Salem to Concord Bikeway Feasibility Study

Salem to Concord
Bikeway Feasibility Study

Submitted to:
New Hampshire Department of Transportation and the Citizens Advisory Committee

Prepared by:
Rizzo Associates, Inc. and
Alta Planning and Design

April 30, 2003

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Executive Summary

As part of the Salem to Manchester I-93 widening project, it was suggested that bicycle and pedestrian travel between Salem and Manchester be evaluated. The NHDOT developed a conceptual plan for a shared use path within the I-93 right-of-way (ROW), however, the public requested that alternative routes be identified. Subsequently, Rizzo Associates, Inc. and Alta Planning + Design were retained by the NHDOT to identify, evaluate and compare three basic options for accommodating bicycle and pedestrian routes within the Salem-Concord corridor. The three options included the previously considered shared use path within the I-93 ROW, constructing a shared use path within abandoned railroad corridors and upgrading existing roads to better accommodate bicyclists and pedestrians. The methodology and results of this evaluation are summarized in this feasibility study.

Public and Agency Involvement

Public involvement was extensive throughout the course of the study and included the formation of a Citizen's Advisory Committee (CAC). The CAC included members from eleven communities (as shown in Figure 1) within the Salem-Concord corridor and representatives from the Bicycle/Pedestrian Transportation Advisory Board, Rockingham, Central New Hampshire and Southern New Hampshire Planning Commissions, Department of Resource and Economic Development, Department of Historical Resources and the New Hampshire Department of Transportation. The CAC guided the study process and met on four occasions.

Additionally four public information meetings were held. At these meetings presentations of the options were made and representatives from the CAC and the consultants listened to public comments on the project.

Based on recommendations and technical data provided by the consultants, the CAC made the final selection of an option to be considered for further development for a bicycle/pedestrian connection between Salem and Concord.

Project Purpose and Need

Critical to the study process was a clear understanding of the project's need and purpose. The Project Purpose and Need Statement was

developed by the NHDOT, the CAC and the consultants with public input and is as follows:

> *The purpose of the study is to identify a feasible alternative transportation corridor (facility) for pedestrians and bicyclists between Salem and Concord. This facility would provide for non-motorized travel within and between communities along the Interstate 93 (I-93) corridor between Salem and Concord. In an effort to reduce the dependence on motor vehicle trips on I-93 and other roadways, this alternate corridor (facility) should encourage and provide a transportation link for both work and non-work related trips, and be desirable for a wide range of bicyclists and pedestrians. Potential options for a north-south alternative transportation facility in the corridor include a bicycle path in portions of the I-93 right-of-way between Salem and Londonderry, use of existing roadways and use of abandoned or active rail corridors.*

Options

Options evaluated as part of this study included both off road and on road alternatives such as the proposed I-93 shared use path, the abandoned Manchester - Lawrence Railroad Corridor, the abandoned Concord – Portsmouth Railroad Corridor, segments of the New Hampshire Heritage Trail and on-road options. The following briefly describes each of these options.

I-93 Shared Use Path. This 13 mile path would begin at Route 97 (Exit 2) and end at Route 28 in Londonderry (Exit 5). It does not provide a complete connection between Salem and Concord and thus may only be considered for the Salem to Londonderry portion of the study area.

The proposed path is currently designed as a ten foot wide paved path with two-foot wide gravel shoulders. The path is no closer than 30 feet from the nearest edge of travel way on the highway and in most cases is located at the bottom of the highway fill slopes.

Manchester - Lawrence Railroad Corridor. The Manchester - Lawrence Railroad corridor is 23.6 miles long, connects Salem and Manchester and travels through Windham, Derry and Londonderry. In Salem, the corridor is unimproved and the former railroad rails and ties remain. Through most of Windham the corridor has been improved to accommodate a dirt trail used primarily by All Terrain Vehicles (ATVs). Dirt trails and paved pathways have been constructed along segments in Derry and Londonderry. The corridor includes 35 at grade

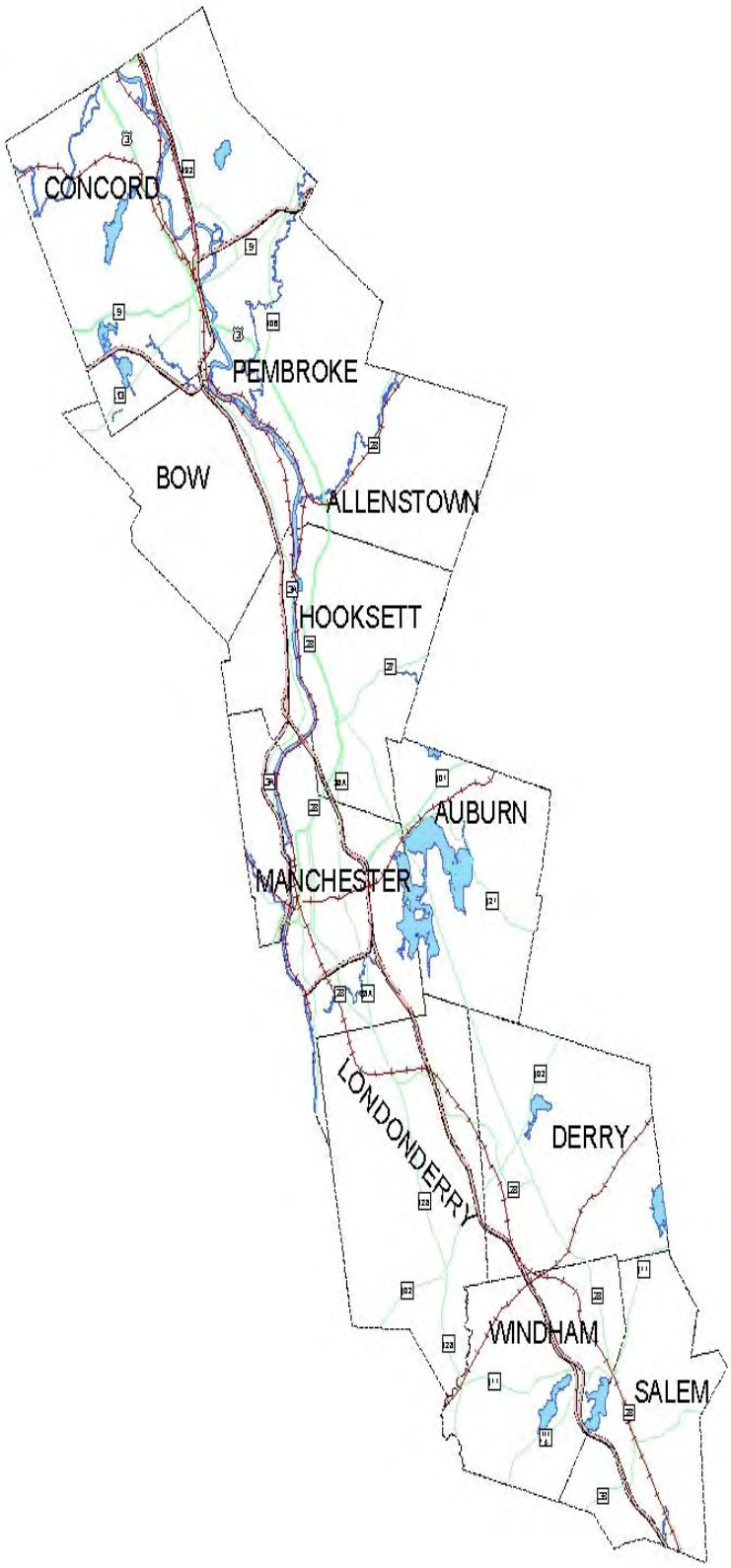

Figure 1

Salem - Concord Bikeway Feasibility Study Limits

crossings generally with low speed, low volume two-lane roads and 17 major structures including cattle passes and bridges over roads, culverts and watercourses.

A shared use path within this corridor would be 12 feet wide with a bituminous concrete surface and three foot wide shoulders. The shoulders would be constructed with crushed stone. At grade crossings would be designed based on the travel speeds and traffic volumes of the crossing roadway. In most cases only signing and crosswalks would be necessary. At a few locations the path would be realigned to cross at an existing intersection. Some modifications to traffic signal timings and phasing may be needed. Additionally, new flashing warning beacons are suggested at three locations. The most difficult at grade crossings are at Queen City Avenue in Manchester, and Rockingham Park Boulevard in Salem, where travel speeds and traffic volumes are high.

Concord –Portsmouth Railroad Corridor. This 5.8 mile long corridor was last active as a railroad facility approximately 50 years ago. The segment considered for this project begins on the east side of the Merrimack River on Merrimack Street in Hooksett at the Hooksett District Court, continues through Allenstown, Pembroke and crosses the Merrimack River into Concord. The corridor has five at grade crossings with low speed, low volume two-lane roads and four major bridges over watercourses.

Similar to the Manchester - Lawrence corridor, a shared use path within this corridor would be 12 foot wide with a bituminous concrete surface and three foot wide shoulders. The shoulders would be constructed with crushed stone. The only portion of the four bridges over waterways which remain are the stone piers and abutments, thus each bridge would require a new bridge superstructure. The largest bridge crosses the Merrimack River and is 470 feet long.

New Hampshire Heritage Trail Segments. The proposed New Hampshire Heritage Trail is 230 miles long providing a route from Massachusetts to Canada. Communities design, build and maintain local Heritage Trail segments. The study considered the Manchester and Hooksett portions of the trail. Specifically, the portion of the proposed trail in Manchester between Granite Street and the Amoskeag Bridge may be appropriate for pedestrians. In Hooksett, the portion of the proposed trail between Depot Road and Merrimack Street would be useful as a connection between the on road segments of the proposed bikeway in Manchester and the southerly endpoint of the Concord-Portsmouth Railroad corridor.

Continuous On-Road Option between Salem and Concord. Evaluation of an on road option began with a study of The New Hampshire Regional Bicycle Maps. The on-road option is 36 miles long and encompasses 18 roadway links. Major roadway segments include Route 39, Pleasant Street and North Policy Road in Salem, Route 111 and North Lowell Street in Windham, Ash Street in Derry, Route 28 and Mammoth Road in Londonderry, Mammoth Road in Manchester, Route 28A/Route 28, Main Street and Pine Street in Hooksett, Bow Bog Road and Logging Hill Road in Bow and South Street in Concord. To accommodate bicyclists, many of these roads would require widening to provide a minimum 4 foot shoulder on both sides, and sidewalks would be constructed for pedestrians.

Other On Road Options. Several roadway links were identified by the CAC, the public at-large and by the consultants as augmenting the three major options for a continuous path between Salem and Concord. These links are located in Bow, Manchester, Hooksett, Pembroke and Concord.

Recommended Route. A recommendation for a preferred route was based on a comprehensive evaluation of each option based on criteria set forth by the CAC. The criteria included determining how well the option met the goals of the purpose and need statement, design and construction issues, costs, resource impacts and compatibility with community plans. As part of this process the "Rail Trail Alternative" was developed and is a combination of the other three options. It encompasses the two abandoned rail corridors, connected by an on-road option in Manchester and portions of the proposed Hooksett Heritage Trail. It was this combination alternative that was found to most closely meet the criteria of the CAC. A detailed description of the route follows:

Segment Name	Facility Type	From	To
Manchester-Lawrence Railroad	Shared use path (rail to trail) and on-road segment around Manchester Airport	Hampshire Road, Salem	Depot Street, Manchester
Depot Street, Canal Street and River Road (Manchester)	Bicycle route (on road) and sidewalk	Concord Railroad crossing of Depot Street (Manchester)	Hooksett Town Line
Heritage Trail	Shared use path	Depot Road, Hooksett	Merrimack Street, Hooksett
Merrimack Street (Hooksett)	Bicycle route (on road)	Heritage Trail at proposed crossing of Merrimack River	Southerly end of Concord – Portsmouth Railroad
Concord – Portsmouth Railroad	Shared use path (rail to trail)	Merrimack Street, Hooksett	Westerly bank of Merrimack River
Hall Street	Bicycle route and sidewalk (on road)	Merrimack River, Concord	Downtown Concord

Phasing

Phasing for the development of the Salem – Concord Bikeway is broken into short-term, mid-term and long-term components. In the short term, efforts should be made to secure land not currently owned by municipalities or the state. Design and construction of the portion of the trail located within the Manchester–Lawrence abandoned rail corridor would follow. Lastly, the design and construction of the portions of the trail north of Manchester including the Concord – Portsmouth corridor and Hooksett Heritage Trail would be completed.

1.0 Introduction

The New Hampshire Department of Transportation (NHDOT) is studying the feasibility of improving bicycle/pedestrian accommodations in the Salem – Concord corridor. The corridor is within the Merrimack River Valley and includes the Interstate 93 (I-93) transportation facility. As part of a project to widen I-93, the public suggested that the NHDOT not only consider motor vehicle needs but also the movement of bicyclists and pedestrians within the corridor. As a result, the NHDOT developed a conceptual plan and profile for a shared use path (bicycle and pedestrian) within the I-93 right-of-way (ROW). Some felt that the so-called "I-93 bicycle path" was not the best option for accommodating bicycle and pedestrian travel within the corridor. Thus, the NHDOT retained Rizzo Associates, Inc. and Alta Planning + Design to identify and evaluate alternative bicycle and pedestrian routes within the Salem – Concord corridor.

This study examines three basic options for accommodating bicycle and pedestrian travel within the Salem – Concord corridor:

1. Constructing a shared use path within the I-93 corridor
2. Constructing a shared use path within abandoned railroad corridors
3. Using existing roads "as is" or improving them to better accommodate bicycles and pedestrians

The first option includes a path within the I-93 ROW from Salem to Londonderry. The second option includes portions of the abandoned Manchester – Lawrence Railroad from Salem to Manchester and the abandoned Portsmouth – Concord Railroad from Hooksett to Concord. The third option includes a series of state and local roads that were designated as state or regional bike routes on the New Hampshire Regional Bicycle Map. Within options two and three are use of segments of the New Hampshire Heritage Trail in Manchester and Hooksett.

Although these three basic options were identified early in the process, it was also deemed necessary to consider and evaluate combinations of these options. In fact, combinations of the three basic options were essential to create continuous routes between Salem and Concord.

The study included field reconnaissance of the I-93 corridor and certain parallel state and local roads. An inventory of the abandoned railroad corridors was also conducted. Geographic information system (GIS) data on wetlands, surface water, roads and publicly owned recreation and conservation properties was obtained and used to create a project map series. Alignments of the various alternatives were digitized and printed in color on

aerial photography of the corridor. The overall and detailed maps of the corridor are included in the report and project website.

Detailed valuation plans (val plans) prepared for both railroads in 1914 were obtained and consulted during the preparation of this study. The val plans show the extent of the railroad right-of-way, bridge types and dimensions, and buildings that existed at the time near the railroad.

2.0 Public and Agency Involvement

The NHDOT has sought input in the study from within the department and from the Department of Resources and Economic Development (DRED), regional planning agencies, municipalities, and the public. The study has been guided by a Citizen's Advisory Committee (CAC) established for the project. The CAC includes the following members:

Name	Organization	Representing
Domenic Ciavarro	Consultant	Rizzo Associates, Inc
Nancy Doherty	Consultant	Rizzo Associates, Inc
Paul Smith	Consultant	Alta Planning + Design
Catherine Coletti	RPC	Central New Hampshire Regional Planning Commission
Scott Bogle	RPC	Rockingham Planning Commission
Peter Reed	RPC	Southern New Hampshire Planning Commission
Quazi Bari	RPC	Southern New Hampshire Planning Commission
Richard Betterly	State	Department of Historic Resources
Robert Sproel	State	Dept. of Resource and Economic Dev. – Div. of Parks and Recreation Bureau of Trails
Lou Barker	State	NH DOT
William Cass	State	NH DOT
Tom Jameson	State	NH DOT
Ram Maddali	State	NH DOT
Ansel Sanborn	State	NH DOT
Cheryl Killian	State	Gov. Committee on Disability
Meena Gyawali	Manchester	Planning Department
Paul Doolittle	Derry	Town Council & Derry Pathways
Michael DiBitetto	Hooksett	Town Council
Sandra Lagueux	Londonderry	Londonderry Trailways
John St. Hilaire	Manchester	Queen City Trails Alliance
Bob Menefra	Manchester	Queen City Trails Alliance
Kerrie Diers	Pembroke	Town Planner
Wayne Morris	Windham	Windham Representative
Robert Jacobellis	Windham	Citizen
John Mangan	Windham	Citizen
Mark Samsel	Windham	Citizen
Linda Harvey	Salem	Bicycle/pedestrian Transportation Advisory Board (BPTAB)

Detailed minutes are provided in the Appendix for each of these meetings. A brief summary of the key points of discussion at each of the meetings follows.

First Citizens Advisory Committee Meetings (December 12, 2002)
The Salem – Concord Bikeway CAC first met on December 12, 2002 in Manchester at the offices of the Southern New Hampshire Planning Commission. The NHDOT and its consultants presented initial research on potential options including a bicycle and pedestrian path within the I-93 right-of-way (ROW) and a path within two abandoned rail road ROWs. All terrain vehicles (ATV) use on the Windham portion of the Lawrence – Manchester abandoned rail corridor will need to be addressed.

The committee requested that the consultants meet with the Manchester and Hooksett Planning Departments on the location and status of each community's portion of a proposed New Hampshire Heritage Trail. The Heritage Trail generally follows the easterly bank of the Merrimack River through Manchester and Hooksett and may provide a good option for portions of the Salem-Concord bikeway.

Second Citizens Advisory Committee Meeting (January 23, 2003)
At the second meeting, the NHDOT and its consultants presented more detailed research on the potential options. A concept for the trail alignment was presented for the segment that passes around the Manchester Airport. Initial concepts for bicycle and pedestrian connections from the rail corridor to I-93 park-and-ride lots were also discussed. Concerns were raised regarding wetlands and ATV use in Windham, a gas line in Londonderry and ROW encroachments.

For the northerly portion of the trail within the rail corridor, the bridges on the Soucook River, Suncook River, Allenstown canal and Merrimack River were identified as key structures requiring significant reconstruction.

Discussion of the I-93 option raised concerns regarding air quality and a lack of connections to town roads.

On road options were presented and the committee felt that the slopes, trucks and traffic volumes on some the roads may discourage bicyclists.

During this meeting the CAC discussed and developed a format for the Public Information Meetings.

Public Information Meetings (February 11 and 13, 2003)
The first set of public information meetings were held in Derry on February 11 and in Hooksett on February 13, 2003. At each meeting a one-hour presentation was made on project options and potential combinations of:

1. I-93 bicycle and pedestrian path
2. Shared roadway option
3. Railroad corridor option

The technical team answered questions and listened to public comments for an additional hour or more. Issues raised by the attendees included trail users, trail surface, the opportunities and/or conflicts presented by the bicycle/pedestrian mode and other modes such as rail and ATV, funding and maintenance. Lists of positive and negative attributes for each option were developed and are summarized in the meeting notes.

Third Citizens Advisory Committee Meeting (February 27, 2003)
The focus of this meeting was to discuss the comments received during the public information meetings and to develop a recommendation for a preferred alternative. Specifically a format for evaluating each alternative was developed.

Public Information Meetings (April 1 and 3, 2003)
The second set of public information meetings were held in Windham on April 1, 2003 and in Pembroke on April 3, 2003. A presentation was made by NHDOT and the consultants at each of these meetings. The presentation included a summary of the comments and public input received at the first set of public meetings, description of the recommended route, quantitative analysis of the options, analysis of resource and community compatibility and discussion of future steps.

Issues raised by attendees included ATV displacement and trail replacement, snowmobile use, town liability and responsibilities, funding, land purchase and trail surface.

John St. Hilaire of the Queen City Trail Alliance is organizing a “Corridor Committee” to work on the Salem to Concord bikeway implementation. The committee will be a strong advocate for this project. He had sign up sheets available.

Fourth Citizens Advisory Committee Meeting (April 15, 2003)
The fourth and final CAC meeting was held in April to discuss comments received from the public, the preferred alternative, project phasing and future steps. The committee agreed that the preferred route includes both abandoned rail corridors, portions of the New Hampshire Heritage Trail and short roadway segments in Manchester and Hooksett. Although three options were considered for connection to downtown Concord, the committee favors the trail crossing the Merrimack River and connecting to Hall Street in Concord, as strongly supported at the Pembroke Public Information Meeting.

As part of the discussion on the preferred alternative the surface of the trail was raised as a key design issue. During the public information meetings people spoke in support for both a paved surface and an unpaved surface. The pavement surface does have an effect on different types of trail users. The CAC expressed a preference for a paved path but felt that surface treatment should be discussed at the local level during project development. It was requested that this feasibility study present both the positive and negative aspects of both surfaces (see Chapter 5.0 – Recommended Route).

Linda Harvey, the Salem representative reported that preliminary discussion with town officials indicate that an overpass of the trail at the Rockingham Boulevard/Route 28 intersection may be required.

Obtaining funding for the trail was discussed. July 31, 2003 is the deadline for submitting an application to the Congestion Mitigation and Air Quality Improvement Program (CMAQ) for funding. The application is submitted through the regional planning commissions. If the application is approved by the planning commissions and submitted to the state, the earliest funding for design and construction may not be available until later than 2005. Moreover, the funding would cover only 80 percent of the design and construction costs. Funding for the remaining 20 percent matching funds would need to be provided at the local and state levels.

3.0 Project Purpose and Need

The first step in the Salem – Concord Bikeway Feasibility Study was the development of a project purpose and need statement. The Purpose and Need Statement sets the benchmark by which the various options will be evaluated. For this study an iterative process was used to develop and refine the purpose and need statement. The final Project Purpose and Need Statement as developed by the NHDOT, Citizens Advisory Committee and consultants with public input is as follows:

> *The purpose of the study is to identify a feasible alternative transportation corridor (facility) for pedestrians and bicyclists between Salem and Concord. This facility would provide for non-motorized travel within and between communities along the Interstate 93 (I-93) corridor between Salem and Concord. In an effort to reduce the dependence on motor vehicle trips on I-93 and other roadways, this alternate corridor (facility) should encourage and provide a transportation link for both work and non-work related trips, and be desirable for a wide range of bicyclists and pedestrians. Potential options for a north-south alternative transportation facility in the corridor include a bicycle path in portions of the I-93 right-of-way between Salem and Londonderry, use of existing roadways and use of abandoned or active rail corridors.*

4.0 Options

Several options for bicycle and pedestrian travel between Salem and Concord were identified as part of this study and are summarized in this chapter. The options include both off road and on road alternatives such as the proposed I-93 bicycle path, abandoned railroad corridors, segments of the New Hampshire Heritage Trail, existing roadways, and combinations of the same.

For the I-93 option and the Heritage Trail segments a description of the proposed design is presented. For the two abandoned railroad corridors, the existing conditions are identified followed by a section on design issues related to creating the bicycle/pedestrian shared use trail.

Each of the options is shown on Figures 2 through 9. These figures are based on aerial photographs of the Salem/Concord corridor.

4.1 Interstate 93 Bicycle Path

In an effort to encourage multiple modes of transportation and reduce the dependence on motor vehicle travel, a bicycle/pedestrian path is being considered as part of the Interstate 93 widening project from Salem to Manchester. The proposed path would be for exclusive bicycle and pedestrian use. It would be located adjacent to I-93, within the existing and proposed right-of-way limits of the highway. The approximately 13 mile path begins in Salem near Exit 2 (Route 97) and ends in Londonderry near Exit 5 (Route 28). This option does not provide a complete trail to Concord and thus may only be considered for the Salem to Londonderry portion of the corridor.

The proposed design of the facility includes a ten foot paved path with 2-foot gravel shoulders on each side. The path would be located no closer than 30 feet from the nearest edge of travel lane on the highway and in most cases will be located at the bottom of the highway fill slopes. Figure 10 depicts a typical cross sectional view of the path. The following section describes in detail the proposed route of the I-93 bike path.

The facility begins at the intersection of Pelham Road and North Policy Street in Salem on the east side of I-93. The path continues north adjacent to the northbound on-ramp. Continuing to the north, the path is located at the bottom of the slope adjacent to I-93. The path crosses under Brookdale Road and continues to the Windham town line between the highway and Canobie Lake.

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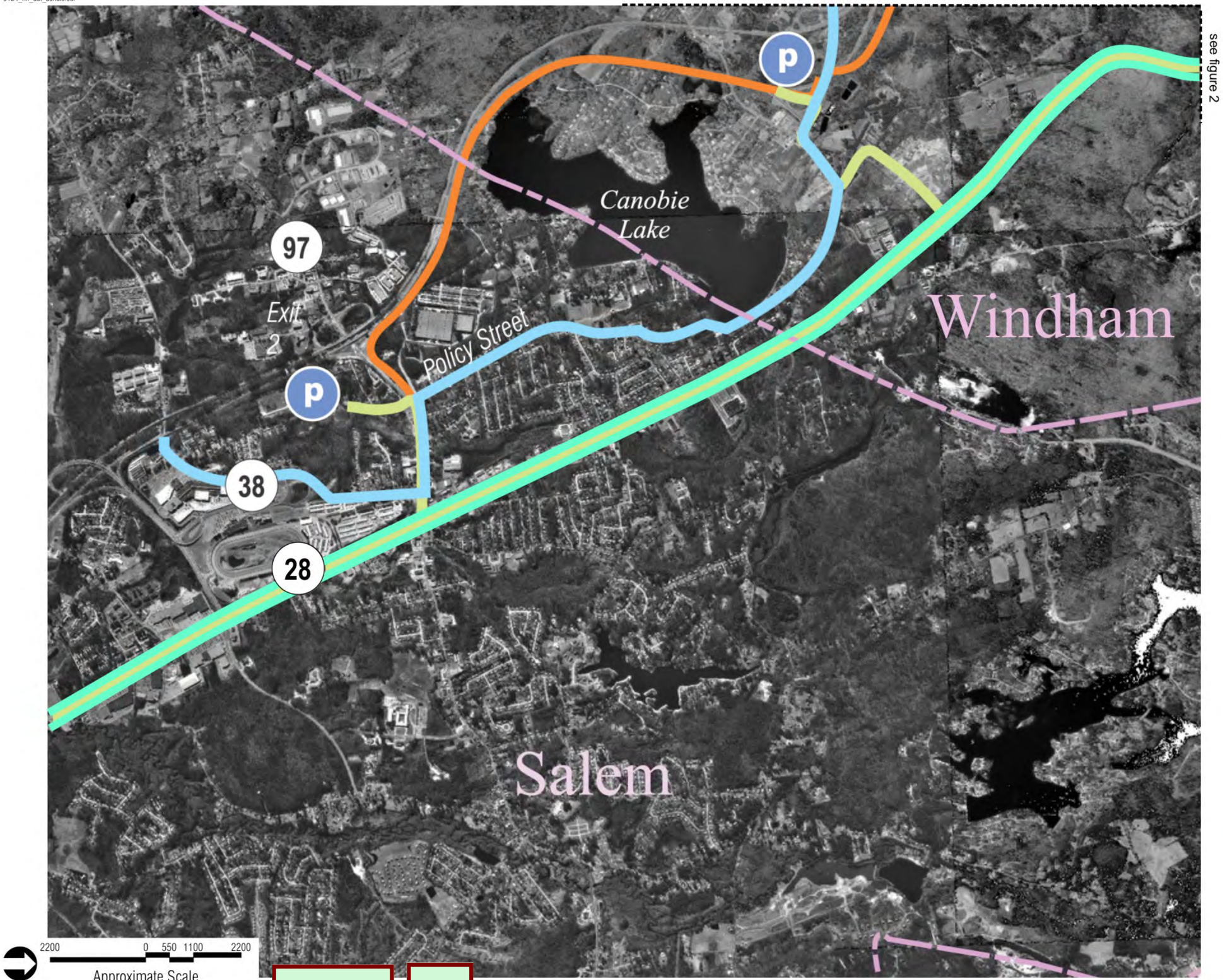

Legend

- Town boundaries
- Salem-Manchester RR ROW
- Proposed I-93 Bikepath
- Heritage Trail
- Hooksett-Concord abandoned RR ROW
- Roadway Alternative
- Park & Ride
- Recommended Route

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Salem-Concord Pedestrian/Bikeway Corridor Options

Figure 2

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- Park & Ride
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Approximate Scale

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Salem-Concord Pedestrian/Bikeway Corridor Options

Figure 3

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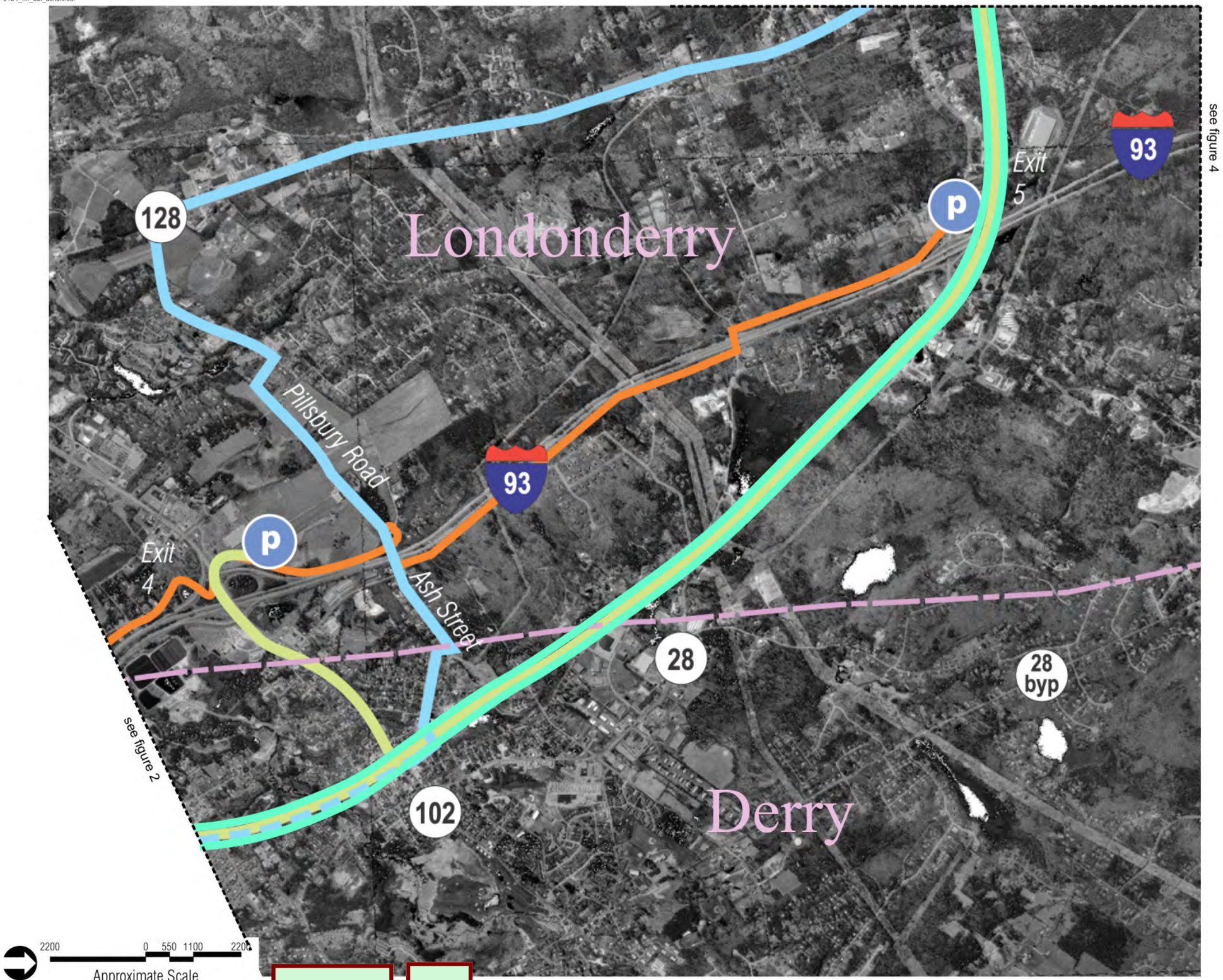

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Salem-Concord Pedestrian/Bikeway Corridor Options

Figure 4

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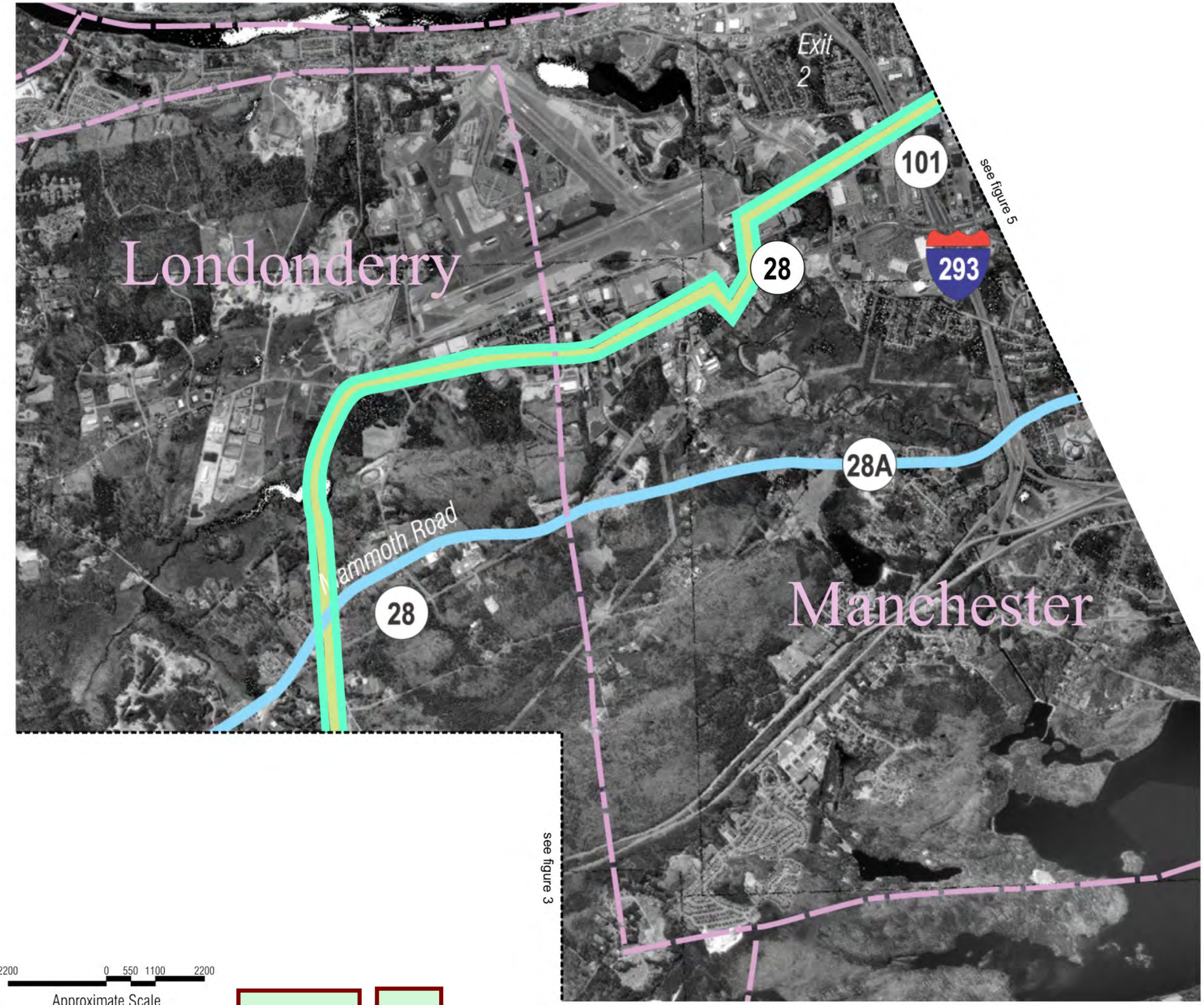

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Salem-Concord Pedestrian/Bikeway Corridor Options

Figure 5

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Legend

- Town boundaries
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Salem-Concord Pedestrian/Bikeway Corridor Options

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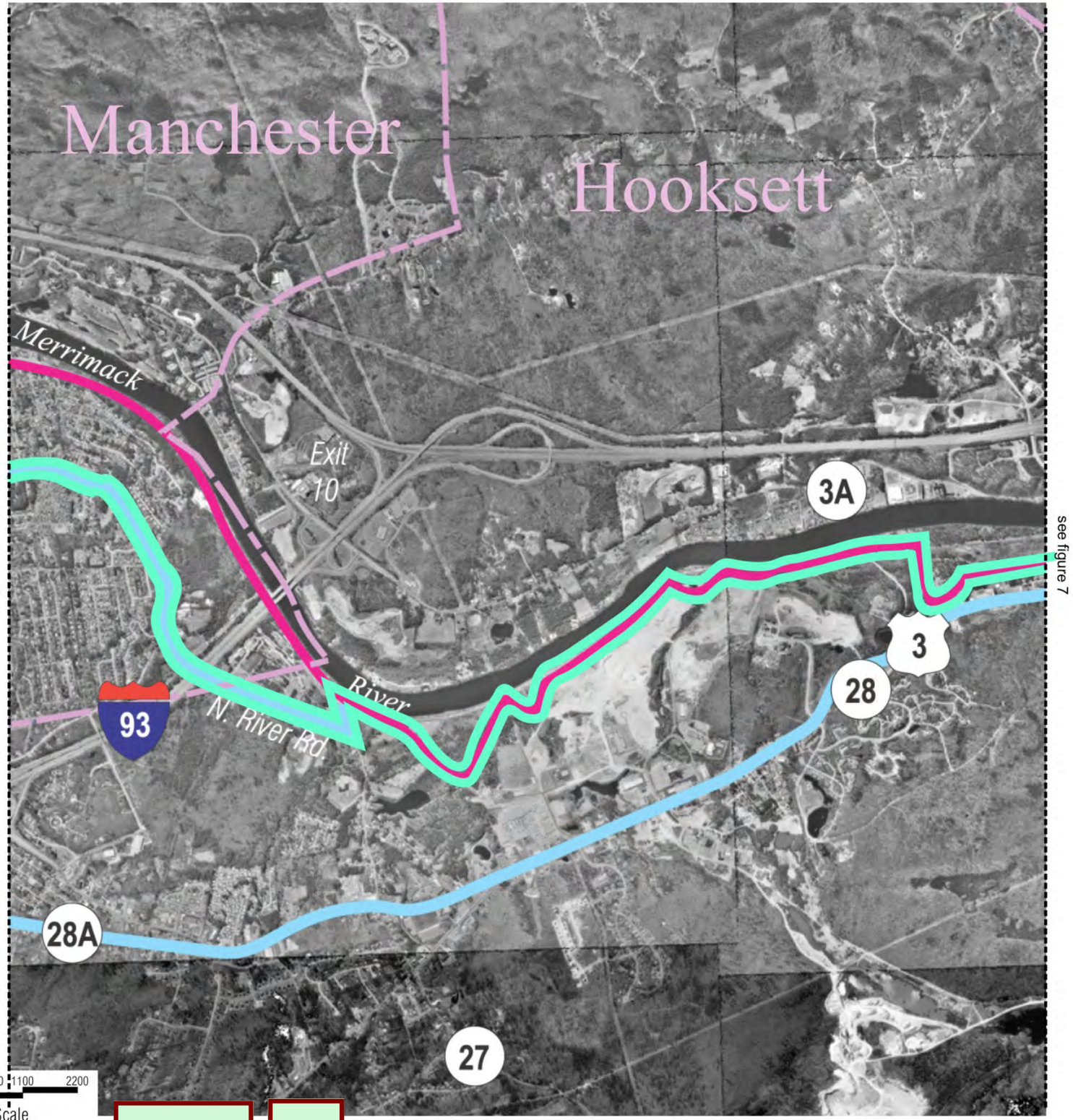

see figure 5

see figure 7

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Approximate Scale

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Salem-Concord Pedestrian/Bikeway Corridor Options

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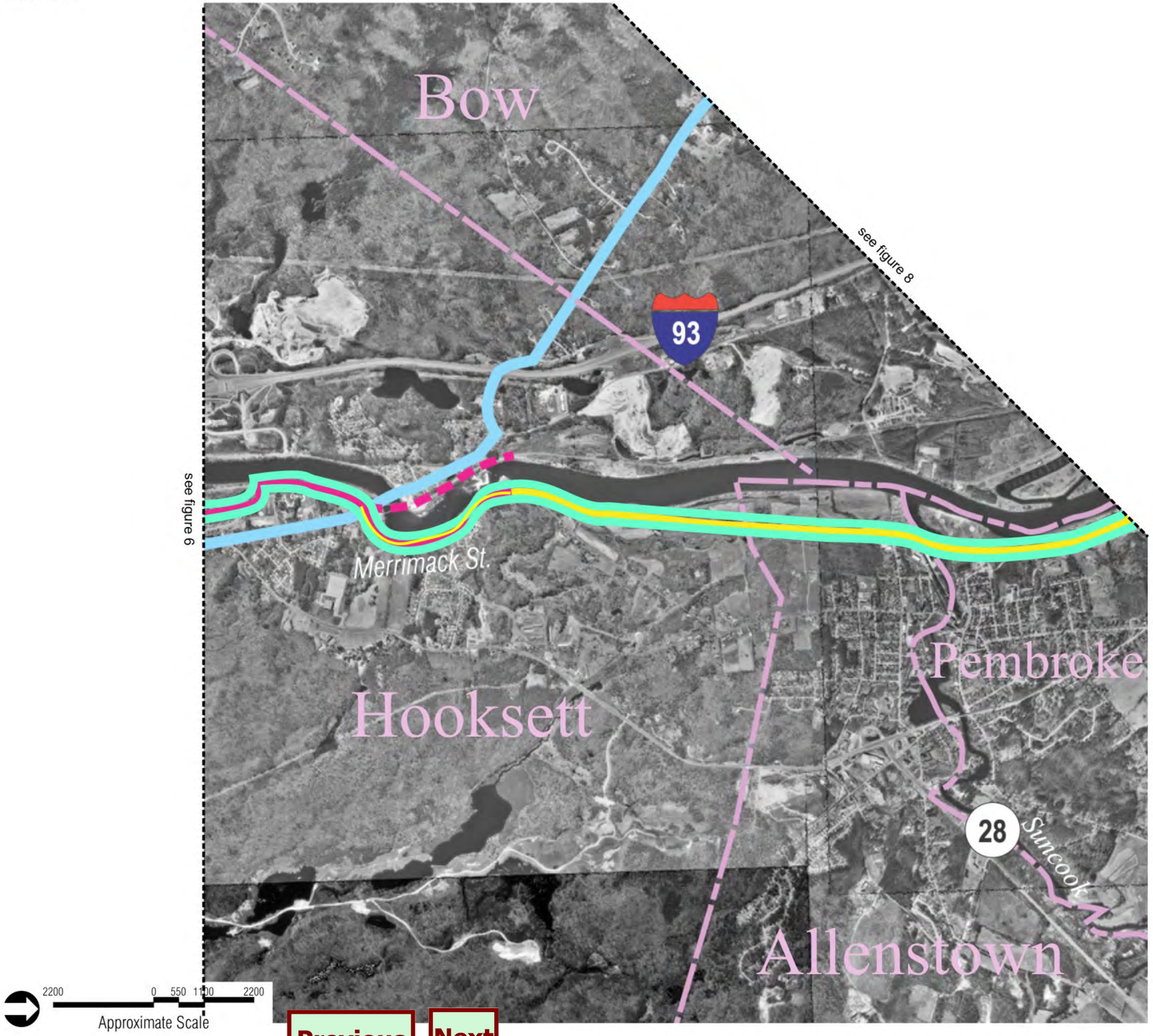

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Salem-Concord Pedestrian/Bikeway Corridor Options

Figure 8

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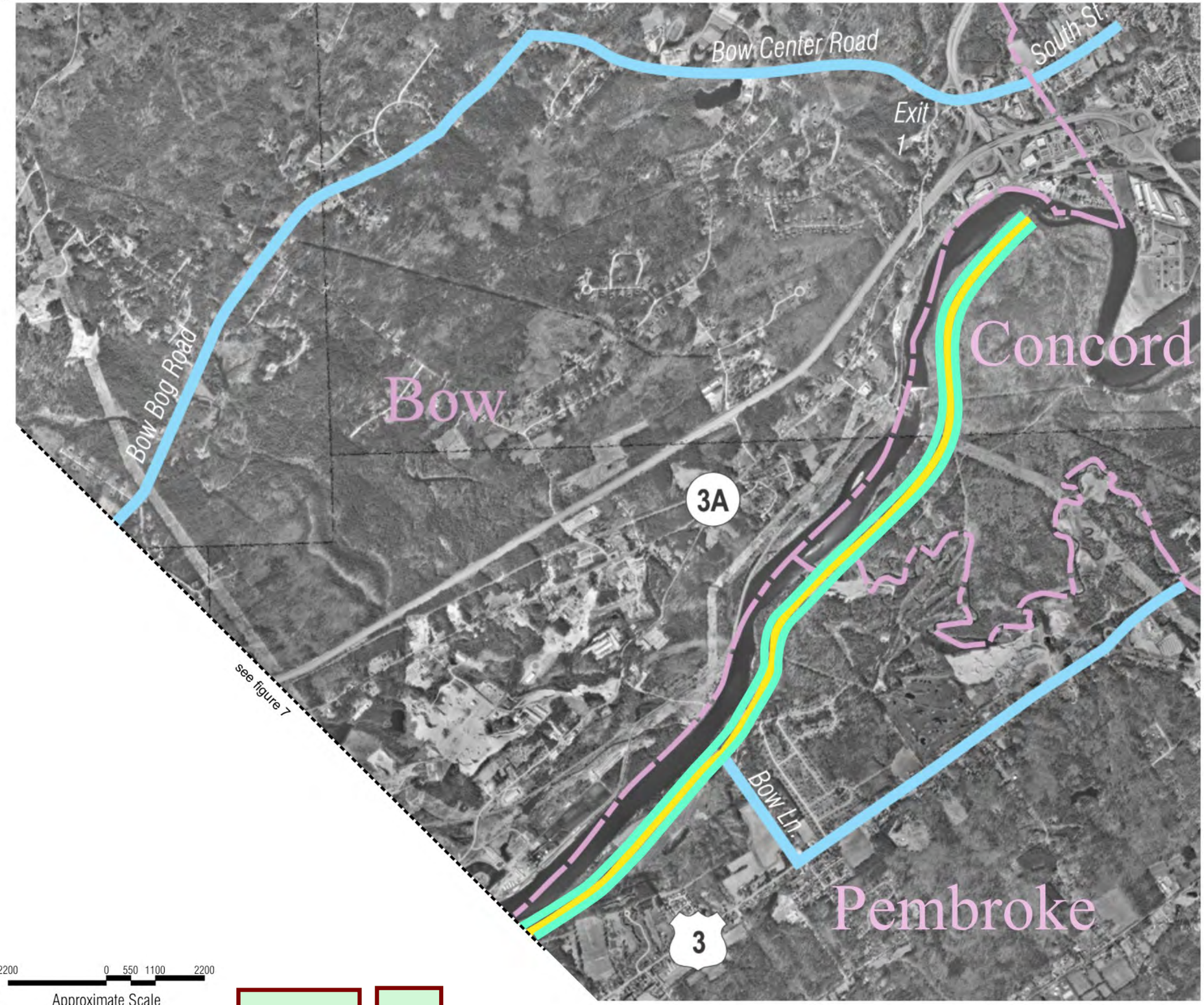

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Salem-Concord Pedestrian/Bikeway Corridor Options

Figure 9

In Windham the path remains on the east side of I-93 and then utilizes the existing northbound barrel, because the proposed northbound lanes will be relocated to the west near the southbound lanes. A connection is proposed at Wildwood Road. The path then connects to Range Road near Exit 3 and provides a connection to the proposed park and ride lot. The path continues along Route 111 for a short distance, crosses Route 111 and continues along the east side of the highway at the bottom of the slope. Along this section the path is directed around the weigh station and then intersects with North Lowell Road.

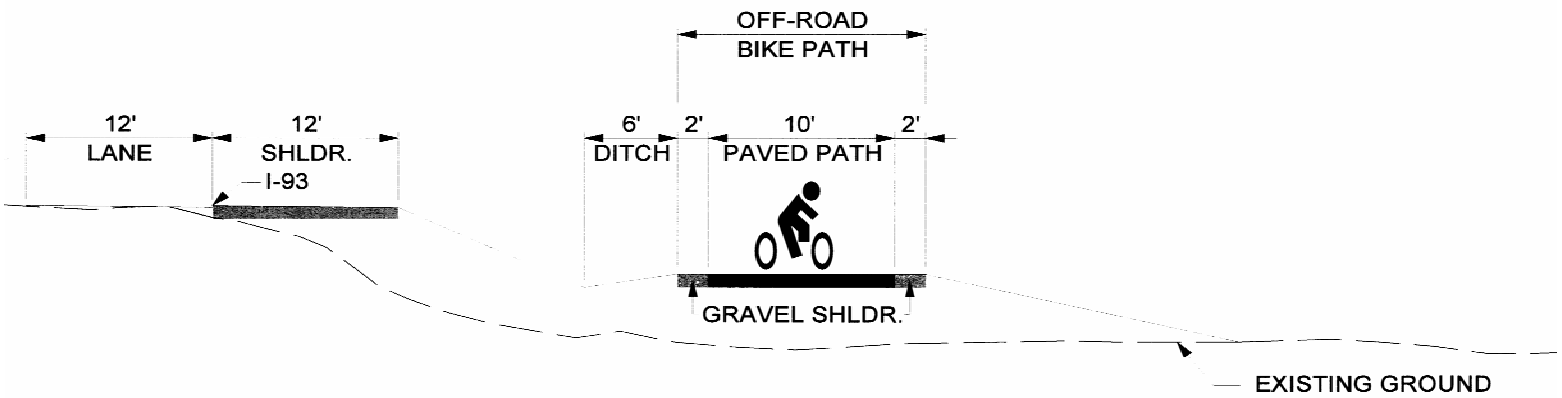


Figure 10 Typical Section I-93 Path

In Derry the path remains on the east side of the highway and utilizes a section of the abandoned Manchester Lawrence railroad up to Fordway Extension. At Fordway Extension the path crosses under I-93 and continues north on the west side of the highway at the bottom of slope. The path intersects Kendall Pond Road and continues into Londonderry on the west side of the highway.

The facility is located to the west of the highway and the Exit 4 southbound onramp. It then crosses the on-ramp and Route 102 at a signalized intersection. This provides access to the Exit 4 park and ride lot. Continuing north it is located on the west side of the southbound off-ramp and I-93 to Pillsbury Road. The trail crosses back to the east side of the highway at Pillsbury Road and continues north at the bottom of the slope. The path then intersects Stonehenge Road and crosses under the highway to the west side. The path continues north on the west side of the I-93 to Exit 5 at Route 28. Here it provides access to the proposed park and ride lot.

Table 1 summarizes the I-93 option by segment. The NHDOT estimates the construction cost for the I-93 bikeway is $8,400,000.

Segment	Description	Town or City	Length (miles)	Grade Crossings (Intersections)
1	Pelham Road to Windham Town Line	Salem	1.4	Brookdale Road
2	Windham Town Line to North Lowell Road	Windham	4.9	Wildwood Road, Westshore Road, Edgewood Road, Route 111, North Lowell Road
3	N. Lowell Road to Kendall Pond Road	Derry	2.0	Fordway Extension, Kendall Road
4	Kendall Road to Route 28	Londonderry	4.3	Route 102, Pillsbury Road, Ash Street, Stonehenge Road, Route 28

Table 1 I–93 Bikeway Summary by Segment

4.2. The Manchester and Lawrence Railroad Corridor

An off road option is provided by the existing Manchester - Lawrence Railroad corridor. Specifically, the 23.6 mile segment between Hampshire Road in Salem to Depot Street in Manchester was identified as a possible segment of the Salem-Concord Bikeway.

On the Boston and Maine Railroad, branch lines like the Manchester and Lawrence more often linked two (or more) cities that already were served by other rail connections. The Manchester and Lawrence Branch was constructed in 1847 to 1849 when cities north of Boston were experiencing the industrial revolution. The first train ran the entire railroad on November 13, 1849. A segment of the railroad in Windham was the most expensive to construct because extensive cutting through ledge and filling of lowlands was necessary for a distance of three miles. In downtown Manchester, the Manchester and Lawrence Branch was constructed parallel and west of Canal Street. The branch joined the Concord Railroad several hundred feet north of Granite Street.[1]

All segments of the railroad have been abandoned and most are publicly owned. The short stretch (less than one mile) south of the Spicket River in Salem is still owned by Guilford Transportation. Most of the alignment is now owned by the State of New Hampshire. All but two segments in Derry and Manchester are owned by those municipalities. Delaware Rock, Inc. owns the 1.6 mile former rail corridor between North High Street in Derry and Route 28 in Londonderry. The railroad corridor through Manchester Airport is owned by the airport.

Alta Planning + Design staff walked the railroad corridor from Kelley Road in Salem to Mammoth Road in Londonderry on October 29-30, 2002. Additional portions of the corridor were investigated in December 2002 and January 2003. The field reconnaissance, interviews with local and state officials, and additional research has been used to assess the feasibility of constructing a shared use path for bicycle and pedestrian use in the former railroad corridor.

It should be noted that this feasibility analysis considers construction of a non-motorized rail-trail and not a rail with trail. Given the presence of extensive wetland areas adjacent to the trail particularly in Windham and Derry, it would be difficult to construct a trail with adequate separation from an active rail line.

[1] Richard A. Hoisington, "This Train Does Not Stop at Nutt's Pond: A History of the B&M's Manchester & Lawrence Branch," *The New England States Limited* (Spring 1978).

The following section describes the corridor from south to north and is divided into 18 segments. Major features within each segment are discussed, and a limited number of photographs are provided. Following the segment descriptions is a discussion of the feasibility of constructing a rail to trail within the 23.6 mile corridor from Hampshire Road in Salem to Depot Street in Manchester.

Three major tables are included at the end of the section summarizing the analysis of the grade crossings, structures and trail segments. Order-of-magnitude construction cost estimates are included in the summary table.

4.2.1 Description of Existing Corridor

1. Hampshire Road to Kelley Road (Salem)

This segment begins just north of the Massachusetts state line and extends 1.1 miles north to Kelley Road. The railroad south of Spicket River is abandoned but still owned by Guilford Transportation. The State of New Hampshire has not initiated the process to acquire this part of the rail corridor. The State owns the entire rail corridor in Salem north of Spicket River. This segment contains two structures: a bridge over Spicket River (shown below) and a cattle pass.

Looking west at railroad bridge over Spicket River (Photo: Linda Harvey).

2. Kelley Road to Rockingham Park Boulevard (Salem)

This segment parallels Route 28 and is approximately 1.0 mile long. Commercial properties are located on both sides of the highway. Residential properties including apartments abut the railroad on the west side along with several shopping centers. The former railroad right-of-way (ROW) is 82.5 feet wide and is shown in section in the Trail Design section (Salem).

Looking north at Hagop Road crossing of rail corridor paralleling Route 28 (Photo: Linda Harvey).

3. Rockingham Park Boulevard to Main Street (Salem)

The segment from Rockingham Park Boulevard to Main Street is approximately 1.0 mile long. Rockingham Park Boulevard crosses the railroad corridor with nine lanes (see photo below) separated by medians adjacent to Route 28. This roadway design is evident on the railroad valuation plans prepared in 1914. Rockingham Park Boulevard leads to Exit 1 of Interstate 93. North of this intersection the railroad corridor abuts Rockingham Park, the horse track, including the entrance commonly used to bring horses into the park.

Rail crossing at Rockingham Boulevard

Approaching Main Street, Salem

4. Main Street to Route 111 (Salem)

The Salem Depot is located along the railroad at Main Street in Salem. Main Street leads to Exit 2 on Interstate 93. North of the Salem Depot, portions of the rail corridor are used by Dodge Grain for storage and loading. North of Willow Street the railroad corridor abuts wetlands and includes drainage structures under the railroad. The railroad corridor abuts residential properties on the west, north of the crossing of Old Rockingham Road. The segment from Main Street to Route 111 is approximately 1.8 miles long.

Culvert north of Willow Street

Residences on Old Rockingham Road

5. Route 111 (Salem) to Depot Road (Windham)

The railroad corridor is 4.1 miles long from Route 111 to Depot Road. Route 111 leads to Exit 3 on Interstate 93. A dirt trail is maintained by the New Hampshire Department of Resources and Economic Development (DRED) within this segment. The trail is open to motorized all-terrain vehicles (ATVs). In this segment, the former railroad is elevated and has a 99 feet wide right of way (see Windham Cross Section in Design Section). The existing trail provides access to and views of natural areas including Mitchell Pond. Two historic stone bridges and stone walls are present within the rail corridor. The narrow rail corridor through wetlands and rock cuts (ledge) is adequate for the trail, but not for a railroad and a trail (rail with trail).

Windham – Existing dirt trail in former railroad right of way

Historic stone arch bridge

View of Mitchell Pond from rail corridor

6. Depot Road (Windham) to Kendall Pond Road (Derry)

This 2.3 mile long segment includes predominantly rural areas and wetlands between Windham Road and Bowers Road. The Town of Derry owns the railroad corridor north of Windham Road. A short stretch of the railroad corridor parallels and is close to Interstate 93. North of Bowers Road, residential properties abut the railroad and more are under construction.

Existing dirt trail in wetlands

Abutting residential properties

7. Kendall Pond Road to West Broadway (Derry)

The Town of Derry, owns this 0.8 mile long segment of the former railroad ROW and has constructed a 10-foot wide paved shared use path for bicycles and pedestrians (see Design section). The area along the path is predominantly residential. The ROW was converted to a public street at Nutfield Court as part of a residential subdivision. The path crosses a stone arch bridge over Beaver Brook. The path becomes a sidewalk adjacent to the Derry Depot, which was recently converted to a restaurant. West Broadway leads to Exit 4 of Interstate 93.

Existing paved path in Derry

Derry Depot under renovation in October 2002

8. West Broadway to North High Street (Derry)

The former railroad alignment includes a wide crosswalk on West Broadway and brick sidewalks along Manning Street to the north. After Manning Street dead ends, the railroad corridor contains a dirt trail. The trail continues over Hornes Pond on a stone arch railroad bridge. The trail runs through a new residential development just south of North High Street. This segment of the railroad corridor is 0.6 miles long.

9. North High Street (Derry) to Rockingham Road, Route 28 (Londonderry)

According to data provided by NHDOT, this segment of the former Lawrence and Manchester Branch railroad is owned by Delaware Rock, Inc. The corridor remains intact with no buildings or other intrusions. A short stretch of a cut section of the railroad corridor was filled to create an at-grade crossing of B Street where a structure had been previously. This segment of the railroad corridor is 1.1 miles long.

10. Route 28, Rockingham Road to Auburn Road (Londonderry)

This 1.6 mile segment is predominantly rural. It ends at an industrial area where the trail parallels Independence Drive.

Existing dirt trail in Londonderry at milepost 9 (9 miles south of Manchester Depot).

11. Auburn Road to Route 28, Rockingham Road (Londonderry)

A portion of the railroad corridor in this segment was purchased by a private developer and used to construct a driveway to a new office building in the northeast quadrant of the I-93/Route 28 interchange. The building is located just north of the rail crossing of Auburn Road. About 20 feet of the rail corridor was not used. Further north, I-93 spans over the rail corridor on two bridges. Between I-93 and Route 28 the corridor along the railroad is primarily industrial and undergoing development. The segment from Auburn Road to Route 28 is 1.6 miles long.

Office building driveway in former rail ROW

Existing dirt trail in rail corridor near North Londonderry Elementary School near Exit 5

12. Route 28, Rockingham Road to Harvey Road (Londonderry)

This segment of the former railroad corridor is 1.3 miles long. It includes an at-grade crossing of Mammoth Road and a small bridge over Little Cojas Brook. A pipeline easement parallels the railroad on the west side.

13-15. Route around Manchester Airport (Londonderry and Manchester)

Between Harvey Road in Londonderry and Perimeter Road in Manchester the railroad corridor is owned by the Manchester Airport and would not be used for trail development. The trail would be an on-road bicycle facility (shoulder or bicycle lane) with sidewalks on Harvey Road and Perimeter Road. A short section of shared use path would be constructed around the new airport runway. More detail of this facility is provided in the Design section (Section 4.2.2).

Harvey Road

Area between Willow Street and airport

16. Perimeter Road to Goffs Falls Road (Manchester)

North of Perimeter Road the railroad corridor is owned by the City of Manchester. The segment from Perimeter Road to Goffs Falls Road is 0.4 mile long. A 150-foot long wood trestle bridge spans the Great Cojas Brook. This is the longest railroad bridge on the Manchester and Lawrence Branch.

Rail bridge over Great Cojas Brook (Photo: John St. Hilaire)

17. Goffs Falls Road to South Beech Street (Manchester)

The City has received a grant from NHDOT to construct a paved shared use path within the Manchester and Lawrence Branch corridor from Goffs Falls Road to South Beech Street, a distance of about 1.5 miles. This segment serves Precourt Park, Nutts Ponds, single family and multifamily housing, commercial and industrial areas.

The abandoned rail corridor passes under I-293

18. South Beech Street to Depot Street (Manchester)

This 1.2 mile long segment includes an at-grade crossing of Queen City Avenue, a busy four-lane roadway with a median. Just to the north, another abandoned railroad intersects the Manchester and Lawrence Branch. This railroad has been designated for future development as the Rockingham Trail, which will connect Manchester to the Seacoast. The Manchester-Lawrence Branch trail would terminate at Depot Street. The last 1000 feet or so would parallel the active Concord Railroad.

Queen City Avenue in Manchester. Rail crossing in mid-ground.

Looking south near Cove Street (active rail on the right).

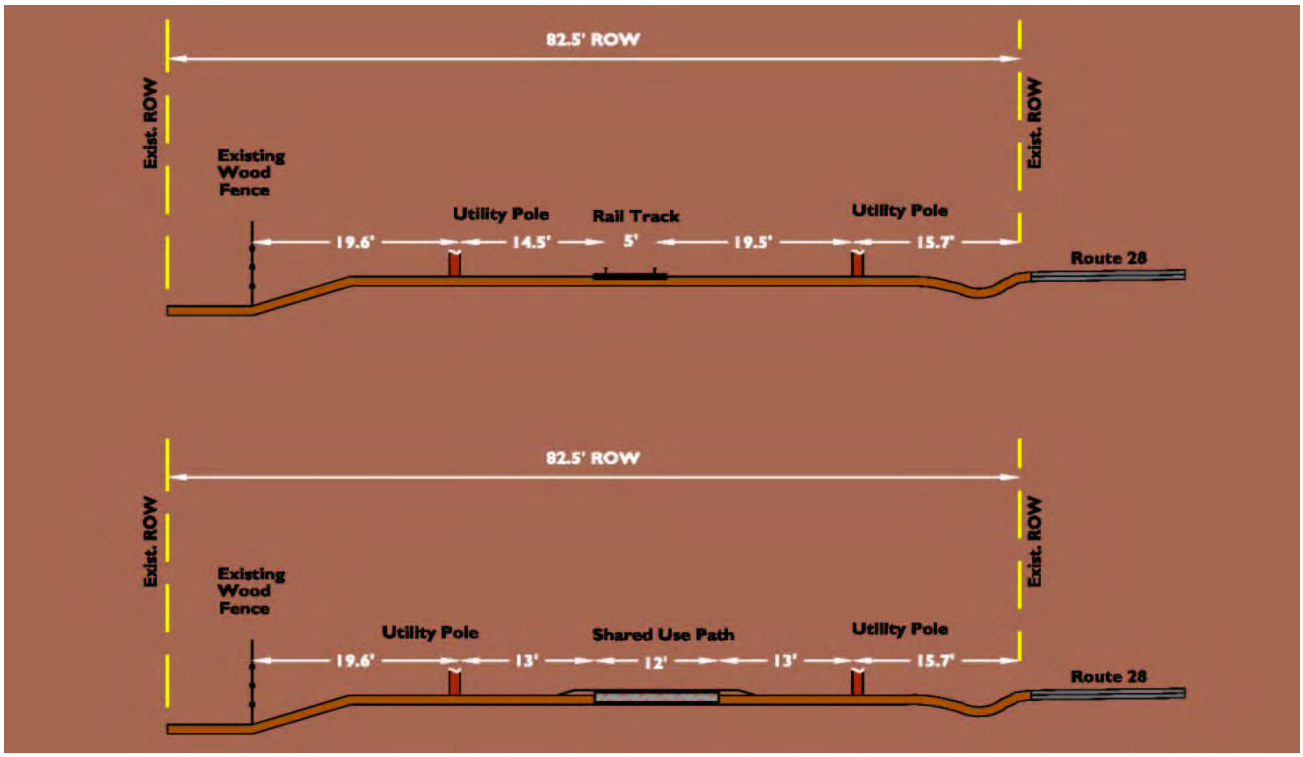
4.2.2 Design

The railroad corridor is an ideal location to develop a paved bicycle and pedestrian path. One significant advantage the railroad corridor has over other options is its relatively flat grade. The railroad was designed to have a maximum grade of only 1 to 2 percent (1 to 2 foot change in elevation in 100 feet).

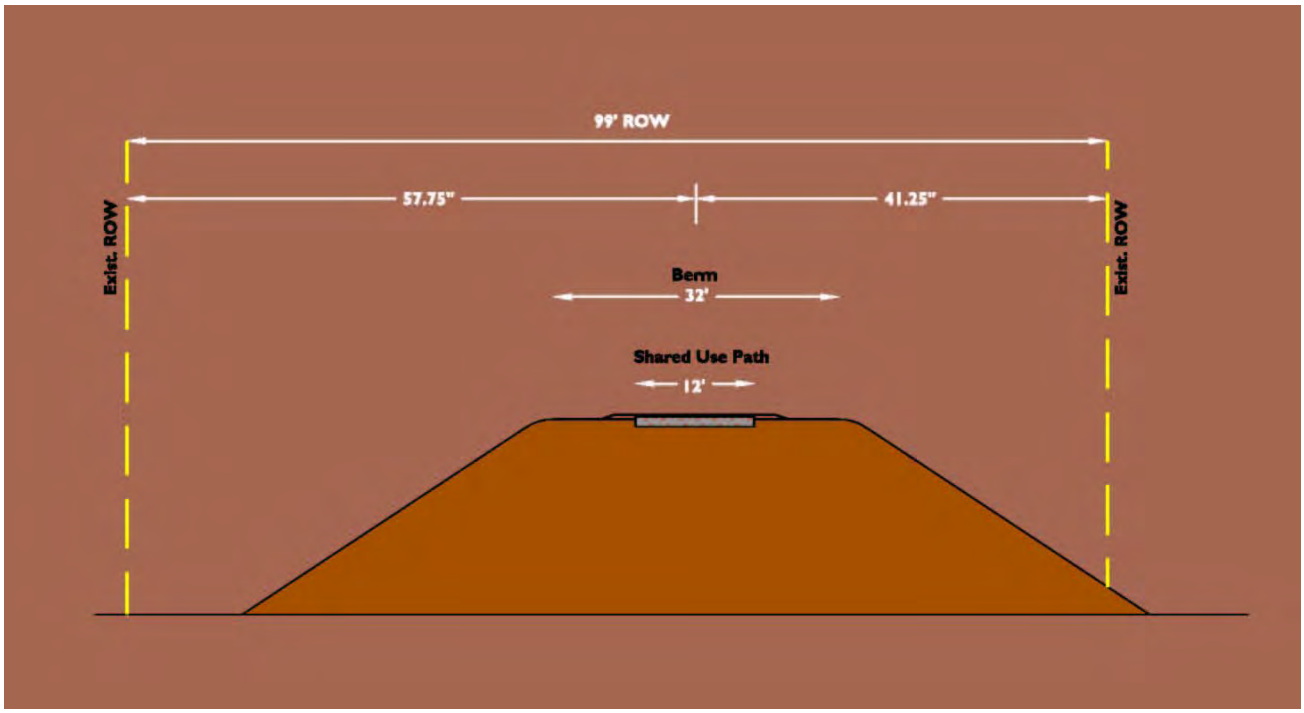
Typical Cross Sections. This option would require construction of a trail in the bed of the former railroad. Based on input from the advisory committee and public meetings, the trail would be 12 feet wide with a 2.5 inch thick bituminous concrete (asphalt) surface course. Three-foot wide shoulders would be provided on both sides of the path. The shoulders would have a 4-inch surface course of crushed stone. A 10-inch gravel base would be provided under the trail and shoulders. Three typical cross sections are shown on the following page.

Based on field observations, this cross section is readily accommodated throughout most of the length of the Manchester – Lawrence corridor. Minor widening and slope work will be necessary.

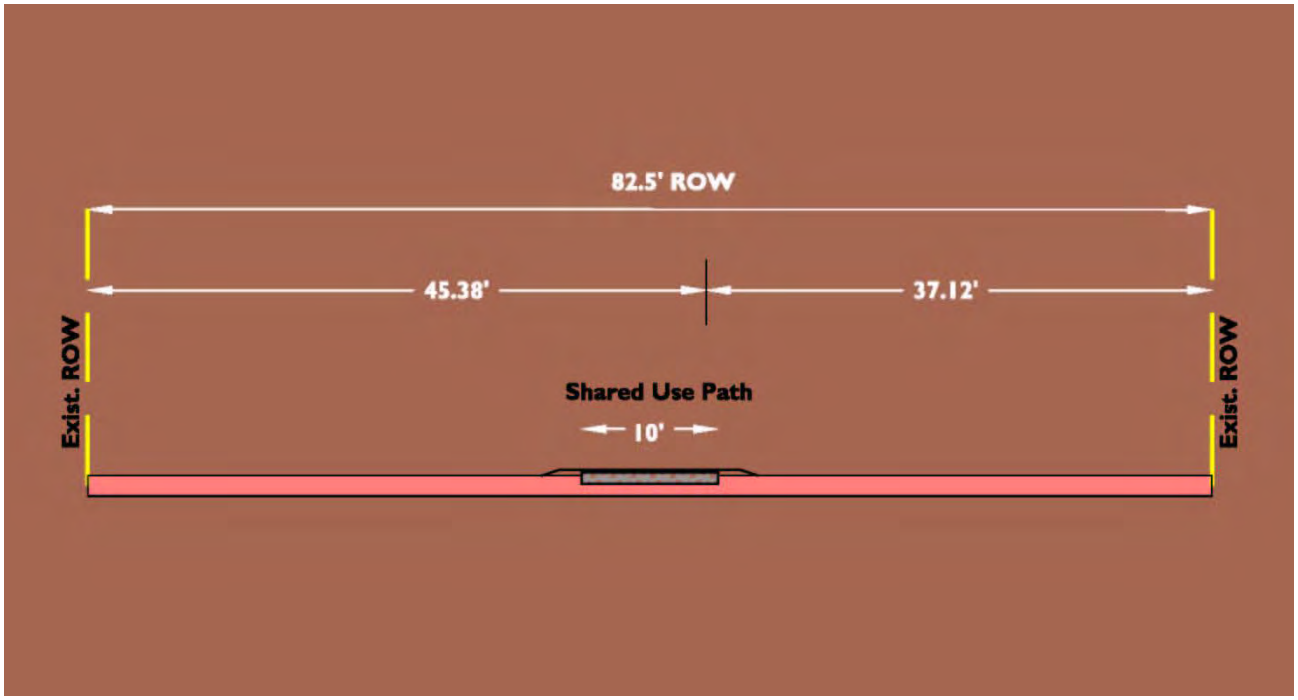
Proposed Trail Around Manchester Airport. As the railroad corridor is inaccessible between Harvey Road and Perimeter Road a link would be required to connect the northerly end point of the corridor, south of the airport to the southerly end point of the corridor, north of the airport. Harvey Road would be reconstructed to provide 4-foot wide shoulders and a sidewalk from the railroad corridor to the 90 degree turn at the new airport runway. A shared use path is recommended along a portion of Harvey Road and Willow Street to get around the eastern end of the new runway/extension at Manchester Airport. The trail would begin at the 90 degree turn of Harvey Road west of Willow Street. It would be constructed on the south side of the



Salem – Proposed typical cross section in level terrain with existing rails still in place.



Windham –Proposed typical section in elevated terrain with existing dirt trail



Derry – Proposed typical section in level terrain with existing paved path

fence along the runway and may require a retaining wall. The path would be offset from the edge of road by at least five feet. The path would turn and go north along Willow Street on the east side of the runway fence. The path would turn back to the west and follow the north side of the runway fence to the 90 degree turn of Perimeter Road. Perimeter Road would be restriped to provide 4-foot wide shoulders or bicycle lanes and a sidewalk from the 90 degree turn at the airport runway to the railroad corridor.

At-Grade Crossings. Crossings of the proposed trail within the former railroad ROW with roadways at the same elevation (at grade) require evaluation and design. Most of the 35 roadways which the trail would cross are low speed, low volume two-lane roads. However, other roadways that the trail would intersect carry more traffic at higher speeds.

Evaluation of trail crossings involves analysis of traffic patterns of vehicles as well as trail users. This includes traffic speeds, street width, traffic volumes (average daily traffic, and peak hour), line of sight, and trail user characteristics. This study identifies potential crossing treatments given available information, which must be verified and/or refined during the design and construction document stage. Table 2 summarizes this data and the proposed treatment for each of the at-grade intersections.

The proposed systems approach in this report is based on established standards, published technical reports, and the experiences on existing

facilities. Generally speaking, there are four types of improvements to consider for trail/roadway intersections:

Basic Crossing Prototypes

- Unsignalized mid-block crossings of residential, collector, and sometimes major arterial streets.
- Routed to Existing Intersection - Bikeways which emerge near existing intersections may be routed to these locations.
- Signalized/Controlled – Bikeway crossings which require installation of traffic signals or other control measures due to traffic volumes, speeds, and trail usage.
- Grade separated – Bridges or underpasses which provide the maximum level of safety but also generally are the most expensive and have right of way, maintenance, and other public safety considerations.

Most of the 35 crossings fall into one of the first two categories. Typical treatments included at unsignalized mid-block crossings are a striped crosswalk with advance warning signs on the road and stop signs on the trail. It is important that these crossings be installed where motorists have sufficient stopping sight distance. Many of the crossings in Salem are appropriate for routing the trail to the adjacent intersection with Route 28. A crosswalk will need to be installed in locations where one does not presently exist. If the intersection is signalized, then changes in signal timing and phasing may be appropriate.

Three locations are recommended for consideration for flashing warning beacons over crosswalks. These are at the rail trail crossing of Windham Road in Windham, at the intersection of Sanborn Road and Route 28 in Londonderry, and at the 90 degree turn of Harvey Road in Manchester.

The most difficult trail/roadway intersections in the 23.6 mile corridor are the intersection of the rail trail and Queen City Avenue in Manchester and at Rockingham Park Boulevard in Salem. It is recommended that a traffic signal warrant analysis be conducted for Queen City Avenue in Manchester. The analysis should consider traffic operations at the two closest signalized intersections on Queen City Avenue at Willow Street and Elm Street. If warranted a pedestrian actuated traffic signal system should be installed at the trail/roadway intersection. If the signal is not warranted or if it is determined that signalization of the crossing would cause significant traffic congestion, then a grade-separated trail crossing should be constructed. This would most likely be a bicycle/pedestrian bridge over the roadway.

Based on comments and feedback from Salem officials, the introduction of a pedestrian phase to the Rockingham Boulevard intersection will likely result in a degradation of the overall operations at this location. The intersection is currently at or exceeding capacity, resulting in long delays and vehicle stacking. Here again an analysis is suggested to determine if the at grade intersection can accommodate a pedestrian phase, however, for this study, we have assumed a grade separated trail crossing. This would most likely be a bicycle/pedestrian bridge over the roadway.

Structures. Seventeen (17) major structures are located within the railroad corridor. They can be classified as follows:

a) Five (5) road bridges over the railroad
b) Two (2) cattle passes
c) Two (2) railroad bridges over dirt roads
d) Two (2) large culverts under roadways (installed after railroad operations ceased)
e) Six (6) railroad bridges over watercourses

Table 2 Rail Trail/Roadway Grade Crossings and On-road Segments (Manchester –- Lawrence Branch)

Road Name	Town or City	No. of Lanes	Estimated Road Width (ft)	Estimated Median Width (ft)	Estimated Travel Speeds (mph)	Average Daily Traffic	Proposed Treatment	Estimated Cost ($)
Hampshire Rd	Salem	2	28		35	2,900	Install stop signs on the trail and pedestrian crossing warning signs on the road.	1,500
Kelley Rd	Salem	4	60		30	5,200	Install stop signs on the trail and a crosswalk with warning signs at the Kelley Road/Duffy Road intersection.	1,500
Mall Drive (Best Buy)	Salem	4	60	6	25		Align trail to cross at Route 28. Modify existing signal system to provide pedestrian crossing equipment and no right turn on red on both SB Route 28 and Mall Driveway. Modify existing channel and median islands to accommodate crosswalks.	15,000
Hagop Rd	Salem	2	20		20		Install stop signs on the trail and a crosswalk with warning signs on the road.	1,500
Cluff Crossing (Dennys)	Salem	4	48	6	35	13,000	Align trail to cross at Route 28. Modify existing signal system to provide pedestrian crossing equipment. Modify existing median island to accommodate crosswalks.	15,000
Rockingham Park Blvd	Salem	9	112	6	25	34,000	Overpass of Rockingham Park Boulevard including ramp sections, if signal cannot accommodate pedestrian phase.	700,000
Main St	Salem	2	26		25	17,000	Install stop signs on the trail and a crosswalk with warning signs on the road.	1,500
Willow St	Salem	2	30		20	1,000	Install stop signs on the trail and a crosswalk with warning signs on the road.	1,500
Old Rockingham Rd	Salem	3	40	6	30		Align trail to cross at Route 28. Modify existing signal system to provide pedestrian crossing equipment. Modify existing median island to accommodate crosswalks.	15,000

Road Name	Town or City	No. of Lanes	Estimated Road Width (ft)	Estimated Median Width (ft)	Estimated Travel Speeds (mph)	Average Daily Traffic	Proposed Treatment	Estimated Cost ($)
Route 111 (Range Rd)	Salem	6	80	6	35	20,000	Align trail to cross at Route 28. Modify existing signal system to provide pedestrian crossing equipment and no right turn on red at SB Route 28 and Route 111. Modify existing channel and median islands to accommodate crosswalks.	15,000
Roulston Rd	Windham	2	24		30		Install stop signs on the trail and a crosswalk with warning signs on the road.	1,500
Depot Rd	Windham	2	24		30		Install stop signs on the trail and a crosswalk with warning signs on the road.	1,500
Frost Rd	Windham	2	24		30		Install stop signs on the trail and a crosswalk with warning signs on the road.	1,500
Windham Rd	Windham	2	30		40	4,700	Install stop signs on trail and crosswalk with warning signs on the road. Install new flashing warning beacon over crossing.	5,500
Kendall Pond Rd	Derry	2	24		40		Install stop signs on the trail and a crosswalk with warning signs on the road.	1,500
Hall Av	Derry	2	20		20		Install stop signs on the trail and a crosswalk with warning signs on the road.	1,500
Nutfield Court	Derry	2	20		20		Shared roadway and sidewalk.	
South Av	Derry	2	20		20		Install stop signs on the trail and a crosswalk with warning signs on the road.	1,500
West Broadway	Derry	2	40		30	20,000	Use existing crosswalk	
Manning St	Derry	2	24		25	1,500	Shared roadway and sidewalk.	
Rollins St	Derry	2	24		30	2,100	Use existing crosswalk	
North High St	Derry	2	24		35	2,500	Install stop signs on the trail and a crosswalk with warning signs on the road.	1,500
Rockingham Rd (Rt 28)	Londonderry	2	24		35	19,000	Install stop signs on the trail and a crosswalk with warning signs on the road.	1,500
Liberty Dr	Londonderry	2	24		30		Align trail to cross at Independence Drive. Install stop signs on the trail and a crosswalk with warning signs on the road.	1,500
Auburn Rd	Londonderry	2	24		30	7,300	Align trail to cross at Independence Drive. Install stop signs on the trail and a crosswalk with warning signs on the road.	1,500

Road Name	Town or City	No. of Lanes	Estimated Road Width (ft)	Estimated Median Width (ft)	Estimated Travel Speeds (mph)	Average Daily Traffic	Proposed Treatment	Estimated Cost ($)
Office Park Drive	Londonderry	2					Add a sidewalk within remaining rail ROW. Bicycles use road (shared roadway).	
Symmes Rd	Londonderry	2	24		35		Install stop signs on the trail and a crosswalk with warning signs on the road.	1,500
Unknown paved road	Londonderry	2					Install stop signs on the trail and a crosswalk with warning signs on the road.	1,500
Clark Rd	Londonderry	2	24		35	300	Install stop signs on the trail and a crosswalk with warning signs on the road.	1,500
Sanborn Rd	Londonderry	2	24		25		Install stop signs on the trail and a crosswalk with warning signs on the road.	1,500
Route 28	Londonderry	2	32		45	15,000	Align trail to cross at Sanborn Road intersection. Install a flashing beacon and conduct warrant analysis for a pedestrian-activated traffic signal.	5,500
Mammoth Rd	Londonderry	2	24		35	3,800	Install stop signs on the trail and a crosswalk with warning signs on the road.	1,500
Harvey Rd at Airport Runway (90 degree turn)	Londonderry	2	30		40	4,000	Install crosswalk with warning signs on the road.	1,500
Perimeter Rd	Manchester	2	32		40	7,400	Install stop signs on the trail and warning signs on the road.	1,500
Gold St	Manchester	2	24		30	4,000	Install stop signs on the trail and a crosswalk with warning signs on the road.	na
South Beech St	Manchester	2	24		30	10,000	Install stop signs on the trail and a crosswalk with warning signs on the road.	na
Queen City Av	Manchester	4	52		40	22,000	Overpass of road or at-grade signalized bicycle and pedestrian crossing	150,000
Depot St	Manchester	2			25		Install stop signs on the trail and warning signs on the road.	1,500
TOTAL								$955,500

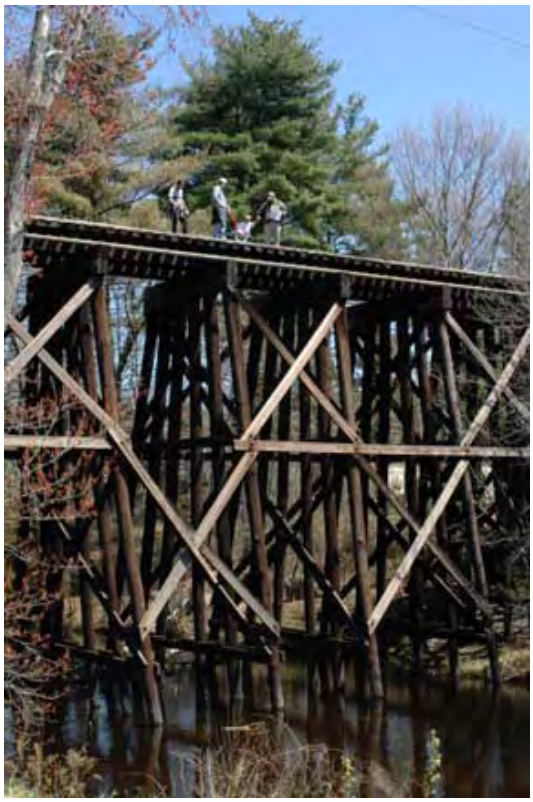
na = not applicable (included in existing City of Manchester project funded through CMAQ funding)

Most of these structures would not need to be modified for development of the rail trail. This includes categories a, b and c. For category d - large culverts, trail sections would be built up to the grade of the existing roads, where a crossing would be installed.

This leaves only category e – bridges over watercourses. Three of the six bridges are covered with significant amounts of fill so that the trail could be built in the same manner as on level terrain. The other three bridges would require building a deck for the trail on the existing deck of the railroad structure. This is a fairly straightforward and inexpensive undertaking. Two of the bridges are small (10 to 15 feet wide and 16 to 20 feet long). An example is shown below of the bridge over Shields Brook in Londonderry. The 70 foot long rail bridge over the Spicket River shown under Segment 1 has a ballast deck, which consists of stone on a concrete slab. The longest bridge, a 150-foot wood trestle over Great Cojas Brook in Manchester, will require redecking for the trail.

Table 3 lists the features of the major structures in Lawrence-Manchester Railroad Corridor along with the proposed treatment, and estimated construction cost, to rehabilitate the bridges for use as a shared bicycle/pedestrian path.

Rail bridge over Shields Brook in Londonderry.



Rail bridge over Great Cojas Brook in Manchester (Photo: John St. Hilaire)

Construction Cost. As stated in the previous section, the Manchester – Lawrence railroad corridor is an ideal location to develop a paved bicycle and pedestrian path. The corridor is relatively flat and is about 82 to 100 feet wide. The path could be developed with a paved surface for bicycling and wheelchairs and crushed-stone shoulders for walking and jogging. The path connects residential areas to commercial, industrial and institutional land uses and would serve commuting and other utilitarian travel needs. A path within this railroad corridor would be relatively straight and direct. It connects town centers in Salem, Derry and Manchester.

The order-of-magnitude construction cost for construction of the trail within the Manchester – Lawrence Railroad corridor is estimated to be $47.00 per linear foot based on the design illustrated in Figure 11 and NHDOT weighted average bid prices for the third quarter of 2002.

Table 3 Rail Structures (Manchester – Lawrence Branch)

				Structure				
Feature Name	**Town or City**	**Railroad Stationing**	**Photo No.**	**Type**	**Length (ft)**	**Width (ft)**	**Proposed Treatment**	**Estimated Cost ($)**
Bridge # 55 over Spicket River	Salem	1617+19	LH-01	Ballast Deck Pile Trestle	70	16	None	
Cattle pass	Salem	1619+00	none	Stone	8	40	None	
Cattle pass	Salem	1791+58	LH-02	Stone	16	20	None	
Bridge #983 over dirt road	Windham	1889+50	123-2322	Stone arch	60	50	None	
Bridge #989 over dirt road	Windham	1892+50	123-2321	Steel girder	40	20	None	
Bowers Rd	Derry	2138+50	123-2365	Unknown	33	100	new trail and GC	
Bridge #15 over Beaver Brook	Derry	2195+/-	123-2380	Stone arch	80	80	none	
Bridge #1625 over Hornes Pond	Derry	2229+/-	123-2395	Stone arch	10	60	none	
Madden Rd	Derry	2250+74	124-2401	Unknown	33	82	new trail and GC	
Franklin St Bridge over RR	Londonderry	2272+27	124-2408	Wood Trestle	40	45	none	
Bridge #1716 over Shields Brook	Londonderry	2276+63	124-2409	Iron Stringer	20	10	build trail deck	$18,000
I-93 Bridges over RR	Londonderry	2405+/-	124-2424	Steel	80	120	none	
Bridge #2170 over Little Cojas Brook	Londonderry	2516+50	none	Conc slab	16	10	build trail deck	$15,000
Bridge #2407 over Great Cojas Brook	Manchester	2647+08	cojasbrook01	Wood Trestle	150	15	build trail deck	$105,000
Goffs Falls Rd Bridge over RR	Manchester	2656+50	none	Unknown	65	105	none	
I-293 Bridges over RR	Manchester	2677+55	127-2735	Steel			none	
Elm St Bridge over RR	Manchester	2781+00	none	Steel/Conc.	280	60	none	
TOTAL								$138,000

GC = Grade crossing

RR = Railroad

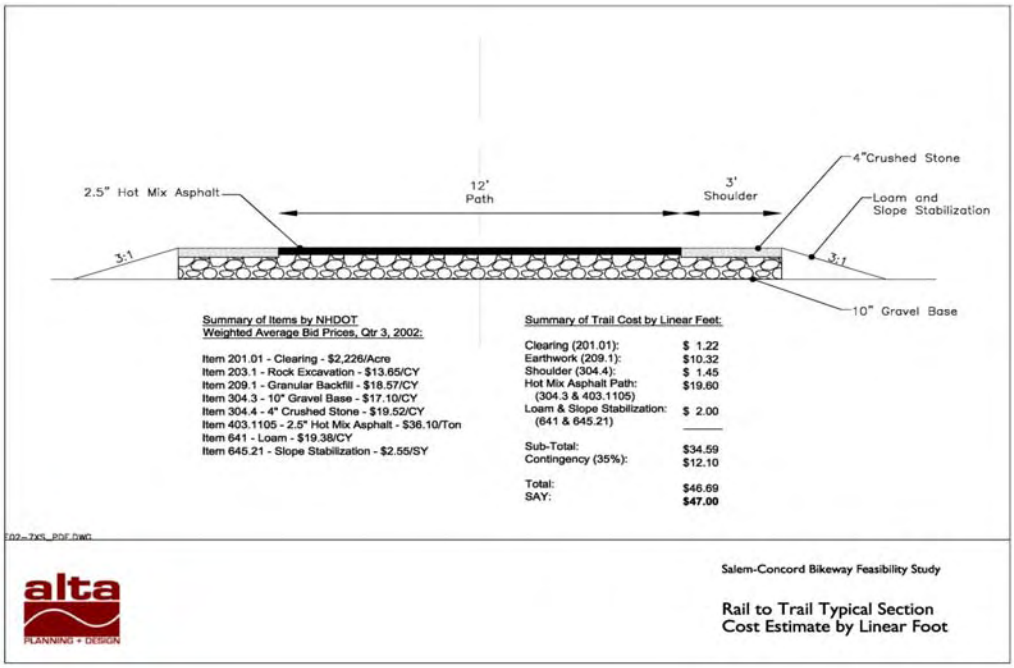


Figure 11 Rail to Trail Typical Section Cost Estimate by Linear Foot

The path in this corridor, commonly called a rail-to-trail, would also be relatively economical to construct. While there would be about 37 locations where the path would cross a roadway, most of these trail/roadway intersections would require only pavement markings and signing. A fully signalized intersection or structure would only be required at the trail's intersection with Queen City Avenue and Rockingham Park Boulevard. Of the 17 existing structures in the railroad corridor, few would need to be modified for the trail. Redecking of three railroad bridges over watercourses could be done at low cost.

Table 4 divides the rail-to-trail into 18 segments. Fifteen are within the former right-of-way of the Manchester and Lawrence Branch. One trail segment in Derry has already been constructed, and Manchester has received a grant to construct a path in another. This leaves 19.1 miles of rail-to-trail left to develop and another 0.4 mile path around the runway at Manchester Airport. The order-of-magnitude construction cost for the 19.5 miles of trail including intersections and structure improvements is estimated to be about $6.1 million as itemized in Table 4. This does not include the cost of right-of-way acquisition in Salem and Londonderry. The cost to either purchase the right-of-way or obtain a permanent easement would be in addition to the figure noted above.

Table 4 Trail Segments (Manchester – Lawrence Branch)

				Length		Estimated Costs ($)			
Seg. No.	**From Location to Location**	**Town or City**	**Owner**	**Feet**	**Miles**	**Trail**	**Intersections**	**Structures**	**TOTAL**
1	Hampshire Road to Kelley Road	Salem	Guilford and State**	5,778	1.1	271,566	1,500		273,066
2	Kelley Road to Rockingham Park Blvd	Salem	State	5,480	1.0	257,560	33,000		290,560
3	Rockingham Park Blvd to Main Street	Salem	State	5,200	1.0	244,400	700,000		944,400
4	Main Street to Route 111	Salem	State	9,748	1.8	458,156	18,000		476,156
5	Route 111 to Depot Road	Salem & Windham	State	21,552	4.1	1,012,944	16,500		1,029,444
6	Depot Road to Kendall Pond Road	Windham & Derry	State and Derry	12,400	2.3	582,800	8,500		591,300
7	Kendall Pond Road to West Broadway	Derry	Derry	4,300	0.8	na	4,500	na	4,500
8	West Broadway to North High Street	Derry	Derry	3,000	0.6	141,000	0		141,000
9	North High Street to Rockingham Road	Derry & Londonderry	Delaware Rock Inc.	5,600	1.1	263,200	1,500	$18,000	282,700
10	Rockingham Road to Auburn Road	Londonderry	State	8,700	1.6	408,900	3,000		411,900
11	Auburn Road to Route 28	Londonderry	State	8,545	1.6	401,615	7,500		409,115
12	Route 28 to Harvey Road	Londonderry	State	6,615	1.3	310,905	8,500	$15,000	334,405
13*	Harvey Road	Londonderry & Manchester		8,000	1.5				0
14*	Path around Airport Runway	Manchester		1,900	0.4	258,500			258,500
15*	Perimeter Road	Manchester		1,100	0.2				0
16	Perimeter Road to Goffs Falls Road	Manchester	Manchester	2,115	0.4	99,405	1,500	$105,000	205,905
17	Goffs Falls Road to South Beech Street	Manchester	Manchester	8,110	1.5	na	na	na	na
18	South Beech Street to Depot Street	Manchester	Manchester	6,240	1.2	293,280	151,500		444,780
TOTAL				124,383	23.6				
Subtotal Rail Trail***				102,873	19.5	$5,004,231	$955,500	$138,000	$6,097,731

* not in former railroad right of way
**Guilford owns corridor south of Spicket River.
***excluding Segment 7 (already built by Derry) and Segment 17 (City of Manchester project funded through CMAQ program); includes trail around airport runway.
CMAQ = Congestion Mitigation and Air Quality Improvement Program

4.3 Concord – Portsmouth Railroad Corridor

Much of the abandoned Concord – Portsmouth line between Hooksett and the Merrimack River in Concord was either walked or observed from nearby access points. This abandoned rail corridor passes through portions of Hooksett, Allenstown, Pembroke and Concord for a distance of 5.8 miles. All segments of the railroad have been abandoned and are either publicly or privately owned. The following section describes the corridor from south to north and is divided into four segments. Three tables are provided at the end of this section summarizing the analysis of the grade crossings, structures, and trail segments.

4.3.1 Description of Existing Corridor

1. Hooksett

This section begins in Hooksett on the east side of the Merrimack River at the Hooksett District Court located on Merrimack Street. The active B & M Railroad continues at this point on the west side of the Merrimack River and the old piers for the abandoned rail are still in place in the river. The abandoned rail corridor continues north in Hooksett for approximately one mile along the east bank of the river.

Current ownership of the abandoned corridor includes the Town of Hooksett at the southerly limit, the Hooksett Land Trust, and one private owner in the northerly end. There are no grade crossings, or intersections with existing streets along this section of the corridor and the only access point is Merrimack Street at the Court House. There are also no major structures required along this segment of the corridor

2. Allenstown

This section begins at the Hooksett townline and continues north through Allenstown for a distance of just over 0.6 miles. The corridor is located a good distance east of the river. The corridor is well defined and graded until it enters the Mill Building area of Suncook Village. For a short distance it is located within the right-of-way of Canal Street. North of Canal Street the abandoned railroad corridor crosses the Allenstown Canal. The granite abutments remain intact for this fifty foot crossing, but the bridge has been removed.

The Pembroke townline is located midway across the Suncook River and again the granite abutments remain intact for this 100-foot crossing, but the bridge has been removed. In Allenstown the right-of-way is currently privately owned by both Levi Ladd and Hodgson and Sons.

3. Pembroke

The corridor continues in Pembroke on the north side of the Suncook River where it crosses at grade with Bridge Street Extension. The corridor continues north parallel to the Merrimack River and passes near a few residential neighborhoods. The next crossing is located at White Sands Road. It then continues north to the Concord townline located at the midpoint of the Soucook River. The granite abutments remain for this fifty foot crossing, but the bridge has been removed**.**

Concord-Portsmouth Railroad Corridor in Pembroke – looking north

The abandoned railroad in Pembroke would provide a continuous trail of approximately 2.2 miles. Ownership of the railroad is a combination of public and private parties including the Town of Pembroke, PSNH, and several private owners.

4. Concord

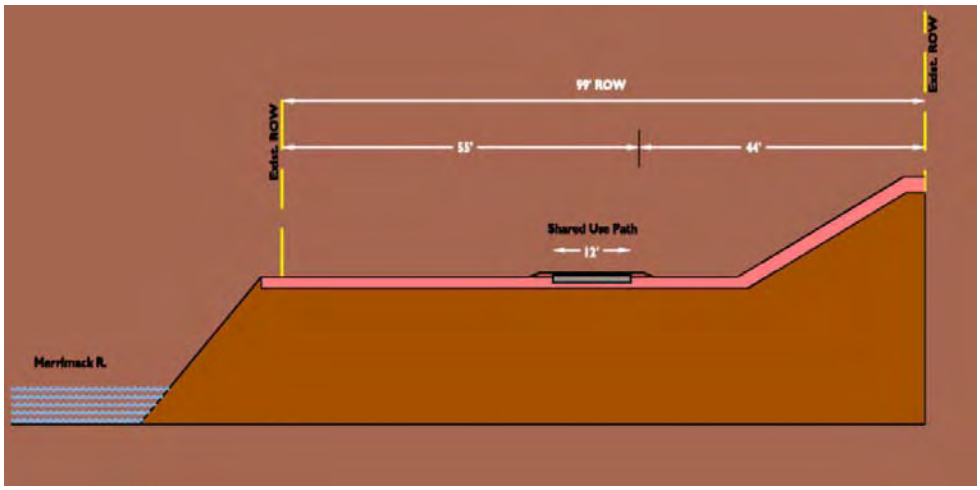
The abandoned railroad continues into Concord on the east side of the Merrimack River. A segment approximately 1.9 miles is situated between the Pembroke townline and the Merrimack River in South Concord. The railroad passes close to the westerly end of Garvins Falls Road in the segment but provides no other grade crossings. The Merrimack River Bridge has been removed but the abutments and piers for this 470 foot crossing remain.

4.3.2 Design

Similar to the Lawrence – Manchester corridor, this railroad corridor is also an ideal location to develop a paved bicycle and pedestrian path. The

corridor is relatively flat and has no ROW intrusions. That is, no major structures have been built within the ROW.

Typical Cross Sections. This option would require construction of a trail in the bed of the former railroad. Based on input from the advisory committee and public meetings, the trail would be 12 feet wide with a 2.5 inch thick bituminous concrete (asphalt) surface course. Three-foot wide shoulders would be provided on both sides of the path. The shoulders would have a 4-inch surface course of crushed stone. A 10-inch gravel base would be provided under the trail and shoulders. A typical cross section is shown below.



Proposed Typical Section - Concord-Portsmouth Railroad Corridor

At-Grade Crossings. This corridor has only five intersections with roadways. Crossings of the proposed trail within the former railroad ROW with roadways at the same elevation (at grade) require evaluation and design. The five roadways which the trail would cross are low speed, low volume two-lane roads. Section 4.2.2 describes the evaluation process and various design alternatives available for at-grade crossings. Table 5 summarizes the at grade crossings.

Structures. Four (4) major structures are located within the railroad corridor and are listed in Table 6. Each structure crosses a major waterway and would require construction of a new bridge deck. Only the piers exist for these structures.

Construction Cost. The order-of-magnitude construction cost for construction of the trail within the Concord - Portsmouth Railroad corridor is estimated to be $47.00 per linear foot based on the design illustrated in Figure 11 and NHDOT weighted average bid prices for the third quarter of 2002. The order-of-magnitude construction cost for the 5.8 miles of trail including intersections and structure improvements is estimated to be

about $2.8 million as itemized in Table 7. This figure does not include the cost of right-of-way acquisition or obtaining permanent easements over the many segments currently in private ownership.

Table 5 Rail Trail/Roadway Grade Crossings and On-road Segments (Concord – Portsmouth Branch)

Road Name	Town or City	No. of Lanes	Estimated Road Width (ft)	Estimated Median Width (ft)	Estimated Travel Speeds (mph)	Average Daily Traffic	Proposed Treatment	Estimated Cost ($)
Merrimack Street	Hooksett	2	24	N/A	30	-	Install stop signs on the trail and pedestrian crossing warning signs on the road.	**1,500**
Canal Street	Allenstown	2	24	N/A	30	-	Install stop signs on the trail and a crosswalk with warning signs at the	**1,500**
Bridge Street Ext.	Pembroke	2	24	N/A	30	-	Install stop signs on the trail and a crosswalk with warning signs at the	**1,500**
White Sands Road	Pembroke	2	24	N/A	30	-	Install stop signs on the trail and a crosswalk with warning signs at the	**1,500**
Garvins Falls Road	Concord	2	24	N/A	30	-	Install stop signs on the trail and a crosswalk with warning signs at the	**1,500**
TOTAL								**7,500**

Table 6 Rail Structures (Concord – Portsmouth Branch)

				Structure				
Feature Name	**Town or City**	**Railroad Stationing**	**Photo No.**	**Type**	**Length (ft)**	**Width (ft)**	**Proposed Treatment**	**Estimated Cost ($)**
Bridge over Allentown Canal	Allenstown	115+00		Stone Piers Remaining	50	12	New Deck / railings	100,000
Bridge over Suncook River	Allenstown/ Pembroke town line	118+15		Stone Piers Remaining	95	12	New Deck / railings	200,000
Bridge over Soucook River	Pembroke/ Concord town line	270+64		Stone Piers Remaining	50	12	New Deck / railings	100,000
Bridge over Merrimack River	Concord			Stone Piers remaining	470	12	New Deck / railings	900,000
TOTAL								1,300,000

Table 7 Trail Segments (Concord – Portsmouth Branch)

				Length		Estimated Costs ($)			
Seg. No.	**From Location to Location**	**Town or City**	**Owner**	**Feet**	**Miles**	**Trail**	**Intersect-ions**	**Structures**	**TOTAL**
1	Merrimack Street to Allenstown	Hooksett	Town of Hooksett and Private	5,453	1.0	$257,000	$2,000	0	$259,000
2	Allenstown town line to Pembroke town line	Allenstown	Levi Ladd and Hodgson and Sons	3,375	0.6	$159,000	$2,000	$300,000	$461,000
3	Pembroke town line to Concord town line	Pembroke	Town of Pembroke and private	11,879	2.3	$558,000	$3,000	$100,000	$661,000
4	Concord town line to Merrimack River	Concord	Private	9,936	1.9	$467,000	$2,000	$900,000	$1,369,000
TOTAL					5.8				$2,750,000

4.4 New Hampshire Heritage Trail Segments

The New Hampshire Heritage Trail is a proposed 230 mile trail traversing the length of the state from Massachusetts to Canada. It would connect diverse landscapes and communities. A preliminary corridor has been chosen running north from Massachusetts along the Merrimack River to Franklin where it joins the Pemigewasset River and goes through Franconia Notch to Lancaster, then follows the Connecticut River to Canada. Hiking is envisioned throughout the trail with other uses including bicycling at the option of each community. Communities design, build and maintain local Heritage Trail segments. Overall trail development is guided by the statewide Heritage Trail Advisory Committee in cooperation with the NH Department of Resources and Economic Development.[2]

4.4.1 Manchester

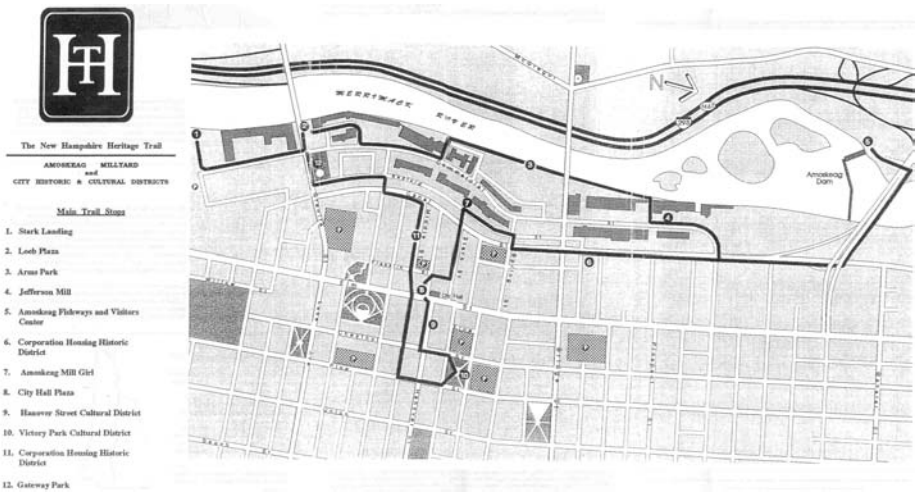


Figure 12 Heritage Trail, Downtown Manchester

Figure 12 shows the Heritage Trail section in downtown Manchester. Portions of the Heritage Trail along the river between the Granite Street and Amoskeag bridges may be appropriate for pedestrians connecting to a trail within the Manchester – Lawrence rail corridor. Cyclists coming from the rail trail are more likely to use Canal Street or a similar roadway to travel through downtown to points north.

The City of Manchester plans to continue the Heritage Trail north of the Amoskeag Bridge to Hooksett. The only area north of the Amoskeag

[2] "The New Hampshire Heritage Trail and your community," brochure produced by NH Heritage Trail Advisory Committee (undated).

Bridge owned by the City is at Stark Park. The State of New Hampshire Health and Human Services Department has a memorandum of understanding with the City for trail use at the Youth Development Center. Further north, the City has a license agreement with Derryfield School and an encroachment agreement with NHDOT for property under Interstate 93. The City does not have any agreements for portions of the trail between the Amoskeag Bridge and Stark Park.[3]

4.4.2. Hooksett

The Hooksett portion of the Heritage Trail is currently being developed by the Hooksett Heritage Trail Committee. A preliminary route has been identified (see Figure 13) and the committee, with assistance from the town, is in the process of acquiring property easements along the proposed route. The following describes the current route of the Hooksett Heritage Trail and possible connections to the on-road segments of the proposed bikeway in Manchester and to the southerly endpoint of the Concord-Portsmouth Railroad.

The proposed rail-trail option would join the Hooksett Heritage Trail at the bend on Depot Road, located approximately 700 feet north of the Manchester/Hooksett town line. The trail leaves Depot Road and continues through undeveloped land for a distance of 3 miles where is intersects Dale Road. The trail travels along Dale Road (0.7 miles) to the northerly endpoint of Dale Road and then turns west towards the active rail corridor along undeveloped land. The trail follows the easterly layout line of the rail corridor for approximately one half mile where it crosses the Merrimack River on the Lilac Bridge. At this point the Heritage Trail provides an option of remaining on the east side of the river and proceeding onto Merrimack Street.

It is suggested that the Merrimack Street option be utilized in order to provide access the to the southerly end point of the Concord-Portsmouth Railroad corridor located approximately 0.8 miles north of the Merrimack Street/Main Street intersection.

[3] E-mail from Ronald Johnson, Manchester Department of Parks, Recreation and Cemeteries, February 24, 2003.

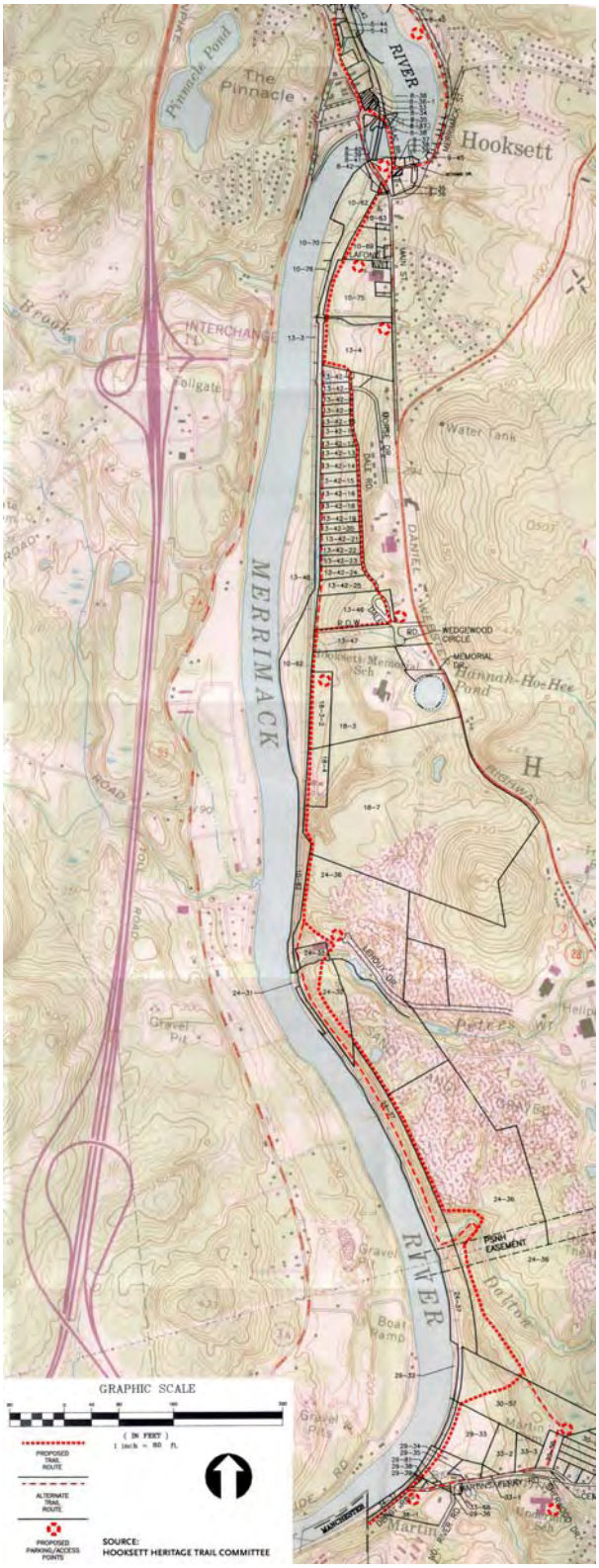


Figure 13 Heritage Trail, Hooksett

RIZZO ASSOCIATES
A TETRA TECH COMPANY

4.5 Continuous On-Road Option between Salem and Concord

The development of a continuous on road connection for bicyclists and pedestrians between Salem and Concord began with study of The New Hampshire Regional Bicycle Maps – Merrimack Valley Region South and Merrimack Valley Region North. These maps, prepared in 2002 by the NHDOT, the Bicycle and Pedestrian Transportation Advisory Board, Regional Planning Commissions and experienced cyclists, depict a network of roadways designated as statewide or regional bike routes. The most direct route between Salem and Concord was identified and presented to the Citizens Advisory Committee and to residents of the study area at the two public information meetings. Based on comments received from committee members and residents, the route was modified slightly and then evaluated by Rizzo Associates, Inc. staff.

The route was evaluated for 1) safety, and specifically, conformance to the *Guide for the Development of Bicycle Facilities (*American Association of State Highway and Transportation Officials (AASHTO),1999); 2) convenience for cyclists; and 3) cost of constructing the improvements. Within the study area, a number of roadway segments were considered. Each roadway segment was evaluated with respect to:

- road width
- road cross section (lane arrangement, median, etc)
- posted and observed travel speeds
- grade
- traffic volumes
- travel speeds
- points of conflict (intersections, major driveways, etc.)
- directness

The evaluation consisted of field investigation and collection of available traffic data. The field investigation consisted of measuring pavement/travel lane widths, noting sidewalks, curbing, on-street parking and highlighting pinch points (i.e. an area on a roadway where there is an abrupt change in the roadway's cross section). Table 8 provides a summary of roadway characteristics for the segments which form the on-road option.

The following section briefly describes the on-road option from south to north. The route is approximately 36 miles long, encompasses 18 roadway links and travels through eight communities. In Derry, an approximately 2.5 mile section of this option will utilize the abandoned Manchester-

Table 8 On Road Option Summary of Roadway Segment by Town

Town	Road	Link	Length		Cross Section	Sidewalk	Curb	On-Street Parking	Posted Speed	Observed Speed	Grade	Ave. Daily Traffic (2003)	Land Use
TOWN OF SALEM													
Salem	Route 38	I-93 Overpass to S. Policy Road approach	0.2	Miles	40' wide with 6' shoulders	No	No	No	30 mph	40 to 45 mph	flat	11,000	residential
Salem	Route 38	Through Route 38/S. Policy Road intersection	0.1	Miles	varies - as wide as 70' with 2' shoulders	No	No	No		0 to 40 mph	flat	11,000	commercial
Salem	Route 38	End of S. Policy Road intersection to Enterprise Drive	0.1	Miles	varies - as wide as 50' with no shoulders visible	No	No	No	30 mph	40 mph	flat	11,000	commercial
Salem	Route 38	Enterprise Drive to Mall Road	0.2	Miles	28' wide with 2' shoulders visible	No	No	No		35 to 40 mph	flat	11,000	commercial
Salem	Pleasant Street	Mall Road to back entrance to Rockingham Park	0.5	Miles	28' wide with 2' shoulders visible	No	No	No		35 to 40 mph	flat	5,000	residential
Salem	Pleasant Street	Back Entrance to Rockingham Park to Main Street	0.4	Miles	25' wide with 2' to 3' shoulders	Yes - on one side (switches)	Yes at side-walks	No		30 mph	flat	5,000	residential
Salem	Main Street	Pleasant Street to N. Policy Road	0.4	Miles	32' wide with 3' to 4' shoulders	Yes - on both sides (5' to 7')	Yes	No	30 mph	35 to 40 mph	moderate	16,000	residential and commercial
Salem	N. Policy Road	Main Street to Windham Town line	1.8	Miles	24' wide with 1' shoulders	Yes - on both sides (5')	Yes at side-walk	No	30 mph	35 to 40 mph	moderate	8,000	residential and amusement park
TOTAL LENGTH OF ROADWAY IN SALEM			3.7	miles									
TOWN OF WINDHAM													
Windham	N. Policy Road	Salem Town line to Route 111	0.1	Miles	24' wide with 1' shoulders	Yes - on both sides (5')	Yes	No	30 mph	35 to 40 mph	moderate	8,000	residential
Windham	Route 111	N. Policy Road to turn at Route 111A	0.9	Miles	26' wide with 1' to 2' shoulders visible	No	No	No	35 mph	35 to 40 mph	moderate	18,000	residential
Windham	Route 111	Route 111A to I-93 NB Bridge	0.3	Miles	varies - as wide as 45' with 3' to 5' shoulders	No	No	No	40 mph	40 to 45 mph	flat	23,000	open

Town	Road	Link	Length		Cross Section	Sidewalk	Curb	On-Street Parking	Posted Speed	Observed Speed	Grade	Ave. Daily Traffic (2003)	Land Use
Windham	Route 111	I-93 NB Bridge to beginning of Commons Area	1.3	Miles	42' with 5' to 7' shoulders	No	No	No	40 mph	40 to 45 mph	moderate	23,000	retail
Windham	Route 111	Beginning of Commons Area to Church Street	0.3	Miles	varies - as wide as 58' with no shoulders	No	No	No	40 mph	40 to 45 mph	moderate	23,000	retail
Windham	Route 111	Church Street to N. Lowell Street	0.2	Miles	44' wide with 6' shoulders	No	No	No		40 mph	moderate	23,000	residential
Windham	N. Lowell Street	Route 111 to junction with rail line	2.8	Miles	25' wide with 1' to 2' shoulders	No	No	No	35 mph	35 to 40 mph	moderate	5,000	wooded/ residential
TOTAL LENGTH OF ROADWAY IN WINDHAM			**5.9**	**miles**									
TOWN OF DERRY													
Derry	Rollins Street	Begin at RR and Hood Park to Maple Street	0.1	Miles	24' wide travel way with 0'-2' shoulders	no	No	No	30 mph	30 mph	moderate	2,100	mix-urban
Derry	Maple Street	Rollins Street to Ash Street	0.1	Miles	22'-24' wide with no shoulders	no	No	No	30 mph	30 mph	steep	2,000	mix-urban
Derry	Ash Street	Maple Street to Town Line (includes Ash Street Ext)	0.8	Miles	24' wide travel way with 0-2' shoulders	no	No	No	35 mph	35 to 40 mph	moderate	6,700	residential
TOTAL LENGTH OF ROADWAY IN DERRY			**1.0**	**miles**									
TOWN OF LONDONDERRY													
Londonderry	Ash St	Londonderry/Derry town line to Pillsbury Street	1.3	Miles	22'-24' wide with 0' shoulders	No	No	No	35 mph	30 to 45 mph	moderate	6,100	commercial and residential
Londonderry	Pillsbury St	Ash Street to Route 128	1.4	Miles	22'-24' wide with 0' shoulders	No	No	No		30 to 45 mph	steep	6,000	commercial and residential
Londonderry	Route 128	Pillsbury Street to Route 28	3.2	Miles	varies - as wide as 28' with 0' to 10' shoulders	No	No	No	25 mph - 50 mph	20 to 60 mph	steep	11,000	commercial

Town	Road	Link	Length		Cross Section	Sidewalk	Curb	On-Street Parking	Posted Speed	Observed Speed	Grade	Ave. Daily Traffic (2003)	Land Use
London-derry	Mammoth Rd	Route 28 to Manchester/Londonderry town line	1.5	Miles	varies - as wide as 60' with 0' to 4' shoulders	No	No	No	40 mph	40 to 50 mph	flat	15,100	commercial
TOTAL LENGTH OF ROADWAY IN LONDONDERRY			**7.4**	**Miles**									
					CITY OF MANCHESTER								
Manchester	Mammoth Rd	Town Line to I-293	1.7	Miles	varies - wide travel way with 2' shoulders	No	No	No	35 mph	35 to 40 mph	moderate	10,000	residential
Manchester	Mammoth Rd	I-293 to Huse Road	0.8	Miles	24' travel way with 0-2' shoulders	Yes	Yes	No	35 mph	35 mph	moderate	11,000	residential/ urban
Manchester	Mammoth Rd	Huse Road to Bridge Street	1.7	Miles	Variable width, turn lanes, 0-2' shoulder, traffic signals	Yes	Yes	No	30 mph	30 to 35 mph	moderate	17,000	urban/mix
Manchester	Mammoth Rd	Bridge Street to town line	1.6	Miles	Variable width, wide travel way, 0-8' shoulder	Yes	Yes	No	30 mph	35 to 40 mph	moderate/ steep	13,000	residential
TOTAL LENGTH OF ROADWAY IN MANCHESTER			**5.8**	**Miles**									
TOWN OF HOOKSETT													
Hooksett	Route 28A/ Route 28	Hooksett/Manchester town line to Main Street	4.3	Miles	varies - as wide as 60' with 0' to 5' shoulders	Only near the Man-chester line	Yes -at side-walks	No	35 mph - 45 mph near Man-chester line	30 to 60 mph	moderate	6,000 to 32,000	commercial
Hooksett	Main Street	Route 28 to Pine Street	0.8	Miles	25' wide with 0' to 2' shoulders	Yes - on bridge over the river	Yes	No	30 mph - 20 mph at school	30 mph	moderate	6,300	residential
Hooksett	Pine Street	Main Street to town line	0.9	Miles	25' wide with 0' to 2' shoulders	No	No	No	30 mph	30 mph	moderate	2,200	residential
TOTAL LENGTH OF ROADWAY IN HOOKSETT			**6.0**	**Miles**									

Town		Road	Link	Length	Cross Section	Sidewalk	Curb	On-Street Parking	Posted Speed	Observed Speed	Grade	Ave. Daily Traffic (2003)	Land Use
TOWN OF BOW													
Bow	Bow Bog Rd	Bow/Hooksett town line to Bow Center Road	3.4	Miles	27' wide with 0' to 3' shoulders	No	No	No	30 mph	35 to 40 mph	moderate	2,200	residential
Bow	Bow Center Rd	Bow Bog Road to Logging Hill Road	1.8	Miles	30' wide with 2' to 8' shoulders	No	No	No	35 mph - 25 mph at school	35 to 45 mph	moderate		residential
Bow	Logging Hill Rd	Bow Center Road to I89	1.3	Miles	30' wide with 2' to 4' shoulders	No	No	Yes	35 mph	45 mph	steep	7,300	residential
Bow	South St	I-89 to Bow/Concord town line	0.2	Miles	20'-22' wide with 1' shoulders	No	No	No	30 mph	0 to 40 mph	moderate	8,100	commercial
TOTAL LENGTH OF ROADWAY IN BOW			**6.7**	**miles**									
CITY OF CONCORD													
Concord	South St	Bow/Concord town line to Iron Works Road	0.9	Miles	24' wide with 1' to 2' shoulders	Yes - east side only	Yes - at side-walks	No	30 mph	40 mph	flat	4,700	residential
TOTAL LENGTH OF ROADWAY IN CONCORD			**0.9**	**miles**									
TOTAL LENGTH OF ON-ROAD OPTION			**35.8**	**miles**									

Lawrence railroad corridor. This option is segmented by community. Following the description of the on-road option is a discussion of the feasibility of modifying the existing roadways to accommodate bicyclists and pedestrians.

4.5.1 Description of Existing Roadways

1. Salem

The on-road option begins on Route 38 at the I-93 overpass southwest of The Mall at Rockingham Park and continues for 3.7 miles through Salem. Through Salem, the route includes Route 38, Pleasant Street, Main Street and North Policy Road. Travel speeds on each of these roads were observed at between 30 and 45 mph, although posted speed limits were generally 30 mph. None of the roads had on-street parking and only the northerly section of Pleasant Street, Main Street and North Policy Road included sidewalks. Major intersections include Route 38/South Policy Road, Pleasant Street/Main Street and Main Street/North Policy Road. Each of these intersections is under traffic signal control. It was noted at the first Citizen's Advisory Committee meeting that North Policy Road is narrow with limited shoulders and right of way and carries a high percentage of truck traffic. The road also experiences a significant increase in traffic volumes when Canobie Lake Park is open in the summer. A photo of North Policy Road is provided below.

Looking north on North Policy Street

2. Windham

The on-road option continues in Windham along North Policy Road, Route 111 and North Lowell Street. Route 111, between Route 111A and North Lowell Street, is a high speed arterial roadway carrying approximately 23,000 vehicles per day. However, wide shoulders are

generally provided on both sides of the street and could be used for bicycle lanes. Major signalized intersections are located at Route 111A/Route 111 and Route 111/Commons Shopping Center Driveway. Approximately half of the on-road route in Windham follows North Lowell Street. North Lowell Street travels through farm lands, wooded areas and residential areas. It carries approximately 8,000 vehicles per day and provides two travel lanes and narrow shoulders. North Lowell Street intersects the Manchester and Lawrence railroad corridor at approximately the Windham/Derry townline. Photos of Route 111 and North Lowell Street are provided below.

Route 111 looking north, between I93 and The Commons

North Lowell Street looking north, south of the Windham/Derry townline

As a viable on-road option was not identified by the Citizens Advisory Committee for the southern area of Derry, it was suggested that the on-road option include an off road section along the Manchester Lawrence railroad corridor. Thus, the route continues north on the railroad corridor beginning at the Windham/Derry townline, traveling off-road through Derry until Rollins Street

3. Derry

The on-road option travels for approximately 1 mile in Derry along Rollins, Maple and Ash Streets. These roads generally carry low traffic volumes; have 24 foot wide sections and narrow (one to two foot) or no shoulders. Although the route follows Maple Street for only 0.1 miles, the grade is steep on this roadway. In addition, the intersection of Maple Street and Ash Street is at a skewed angle, involves steep approach grades and has poor sight distance.

4. Londonderry

The longest segment (7.4 miles) of the on-road option is located in Londonderry. The route enters Londonderry on Ash Street, crosses over I-93 onto Pillsbury Road where it continues until Route 128. The route then proceeds on Route 128/Route 28 to the Londonderry/Manchester town line.

Both Ash Street and Pillsbury Road are two lane roads with no shoulders and have moderate to steep grades (as seen in the photos below).

Ash Street looking east

Pillsbury Road looking west

In Londonderry, both Route 128 and Route 28 have varying cross-sections, generally travel through heavy commercial areas and carry between 10,000 to 15,000 vehicles per day. Travel speeds range between 25 and 60 mph. At the Londonderry/Manchester townline the route continues onto Route 28A (South Mammoth Road).

Route 128 looking south

5. Manchester

The on-road option travels entirely through Manchester on Mammoth Road for a distance of 5.8 miles. Traffic volumes range from 10,000 to 17,000 vehicles per day and the posted speed limit is 30-35 mph. Mammoth Road has been broken down to four segments in Manchester due to varying land use, cross section, and character of the roadway.

The first section begins at the town line and continues north for 1.7 miles to Interstate 293. The roadway passes through residential neighborhoods and provides a wide travel way with 2' shoulders and sidewalks on both sides. The second segment continues from I-293 and runs 0.8 miles north to Huse Road. This segment is more densely developed with a mix of residential and commercial uses. The cross section remains the same as the first section, but there is a higher number of driveways along this section. The third section includes Mammoth Road between Huse Road and Bridge Street and covers 1.7 miles. This section passes through a densely developed urban area. There are numerous driveways and three major signalized intersections with additional turn lanes. The 2'shoulders and sidewalks continue through this heavily traveled section. The final sect ion continues north to the Hooksett town line and covers 1.6 miles. This section is less densely developed and passes through primarily residential areas. It provides a wide travel way with variable width shoulders up to 8' wide; however the observed speeds were above the posted 35 mph limit.

Mammoth Road between I-293 and Huse Road

Mammoth Road between Huse Road and Bridge Street

Mammoth Road between Bridge Street and the Hooksett town line

6. Hooksett

Through Hooksett, the on-road option travels along Route 28A (Mammoth Road), Martins Ferry Road, Route 28 Bypass, Route 28, Main Street and Pine Street. The southerly portion of Route

28A/Route 28 travels through heavily commercialized areas characterized by numerous traffic signals and intersections. The road widens to as much as 60 feet in some areas and carries a high volume of traffic. The northerly segment of Route 28 carries approximately 32,000 vehicles per day and travels through a mix of commercial and residential areas.

Route 28 looking north at Walmart Driveway

On Main Street the route passes through predominately residential areas, past the Village School and crosses the Merrimack River. The Merrimack River bridge includes wide shoulders and a sidewalk as shown in the photo below.

Main Street Bridge in Hooksett

Pine Street is a local roadway characterized by low traffic volumes and travel speeds.

7. Bow

Bow Bog Road, Bow Center Road, Logging Hill Road and South Street form the Bow segment of the on-road option. With the exception of South Street, these roads are typically 30 feet wide, have varying shoulder widths and moderate to steep grades. The Bow

Memorial Elementary School is located along this route on Bow Center Road.

Bow Bog Road looking south

Bow Center Road looking north at Bow Memorial School

Logging Hill Road looking north at I-89

Logging Hill Road continues as South Street north of I-89 and is a narrow roadway traveling through commercial development.

8. Concord

The on-road option enters Concord on South Street and ends at Iron Works Road, a distance of approximately 0.9 miles. South Street, in Concord is a residential roadway with a sidewalk on the east side of the road. The road has narrow shoulders and a fairly level grade. From South Street cyclists and pedestrians may choose from a variety of streets that bring them to downtown, the medical area on Pleasant Street, or the schools in the south end.

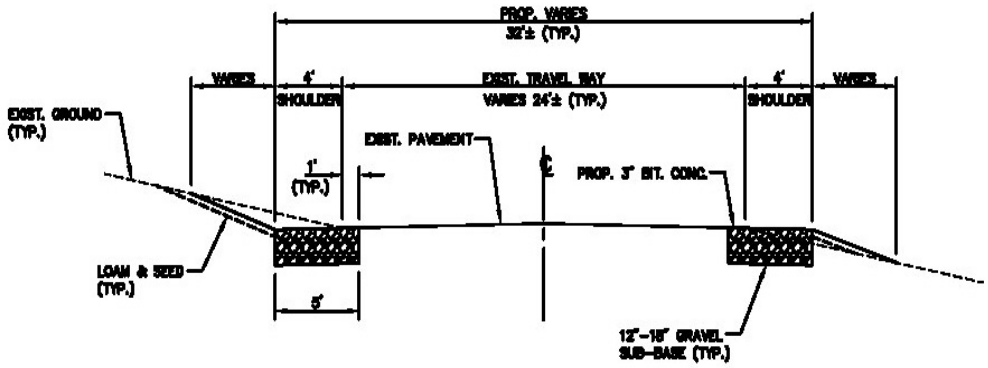
South Street looking north from Bow/Concord town line

4.5.2 On-Road Bicycle and Pedestrian Facility Design

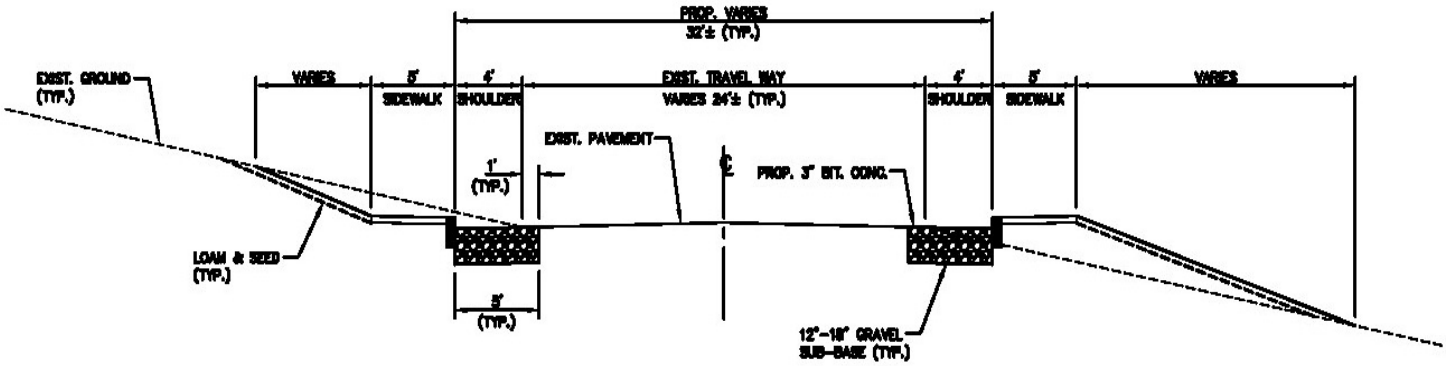
Proposed Typical Sections. In order for the on-road option to meet the criteria as stated in the Project Purpose and Need and specifically for the option to be desirable to a wide range of cyclists, improvements would be necessary for many of the roadway segments. A preferred shared roadway, that is one for use by automobiles and cyclists, would possess certain geometric dimensions. These include at a minimum travel lanes for automobiles of 11-12 feet and paved shoulders of 4 feet. Not all of the roadways necessarily need to provide these dimensions, but those carrying moderate to high traffic volumes and displaying higher travel speeds should be improved to meet the desired cross section to consider the on-road option a viable alternative. These would be considered the priority roadway segments and other links could be upgraded at a later time. The roadways requiring improvements could be upgraded to either include a 4-foot shoulder at a minimum or a 4-foot shoulder, curbing and sidewalks for pedestrians. Typical cross-sections for both options are shown in Figure 14.

Construction Costs. Construction would include box widening on both sides of the roadway to provide shoulders, granite curbing, bituminous sidewalks, incidental storm drainage, and slope treatments. These construction costs would range from $110 per linear foot for shoulder widening and pavement overlay to $200 per linear foot if

curbing and sidewalk were included. Table 9 summarizes by community the construction cost estimates for both cross-sections.



COLD PLANE & BOX WIDENING



COLD PLANE & BOX WIDENING
WITH CURB & SIDEWALK

Figure 14 Typical Roadway Sections

The cost per linear foot for roadway improvements ranges from $110 to $200. These are construction costs only and do not include engineering, permitting, and right-of-way costs. Widening of some of the roadway links to include shoulders and sidewalks will likely require right-of-way acquisition.

Table 9 Road Segments Requiring Improvements and Estimated Construction Costs

Roadway Segment	Length (Miles)	Option 1 – Shoulder Widening with Pavement Overlay		Option 2 – Shoulder Widening, Curbing, Sidewalks and Pavement Overlay	
		Cost per Linear Foot	Total Cost	Cost Per Linear Foot	Total Cost
Salem					
Pleasant Street	0.9	$110	$522,720	$200	$950,400
Main Street	0.4	$110	$232,320	$200	$422,400
North Policy Street	1.8	$110	$1,045,440	$200	$1.900,800
Subtotal - Salem	3.1	$110	$1,800,480	$200	$3,273,600
Windham					
North Policy Road	0.1	$110	$58,080	$200	$105,600
N. Lowell Street	2.8	$110	$1,626,240	$200	$2,956,800
Subtotal - Windham	2.9	$110	$1,684,320	$200	$3,062,400
Derry					
Ash Street	0.8	$110	$464,640	$200	$844,800
Subtotal – Derry	0.8	$110	$464,640	$200	$844,800
Londonderry					
Ash Street	1.3	$110	$755,040	$200	$1,372,800
Pillsbury Street	1.4	$110	$813,120	$200	$1,478,400
Subtotal - Londonderry	2.7	$110	$1,568,160	$200	$2,851,200
Hooksett					
Main Street	0.8	$110	$464,640	$200	$844,800
Pine Street	0.9	$110	$522,720	$200	$950,400
Subtotal – Hooksett	1.7	$110	$987,360	$200	$1,795,200
Bow					
Bow Bog Road	3.4	$110	$1,974,720	$200	$3,590,400
Subtotal - Bow	3.4	$110	$1,974,720	$200	$3,590,400
TOTAL	13.0		$8,479,680		$15,417,600

4.6 Other On-Road Links/Considered/Suggested

Through field observation and feedback from the Advisory Committee and the public at-large, several alternative roadway links were identified and considered. In addition, the off-road option on abandoned railroads required on-road links to provide a continuous route.

Bow. In Bow, it was suggested that Edgewater and River Road be considered in lieu of Bow Bog Road and Bow Center Road. Edgewater Road is signed as no-trespassing, and therefore Johnson Road was considered. The route would continue in to Bow as previously described and enter into Bow on Route 3A for a very short distance to Johnson Road. The option would continue north on Johnson Road for 0.7 miles. The roadway is 24' wide with little or no shoulders, very low traffic volumes and sparsely developed. Continuing onto River Road for a distance of 2.9 miles and join back onto Route 3A in the northerly end of Bow near Grappone Junction. River Road provides 24' of pavement with little or no shoulder on a relatively flat grade.

Manchester. In Manchester, an on-road option was considered beginning at the northerly end of the Manchester Lawrence Railroad. This on-road link includes Depot Street, Canal Street, and River Road. Depot Street provides wide travel lanes with no shoulder or sidewalks, and carries low traffic volumes. Canal Street parallels Elm Street and passes through the Mill District for a distance of 1.3 miles. It provides a four lane median divided cross section with sidewalk on the east side. It is posted at 30 mph, carries high volumes of traffic and passes through several signalized intersections. The on-road option continues on River Road for a distance of 3.0 miles to the Hooksett town line. The roadway passes through residential areas and is posted at 30 mph. The cross section includes wide travel lanes (28' +/-) with sidewalks on both sides.

Hooksett. This on-road option continues into Hooksett on North River Road. Continuing northerly for a distance of 0.5 miles, the roadway provides two 12' lanes with little or no shoulder and no sidewalks. It passes through residential neighborhoods and both the Derryfield High School and Southern NH University.

From North River Road, the option turns onto Depot Road and continues for 0.2 miles to the Hooksett Heritage Trail network. Depot Road is a narrow single lane roadway providing access to one business.

On the northern end of the Heritage trail in Hooksett, an on-road option or link is again required to connect to the abandoned railroad to the north. This option includes Merrimack Street from Main Street to the Hooksett Town Courthouse, a distance of 0.8 miles. Merrimack Street is

posted at 30 mph, provides two 12 travel lanes with no shoulder. The roadway is posted for no parking, however many homes are located close the edge of pavement and many driveways exist along this section.

Pembroke/Concord. The final alternate on-road link is in Pembroke and Concord. This link provides options to continue north from the abandoned rail corridor. White Sands Road intersects the abandoned railroad corridor at the White Sands Conservation Area in Pembroke. The on-road option would begin here and continue on White Sands Road for a very short distance (less than 0.1 miles) to Bow Lane. Bow Lane is residential neighborhood street approximately 20 feet wide. It is posted at 25 mph and carries very low volumes fro a distance of 0.7 miles. Bow Lane Road continues to Route 3. Route 3 provides two travel lanes with 8' shoulders and sidewalks along a portion of the road. Speeds were observed in excess of the posted 35 mph limit, and traffic volumes are relatively high. Route 3 continues into Concord, where users will have the ability to access the downtown and other points of interest on a variety of roadway links.

Another option to connect the abandoned rail in Concord to the roadway network occurs at Garvins Falls Road. Garvins Falls Road is a narrow, steep residential street that runs from the railroad and Merrimack River north to Route 3. Traffic volumes and travel speeds are very low on this roadway link.

5.0 Recommended Route

A series of options for a continuous bicycle facility from Salem to Concord were identified and analyzed in the previous chapter. The options fall within three broad categories:

1. Interstate 93 bicycle path
2. Other off-road options
3. On-road options

In addition to each stand alone option, combinations of the three were also evaluated. Each option provided a certain degree of advantages and disadvantages as noted by the CAC and the general public at the public meetings. The following provides a summary of the general advantages and disadvantages of the options.

I-93 Bike Path

Advantages:
– exclusive paved pathway
– connections to future park and ride lots
– maximum grade of 5 percent

Disadvantages:
– access/connections to neighborhoods
– difficult intersections at interchanges
- proximity to highway
- services only a portion of the corridor

Abandoned Railroad Corridors

Advantages:
– continuous facility from Salem to Concord
– appropriate for basic cyclists and pedestrians
– good access to neighborhoods, businesses and recreation
– flat grade of less than 2 percent

Disadvantages:
– large number of trail/roadway intersections
– private ownership, especially north of Manchester
– potential reactivation of rail service in the corridor

On-road

Advantages:
– direct route along corridor
– access to neighborhoods, business, schools, etc
– many links are low volume/low speed

– the network exists today

Disadvantages:
– only serves advanced cyclists
– major intersections and numerous points of conflict
– cost and impact of widening and sidewalk construction
– many segments are on steep grades

The CAC developed a range of evaluation criteria for each of the options or combination of options. The criteria included a measure of achievement of the stated project purpose, design and construction issues, costs, resource impacts, and compatibility with community plans.

In the technical analysis and public involvement process, combinations of the options were also considered. One combination alternative would use the two abandoned rail corridors and connect them with an on-road option in Manchester and portions of the proposed Heritage Trail in Hooksett. This combination option, called the "Rail Trail Alternative", is compared to the I-93 bicycle path alternative and a continuous on-road alternative on the evaluation matrix provided in Table 10 on the following page.

The analysis shows that the rail-trail option best meets all of the objectives stated in the project purpose. The on-road option meets some of the objectives, but fails to provide for a wide range of cyclists as it was only deemed an appropriate route for experienced cyclists. The I-93 route provided a route for a wide range of cyclists, but many expressed concern regarding it's proximity to the Interstate highway, and this option did not continue north of Londonderry.

The rail-trail option was also shown to require limited right-of-way to the south of Manchester, and relatively straight forward design. Right-of-way acquisition or easements must be obtained for the abandoned Concord – Portsmouth rail corridor. The rail trail option provided a pathway with flat grades making the option desirable to more cyclists. With a construction cost of nearly $9 million it was the lowest cost option for the entire Salem to Concord route. The on-road option could potentially have right-of-way issues depending upon the constraints to widening for shoulders and sidewalks. The estimated construction costs to upgrade approximately one third of the on-road links is $15.5 million. Right-of-way and impact mitigation would require additional funds. The I-93 option is similar to the rail-trail option in that design and row issues are minimal, however the construction costs for the 13 mile path are $8.4 million.

A topic of much debate centered on trail surface and maintenance costs. Discussions on trail surface will continue at the local level within each community. This study was completed under the premise that a paved trail might be a preference.

The evaluation of maintenance costs for the options does vary as it relates to community costs. The I-93 bike path, located within the I-93 ROW would be maintained by the State. On-road facilities and the rail-trail options would require local maintenance.

With regard to impacts to natural resources, safety, compatibility with community plans, and universal accessibility, the rail-trail again ranked higher than the two other options. The on-road option was not ranked as high because of the potential limited use to that of experienced cyclists. Although the I-93 option provides what could be the best connection between the proposed park and ride lots, it was not considered as compatible with community plans and was deemed a more utilitarian corridor.

Connections and access to and from neighborhoods, recreation, businesses, schools and other facilities such as the park and ride lots was determined to be an important factor and one that could have the greatest effect on the utilization of this facility. The rail-trail option, although within a dedicated right-of-way, is not located in secluded undeveloped areas. In fact, it passes through or adjacent to a wide range of developed areas including residential neighborhoods retail and commercial areas, recreation areas, and schools. The proposed park and ride lots along I-93 are located a short distance from the rail trail and can be readily accessed by on-road links. The proposed park and ride lot at Exit 5 in Londonderry is actually adjacent to the rail corridor.

Table 10 Alternatives Analysis – Evaluation Summary

	Alternatives		
	I-93 Bike Path	**On-road**	**Rail Trail [x,y]**
Purpose and Need			
Feasible alternative transportation corridor	yes	yes	yes
Travel within and between Salem and Manchester	yes	yes	yes
Travel within and between Manchester and Concord	no	yes	yes
Provide for work and non-work related trips	yes	no	yes
Wide range of cyclists and pedestrians	marginal	no	yes
Reduction of vehicle trips	yes	marginal	yes
Construction / Design			
Length (mi)	13.0	36.0	29.4
Right-of-Way issues	none	limited	substantial[c]
Design Issues	limited	substantial	none
Bridge Structures	none	none	limited
Construction Cost [a]	$8.4 million	$15.5 million	$8.9 million[d]
Grade	marginal	steep	flat
Resource Impacts / Community			
Wetlands	9.0 acres	minimal	minimal
Stream Crossings	-	none	existing
Access/connections to communities [b]	limited	yes	yes
Compatibility w/community plans	limited	limited	yes
Universal accessibility	limited	limited	yes
Maintenance requirements	limited	limited	limited
Recreation and utilitarian use	limited	limited	yes
Safety	yes	limited	yes

Rating System

Construction / Design Issues Ratings:	Alternative meets desirable standards
	Some construction to meet minimum standards
	Difficult construction to meet minimum standards
Purpose and Need Ratings:	Alternative supports the Purpose and Need statement
	Alternative does not support the Purpose and Need statement
	Alternative provides some benefit

[x] Includes on road option around airport and between two abandoned rail corridors
[a] Construction cost does not include Right-of-Way costs
[b] Includes access / connections to recreation, schools, businesses, park and ride lots, and neighborhoods
[c] Right-of-way issues are minimal south of Manchester, but are substantial in Hooksett, Allenstown, Pembroke and Concord.
[d] Cost does not include work associated with the development of the Heritage Trail in Hooksett.
[x] Salem to Manchester segment is 23.6 miles long of which 19.5 miles is new shared use path development
[y] Cost of 19.5 miles of new shared use path from Salem to Manchester including intersection and structure improvements is $6.1 million

Based on this evaluation, feedback from the CAC, and public comments received at four public information meetings, it is recommended that the Rail Trail Alternative, which includes on-road and Heritage Trail segments, be carried forward for further development. The recommended alternative, presented in Table 11 consists of six key segments.

Table 11 Summary of Recommended Route

Name	Facility Type	From	To
Manchester-Lawrence Railroad	Shared use path (rail to trail) and on-road segment around Manchester Airport	Hampshire Road, Salem	Depot Street, Manchester
Depot Street, Canal Street and River Road (Manchester)	Bicycle route (on road) and sidewalk	Concord Railroad crossing of Depot Street (Manchester)	Hooksett Town Line
Heritage Trail	Shared use path	Depot Road, Hooksett	Merrimack Street, Hooksett
Merrimack Street (Hooksett)	Bicycle route (on road)	Heritage Trail at proposed crossing of Merrimack River	Southerly end of Concord – Portsmouth Railroad
Concord – Portsmouth Railroad	Shared use path (rail to trail)	Merrimack Street, Hooksett	Westerly bank of Merrimack River
Hall Street	Bicycle route and sidewalk (on road)	Merrimack River, Concord	Downtown Concord

A design of a shared use path in the abandoned Manchester – Lawrence Branch railroad right of way was presented in Section 4.2 of this report. The path or rail trail is shown as a 12-foot wide path with 3-foot wide shoulders. The path is shown with a 2.5 inch thick bituminous concrete (asphalt) surface course while the shoulders are shown with a 4-inch thick surface course of crushed stone. A 10-inch gravel base is shown under the trail and shoulders. The order-of-magnitude construction cost estimates for this trail and other paths included in the Recommended Route are based on this design.

The actual path design would be developed during the development of plans, specifications and estimates (PS&E) if the recommendation is advanced to implementation. During the design phase, public hearings will be held. At that time the project proponents and the public can more fully discuss how the path is designed. One issue to be resolved during project development is whether the surface course of the path should be bituminous concrete or crushed stone. As stated earlier in the report, most members of the Citizens Advisory Committee expressed a preference for a paved path. At the public meetings, persons spoke in favor of a paved path, while others thought the path should be unpaved. In addition, an off-road facility such as the recommended route, will provide and allow snow mobile use during the winter months.

A paved path will better serve the design users as defined earlier in the report (bicyclists, wheelchair users and pedestrians, including walkers, runners, and people with baby strollers, etc.). This includes commuters and other utilitarian cyclists who ride touring or road bikes (i.e., bicycles with narrow tires). As the name implies, these bicycles are used by most touring cyclists who ride long distances, stay overnight and contribute to the tourism economy of the state. A crushed stone surface will more likely create a drag on the cycle, making it more difficult to cycle on the path. Commuters and other utilitarian cyclists generally prefer paved trail surfaces for ease of riding. During rainy weather, these cyclists are more likely to get dirty or muddy riding on an unpaved trail.

In their *Guide for the Development of Bicycle Facilities* published in 1999, the American Association of State Highway and Transportation Officials (AASHTO) discusses ways that an unpaved surface affects their design criteria for shared use paths. AASHTO recommends a maximum grade of 5 percent for paved paths. However they state: "grades steeper than 3 percent may not be practical for shared use paths with crushed stone or other unpaved surfaces for both handling and drainage reasons." AASHTO also states: "Since bicycles have a tendency to skid on unpaved surfaces, horizontal curvature design should take into account lower coefficients of friction." AASHTO recommends a lower design speed for unpaved paths.

Generally, unpaved paths will require substantially more maintenance since the crushed stone surface is subject to rutting and washouts resulting from rainstorms. The less stable surface is less comfortable for young bicyclists, persons in wheelchairs and those pushing baby strollers.

The shoulders of the shared use path, which are shown with a crushed stone surface in the example in Section 4.2, might be widened to 4 feet to better accommodate joggers and other non-motorized users who may prefer a giving trail surface.

6.0 Project Phasing

The recommended route for the Salem – Concord Bikeway makes use of two former railroad corridors:

1. The Manchester – Lawrence Branch from Salem to Manchester

2. The Concord – Portsmouth Railroad from Hooksett to Concord

Due to the length of the project and the lack of public ownership in some segments of the former railroad corridors, bikeway development would need to be phased. In the initial phases, the public would seek to acquire fee simple ownership or easements in those portions of the corridors not now owned by municipalities or the State of New Hampshire. Where there is public ownership, local government support and funding, then segments of the bikeway can proceed into design and construction.

A potential sequence for implementing the Salem – Concord Bikeway is as follows:

Short term

- *Salem* – The 160-acre Rockingham Race Track property is in the early stages of redevelopment which could include constructing portions of the rail trail. Sections along Route 28 may be constructed in advance of other rail-trail segments.

- *Manchester – Lawrence Corridor*– Investigate possibility of acquiring an easement or fee simple ownership for segment owned by Delaware Rock (Derry and Londonderry).

- *Manchester – Lawrence Corridor* – Acquire segment owned by Boston and Maine Railroad (Guilford) between Spicket River and state line in Salem.

- *Concord – Portsmouth Corridor* – Investigate the possibility of acquiring easements or fee simple ownership for segment between the Hooksett District Court and Concord including the Merrimack River crossing.

- *Hooksett Heritage Trail* – Acquire necessary easements for segment between North River Road and Merrimack Street.

Mid term

- *Manchester – Lawrence Corridor* – Design and construct rail-to-trail project between New Hampshire/Massachusetts State line and Depot Street in Manchester.

Long term

- *Hooksett Heritage Trail* – Design and construct Heritage Trail between North River Road and Merrimack Street

- *Concord – Portsmouth Corridor* – Design and construct rail-to-trail project between the Hooksett District Court and Concord including the Merrimack River crossing.

This feasibility study documents and confirms the feasibility of developing a suggested bicycle and pedestrian facility or route from Salem to Concord. Implementation of the route as described in this chapter requires community involvement and ownership. In order for the project to move beyond the feasibility study, it must be shown to be technically feasible, which has largely been demonstrated herein, environmentally sound, affordable, and supported locally. Communities will have to continue to discuss the project issues and make a series of difficult choices. The NH Department of Transportation will assist the communities interested in moving forward on this important project.