

I. INTRODUCTION

STUDY PURPOSE

The purpose of this study is to determine the engineering feasibility of developing the Eastern Trail. It was initiated at the request of the Eastern Trail Alliance and funded by the Maine Department of Transportation (MDOT) through the Federal Enhancements funds. The study seeks to:

1. Determine the best on-road and off-road routes for the development of the trail within the proposed corridor
2. Develop cost estimates for project funders and for public and private fundraising efforts.

BACKGROUND

The Eastern Trail is a proposed 55 mile trail that extends from Kittery to South Portland, Maine. It would include:

- a newly created multiple use trail for most of its length
- use of existing roadways to fill gaps in the off-road route network and
- make use of some existing trails.

From South Berwick to South Portland, the proposed trail corridor follows the alignment of the abandoned Eastern Railroad line, the first rail line in Maine in the early 1800's. As envisioned, it would provide numerous transportation and recreational benefits for residents of and visitors to southern Maine. The Eastern Trail corridor connects many town centers and is adjacent to several large employers including Pratt & Whitney, in North Berwick and Southern Maine Medical Center, in Biddeford. It is anticipated that it would be a significant 'draw' to the region for bicyclists and walkers that enjoy long distance trails. The Eastern Trail is one of three trails identified by the Maine Department of Transportation as a trail of 'statewide significance' in its 20-year plan.

EASTERN TRAIL ALLIANCE

Efforts to implement the trail are led by the Eastern Trail Alliance (ETA). The Alliance is a coalition of trails groups, municipalities, government and other agencies, non-profits and individuals that advocate for development of the trail. The Alliance has received support from each of the twelve municipalities through which it passes. The group raised the local match required for this engineering feasibility study.

For more information the ETA may be reached at:
Eastern Trail Alliance, P.O. Box 250, Saco, Maine 04072
Website: www.easterntail.org.



EAST COAST GREENWAY

The Eastern Trail will also be the southern Maine 'gateway' segment of the East Coast Greenway. The Greenway is a national trail system that is planned to extend for 2,600 miles from Key West, Florida to Calais, Maine. The goal is "to connect existing and planned trails that are locally owned and managed to form a continuous, safe, green route -- easily identified by the public through signage, maps, users guides, and common services" (East Coast Greenway Alliance website).

PURPOSE AND NEED STATEMENT

A purpose and need statement has been developed by the ETA to satisfy one requirement of the National Environmental Policy Act (NEPA). The statement articulates why the project is important, the benefits that will accrue from its implementation and provides context for the review of potential impacts.

The Mission of the Maine Department of Transportation is to create and maintain an efficient, environmentally sound transportation system, responsive to the diverse needs and values of the citizens of Maine. It is the MDOT's commitment to deliver both safe and efficient transportation and to protect and enhance Maine's cultural, economic, social and natural resources.

Statement of Purpose:

- Establish a four-season, non-motorized, multipurpose, transportation and recreation trail between Portsmouth, New Hampshire, and South Portland, Maine, serving as the southern Maine portion of the East Coast Greenway.
- Promote trail-associated economic development in York and Cumberland Counties by providing a trail to directly serve recreational, commercial, and social activities by residents of and visitors to the southern Maine region.

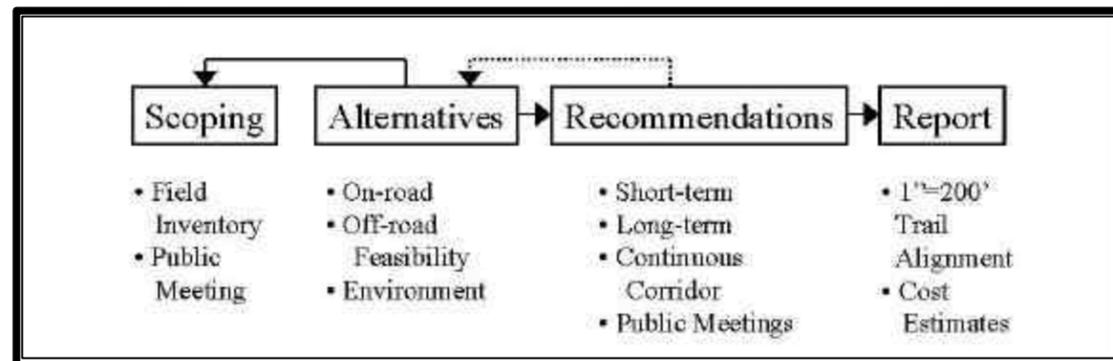
Statement of Need:

- Join the network of multi-use trails in the United States and Canada and provide the route for the East Coast Greenway in southern Maine. Incorporate the trail into the Maine Department of Transportation's vision of a continuous multi-modal route from Boston to Portland, Portland to the New Hampshire White Mountains, and north to trails and related routes in Brunswick and in the mid-coast and Downeast regions. Integrate this trail with existing local trail systems.
- Begin with a trail segment at least 50 miles long to make it worthwhile for people to come from substantial distances and stay in the area for several days to use it. Bring trail users into the centers of the towns along the trail so they can benefit from the availability of services and accommodations and so businesses can benefit from the visitors' patronage.

- ☞ Reopen an important piece of Maine transportation history, the first rail line into the state, using the trail to link rail history with the continued important role this resource will play in southern Maine. Utilize the former railroad and current utility corridor rights-of-way and other public lands and easements in such a way as to minimize the cost of the trail.
- ☞ Provide a multi-use trail connection among areas of historical and natural significance in southern Maine, including the beach areas and inland plains, and towns and cities both on and near the trail. Provide, where possible, an off-road transportation and recreation trail for access to areas of scenic beauty, as well as a quiet and safe transportation alternative for all ages and abilities. Form connections between towns as a thread to promote regional cooperation in tourism development plans. Provide direct connections and transportation loops to towns and special attractions using both on-road and off-road alternatives.
- ☞ Provide safe transportation corridors for all trail users through congested urban areas. Provide a safe, inviting facility to encourage regular healthy exercise for transportation or recreation.

PLANNING PROCESS

The planning process for the study consisted of three phases: Project Scoping, Alternatives and Recommendations. The Project Scoping phase included holding an initial Public Scoping Meeting in November 1999 to get input from the public on the concept of the trail, alternatives to assess and on specific issues to consider when performing the study. The field work also was conducted during this phase. Bridge/structural and environmental screening for the corridor were also performed.



The Alternatives phase assessed the on-road as well as the off-road trail alternatives. The on-road alternatives were evaluated for the current bicycle compatibility as well as the relative feasibility for upgrading the roadways, if needed. Off-road trail segments were categorized by their existing conditions and an improvement strategy was developed for each typical condition that currently exists.

For the Recommendations phase, interim and longer term recommendations for the on-road route and off-road trail segments were made. Order of magnitude cost estimates were also prepared for developing the trail. A series of five public meetings were held in March 2000 to provide an opportunity for the public to comment on the preliminary recommendations.

This report provides detailed descriptions in text, tables and photographs of the proposed conceptual location of the trail (on-road and off-road) as well as refined cost estimates.

CORRIDOR OVERVIEW

The Eastern Trail Corridor is a 55 mile corridor from the New Hampshire border/Route 1 in Kittery to Bug Light Park in South Portland. The corridor passes through twelve municipalities with varying types of terrain and conditions. The former rail bed is gentle in grade by design.

The old Eastern Railroad rail bed potentially makes a natural trail surface with improvement. The corridor was selected to form the “spine” of an essential trail network from South Berwick to South Portland. Where the corridor disappears or is unavailable, an on-road route will be used to fill the gaps.



As currently being planned, the trail will consist of both on-road and off-road trail segments. The off-road multiple-use trail will extend for up to 42 miles from the proposed Jewett trailhead in South Berwick to Bug Light Park. In South Portland, the trail makes use of the existing South Portland Greenbelt and connects to the Portland Trails network and the rest of the East Coast Greenway from Portland northward.

The first twelve miles of the trail, from Route 1 in Kittery to the Jewett trailhead in South Berwick, are planned to be a permanent on-road route. Other off-road routes were evaluated but no feasible alternatives were identified. From Jewett northward, a continuous on-road network has been identified to provide a designated trail for interim use until off-road trail segments are completed. As off-road trail segments are built, on-road trail sections will be replaced. These will also serve as maintenance routes if portions of the trail or gas pipeline require maintenance and the trail is not usable.

The corridor has been divided into 22 segments for planning and cost estimating purposes. These 22 segments have been developed based on the following criteria:

- ☞ Segments are wholly within a single municipality
- ☞ Segments are readily identifiable and locatable by physical endpoints, either roadways or rivers/streams.
- ☞ Segments are of a reasonable length to suggest potential implementable projects of a reasonable cost.

For most of the proposed off-road trail corridor a Granite State Gas Company gas pipeline is located within the corridor. This presents a trail feasibility opportunity as well as design and use constraints

to the trail. The opportunity exists due to the single right-of-way ownership for a large portion of the proposed trail corridor. Design and use constraints exist due to the existence of the high pressure gas pipeline. Design and construction of the trail will need to be done with detailed consideration of the pipeline's location and its operations and maintenance requirements. The exact location of the pipeline will need to be determined during design of the trail.

Eastern Trail: Segment Descriptions

Segment	From-To	Municipality	Miles	On/Off Road
1	NH State Line/Kittery to Kittery/Eliot Town Line (TL)	Kittery	2.3	On
2	Kittery/Eliot TL to Eliot/S. Berwick TL	Eliot	6.3	On
3	Eliot/S. Berwick TL to Jewett Trail Head	S. Berwick	3.9	On
4	Jewett Trail Head to Emerys Bridge Road	S. Berwick	2.3	Off
5	Emerys Bridge Road to S. Berwick/N. Berwick TL	S. Berwick	2.6	Off
6	S. Berwick/N. Berwick TL to N. Berwick/Wells TL	N. Berwick	3.2	On/Off
7	N. Berwick/Wells TL to Bald Hill Road	Wells	2.8	Off
8	Bald Hill Road to Chicks Crossing Road	Wells	2.9	Off
9	Chicks Crossing Road to Wells/Kennebunk TL	Wells	1.6	Off
10	Wells/Kennebunk TL to Rt 99	Kennebunk	2.1	Off
11	Rt 99 to Arundel/Kennebunk TL	Kennebunk	2.1	Off
12	Arundel/Kennebunk TL to Old Limerick Road	Arundel	0.8	Off
13	Old Limerick Road to Arundel/Biddeford TL	Arundel	2.6	Off
14	Arundel/Biddeford TL to Route 111	Biddeford	1.4	On/Off
15	Route 111 to Saco River	Biddeford	1.6	On/Off
16	Saco River to Route I-195	Saco	1.7	Off
17	Route I-195 to Saco/Old Orchard Beach TL	Saco	2.0	Off
18	Saco/Old Orchard Beach TL to Old Orchard Beach/ Scarborough TL	Old Orchard Beach	1.8	Off
19	Old Orchard Beach/ Scarborough TL to Black Point Road/Rt 207	Scarborough	3.4	Off
20	Black Point Road/Rt 207 to Scarborough/S. Portland TL	Scarborough	2.2	On/Off
21	Scarborough/S. Portland TL to Ball Fields	S. Portland	1.5	On
22	Ball Fields to Bug Light Park	S. Portland	4.3	Off

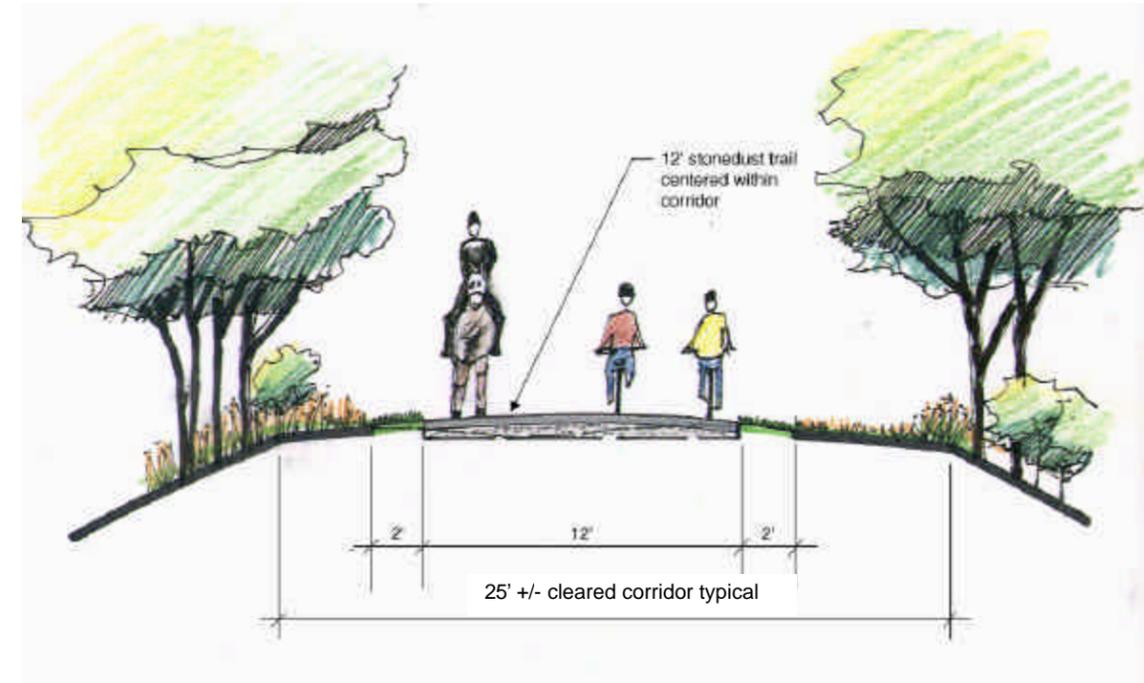
Source: Wilbur Smith Associates.

Total 55.3 miles

A small portion of the corridor has been improved and is currently open for use. South Portland has created approximately 2.5 miles of paved pathway as part of its Greenbelt System. The City of Saco has improved sections of trail north of Route 1.

TRAIL DESIGN

Off-road Trail. The preferred off-road trail design standard is for a twelve foot wide trail with a stonedust surface. Other trail elements such as grade, bridges, railings and trail shoulders will meet AASHTO design standards where feasible. In some areas, for example urban areas, it may be desirable for the trail be paved to expand the potential user base to include rollerbladers.

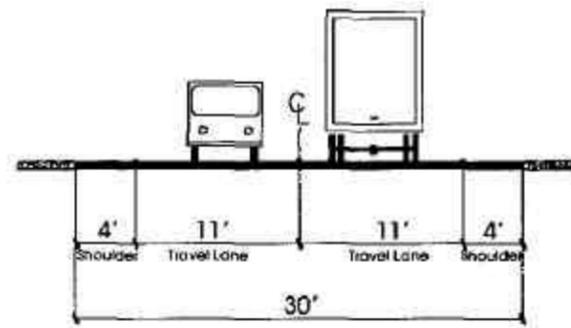


For the off-road trail segments, existing conditions have been grouped into six typical cross-sections. For each of these cross-sections, a 'design treatment' has been developed that recommends how to bring it to the desired design standard. A per linear foot cost estimate has been developed.

Diagrams of these typical cross-sections and recommended design treatment are provided in Section III, Recommendations. It is desirable for consistent trail design and construction detail along the length of the off-road trail.

On-Road Route. For permanent on-road route sections, the minimum recommended route design is four foot paved shoulders. Bicyclists and walkers would share the shoulder (traveling in opposite directions -- bicyclists riding with traffic and walkers against traffic) where sidewalks are not provided. In a few locations this four foot minimum width may not be feasible due to environmental impacts such as adjacent wetlands or mature trees along the road edge.

For the interim on-road route, no roadway improvements related specifically to the trail are being recommended. For off-road segments that will not be completed in the near term, consideration should be given to upgrading these roads with shoulders as well.



Recommended Minimum Trail:
Long Term On-road Sections



Dennett Road in Kittery with 4' shoulders

TRAIL USERS

The trail is being developed as a multiple-use pathway. In addition to walkers and bicyclists, equestrian use, where compatible, is desired. The off-road trail segments are to be designed to be compliant with the Americans with Disability Act (ADA) where feasible. The most difficult sections to make ADA-compliant will be the many trail-roadway intersections with significant grade differences. At many of these road crossings, a moderate (8') to large (18') grade difference exists between the old rail bed and the crossing road. To become ADA compliant, the design of the trail will need to adhere to grade criteria.

Certain federal funds (such as Transportation Enhancements which are provided to improve pedestrian and bicycle transportation) that are likely to be used for trail construction prohibit all-terrain vehicles. Use of all-terrain vehicles is incompatible with the gas pipeline and other non-motorized trail users. It is anticipated that motorized users such as all-terrain vehicles will be prohibited from off-road sections of the trail. While the Eastern Trail Alliance would like to encourage snowmobile use in certain sections, along sections owned by the Granite State Gas Company, the proposed easement would prohibit all motorized traffic. The regional or municipal entity responsible for each section of the trail will ultimately determine which trail uses are permissible.

TRAIL MANAGEMENT

The Eastern Trail Alliance has created a Government Relations Committee one task of which is to develop a proposed intermunicipal agreement between the corridor municipalities and other entities. The proposed agreement will establish trail implementation and management guidelines. Similar to

trail design and construction, it is desirable to have uniform trail management and maintenance procedures to ensure a high quality trail experience for users. Active, hands-on management of the trail is critical to the long term success of the trail. An Eastern Trail Management District has been proposed for active management of operation, construction and maintenance of the trail.

PUBLIC PARTICIPATION

The public participation program was structured to comply with the early public input requirements of the National Environmental Policy Act (NEPA). Public meetings consisted of a Public Scoping Meeting held in Kennebunk in November 1999 and a series of five community meetings in March 2000. The community meetings were held in Eliot (March 1), South Berwick (March 6), Kennebunk (March 14), Saco (March 28) and Scarborough (March 30).

At the Public Scoping Meeting, the general concept of the trail was described. Breakout sessions were held for participants from groups of municipalities to identify issues related to the trail development, priorities and desired trail amenities.

At the March 2000 community meetings, preliminary recommendations were presented. The recommendations included those for on-road (interim and permanent) and off-road trails and preliminary cost estimates. Comments received at these meetings were incorporated into the recommendations. Minutes of these meetings are provided in Appendix D.

GAS PIPELINE – TRAIL CONSIDERATIONS

The presence of the gas pipeline along the off-road trail corridor will require a high degree of collaboration between the gas company and trail advocates during the design and construction stages. For most of the corridor, the location of the pipeline is not evident. During the design phase, it will be necessary for the gas company to determine the exact location of the pipeline. During the construction phase, the gas company requires that a company representative be present during all construction activities.

To minimize disruption of the trail surface during pipeline maintenance, it is desirable to maintain at least a minimum horizontal distance from the pipeline. At locations such as the Kennebunk River, new bridges will need to be built that maintain minimum clearances from the pipeline to allow inspection and maintenance activities.

Special attention will need to be paid to locations with gas regulating stations. These are sensitive locations and the stations occupy a large portion of the cleared corridor where they are present. Most of the intersections of the corridor and roadways also contain gates that restrict access. Consideration should be given to modification or replacement of these gates to allow easier passage by trail users but still restrict access by unauthorized motorized vehicles.

II. EXISTING CONDITIONS

OFF-ROAD TRAIL

Existing conditions were recorded by performing a field survey of the trail corridor from the proposed Jewett trailhead in South Berwick to the Wainwright Athletic Field Complex in South Portland. Field crews recorded conditions using measurements, observations and photographs. Extensive documentation of conditions is presented in the corridor plans prepared at the scale of 1" = 200' in Appendix A. These plans show identified opportunities and constraints along the corridor.



Photographs of representative conditions along the corridor are shown in conjunction with recommended improvement strategies in Section III. A majority of the corridor is characterized by a 20' to 30' cleared corridor within an approximately 66' right-of-way.

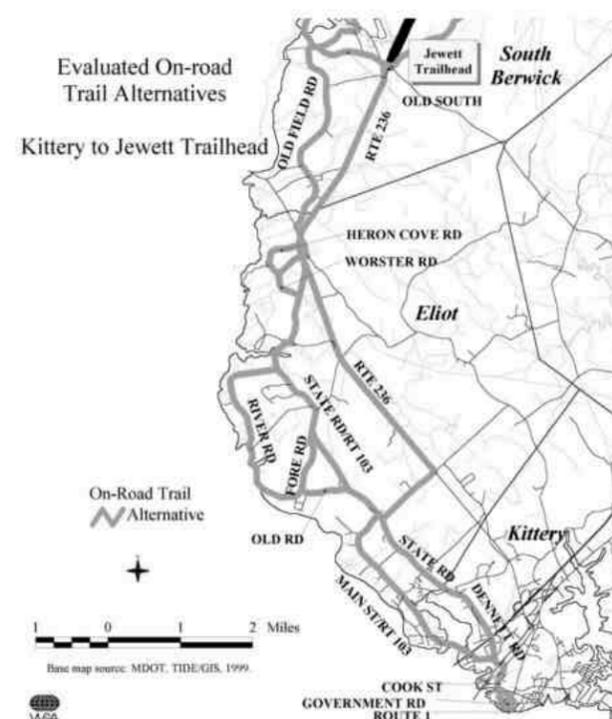
ON-ROAD ROUTE ALTERNATIVES

Kittery to South Berwick/Jewett Trailhead.

The first twelve miles of the trail, from Route 1 in Kittery to the Jewett trailhead in South Berwick, are planned to be permanent on-road segments. (Route 236 was constructed on the old rail right-of-way in this area.)

Several potential off-road routes were screened for feasibility and desirability for use in this area. None were deemed feasible.

Candidate roads were identified in work sessions with the ETA Trail Development Committee and through field work. These roads were inventoried for their existing condition: pavement condition, bridges, pavement width, width of shoulders and type of shoulder – paved or gravel. Roadside conditions were also noted for the potential for shoulders to be added



where absent. Conditions noted included drainage structures, distance from pavement edge to constraints such as mature trees, retaining walls, fences, guardrails and potential wetlands.

Combinations of roads were evaluated as potential routes based on the following criteria:

- ☒ Current level of accommodation for bicyclists and pedestrians by presence of shoulders, traffic volumes and traffic speeds
- ☒ Ability to add new paved shoulders or widen existing shoulders, if needed
- ☒ Continuity and directness so the route would be understandable to visitors to the area
- ☒ Type and quality of the connections provided -- parks, town/commercial/residential centers and visual interest/aesthetic appeal
- ☒ Potential use of and value to the local populace.

Interim On-road Route: Jewett to South Portland. As previously described, a continuous on-road route will be designated in the interim as the Eastern Trail. This will provide an identifiable route that cyclists can use to traverse the corridor. This interim route will link to other routes comprising the East Coast Greenway for the near-term until more off-road trail segments are developed. Candidate roadways were identified by the Trail Development Committee and through field work.

These roads were also inventoried with existing condition noted. It was desired to identify a continuous corridor that met many of the same criteria as the permanent on-road trail. These criteria were:

- ☒ Current level of accommodation for bicyclists and pedestrians by presence of shoulders, traffic volumes and traffic speeds
- ☒ Continuity and directness so the route would be understandable to visitors to the area
- ☒ The type and quality of the connections provided -- parks, town/commercial/ residential centers and visual interest
- ☒ Proximity to the corridor
- ☒ Ability to provide an alternative route during trail construction/maintenance or pipeline maintenance.

PRELIMINARY ENVIRONMENTAL SCREENING

The purpose of the Preliminary Environmental Screening is to identify early in the trail development process potential environmental issues. As part of this screening process, federal and state agencies were contacted that are responsible for administering databases for rare, threatened, or endangered species, significant wildlife habitat, unusual natural communities and critical areas, and significant architectural properties listed under the National Register of Historic Places.

The assessment used secondary source information exclusively. This included the information obtained from government agencies as well as aerial photographs provided by the Maine Department of Transportation. A presentation was made on the project at the January 11, 2000 Interagency Scoping meeting at the Maine DOT.

Findings from the preliminary environmental screening are:

Wetlands. The majority of wetlands adjacent to the old Eastern Railroad right-of-way are palustrine emergent, scrub/shrub, and forested. Of the 92 areas located and identified as potential adjacent wetlands; 46% are scrub/shrub wetlands, 24% are forested wetlands, 22% are scrub/shrub/emergent complexes, and 8% are emergent wetlands. The exception is the Scarborough salt marsh area, which would be considered tidal. There are also suspected jurisdictional wetlands located at 10 road crossings between South Berwick and South Portland. A "Jurisdictional Wetland" is a wetland that is regulated by the US Army Corps of Engineers as a "water of the United States" under Section 404 of the Clean Water Act (as amended). Field delineation is required to determine if jurisdictional wetlands exist.

Significant Fish and Wildlife Habitat. The proposed corridor passes through three areas that are designated as significant fish and wildlife habitat. These include a deer wintering area directly northwest of the corridor near the Wells and North Berwick town lines, an inland wading bird habitat between the Perry Oliver Road and Bald Hill Crossing Road in Wells, and a coastal wading bird habitat which encompasses the entire area of Scarborough Marsh. The Great Works River watershed is thought to be potential habitat for the state-listed swamp darter due to the fact that tributaries into this river have had positive survey results. The Great Works River has not yet been surveyed for this species.

Rare, Threatened, and Endangered Species. The Maine Natural Areas Program has listed 14 plant species that may be located adjacent to the old Eastern Railroad corridor. One exemplary natural community (Pitch Pine Bog-S1/S2) is located in the Scarborough Marsh area.

Historic, Pre-Historic, and Register of Historic Places. The Maine Historic Preservation Commission has listed both historic and pre-historic features in the general vicinity of the corridor.

STRUCTURES OVERVIEW

A visual assessment of major structures was conducted at twenty six locations including existing bridges, missing bridges, and larger culverts. Eight of the locations were where bridges once spanned rivers, streams or roads. One location was at a newly created stream channel adjacent to an existing bridge. Three locations would potentially require all new bridges – across the Maine Turnpike north of Exit 3 in Kennebunk, across the Saco River adjacent to the existing rail bridge and at Upper West Brook in Wells. Note was also made of smaller culverts (where they could be visually located) as to their current condition. The full structures report is available in Appendix C.



Missing Bridge at the Great Works River



Double Box Culvert, Lovers Brook,
South Berwick



New Bridge Needed at Upper West
Brook, Wells

III. RECOMMENDATIONS

OFF-ROAD TRAIL

The potential for an off-road Eastern Trail extends for approximately 42 miles from the Jewett Trailhead in South Berwick to Bug Light Park in South Portland. Recommendations are made for the portion of the corridor south of the Wainwright Athletic Complex in South Portland. The City of South Portland is actively implementing the remaining portion of their Greenbelt system north of the athletic fields.

An off-road trail totaling approximately 35 miles is recommended to be located within or adjacent to the corridor. For approximately 4 miles it was deemed infeasible to recommend an off-road trail at

this time. On-road routes have been identified for the three sections where they occur. These locations, identified in the following section, should be re-evaluated as circumstances change.

This study identifies conceptual feasibility only. A critical part of the design phase that will impact trail location and costs will be the determination of the exact location of the pipeline within the right-of-way, where present. For much of the corridor, the pipeline's location was not evident and assumptions in the field were necessarily made in preparation of these conceptual plans.

Trail Cross-sections:

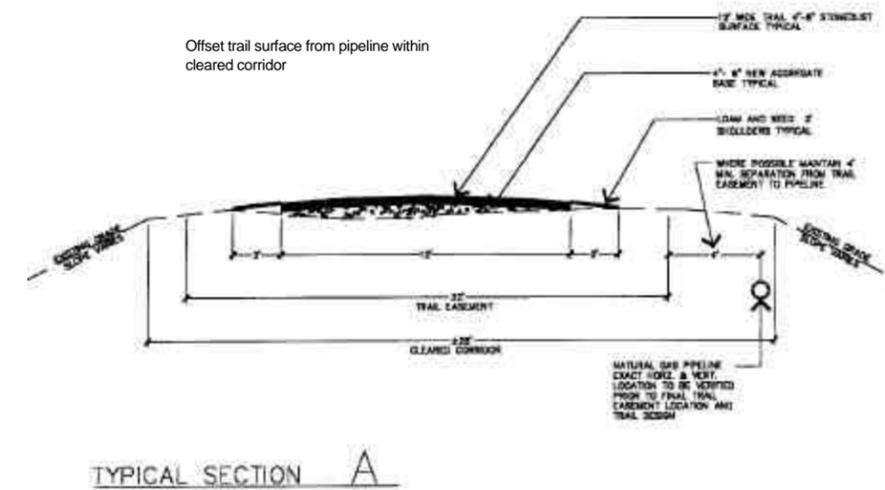
Six concepts for trail surface improvements were developed. They range from the lower cost, minor improvements (Cross-section A) to the more costly involving drainage improvements (C) or retaining walls (F). Common features (except where noted) for the cross-sections are:

- a twelve (12) foot stonedust trail surface with 4" – 6" of surface material
- 2% cross-slope of the trail to maintain drainage
- a two (2) foot clear or shoulder area on each side of the trail
- minimum of eight (8) foot vertical clearance (10 feet where equestrian use anticipated).

Cross-section A: This is the least intensive improvement concept. Minor grading and 4" – 6" of base material are needed. This is the most common recommended improvement, accounting for an estimated 47%, or 17 miles, of the trail corridor.



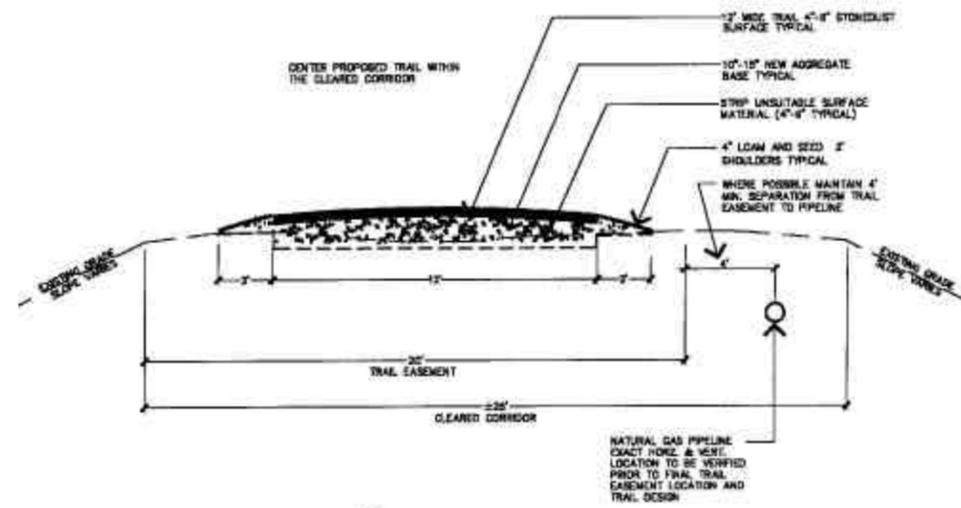
Typical Conditions Along Cross-section A



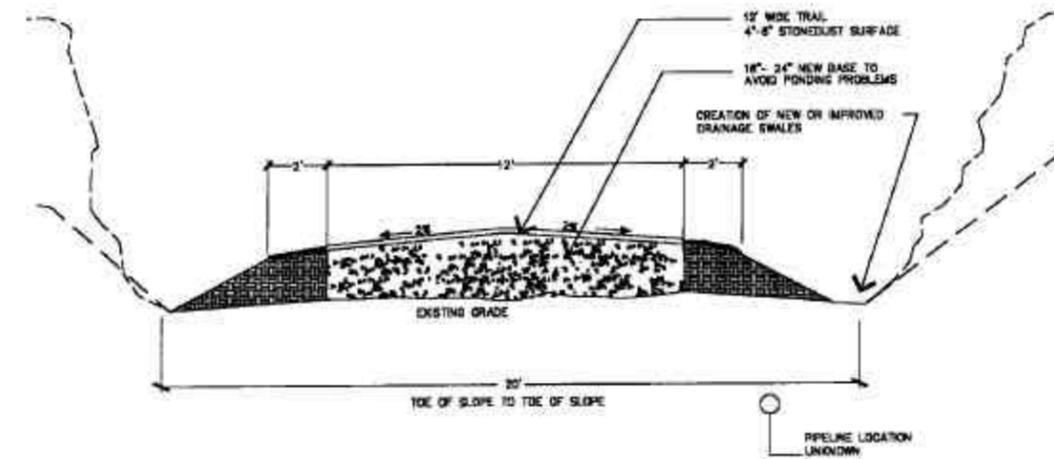
Cross-section B: This is a variation on cross-section A, estimating that deeper stripping of surface material and additional base material (10" – 15") are needed. This is the second most common improvement recommended, accounting for an estimated 30%, or 10.6 miles, of the off-road corridor.



Typical Conditions Along Cross-section B



TYPICAL SECTION B



TYPICAL SECTION C

Cross-section C: This cross-section is developed for existing conditions where there may be ponding or wet conditions along the trail. Often it occurs in a 'cut' section with ledge on one or both sides. It prescribes stripping of unsuitable surface material and building up the trail surface with a larger amount of base (typically 18" – 24"). New or improved drainage swales would be created adjacent to the trail. This improvement concept accounts for 10%, or 3.6 miles, of the off-road trail corridor.



Typical Conditions Along Cross-section C

Cross-section D: Cross-section D occurs where the cleared area of the corridor slopes to one side. Often a mound is evident to one side of the cleared area (the upper portion of the slope) that is the likely location of the gas pipeline. Here the recommended improvement makes use of the existing slope to grade the new trail away from the mound to establish drainage. This occurs for 4% of the corridor, or 1.6 miles.



Typical Conditions Along Cross-section D