitate transportation use. It is consistent with the Concord 2030 Master Plan and Concord’s Vision for 2020 by connecting neighborhoods and re-connecting Concord to the River.

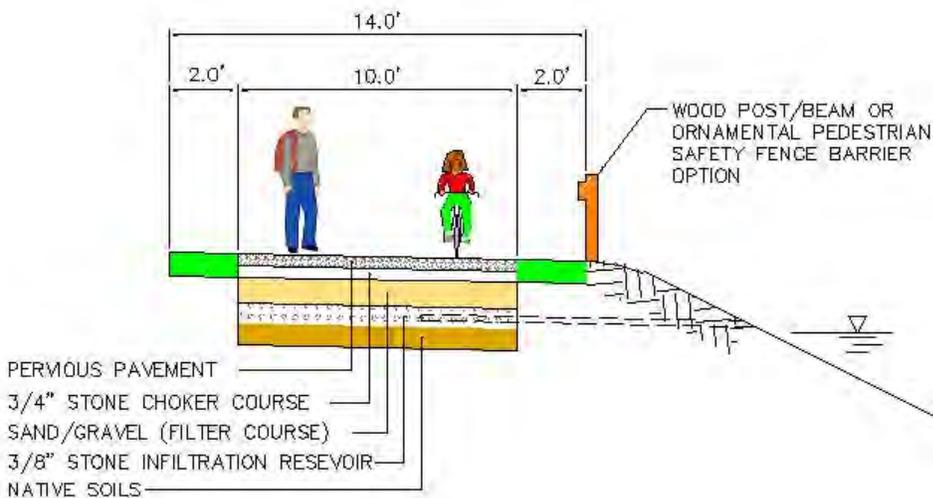
3. Typical Path Section

To provide an environmentally friendly and safe design, and meet the Committee's vision for the Greenway Path, the following typical path sections are proposed for implementation throughout the project. Both sections will meet AASHTO guidelines and provide for stormwater treatment and infiltration key components of the Comprehensive Shoreland Protection Act. Refer to Appx. I for a detailed description of these sections, their intended application and their stormwater treatment components.

Bio-Swale Typical Section



Pervious Pavement Typical Section



The photos on the following page are taken along the Cape Cod Rail Trail (one of FST's design and construction phase projects) and show a paved width similar the above sections, path side vegetation and pedestrian barriers. These demonstrate the look and feel that we expect to see on sections of the future finished Greenway Path.



4. Project Study Area – Segment Designations

For organizational purposes, the Study Area from Boscawen in the north to Pembroke in the South has been divided into 5 segments described from North to South as follows (refer to Merrimack River Greenway Path Corridor Plan in appendix):

- 1** **Segment #1** -Concord/Boscawen corporate limits near the Hannah Dustin monument to Sewalls Falls Road
- 2** **Segment #2** - Sewalls Falls Road to Clark Street/Dept. of Corrections
 - #2A - Sewalls Falls Road to 2nd Street
 - #2B - 2nd Street to Clark Street/Dept. of Corrections
- 3** **Segment #3** - Clark Street/Department of Corrections to Horseshoe Pond Lane/Pierce Manse
 - #3A - Clark Street/Department of Corrections to McGuire Street/Smokestack
 - #3B - McGuire Street/Smokestack to Penacook Street/Pierce Manse
- 4** **Segment #4** - Pierce Manse to Garvins Falls/PSNH
 - #4A - E. Side of River, Loudon Road to Manchester Street/Rte. 3
 - #4B - E. Side of River, Manchester Street/Rte. 3 to Garvins Falls/PSNH
 - #4C - W. Side of River, “Opportunity Corridor”
- 5** **Segment #5** -Garvins Falls/PSNH to Soucook River Bridge/Pembroke Town Line

5. Narrative

Proceeding in numerical order from North to South, the overall project corridor has been broken down into areas and sub-areas as described in section 3 above and shown on the Merrimack River Greenway Path Corridor Plan (Appx. A). In this “Narrative” section FST first summarizes why the preferred route through each area and sub-area most closely meets the Purpose/Need established by the Committee. The location of GPS waypoints (WP) referenced in the text are shown on the issues graphics (Appx. “C). Following each summary, a list of study-findings will be provided in the issue categories described below:

- A. **General** – summary of each segment including (as appropriate) discussions of existing land uses, priorities, major issues and logic for path placement along the east or west of the Merrimack River.
- B. **Trail Summary** – narrative description of the location of the preferred route, proceeding in a north to south direction. GPS waypoints shown on the enclosed plans are referenced as necessary (refer to appendices).
- C. **R.O.W./Ownership** - information regarding past, future, or currently ongoing negotiations related to property rights for the segment. Clearly a major factor in the level administrative effort required to implement some proposed path segments. General property ownership plans are provided in Appx. D.
- D. **Points of Interest** – brief descriptions provided by Jennifer Kretovic of Concord 20/20 for these locations, marked with “point of interest” symbols on the Merrimack River Greenway Path Corridor Plan. One of the most exciting elements of the Greenway Path is the abundance of cultural resources that future users of the path will experience.

- E. **Scenic Value** – photos showing scenic areas accessible by the proposed route; marked with a scenic view symbol on the Merrimack River Greenway Path Corridor Plan. Reconnecting the public to the river is accomplished in no small part by providing access to the Merrimack’s stunning vistas.

- F. **Technical Issues** – summary of general engineering, ADA accessibility, constructability and other technical issues. A major component of the conceptual level cost estimates for any given path segment will be based on the cost per linear foot derived for the recommended path type (Appx. G). However, many areas will have specific technical issues that must be overcome with atypical earthwork efforts, or structures such as boardwalks and bridges. In this section FST will identify these areas and provide recommendations.
- G. **Environmental / Permitting** – This section will include specific recommendations (where warranted) that FST believes will guide the segment more efficiently through the environmental permitting process. The general permitting and coordination requirements

outlined in Smart Associates Memorandum of October 12, 2010 (Appx. F) for the Terrill Park Area 4A apply similarly to the entire river corridor. These include **Wetlands Dredge and Fill Permits** (Wetlands Permit) for impacts to jurisdictional wetlands, Shoreland Permit for work in jurisdiction of the **Comprehensive Shoreland Protection Act** (CSPA) including all land within 250' of the River's reference line. The Alteration of Terrain (AOT) Permit is typically required for impacts >50,000 SF along the river. As proposed, this project would qualify for an **AOT "General Permit by Rule"** under NH Administrative rules Chapter Env-Wq 1503.03 (c) assuming that the work is done in accordance with "Best Management Practices For Erosion Control During Trail Maintenance and Construction", DRED Bureau of Trails, 2004.

SEGMENT 1

1

- A. **General:** The western bank of the Merrimack River is bounded by several privately owned properties and some conservation lands. An oxbow lake poses a major barrier, with an open water connection to the Merrimack River to the east, and a steep river bluff to the west. The only passage through is the Pan Am Railways rail corridor, but this corridor is too narrow for rail with trail, and it is unlikely that the rail corridor will be converted to trail use. Pan Am owns up to about .6 miles north of the Concord line in Boscawen. The State of New Hampshire owns the right-of-way north of here all the way to near the Vermont Border. Because of these challenges, the West side of the River is not a recommended route for a path. An on-street option through the segment west of the river is shown on the Merrimack River Greenway Path Corridor Plan. The East side of the Merrimack River is the recommended alignment from the Boscawen line to Sewall's Falls Bridge.

At this time, a path in this segment is a lower priority when weighted against other portions of trail due to its distance from neighborhoods and developed areas. As future office space or other development are proposed in the segment, it is recommended that provisions be made to preserve a right-of-way for a path, and if possible, have a segment of the path be completed as part of the development. The information provided herein will help the City make a case for inclusion of a path in any development as it may actually add value to the commercial properties and improve their chances of obtaining environmental permits. It is becoming a popular trend for workplaces to provide walking paths and green space on site for employees to walk and recreate during lunch hour or other times. A recreational pathway should be considered an important piece of developing these parcels as commercial space. The path could also serve as a non-motorized transportation route for future employees.

- B. **Trail Summary:** While it is not the intent of the Committee to propose trail work outside the corporate limits of the City of Concord, it is necessary to briefly address a small area in Canterbury and Boscawen when discussing the ideal path route and a future connection to the southern



terminus of the Northern Rail Trail (WP 231). At this point approximately 1,500' north of Route 4, Pan Am ownership of the existing rail corridor ends (above). Because of the Pan Am ownership, it is unlikely that a connection will be made along the rail corridor from here southerly to the preferred route in Concord.

Trail users will need to follow River Road south to the vicinity of WP 247 (just north of the Hannah Dustin monument) where the preferred route will turn easterly following the course formerly taken by Route 4. The path will require a new pedestrian river bridge (right) that, at the halfway point across the river, will enter the Town of Canterbury for less than 1,000', then onto Hanna Dustin Road and the Concord City Limits. As soon as practicable, the preferred route turns southerly from the roadway, through existing agricultural fields towards the river, then easterly following the river for approximately 2,000' where scenic views are likely. A short northerly segment will connect to Whitney Road Extension (WP 140).



Whitney Road improvements between WP 142 to WP 136 are proposed as part of the Planning Board-approved "Concord Solid Waste Resource Recovery Cooperative." The site plan approval includes extending Whitney road approximately 1600' to the entrance of the proposed recycling facility. The roadway design includes a 66 foot wide right-of-way, 34 feet of pavement, including two 12 foot travel lanes and 5-foot shoulders, and a 5-foot sidewalk on the east side of the street. Due to the close proximity of the steep, eroding Merrimack River bluff to the west, and the Burnham Brook bluff to the east, the preferred route will not include a separate shared used path in this area. The Coop project has been seeking "buy-in" from the surrounding communities for the single stream recycling service prior to construction that is estimated to occur in the next 2-3 years.



South of WP 136, the existing Whitney Road extension turns easterly away from the river. At this point, the existing route becomes an alternative, short-term solution that provides no river connection or scenic views (above left). The preferred route will follow the shoreline through existing woodland currently occupied by a few footpaths. The exact route cannot be determined at this time, as the proposals for private land in this Industrial Zone will be subject to future coordination between developers and City



Planners.

Due to undulating topography in the slight peninsula west of the Concord Monitor building, the preferred route will turn easterly, away from the Merrimack River towards WP 130. From here, the trail turns southerly and crosses an un-named brook west of a stone arch railroad bridge (above). With future development of the area, this crossing will likely be integrated with the Whitney Road extension connecting to the Concord Monitor and Sewalls Falls Road.

C. R.O.W./Ownership

- With the exception of on-road alternate route options indicated on the Merrimack River Greenway Path Corridor Plan, the vast majority of the preferred route is on private property.
- The ideal route requires a new pedestrian crossing structure over the Merrimack River utilizing existing abutments and piers along the former Route 4 alignment (south of the current Route 4 bridge). The entire structure would fall within the Town of Boscaawen and the Town of Canterbury, greatly limiting Concord's ability to influence this option.

- On the east bank of the river, the aforementioned crossing would cut through the Heritage Herbs property, a quaint home-based business on the quiet, graveled northern end of Hannah Dustin road. The old bridge abutments are not visible from the road as nature has reclaimed a large fill pile completely concealing the former bridge approach (right). The property is meticulously kept and liability with opening it to public use is likely the owner's main concern.



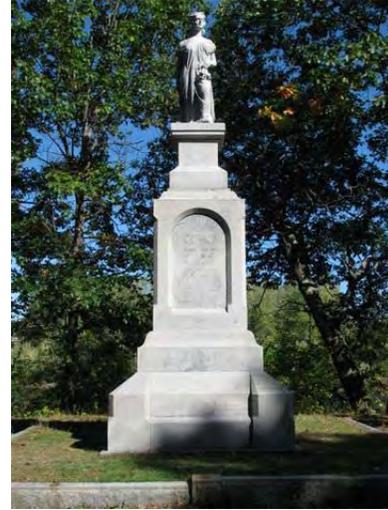
- The Whitney Road extension segment of the trail from the Boyce Highlands building in the Concord Crossing industrial park to the Concord Monitor is in the hands of three private owners, Wheelabrator, Concord Regional Solid Waste, and Newspapers of NH (Concord Monitor). All three entities are expected to be receptive to the inclusion trails on these lands in current and future development plans.

D. Points of Interest

- **Hannah Dustin Memorial**

The Greenway route passes near the Hannah Dustin Memorial, a small park and monument. The Greenway Path would direct more attention to this often forgotten open space and piece of history.

Hannah Dustin is the first American woman to have a statue erected in her honor. As the story goes, she was a colonial New England woman when in March of 1697, was captured by the Abenaki Indians along with her newborn daughter (who did not survive) along with her nursemaid and aunt, Mary Neff. Traveling by canoe along the Merrimack River, the tribe took up camp where the Contoocook River meets the Merrimack in Penacook, NH. The women escaped their captors by killing them in the night and fleeing in their canoe. After escaping, Hannah Dustin went back and scalped the Indians who captured her.ⁱ



The tale itself is gruesome in detail and the original account was told by Cotton Mather, a well known 17th Century Puritan Minister. It should be noted that history was often told as narrative. Harvard Professor, Jill Lepore, offers the best summary of the times with regard to conflicts with Native Americans.

“Waging the war, writing about it, and remembering it were all part of the attempt to win it, but none of these efforts ever fully succeeded. No matter how much the colonists wrote about the war, no matter how much or how eloquently they justified their cause and conduct ... [they] could never succeed at reconstructing themselves as “true Englishmen.” (Lepore 1997, p. 175)

Access

An existing footpath on the east side of the railroad corridor leads trail users from the bend in River Road at WP 247 to the monument. The length of this segment is approximately 500’ and is indicated as an alternative route, utilizing an existing pedestrian crossing on the railroad bridge.

- **Stone Arch Railroad Bridge**

Hidden amongst the trees, small streams and the rocky edge along the Merrimack, this historic Stone Arch Bridge is reminiscent of the challenges workers faced in this topography while constructing the rail lines. Stone arches, such as this, were often employed for short spans.ⁱⁱ

Access

Direct view from trail at WP 128 just north of Concord Monitor parking lot.

- **Concord Monitor**

The Concord Monitor has been published continuously since 1864. Over the years more than 10 newspapers existed in the city but only the Monitor has endured. In 1923, The New Hampshire Patriot merged with The Concord Monitor and so the Patriot name lives on in the Monitor’s masthead. The offices and printing operations moved to this facility in 1989.ⁱⁱⁱ

Access

The Monitor facility is passed by the trail segment along Monitor Drive, near WP 157.

E. Scenic Value

The preferred route in this segment most closely meets the goal of providing scenic value; particularly river views. The following are several scenic vistas accessible by this trail segment:

- View of the River, agricultural fields and distant mountains to the north near the NH Park and Ride lot WP 245 (below left):
- Past, Present and Future - view of present Rte. 4 crossing; past Rte. 4 crossing and potential future path crossing from Hanna Dustin Monument site (below right):



- View of the River and grazing cows from bluff at WP 137:



F. Technical Issues

- While abutments and one pier remain between WP 228 and WP 144, the crossing would require two new pedestrian bridge spans roughly 170' each.

- Approach grades down to the brook crossing near WP 128 (just north of Concord Monitor) are in excess of 15%. Three potential options are:
 1. Provide a path meeting ADA criteria for longitudinal grades <5%, by re-profiling a 150' +/- segment on each side of the brook, leading to a timber brook crossing structure nearly 20' above the river bed. This option would maintain a “straight line” path route.
 2. Provide switchback approach route on each side to a timber brook crossing structure. The switchback could be designed using ADA ramp criteria (allowing 1:12 slopes with 4' level landings every 30').
 3. Direct the path easterly from WP 130 to the existing railroad corridor and utilize the existing railroad crossing. This option is not feasible in the short term as the rail line is the state owned main line that goes through the lakes region and up to Lincoln. It gets occasional RR use and is not wide enough for the addition of a path.

Future development in this area will likely include bringing the Whitney Road Extension to the Concord Monitor and Sewall's Falls Road. Accommodations for the path crossing could presumably share the same bridge as the road. For this reason, we recommend a version of option #2 (above) where a timber bridge crossing with switchback approaches is provided in the interim. The switchbacks should be low-cost, non-structural (earthwork) and meet ADA grades to the extent possible.

G. Environmental / Permitting

The environmental permitting of the preferred route in this segment should be straightforward. Large-scale dredge/fill is not anticipated, however wetlands delineation during design phases could reveal minor jurisdictional impacts requiring a Wetlands Permit. Generally speaking, plans for future developments in the Concord Industrial District will not include large-scale disturbance in the first 150' from the River reference line due to restrictions in the CSPA. However, a properly designed shared use path located outside the 50' waterfront buffer can be consistent with the purpose of the CSPA and actually increase the appeal of the potential development to the local, State and Federal review/permitting groups. It would seem to be in the best interest of developers to work with the City to include easements for the path in future plans.

A. General: The east bank of the Merrimack River from the Sewall’s Falls Bridge to I-93 is largely undeveloped and is comprised mostly of conservation lands. This portion of the route is relatively remote and isolated, providing little access from residential areas or work places, serving only a minimal transportation role. For this reason, The East side of the River may be better used for un-paved and un-improved recreational trails. Another option for east side is for a rail with trail in or along the State of New Hampshire rail line and I-93. Yet, this is not a preferred route due to costs associated with the required buffering between the rail and path, the lack of scenic qualities, and limited access from residential areas and businesses.

The west side of the Merrimack River currently has some popular, active trails that can be readily followed and upgraded making this among the best starting points for the development of a complete north to south shared use path. These segments are reasonably close to some residential areas and a school, and there are fewer cost barriers than many other portions of the trail.

B. Trail Summary: Segment 2A begins at Monitor Drive and follows Sewalls Falls Road southeasterly across the steel truss Sewalls Falls Bridge (POI) approximately 1,500’ to the New Hampshire Fish and Game (NHFG) Sewall’s Falls public boating access facility. The City’s plans for this piece include replacing the existing bridge grate surface with a solid deck and installing a new bridge parallel to the existing structure. Each bridge will have one-way traffic. With the preferred Greenway Path route passing through, it is critical that future planning and design of the new crossing and modified existing crossing include bicycle and pedestrian accommodations.

Parking and bathroom facilities are available on the NHFG property. A wooden kiosk marks the trailhead where an existing footpath (designated Heritage Trail segment) follows the Merrimack River in a southeasterly direction. The preferred route will follow the alignment of this well-established, well-traveled path thereby minimizing additional disturbance. The first 3,000’ from the trailhead is generally homogenous, with wide, compacted gravel, surfaces that meander in and out of the 50’ waterfront buffer (right). Scenic views are plentiful through this stretch, with evidence of “herd” path access points to the river, likely locally known fishing and swimming spots.



At WP 56, the trail crosses a small, un-named tributary brook on a timber bridge. From here, the nature of the existing corridor changes such that longitudinal grades are more undulating, horizontal curves are sharper and the available width between existing mature trees is narrower (below left).



At a point roughly 1,500' south from the brook crossing, the trail reaches the historic Sewalls Falls Dam site (POI) at another NHFG trailhead and parking/access facility. Short side trails lead from here to scenic views of remnants of the defunct dam and hydroelectric facility as well as the Rotary Park picnic area. The remainder of the Greenway Path route through Segment 2A follows the existing NHFG access facility roads (above right) to Second Street and the Morono Park trailhead (beginning of Segment 2B). Improvements in this connecting segment will be limited to wayfinding signage.

Segment 2B begins as the trail follows an existing sewer utility easement corridor southerly from the Morono Park trailhead (right, WP 68). For approximately 3000', the trail follows a gravel access corridor that affords a solid trail foundation and ample width. Upgrades to provide the typical path section will require little if any mature tree removal or regrading/earthwork. The path follows the scenic "Oxbow" named after the shape of the adjacent watercourse that was formerly the main Merrimack River alignment.



At WP 74, an existing gravel side path leads northwesterly to Beaver Meadow School. Proceeding southerly from this point, the preferred route crosses an existing box culvert that appears to offer sufficient width, but will require some clearing and a wooden pedestrian safety guardrail. South of WP 76, the character of the existing corridor changes as the path opens into more open field/meadow terrain (right). The gravel access road becomes a largely vegetated path that is maintained in a passable condition for approximately 1,000' to WP 78. At this point a "Heritage Trail" marker is located where a side trail leads west from the main trail, through the interior of the open meadow terrain.



South of this point at WP 79, the character of the existing corridor changes yet again along the preferred route. For approximately 500', to WP 81, the path is constrained by a steep bluff on the west side of the path, and the top of riverbank to the east side of the path (below left). Thick vegetation borders the sides of the path and stunning, unobstructed views of the Oxbow are available to the east.



The remaining 350'+/- of Segment 2B, the path will follow the course of an existing narrow footpath (above right) leading to a crossing of Rattlesnake Brook. A new timber pedestrian crossing structure is required. This crossing will carry the path to the Department of Corrections (DOC) Segment 3A on the brook's south side. The route from here through the DOC property is an ideal match to the project Purpose/Need, with ADA accessible grades, stunning natural vistas along the river and the most direct north/south route from a transportation perspective (refer to Segment 3A writeup). The alternative route, leading westerly from WP 82 to Clarke St through a substantial wetlands area (likely requiring expensive boardwalk) provides no river views and passes through difficult terrain including an 800'+ segment with non-ADA accessible running grades between 5% and 20%. This routing would not meet the purpose and need of the Greenway, but would provide a valuable connection to residential areas and a busy transportation corridor, Rt 3/North State St. It could also serve as an interim route as the Greenway is developed in phases. This connection should be made in order to provide better access to the Greenway, even if full ADA accessibility cannot be achieved.

C. R.O.W./Ownership

- Segment 2A is under State control, managed by NHFG under a Memorandum of Understanding between NH DES, the Water Resources Council, NH Division of Resources and Economic Development (DRED) Division of Parks and Recreation. Proposals to upgrade the existing trails to meet the project's shared use path criteria are likely to be well received by NHFG as the agency legislatively charged with public access responsibilities. However, the project upgrades would require the approval of the Lands Team, an internal NHFG committee that oversees management and use of properties under

the agency's control. This will ensure that specific elements of project proposals do not violate any deed/easement restrictions on the property.

- Most of Segment 2B is readily available for improvements as it is under the ownership of the City of Concord.
- Obtaining property rights to bring the Greenway Path into Segment 3A on DOC property is a major administrative hurdle. The interim solution is to use the alternative path from WP 82, through the Kit Factory property and connecting to Clark Street.

D. Points of Interest

- **Sewalls Falls Bridge**

Steel-truss bridges are disappearing across New England as the aging structures fall into disrepair and are replaced by newer construction types. This bridge was erected in 1915 (right). The span is 660.1 feet long with the deck measuring 16.4 feet wide. The bridge was rehabilitated in 1936 with a second rehabilitation planned in the coming years.



The bridge is historically significant as it was designed by John William Storrs. Storrs was one of the most noted bridge designers and engineers for the Boston & Maine Railroad. The same year this bridge was built, he started his own company Storrs & Storrs with his son, Edward. John W. Storrs was elected Mayor of Concord in 1937.^{iv, v & vi}

Access

As mentioned previously, the Greenway route will use the existing Sewalls Falls Bridge, and a new parallel structure planned for the future.

- **Sewalls Falls Dam**

The Sewalls Falls Dam (below left by FST, below right by Barbara Lemieux) had its own rich history as one of the longest timber dams in the eastern part of the country and the



second commercial supplier of three-phase electrical current in the United States.^{vii} The dam was the brainchild of the Page Brothers, George and Charles, owners of Page Belting Company. The intent was to provide electricity for incandescent lights, arc lighting and electric motors in order to speed production of the leather belts by electric power rather than water power. Page Belting contracted with General Electric to build three large motors that operated on a pulley and belt system. Other amenities surrounding the dam included the Powerhouses, 1 and 2, the Blacksmith Shop, Condenser Building, a sandy beach, picnic tables and an island for company clambakes in the summer.

The Sewalls Falls Dam provided hydroelectric power for the city until 1966 when Concord Electric (Unitil Corporation) made the difficult decision to close the dam. The company could provide a much lower rate for its customers by purchasing electricity directly from Public Service Company of New Hampshire. The dam never operated again and was sold to the State of New Hampshire for \$1.00. It met its final demise when a 100-foot long section washed down river after heavy spring rains in 1984.^{viii}



Access

Views of the remnants of the dam can be seen by taking an existing side trail near WP 66 easterly for 200' +/- . Additionally, an appurtenant grade wall is visible in the forest west of the trail in the area of WP 65 (above right).

- **Mackerel Kit Factory**

Levi Hutchins, inventor of the alarm clock, lived just up the hill near West Congregational Church. The foundation of this factory once belonged to the Mackerel Kit Factory. In his autobiography, Levi Hutchins wrote about the factory saying, “twelve men are employed using five hundred cords of saplings in the manufacture of eighty thousand mackerel kits. The refuse wood readily sells at the factory for two dollars per cord; the trimmings and shavings are also sold there and the farmers buy the sawdust for manure.” Besides the kit factory, Concord’s “West Parish Village” was once comprised of “eighteen dwellings, a store, a tavern, shoemaker’s and carpenter shop, a saw mill, grist mill and a woolen factory.”^{ix}

Access

Remnants of old foundation walls believed to be part of the former Kit Factory operations can be seen to the west of the alternate route near WP 88.

E. Scenic Value

The preferred route in this segment most closely meets the goal of providing scenic value. The following are several scenic vistas accessible by this trail segment:

- View from existing overlook at WP 48 (below left):
- View from existing “beach” accessed near WP 56: (below right)



- View of Sewall’s Falls Dam remnants in river from side path near WP 66 (below left):
- View of river near WP 67 (below right):



- View of river near WP 69 (below left):
- View of Oxbow near WP 70 (below right):



- View of Oxbow near WP 79 (below left):
- View of Oxbow near WP 81 (below right):



F. Technical Issues

- A bench is currently provided at an existing overlook at WP 48. Shorebank erosion at the overlook has resulted in a near vertical bank that is a safety hazard (right). A safety barrier such as a pedestrian wood guardrail is recommended.



- Informal River access points (herd paths) have evolved between WP 54 and WP 55. A single, well-defined access point is recommended here to maintain access while protecting the shorebank from continued erosion. Such an access can be constructed with pervious technologies such as “infiltration steps” (below left) as detailed in the NHDES publication “A Shoreland Homeowner’s Guide to Stormwater Management” or stone-filled mattress technology (below middle and right).



- The existing timber bridge crossing at WP 56 has a 5’ clear crossing width, half the width of the desired proposed path. The approaches have settled, leaving a lip several inches deep (below left). Additionally, the southerly concrete abutment is severely undermined (below right) A new, timber bridge crossing should be constructed, meeting the 10’ path width criteria.



- The existing trail from WP 58 climbs for approximately 200' length along an 8'+/- wide "shelf" cut into the slope at approximately 12+% longitudinal grade (below right). Near WP 59, this path converges with an "upper path" that leads to the rail corridor at WP 61. The two paths are close to each other with mature tree growth stabilizing the slopes to either side. Construction of an ADA accessible slope <5% running grade would require "chasing grade" to the south over 100' resulting in substantial collateral impact to the currently stabilized slopes. A more viable option is to utilize fill on the lower approach portion beginning 50'+/- north of WP 58) of the segment and minor cut on the upper portion to bring running segments as close as practicable to 1:12 slope while grading level landings every 30' along the way. Small retaining walls or timber/stone cribbing with a pedestrian barrier should be provided as necessary along the eastern edge to preserve the desired 10' minimum path width and limit fill on the existing slope. The goal is to bring the segment as close to meeting ADA ramp criteria without imposing undue environmental impact.



- At WP 63, the existing trail passes over a "knob" with steep 10%+ grades. A short 100'+/- path relocation around the knob is over more gradual topography is recommended
- The existing topography creates a 300'+/- long "pinch point" between WP 79 to WP 81. The available level terrain between an imposing bluff (climbing over 80' in elevation) to the west and the river top-of-bank to the east is adequate to provide the desired path traveled width of 10', but not wide enough to provide the bioretention typical section. While the pervious pavement typical section is of appropriate width, it is not practical to include an isolated, short segment of pervious pavement in the path. We recommend a modified standard paved section for this short stretch consisting of fabric wrapped, free draining stone subbase materials with longitudinal perforated underdrain pipes (if necessary) to daylight. The stone layers should daylight at the road shoulder on the bluff side of the path, acting as a "chimney" to infiltrate and pass runoff under the path from the bluff's watershed. The system

is similar to that which is known as a “French Mattress”
http://www.dirtandgravel.psu.edu/resources/Tech_bulletins/french_mattress.pdf.

G. Environmental / Permitting

The encroachment of the existing path into the 50’ waterfront buffer may be the largest impediment to Shoreland permitting for the proposed improvements in Segment 2A. We would be more concerned for this if we were not following the route of an existing, established trail. The purpose of the CSPA is to protect the shoreland and we believe a strong argument can be made that modifications to the existing trail will do less harm than relocating the trail into previously unaltered areas further from the river but still in Shoreland jurisdiction. While there may be isolated segments identified during design where relocation is warranted, FST recommends the path follow the existing route and mitigate impacts in the waterfront buffer in the following ways:

1. Slope the path away from the River, providing provide proper drainage that prevents concentration of runoff and directs it to forested areas on the landside of the path.
2. Implement sustainable shorebank stabilization measures where necessary.
3. Provide pedestrian barriers such as timber guardrail to direct path users away from the sensitive riverbanks.

SEGMENT 3

3

A. *General:* One of the more scenic stretches of land along Merrimack River through Concord is owned by the state of New Hampshire and controlled by the State Department of Corrections (DOC). At this time the DOC will not permit a public trail through this property as inmates from the State Prison cultivate the agricultural fields here. Substantial grassroots and political efforts (and time) will likely be required to change this policy. Because of the “gap” around the NH DOC property for the foreseeable future, an on-street alternative will be needed on a short stretch of North State Street. This street is currently being reconstructed in a “Complete Streets” design that will include five-foot striped bicycle shoulders or bicycle lanes. While this roadway sees relatively heavy automobile and truck traffic, the shoulders will help provide some respite for bicyclists.

B. *Trail Summary:* Segment 3A through the DOC’s agricultural property offers scenic field and river views, abundant wildlife, level topography, and a north-south route closely following the river. Beginning at the southern terminus of Segment 2B, the preferred route follows southerly along the alignment of an existing field access road, to the west and parallel to the Pan Am rail corridor. Views of the existing fields are available in this segment (right). The



preferred route will cross to the easterly side of the tracks in the vicinity of WP 209 via a new pedestrian underpass to be coordinated with plans for high-speed rail upgrades {It should be pointed out that the HSR is in the distant future. These plans should not be dependent on future rail plans.} (below left). In the interim, an existing underpass approximately 500' further south (WP 207) can be used. Several scenic river vistas to the north are passed as the trail follows the field's edge for approximately 1,400' to WP 211. At this point (below right), the access road turns southerly and the width of the wooded buffer increases.



The proposed path will continue easterly for approximately 600' into the undeveloped wooded area towards WP 214. Turning southerly along the river, the trail passes through pristine woodland out of view of the DOC fields for 1,600' to WP 218 where it rejoins the access road (below left). Following the access road southerly for 1,500', the trail reenters the forest for a final 1,000'+/- segment (below right) before crossing a brook on a proposed pedestrian timber crossing to an existing utility corridor and then to the rail corridor at Segment 3B.



The preferred route through Segment 3B follows the Pan Am rail corridor (a Federally Designated high-speed rail corridor) for approximately 4,500' to Horseshoe Pond Lane. This route very closely meets the project Purpose/Need. It is the most cost effective, direct route through the segment, providing level terrain and few engineering challenges while maintaining a close connection to the river with numerous views (below left). For these reasons we recommend that this desirable segment be pursued through negotiations with Pan Am Railways and possibly the FRA. As with Segment 3A, the preferred segment more closely meets the project goals than the alternative routes, so the additional due-diligence effort may be warranted.



An interim/alternative route is available through Segment 3B from the DOC property to the Peirce Manse on Horseshoe Pond Lane. Beginning at WP 202, the alternative route follows the existing sewer utility corridor for approximately 1,600' where at WP 221 it climbs a 350' long existing "switch" path to the Smokestack Center property (POI). This path follows a 15% grade gaining approximately 50' in elevation (top right). Once attaining the "upper level", the path continues southerly nearly 600' along the alignment of an existing wooded footpath that affords little scenic value and no river views. At WP 102 to WP 98, a new embankment and culvert is required to bring the path over a 30'+ deep by 100'+ long gully where Woods Brook washed out site of the former railroad embankment (below right). From the southern side of the gully, the alternate route follows the existing, abandoned rail corridor (below left) to the Peirce Manse property and Segment 4.



C. R.O.W./Ownership

- The preferred route in Segment 3A passes through State of NH Department of Corrections controlled land. There is arguably no single segment of trail in the entire 13-mile corridor that more closely meets the project Purpose/Need. At the same time, there is probably no other segment facing greater administrative obstacles to implementation. This pristine parcel of land is entirely off limits to the general public as it is an agricultural farm worked by inmates. Yearly, thousands of pounds of crops are donated to the NH Food Bank, and hay is baled in fields for sale out of the Farm Shop.

- The preferred route through the DOC property requires an interface with the designated high-speed rail at the segment's southern terminus. The river path in the vicinity of WP 202 is on the east side of the rail corridor. The path must either cross the rail to reach the designated alternate route on the west side, or follow the rail corridor for the preferred route through Segment 3B. Challenging coordination with rail stakeholders for property usage rights is further complicated by the Federally Designated high-speed rail status.
- The presence of the alternate route shared use path and the type of users it will bring through Smokestack property is quite consistent with the property owner's visions for the area. Coordination with property managers will be necessary to obtain property use agreements required for the path.
- The alternate route between Smokestack property and the Peirce Manse follows an abandoned Pan Am Railways corridor. It is believed that Pan Am will be receptive to land use agreements or sale of corridor segments for trail use.
- The alternate route along the abandoned rail corridor from the Peirce Manse area appears to cross a private drive (below). Additional investigation of property rights and coordination with abutters is recommended in this location.



D. Points of Interest

- **Smokestack Center**

Although the towering smokestack has not been used in decades, some of Concord's noted businesses once resided in the Smokestack Center. In the beginning it was the New England Box Co. followed by Rock of Ages which used the facility to cut granite. Rock of Ages was purchased by Swenson Granite. For a time, a refrigeration and heating business called Simons Company was housed here and later New Hampshire Clocks called the Smokestack Center home. The managers of the property are hoping to build a promenade along the river some day.^x

Access

Via the north from N. State Street to McGuire Street (on-road alternative); via “switch” path connector from sewer access/high speed designated rail corridor; or from the south over abandoned Pan Am rail corridor.

- **Franklin Pierce Manse**

The Manse is the only house in Concord owned by Franklin Pierce, 14th President of the United States (1842 to 1848). Moved to this site in 1971 from Montgomery Street, it was restored by The Pierce Brigade. Opened to the public in 1974, it is now an important tourist attraction. The Pierce Manse is a part of the Concord Historic District, which was listed on the National Register in 1975. Franklin Pierce’s private life was beset by tragedy. All three of Pierce’s sons died before maturity, and his wife, Jane Means Appleton Pierce long suffered ill health and died of tuberculosis. Pierce died of a liver ailment and is buried nearby in the Old North Cemetery on North State Street.^{xi}

Access

From the north via abandoned Pan Am rail corridor; or via on-road segment N. State Street to Horseshoe Pond Lane.

- **Horseshoe Pond**

The pond is so named because it is shaped like a horseshoe. However, it is not a pond but really part of the Merrimack River. Horseshoe Pond is most noted for being the resting place of an old iron cannon, which once fueled the rivalry between the North Enders and South Enders along Main Street. After an anonymous North Ender stole the cannon from the Phenix & Endicott Hotel, they spirited it away and sunk it in Horseshoe Pond. Like any good treasure hunt, the exact location is “Known to no man.”¹¹

Access

Direct access via the preferred route along the designated high-speed rail corridor.

- **Page Belting Company / Horseshoe Pond Place**

Charles and George Page were men of extraordinary vision. In 1868 they founded Page Belting Company, a business that manufactured the flat leather belting that was necessary for supplying power to virtually all industrial machinery during the 19th and early 20th centuries. As technology advanced and equipment became smaller, faster and more efficient, the company no longer needed this large complex and renovated the property converting it to elderly apartments and office space.

Ever wonder what a Page Belt might be used for? Mark Coen, the President and CEO, shared that in 1920, the fastest rollercoaster in the world was the Jack Rabbit located at Seabreeze Amusement Park along the shores of Lake Ontario in Irondequoit, New York. Although the Jack Rabbit only held the title for four short years, this “out and back” wooden structure operates even today and is the second oldest roller coaster in the United States and fourth

oldest in the world. In more than 80 years of operation, starting and stopping the cars rely entirely on a belt manufactured by Concord's own Page Belting Company.^{8 & 11}

Access

From the north via the preferred route along the designated high-speed rail corridor, to Horseshoe Pond Lane/Commercial Street on-road segments.

- **McAuliffe - Shepard Discovery Center**

In honor of Christa McAuliffe and Alan Shepard: With a Mercury-Redstone rocket at the front entry and a prominent observatory dome, New England's premier air and space science center is located on the New Hampshire Technical Institute Campus. Housing 45,000-square-feet of new interactive science exhibits, a science store, café, and theater space, the new Discovery Center is a major transformation of the Christa McAuliffe Planetarium. The new McAuliffe-Shepard Discovery Center is a lively science center, featuring 21st century interactive exhibits on aviation, astronomy, Earth and space sciences, a state-of-the-art planetarium and a variety of science and engineering programs.¹¹

Access

From the north via on-road segment from Commercial Street to Delta Drive, or from the south via on-road segment from Fort Eddy Road to Fan Road.

E. Scenic Value

The preferred route in this segment most closely meets the goal of providing scenic value. The following are several scenic vistas accessible by this trail segment:

- View from DOC property near WP 209



- View from DOC property near WP 212



- View from DOC property near WP 214



- View of agricultural land from WP 218



- View towards Horseshoe Pond near WP 95



- View of Horseshoe Pond from rail corridor



F. Technical Issues

- DOC Safety/Security: Under the existing conditions, only signage along the DOC agricultural property borders prevents members of the general public from wandering onto the fields from the north or south via existing trails, utility corridors or railroad right of way.

This is a safety concern as inmates that may at times be unsupervised often occupy the fields. There are no physical barriers or security fences to control access (or egress) from the property.

- DOC agricultural field operations: The DOC agricultural fields are bordered to the east by an access road and woodland buffer of varying width to the river. For nearly 2,300' between WP 212 and WP 218, the ample wooded area could accommodate the Greenway Path essentially out of sight and out of conflict with the field operations, while offering river views to the east. In the areas to the north and south, the access road could be shifted slightly westerly to accommodate the path while having negligible impact on field operations.
- The field and forest area in the southern limits of the DOC property, near WP 201 to WP 202 is seasonally inundated with water. Watermarks on trees indicated water levels in excess of 3' above existing grade (below left) have occurred in this area. Additionally, a brook crossing and elevation gain is required to get from this floodplain area to the utility access road and rail corridor (below right). We recommend a 200'+/-segment of elevated timber boardwalk starting in the wooded area just south of the field. The boardwalk will minimize the displacement of flood storage volume, and simultaneously facilitate the approach to the brook crossing and elevation change at ADA accessible grades.



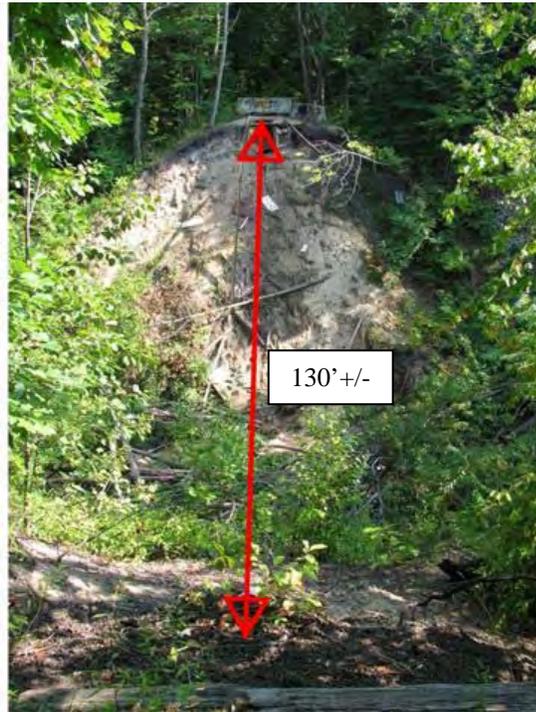
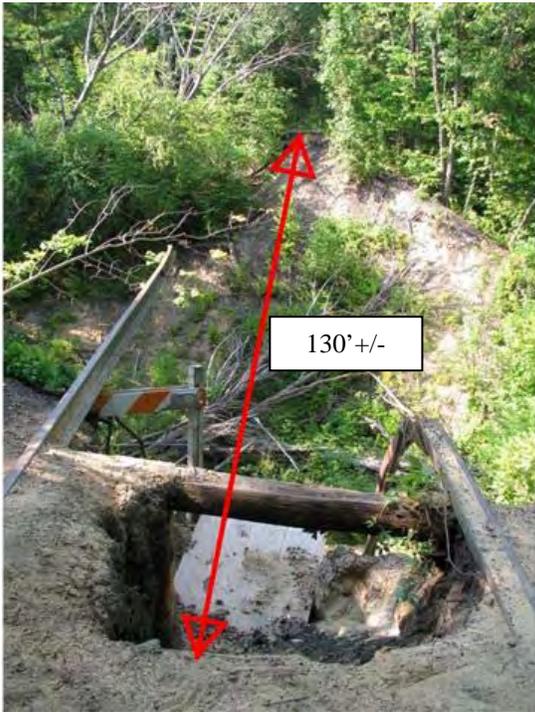
- At WP 221 the trail climbs a 350' long existing "switch" path to the Smokestack Center property (POI). This path follows a 12-15% grade gaining approximately 50' in elevation (right). The western side of the path slopes upward steeper than 2:1 through this segment and is strewn with discarded granite blocks. The eastern slope is approximately 2:1 and vegetated. The existing width of 10'+ is adequate for the proposed path.



Near WP 219, this path reaches the "main level" of the Smokestack property. Construction of an ADA accessible slope <5% running grade is not possible along this route. Additional switchbacks to further ease grade are not an option due to topography. To a limited extent, fill on the lower approach portion beginning

north of WP 221 of the segment can bring running segments closer to 1:12 slope. The further north (up to 250') the fill begins, the closer to ADA "ramp" compliance this segment could become. Level landings should be graded into the path every 30' along the way. Small retaining walls or timber/stone cribbing with a pedestrian barrier should be provided as necessary along the eastern edge to preserve the desired 10' minimum path width and limit fill on the existing slope. The goal is to bring the segment as close to meeting ADA ramp criteria without imposing undue environmental impact.

- In May, 2006 Mother's Day Flood, a major washout of the existing rail corridor embankment occurred between WP 102 to WP 98 leaving a gully of approximately 130' x 30' depth (below). The contours shown on the Issues Graphic for this segment (Appx. C) reflect the pre-washout grading consisting of an embankment and drainage culvert. FST recommends re-establishing this crossing using approximately 6,000+ cubic yards of embankment fill and an appropriately designed and sized drainage culvert.





- Between WP 93 and WP 94, the abutter has encroached on the rail corridor with nearly 1,000 cubic yards of backyard fill that has completely covered the old railbed (right). The condition is visible in the contours shown on the Issues Graphic for this segment in Appx. C. This encroachment will need to be removed to accommodate the proposed path. Coordination with the abutter will be important for obvious reasons as this change will result in the loss of area currently being utilized as “back yard”. If this encroachment is in fact legal, a retaining wall along the west side of the path could mitigate lost of yard square footage.



G. Environmental / Permitting

The environmental permitting of the preferred route in this segment should be straightforward. Large-scale dredge/fill is not anticipated however wetlands delineation during design phases could reveal minor jurisdictional impacts requiring a Wetlands Permit. Generally speaking, the preferred route is in 100-year floodplain through the DOC property. Fill resulting in floodplain displacement must be avoided to the extent possible. A detailed

natural resource area delineation will be required in the wooded floodplain areas between WP 212 and 218 and between WP 201 and WP 202. Boardwalks sections may be utilized in sensitive areas to mitigate impacts to both floodplain storage and natural resources.

SEGMENT 4

4

- A. **General:** Of all the segments along the route, this section has potentially the greatest impact for transportation purposes, and also has some of the most difficult challenges. The connections to Downtown Concord would add significant value to a multi-use path. At this time, there is no clear route for a multi-use path on the west side of the river. Path development on this side through the segment should be considered long-term. The opportunities for a path through this stretch depend much on three possible changes in the future: the future of rail service in the area, any reconstruction or widening of I-93 (I-93 Bow-Concord), and the development of an area of Concord deemed the “opportunity corridor” in the Concord 2030 Master Plan. It is recommended that when either major or incremental changes occur in these three areas that shared use path possibilities be a consideration. Any combination of opportunities may arise to help make a non-motorized transportation route and multi-use path a reality.



The I-93 Bow-Concord project has been added and removed from the New Hampshire Department of Transportation’s Ten-Year Plan during the past several years. When or if this project moves forward, a shared use path must be considered as part of the project. Charrette work completed regarding this project included the development of a shared use path and outlined several alternatives for alignments. Some options moved the highway away from the river, allowing for a shared use path between the Merrimack River and the I-93. Others reconfigured the interchanges that would allow for a shared use path east of the highway. Including a shared use path project with an I-93 project is probably the most likely scenario for the development of a shared use path in this part of Concord. The major drawback, however, is that this project could easily be 30 or more years in the future, if it occurs at all. Alternatives that do not depend on the I-93 project have been studied along the east side of the river.

The Concord 2030 Master Plan and other documents have identified a portion of Downtown as the “opportunity corridor” (Segment 4C). This area is currently low-density development with some under-used properties. The vision is for mixed use, higher density redevelopment to occur in this area. Should any large developments occur, a right-of-way for a shared use path should be considered. The railroads through this stretch of the corridor are all owned by Pan Am Railways, are considered active, and see occasional rail traffic. It is unlikely an agreement can be made with Pan Am Railways regarding rail with trail in the foreseeable future. The rights-of-way range from 50 to as much as 300 or more feet in width, which may

allow for this right-of-way to be used along some portions should conditions change. Depending on possible re-configurations of I-93 and the railroad tracks, private development in the area, the potential development of commuter rail service, or other factors, the option for using the right-of-way for non-motorized transportation purposes should be reevaluated in the future.

While there is little prospect for shared use path development here in the short-term, the most likely medium-term opportunity here may be to connect the terminus of the abandoned rail corridor from the Pierce Manse area to Storrs Street. This would require paralleling an active but unused rail corridor for approximately 0.6 miles, or 3,000 feet. In the medium term, any shared use paths that may be developed at either end of this segment would likely need to be connected via on-street connections. An off-street shared use path through the Opportunity Corridor is highly desirable in order to maximize the Merrimack River Greenway Path's transportation potential. This will need to occur in conjunction with residential and commercial development in the Opportunity Corridor, and/or with any future re-construction of the I-93 corridor or rail corridors.

While a route through Downtown Concord and the "Opportunity Corridor" is a strongly desired long term goal, a route bypassing downtown on the East side of the Merrimack River that will serve both as a recreational "loop" for downtown residents, and a north south transportation link has been desired by the community. This segment has been evaluated in detail as part of this study. This route would connect Loudon Road at or near the Post Office Plaza to the Terrill Park/Manchester Street area and is described below.



Source: <http://www.concord2020.org/>

B. Trail Summary: Segment 4A begins at the Loudon Road bridge, an existing connection between the east and west of the Merrimack River. At the southwest corner of the parking area behind the post office plaza (east side of river), a trailhead of sorts leads to a cornfield access road that parallels the river and cornfield edge for nearly 3,000' (below left).



The access road affords a wide, level base easily upgraded for use as a shared use path. Selective clearing could enhance several scenic river view spots. From the southwest corner of the cornfields, the path transitions along a 500' segment +/- to the environmentally sensitive forested floodplain wetlands characterizing the terrain from here to Terrill Park (above right). A boardwalk segment approximately 1,200' long is recommended for shared use path through this floodplain segment to its southerly connection with the Terrill Park parking area. From the parking lot near WP 114, the preferred route follows the existing gravel trail system through Terrill Park, past the existing fenced dog park (below left) to an existing ADA accessible concrete ramp system connecting the trail to Manchester Street at the southerly limit of Segment 4A. Improvements to this portion of trail are not proposed by this study.



The northerly limit of Segment 4B begins on state owned parcel south of the Manchester Street bridge at WP 149 (above right). From here, the path will follow the shoreline southerly for approximately 700' to the privately owned parcel of land formerly occupied by a drive-in movie theater (now largely reclaimed by nature). Alternatively, the drive-in land can be reached via short on road segment along Black Hill road. Level grades, thick scrub growth and broken pavement characterize the land on this parcel. Old concrete theater screen foundations are still visible along the riverbanks near WP 152. At WP 156, the Greenway Path can follow the alignment of an existing 6'+ wide path for approximately 1,200' to an

outfall that will require a timber pedestrian bridge crossing (below left). From this point southerly for another 2,000' the proposed Greenway Path route follows relatively level, heavily overgrown terrain with no discernable trail until a second timber pedestrian bridge is required to cross a small brook (below right).



Approximately 500' south of this crossing, an iron property pin is reached near WP 167. At this location, the alignment of Garvins Falls Road has turned towards the river such that it is located just over 250' to the east, and over 65' higher in elevation. Existing homes and "back yard" amenities such as sheds, overlooks and steps leading to small boat docks block passage along the river to the Garvin's Falls PSNH property (below right). These features also eliminate any chance of a direct, reasonably level, ADA accessible connection to Segment 5 on the "Garvin's Falls" PSNH property to the south. An existing "switchback" cut into the banks (on private property) provides a steep but clear and passable connection from the Greenway path to Garvin's Falls road near WP 170 (below left). Approximately 300' further south near WP 169, a set of wooden stairs on private property connects the upper road area to the river.



From WP 170 on Garvin's Falls Road, the trail follows on-road southerly for approximately 1,600' before turning westerly into the Garvin's Falls PSNH property marking at the end of Segment 4B and beginning of Segment 5 (near WP 188).

C. R.O.W./Ownership

- On the west side of the river in Segment 4C the land within the Opportunity Corridor is zoned “Opportunity Corridor Performance District and the Gateway Performance District”. Trail rights of way and improvements on private properties will require negotiations as part of the planning and review processes for proposed site developments.
- The City of Concord owns most of the waterfront parcels through Segment 4A along the east side of the river. The waterfront buffer to the west of the cornfields is strewn with tent settlements occupied year round by homeless. Past experience has shown that improvements including trails and increase public use will effectively supplant these riverside residents. It may be prudent to initiate advanced coordination and outreach with these folks through City and State departments of Health and Human Services.
- With the exception of a small parcel of City land near the Manchester Street bridge at the northerly limits of Segment 4B, the entire preferred route for more than a mile will pass through private property in the hands of just two different owners (Appx. D). As mentioned in section v. (below), trails located on the waterfront portion of the property can be an extremely positive component of any development proposal with benefits to the owner, the City and the general public.
- Coordination should be initiated with the owner of the land on which the existing “switchback” is located (near WP 170) as this is the only viable existing “vertical” connector between the Greenway Path and Garvin’s Falls road.

D. Points of Interest

- **Cornfields**

The cornfields were known as the "Middle Intervale" and recognized by the early settlers of Concord as prime agricultural land. The property was once divided into individual farm plots which were later consolidated when residents no longer needed to grow their own food. The Concord Conservation Commission has pursued the city's acquisition of the tract northerly of Terrill Park, which contains approximately 114 acres. The primary goal of the land protection effort is to preserve the prime agricultural soils and floodplain along the Merrimack River. Once acquired by the City, the land is leased to local farming entities to ensure the continued agricultural use.

Access:

Southwest corner of office-park parking lot approximately 750’ due south of the Loudon Road Bridge’s easterly abutment.

- **Terrill Park**

A perfect spot for walking the dog – Terrill Park is complete with an enclosed Dog Park. The park also offers some of the best views of the river in the city. The New Hampshire Audubon Society recommends the park as a perfect spot for bird watching.

Access:

Via proposed boardwalk path through forested floodplain wetland from the north. Via road through driveway on Old Turnpike Road, just south of the Spring Hill Drive intersection. Via Manchester Street trailheads from the south.

E. Scenic Value

- View of Loudon Road bridge from office park / cornfield trailhead (below left)
- View of cornfields (below right)



- View of floodplain wetlands near WP 46 (below left):
- View of floodplain wetlands near WP 117 (below right)



- View of river and statehouse from existing Terrill Park trail (below left):
- View of river and Manchester Street bridge from WP 149 (below right):



F. Technical Issues

- Existing drain pipes protruding through the Manchester bridge's easterly abutments discharge stormwater directly onto the underpass path (right). This drainage should be re-routed under the path to ensure path user safety.
- There is a vertical elevation difference in excess of 60' between the Greenway Path near WP 166 and Garvins Falls Road. A more level route following the shoreline southerly from this point to the PSNH property is not feasible due to private property use and terrain (river) constraints. Near WP 170, an existing switchback path approximately 150' long connects the lower (trail) and upper (road) levels at a grade approaching 30%. Stone, timber or other type of cribbing with a pedestrian barrier is recommended to shore up the river side of the path and maximize its usable width. To the extent possible, level "rest" landings should be incorporated. This connector cannot meet criteria for ADA accessible grades therefore warning signage should be provided at or near the northerly limits of Segment 4B.



G. Environmental / Permitting

- The majority of the area field reviewed north of Terrill Park and south of the cornfields was determined to be a forested floodplain wetland (Segment 4A). Vegetation was generally observed to include silver maple (*Acer saccharinum*), ash (*Fraxinus* spp.), ironwood (*Carpinus caroliniana*), sensitive fern (*Onoclea sensibilis*), and skunk cabbage (*Symplocarpus foetidus*). Willow trees (*Salix* spp.) were also noted along the bank of the Merrimack River. A Natural Heritage Bureau data check turned up records of threatened and endangered species / rare or exemplary natural communities including brook floater, silver maple, sugar maple, bald eagle, northern leopard frog. FST and The Smart Associates coordinated with NHB, NHFG and NHDOT's Natural Resources Group (attending their 10/20/10 meeting to discuss this area of project). In short, it appears that while costly, the

preferred route through this segment is permit-able with the following recommendations noted:

1. Construct the path through the jurisdictional wetland as an elevated boardwalk on helical screw (or similar) piles to avoid filling in floodplain/wetlands.
2. Locate the path where possible (and still meeting the Purpose/Need) outside the regulatory floodway. Otherwise there will be additional analysis required along with a separate permit from the Army Corps related to floodway impact.
3. Proper design of height and deck plank spacing should consider flood elevations and light penetration requirements for vegetation.
4. Boardwalk materials should be durable, low-maintenance and suitable for use in a “wet” environment. Materials should be free of chemical treatments/toxins that could be harmful to the environment.
5. Mature tree removal should be avoided to the fullest extent possible (potential Bald Eagle nesting)
6. Ground disturbance during construction should be limited to that required for pile installation.
7. Tributary stream crossings should be timber bridging in lieu of embankment with culverts (provide passage for required hosts of brook floater mussels).

Refer to Appx. F for documentation of environmental coordination.

- The level of effort to obtain environmental permits for the preferred route in Segment 4B should be quite similar to that described earlier for Segment 1. Large-scale dredge/fill is not anticipated. A properly designed shared use path located outside the 50’ waterfront buffer can be consistent with the purpose of the CSPA and actually increase the appeal of a potential development to the local, State and Federal review/permitting groups.

SEGMENT 5

5

A. General: This segment of the corridor would connect Downtown Concord and the northeast corner of Bow to Pembroke. A continuation of the path outside of Concord could connect to Allenstown, Suncook Village, and Hooksett to the south. The Concord portion of the route appears to be very feasible with the large exception of two missing bridges. The property, locally known as Garvin’s Falls, is owned by Public Service of New Hampshire (PSNH). Much of the corridor is a long-abandoned rail line which is very suitable for conversion to a shared use path. A bridge is missing at a long span across the Merrimack River at Blue Seal Feeds in Bow. The piers and abutments still stand tall in the River, but the bridge was removed long ago. At the town line in Pembroke, the abutments for a bridge over the Soucook River are there, but again the bridge was removed. This segment was the recommended route for the Salem-Concord Bikeway in the Feasibility Study by Rizzo Associates in 2003. One of the goals of this project is to complete a segment of the Granite State Rail Trail, of which the Salem-Concord bikeway comprises the southern portion.

B. Summary: The preferred route through the PSNH property on the east side of the river in the Garvin’s Falls area is shown on Fig. 5.2, Appx. C. This route begins at a point on Garvin’s Falls road near WP 188 from which it follows the shoreline in a westerly direction passing

through previously undisturbed areas (largely outside of the 50' waterfront buffer). The trail continues roughly 3,500' before turning southerly along the shoreline until it meets the missing bridge over the Merrimack River at the Concord/Bow corporate limits (waypoint 180) at a total length of approximately 1,700'.



From this point, the trail follows the relatively level, previously-disturbed railroad/utility access road corridor (left) in an easterly direction passing the Garvin's Falls Dam Hydro Electric Facility point of interest (POI) Near WP 173. Near WP 198 a shared use path spur will follow the route of an existing footpath, northerly approximately 600' from the main trail to an existing parking area at the Garvin's Falls Road cul-de-sac. Approximately 10,200' along the trail from the Bow Town line, the route terminates at the former location of a Soucook

River bridge (Concord/Pembroke corporate limits). Alternative routes bypass the area (on-street option and a north-south utility corridor) or utilize an existing inland ATV/snowmobile path. The alternative options present additional accessible grade challenges and provide no scenic value or exposure to points of interest.

C. R.O.W./Ownership

- Land ownership along the preferred route in this segment is largely in the hands of PSNH, with a small segment in the northeast corner (near where the trail meets Garvin's Falls Road) is privately owned by the Passaconaway Outing Club.

D. Points of Interest

- **Garvins Falls, Dam & Canal**

Garvin Falls is an area of more than 1,000 acres of undeveloped land adjacent to the Merrimack River. The Dam and Canal were constructed for the Manchester Traction, Light and Power Co. circa 1904. At the time, it was the largest electric water power station in New Hampshire. The area housed the 1,900 foot long canal and a 450' dam across the river at the head of the falls.^{xii}

The Merrimack River played a pivotal role in the settlement and subsequent development of the entire Concord region. The river and its banks provided many resources for early inhabitants, including fish, migratory birds, and an important route for communication and transportation. A preliminary archaeological survey has revealed at least four Native American sites dating from 8,000 to 350 years ago.^{xiii}

Access

An existing portage trail (WP 176) and side path (WP 173) provide access to the river and the Garvin's Falls Dam Hydro Electric Facility POI (less than 400' from the proposed trail).

E. Scenic Value

- An existing side path near WP 198 leads to a scenic view at WP 195 in less than 400' (below).



- Between WP 180 and 188; the preferred route follows the shoreline affording scenic river views at multiple locations.

F. Technical Issues

- Along the shoreline north of waypoint 185, the existing topography presents two distinct technical challenges (see Fig. 5.2 for locations). First, a 400' +/- segment of the preferred route may require placement within the waterfront buffer (50' from the reference line) due to the steep embankment on the trail's landside. Second, a 200'+/- segment of trail will follow an existing grade that is in excess of 15%. To maintain ADA accessible grades of 5% or less, at least 500' linear feet would require excavation and regrading or a switchback segment is necessary.
- Near WP 180, abutments and two piers in the river are all that remain of a former bridge crossing over the Merrimack that connected Garvin's Falls to Bow, NH at the rear of the Blue Seal property (below left). A bridge here in the future would allow an east/west connection to the southern limits of Concord's "Opportunity Corridor", as well as a connection to the Town of Bow via the short bike-pedestrian path under I-93. This crossing would be a major undertaking and should be considered part of a long-term plan coordinated with the I-93 widening project and the I-89/Route 106 connector project (currently a study proposed as part of the Regional Transportation Improvement Plan). Due to the myriad of

factors affecting the feasibility of this desirable connection, it has not been included in the conceptual level cost estimate for this study.



- A pedestrian bridge crossing will be required over the Soucook River (above right) for a future connection to the Salem to Concord Bikeway. The crossing will require a span of approximately 60' and can potentially utilize existing stone abutments pending an engineering review during design and implementation.
- The “bathtub” trail drainage condition near WP 194 (right) is commonplace along trails throughout the corridor. We recommend in areas like this (outside the 100 year floodplain) that the proposed Greenway Path bioretention typical section be installed “on top” of existing grade to eliminate the existing deficiency and ensure positive drainage away from the path.



G. Environmental / Permitting

- Approximately 4,500' of the preferred path route between WP 176 to WP 198 will likely not require Shoreland or Wetlands permits as it is outside of shoreland jurisdiction (250' from the reference line) and not likely to have jurisdictional wetland impacts.
- Approximately 2,400' of path will be located within the 100-year floodplain (but outside of the regulatory floodway). As a result, design of this segment should follow existing grades to the extent practicable. Minimizing fill will reduce/eliminate displacement of flood storage volume and simplify coordination efforts with the Army Corps of Engineers (ACOE).
- All paths should be located above the jurisdictional top of bank so as to avoid the need for a Wetlands permit.
- The path segments within 250' of the river reference line will require a Shoreland Permit. The proposed bio-swale typical section will be appropriate in most of these areas. As

identified in part iii. above, a 400' +/- segment of the preferred route will be located within the 50' waterfront buffer. To ensure that this segment can be permitted, we recommend a narrower path section (8' max.) that is constructed of pervious pavement. The alignment established during the design phase should avoid tree removal to the extent possible.

5. Appendices

- A. Merrimack River Greenway Path Corridor Plan
- B. Photos and Location Plans
- C. Issues Graphics
- D. Property ownership plans
- E. Flood data plans
- F. "Terrill Park Area" environmental documentation
- G. Conceptual Level Costs
- H. GPS reference waypoint coordinates (WGS84)
- I. General project elements

ⁱ Smith, Sybil, "Judging Hannah", Yankee Magazine, Yankee Publishing, Inc., Dublin, NH January, 1995 p. 53

ⁱⁱ Technology and Transportation 1790-1870: Bridges, http://flowofhistory.org/themes/technology_transportation/transportation.php

ⁱⁱⁱ Concord Monitor History, <http://www.concordmonitor.com/page/history-of-the-concord-monitor>

^{iv} Quechee Gorge Bridge, <http://www.crjc.org/heritage/V11-30.htm>

^v Liebowitz, Sarah, "Bridge Will Remain", Concord Monitor, Concord, NH (May, 2006) <http://www.concordmonitor.com/article/bridge-will-remain?page=0.0>

^{vi} Sewalls Falls Bridge 02, Bridge Hunter, <http://bridgehunter.com/nh/merrimack/5200700011700/> (Dec, 2008)

^{vii} National Park Service, Historic American Engineering Record, Sewall's Falls Hydroelectric Facility, circa 1992.

^{viii} Kretovic, Jennifer, "Crosscurrents of Change – The Company We Keep", Concord Historical Society 20th Century History of Concord, NH (Oct, 2010)

^{ix} Hutchins, Levi, "The Autobiography of Levi Hutchins" Cambridge: Riverside Press, 1865 p.120, 134, 139, 140

^x Walters, Elizabeth "Rising Up Again", The Concord Monitor, Concord, NH (April, 2005)

^{xi} Dussealt, Andrew and Kretovic, Jennifer "2010 Hike-a-thon Tour Booklet – Troop & Pack 81, West Concord, NH", (April, 2010)

^{xii} "The Engineering Index", Vol.4, The American Society of Mechanical Engineers, New York, NY (1904-1905)

^{xiii} Upper Merrimack River Nomination to the River Protection Program, New Hampshire Department of Environmental Resources. http://des.nh.gov/organization/divisions/water/wmb/rivers/merri_upper2.htm (Accessed, Octo. 2010)