

## 4. GUIDELINES FOR FACILITY DEVELOPMENT

New Hampshire has a considerable network of multi-use trails, community paths, and corridors with the potential for use as recreational and transportation systems throughout the state. The previous chapters describe the status of many of these corridors, with a particular focus on state-owned abandoned rail corridors. The condition and use of these corridors vary widely in terms of level of improvement, surface material, drainage and soil conditions, maintenance, and types of users, including what types of uses are permitted, feasible, and actually present in the corridor.

The data and findings from the previous chapters have been reviewed by the New Hampshire Department of Transportation (NHDOT), Department of Resources and Economic Development (DRED), and the Advisory Committee. It was also presented to the general public at a series of five public meetings conducted throughout the state, and was available through the study website.

This chapter includes a set of guidelines for future trail development, maintenance, and management. The guidelines are based on the current status of the trails and potential trail corridors, as well as input from NHDOT, DRED, the study Advisory Committee, and the general public, through comments made at public meetings and written comment forms. The following are the key issues that were reviewed in establishing the trail development guidelines:

- Facility use and user type
- Facility design
- Corridor ownership, management and maintenance
- Future needs

The following is a brief discussion of the public participation process and a summary of the comments received. This is followed by a discussion of each of the facility development topics, the study’s findings and recommended guidelines for facility development, and related considerations.

### **Public Participation and Comments**

The information on the state-owned abandoned railroad corridors and other off-street trails was assembled and presented to the general public at five meetings, held at various locations throughout the state:

- Keene – May 3, 2004 (attendance = 100+)
- Bethlehem – May 5, 2004 (attendance = 31)
- Lebanon – May 6, 2004 (attendance = 17)
- Portsmouth – May 11, 2004 (attendance = 27)
- Concord – May 13, 2004 (attendance = 47)

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At these meetings, members of the public were encouraged to provide information regarding condition and usage of the trails and potential trail corridors with which they are familiar. In addition, members of the public were invited to make comments at these meetings, and to submit written comments either in person at the meetings, by mail, or by e-mail.

A total of 257 written comment forms or letters were received. The written comments are fairly representative of the issues that were raised and the comments that were made at the public meetings. A wide variety of user groups were represented at the meetings, and among the written responses. The following are some of the key findings from reviewing the public comments.

- Most respondents expressed an opinion on the general type of vehicle that should be allowed on multi-use trails
  - Non-Motorized Vehicles, Snowmobiles, and ATVs (49 respondents). These respondents support leaving the facilities open to a broad range of users, including motorized users. Many of these respondents were ATV owners who feel that they should also be able to use a public resource such as a multi-use facility.
  - Non-Motorized Users and Snowmobiles, NO ATVs (38 respondents). These respondents supported allowing snowmobiles on multi-use facilities during the winter months, but reserving the facilities for non-motorized users during non-winter months. Many of these respondents stated that ATVs tear up the trail surfaces, while snowmobiles do not. In addition, due to the seasonal use patterns, snowmobiles do not interfere with most non-motorized users. Some snowmobile riders who responded opposed ATV use because the snowmobile clubs do trail maintenance, and ATV use makes maintenance more difficult.
  - Non-Motorized Users ONLY (168). These respondents oppose any motorized use of the facilities at any time. The principal reasons cited for opposing motorized use of the trails are that motorized vehicles make too much noise; generate pollution; cause physical damage to the trails (creating ruts, “tearing up” the trail surface); and create conflicts and safety problems due to high vehicle speeds. Many of these respondents supported creating separate trails for motorized users (perhaps adjacent to highways and major roads), to be maintained by the motorized users.
- All respondents expressed support for developing and improving trails, as would be expected from people who take the time to attend meetings of the State Trails Plan and submit comments on the plan. Most respondents (163) favor improving corridors throughout the state. Other respondents cited specific trails where they favor improvements. The following trails were identified specifically by the following number of respondents:
  - Cheshire and Ashuelot (27) – commonly cited together; high number of respondents reflects high attendance at Keene meeting
  - Seacoast Area Trails (14)
  - Northern Rail Trail (11)
  - President Rail Trail (10)
  - Manchester to Seacoast (6)
  - Pondicherry Rail Trail (5)
  - Lebanon to Concord (4)
  - Concord Area Trails (3)
  - Keene Area Trails (3)
  - Conway Branch (2)
  - Profile Railroad (2)
  - Gorham to Whitefield (2)

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- Lebanon to Boscawen (2)
- Rockingham Recreation Trail (1)
- Pisgah Trail (1)
- Lakes Region / Wolfeboro (1)
- Warren Railroad Bed (1)
  
- Most respondents observed that many trails and potential trail corridors have physical shortcomings that should be addressed in order to improve the facilities and encourage higher levels of transportation and recreational use. Respondents raised the following issues related to physical condition of trail corridors; each issue is followed by a response based on the study findings:
  - Issue: Should facilities be paved or unpaved?
  - Response: The majority of public comments indicated that in most cases the facilities should be kept in a more natural, unpaved state using crushed stone, packed dirt, or small gravel for the trail surface. It may be preferable to pave facilities through more populated areas, to make connections with schools and village centers, or in heavily-used recreational areas to encourage walking and biking.
  
  - Issue: Existing bridges will need to be evaluated to ensure they are safe. For underpasses or culverts what is the minimum clearance needed?
  - Response: Horse owners suggested at least 15 feet is needed for head clearance.
  
  - Issue: Are drainage improvements necessary along abandoned railroad corridors?
  - Response: Most rail corridors have gravel/ballast foundations that provide some drainage benefits. However, drainage improvements are still needed along most trails to provide year-round accessibility and to prevent erosion.
  
  - Issue: Should railroad ties be removed?
  - Response: Railroad ties have been removed from some of the abandoned rail corridors, but they still remain along other corridors. Removing the ties would make travel, maintenance and grooming easier throughout the year. However, disposal of railroad ties is costly.
  
- Respondents also noted regulatory and enforcement issues with existing facilities and corridors, including:
  - Issue: Do ATVs have speed limits, and how are ATV speed limits enforced?
  - Response: ATVs have speed limits which are enforced by the Department of Fish & Game. Public comments indicate there is a need for more enforcement.
  
  - Issue: How can people be better informed about the type of uses allowed on different facilities?
  - Response: Better signage is needed to inform ATVs and snowmobiles when and where they can and cannot ride on the facilities.
  
  - Issue: How can noise from motorized vehicles on trails be reduced in populated areas?
  - Response: Some respondents have proposed installing sound barriers between homes and the facility where motorized vehicles would travel. However, these barriers are expensive, and many people find them unattractive.
  
  - Issue: Where should motorized off-road vehicles be permitted to operate?
  - Response: As the discussion in the previous section suggests, this is a contentious issue with a disparity of opinions. Some users favor prohibiting all motorized vehicles from multi-use facilities, and proposed creating separate facilities for them adjacent to highways (where cars already create noise and pollution). Other respondents, in contrast, favored allowing ATVs and

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snowmobiles on a broad range of facilities, and cited the licensing fees that motorized users pay, and the maintenance work that they perform.

- Some respondents cited procedural issues with the development of the State Trails Plan, including:
  - Issue: The public comment period was not long enough.
  - Response: The public comment period after the public meetings was extended to June 4, 2004. This gave members of the public a minimum of three weeks to respond after the final public meeting held on May 13, 2004 in Concord. The comment deadline was more than a month after the first public meeting held on May 3, 2004 in Keene.
  - Issue: Did the study's Advisory Committee adequately represent all people and trail interest groups? Were all of the parties specified under HB 748 for the Statewide Trails System Advisory Committee represented on the Advisory Committee?
  - Response: The study Advisory Committee represented a wide variety of trail users, interest groups, and people throughout the state (through RPC representation). Not all of the groups on the Statewide Trails System Advisory Committee were on study Advisory Committee, but many of them were. In addition, the Statewide Trails System Advisory Committee Chair was on the study Advisory Committee.
  - Issue: Is there a law that mandates that the state provide additional riding opportunities on state lands for ATV groups?
  - Response: Through HB 1273, and the HB 717 study committee, it is the Legislature's intent that additional recreational opportunities be made available for public ATV use on public lands, if appropriate.
  - Issue: Will DRED's management of the corridors result in fair treatment of non-motorized users, since DRED works closely with motorized users (ATV's and snowmobiles) of the corridors.
  - Response: DRED and NHDOT have an agreement to jointly review any improvements proposed to the corridors that DRED manages and NHDOT owns.

The public comments were taken into consideration in drafting the facility development guidelines. However, it is important to note that these comments were used in an advisory capacity, and were put in the context of the research and technical analysis, as well as the input from NHDOT, DRED, other state agencies and the Advisory Committee. The proportion of comments favoring different guidelines (e.g. motorized vehicles permitted versus motorized vehicles prohibited) were noted, but were not recognized as "votes" in a referendum. This is due to the fact that the public comments were submitted by a self-selected group that may not be representative of the general population, and the fact that the state must also protect the legitimate interests of all groups, whether or not they constitute a majority.

## **Facility Use and User Type**

### **Discussion**

The public identified a diverse number of potential trail users. The three principal reasons for using trails are for recreation, transportation, and exercise. Tourism is also identified as a purpose for using the Facilities. These different purposes may imply different ways of using the trails, and different types of users. Many different uses have been identified as well, including:

- Walking/Jogging
- Universal Accessibility
- Mountain biking
- Road biking (with narrow tires)
- Horseback riding
- Cross country skiing
- Dog sledding
- Snowmobiling
- Riding All Terrain Vehicles (ATVs)
- In-line skating

Comments generally support allowing as many different users access to facilities as is feasible and appropriate. However, combining some of these user types can create conflicts. These include:

### **Surface and Type**

Certain types of users prefer specific surface type. Road bikers and in-line skaters prefer paved surfaces. However, paved surfaces may be less desirable for equestrians, joggers, and snowmobilers, who prefer unpaved surfaces. Snow melts more quickly on paved trails than on unpaved trails, which is problematic for snowmobilers and skiers.

### **Environmental**

All Terrain Vehicles (ATVs) and Snowmobiles are louder and faster than non-motorized uses and could have air quality impacts, which may create a conflict for some non-motorized users and trail abutters. The discussion at many of the public meetings focused largely on these conflicts.

### **Seasonal Conflicts**

There is also the potential for wintertime motorized – non-motorized conflicts between cross country skiers and snowmobiles or ATVs.

### **Enforcement**

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Comments from ATV users and non-motorized users indicated that many conflicts result from misuse of machines, such as riding on sections of trail where they are prohibited.

### Guidelines

1. All facilities (new and/or improved) should accommodate as many user types as possible. However, recognizing that there may be some conflicts (both perceived and real), the entity that develops or improves the facility should involve representatives of all user types.
2. The types of users that are permitted and accommodated will vary by trail. Permitted trail usage should be prescribed by land owners/managers. Facility development will depend on several factors, including:
  - Financial constraints
  - Public input
  - Physical constraints (width, existing trail condition, soil conditions, drainage)
  - Abutters and adjacent uses
  - Environmental considerations
  - Potential for facility to make a critical link for certain user types (e.g. connection to the state bicycle network, or a link to motorized use areas).
  - In addition to the differences between user groups, there is also considerable diversity in usage characteristics within a given user group.
3. Associations and clubs are encouraged to work with entities that are developing or improving a facility in order to identify key segments that provide links to high use areas.

## Facility Design

### Discussion

Facility use is currently limited by poor conditions, including drainage, foliage encroachment, continuing presence of railroad ties and/or large diameter ballast. These conditions make facility use difficult for universal accessibility and users such as pedestrians and bicyclists. The public identified a number of locations where facility improvements are needed.

### Guidelines

1. Municipalities, Regional Planning Commissions (RPCs), local user groups, and other trail proponents are encouraged to build upon the facility inventory included in this study, and work with NHDOT and DRED to pursue trail improvements.
2. Facilities should be designed to safely accommodate all users that are permitted on the trail. Recommended references for safe and appropriate design guidelines are the American Association of State Highway and Transportation Officials (AASHTO) *Guidelines for Design of Bicycle and Pedestrian Facilities* and the Federal Highway Administration (FHWA) *Designing Sidewalks and Trails for Access*.

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3. Rail-with-trail may be pursued on state-owned railroad corridors in appropriate circumstances (e.g. where rail traffic is light and adequate corridor width is available). Developing rail-with-trail requires the permission of the railroad owner and close coordination with NHDOT. The NHDOT will provide detailed requirements for such projects with input from operating railroads. Sponsors of these projects must address issues such as safe clearance and separation for trail users, railroad, maintenance requirements that may include temporary trail closure, maintenance and policing of trails, reimbursement of added railroad costs, and insurance, bonding, and indemnification of the state and operating railroads. This report includes typical sections for rail-with-trail, but the dimensions and topography of railroad corridors vary and designs must be adjusted accordingly.
4. Proposed improvements to a trail in a rail corridor that may have rail service restored in the future should be fully evaluated since that trail could have many years of use that would justify the expenditure. This evaluation should include a feasibility study and an order-of-magnitude cost estimate for rail-with-trail or an alternate trail location in the event that the rail service is restored, so that the trail connection is not lost.
5. Maintenance of the facility must be a key component of any design.
6. NHDOT and DRED may provide technical and institutional support for development and improvement of multi-use trails. This report proposes design guidance for development and improvement of multi-use trails, including typical cross-sections addressing differing corridor conditions, trail requirements, and constraints. Typical sections have been included for several general cases, which are shown in Figures 4-1, 4-2, and 4-3. These typical sections address the following critical design issues.

### Trail Design Guidelines - Typical Sections

- Unpaved Path – A trail with a stone dust / crushed stone surface.
- Paved Path – A trail with a bituminous asphalt surface.
- Separate Path Trail – A trail with two parallel surfaces: a hard surface (pavement or stone dust) for users such as bicyclists and wheelchair users, and a soft surface (grass or compacted soil) for users such as horseback riders and joggers. It is desirable to provide separate paths where there is user demand for an alternate surface, and where width is available.
- Rail with Trail, Unconstrained Width – A trail that runs parallel to an active rail line, through a corridor that has adequate width to provide optimal separation and buffering between the rail line and the path (34 feet between the track center line and the edge of the trail shoulder).
- Rail with Trail, Constrained Width – A trail that runs parallel to an active rail line, but has physical width constraints that reduce the buffer between the rail line and the path to a minimum width (20 feet between the track center line and the edge of the trail shoulder).

The following are some of the key issues and design considerations for shared-use paths. All facilities are assumed to support two-way travel. These guidelines are based principally on the American Association of State Highway and Transportation Officials (AASHTO) *Guidelines for Design of Bicycle and Pedestrian Facilities*.

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- Trail width
  - 10 feet recommended (where site constraints preclude 10-foot width, 8-foot minimum width may be acceptable on a case by case basis)
  - 12 – 14 feet recommended in areas of high demand
  - Parallel unpaved path (where applicable): 6 feet minimum, 8 feet recommended – where parallel unpaved path is present, width of paved path may be reduced where overall trail width is adequate
- Vertical clearance
  - 10 feet minimum for horseback riders
  - Other uses may require higher clearances – local conditions and uses should be evaluated for vertical clearance requirements
- Trail foundation design
  - 6 to 12-inch gravel foundation. Thicker foundation is recommended in areas where there will be frequent access by motor vehicles, such as maintenance vehicles, park patrols, and/or emergency vehicles, or where soil conditions are poor
  - 6-inch gravel foundation minimum (acceptable in areas where motor vehicle traffic will be infrequent and soil conditions are good)
- Trail surface
  - Unpaved
    - Hard Surface - 4-inch thick compacted stone dust (available from quarries, typically  $\frac{3}{4}$ -inch maximum diameter prior to compaction)
    - Soft Surface – Grass or packed dirt
  - Paved – 2-inch thick bituminous concrete
- Trail shoulders
  - Width
    - 2 feet minimum
    - 3 feet recommended
    - 3 feet minimum to horizontal obstruction (e.g. sign, fence, tree)
    - 5 feet minimum to vertical hazard (i.e. vertical drop of 2.5 feet or more, top of vertical slope exceeding 3:1) – if less than 5 feet is available, a fence is recommended (with a 3-foot clearance)
  - Slope
    - 20:1 (run : rise) recommended
    - 12:1 acceptable for limited trail segments
    - 6:1 maximum
    - 3 feet minimum to horizontal obstruction (e.g. sign, fence, tree)
    - 5 feet minimum to vertical hazard (i.e. vertical drop of 2.5 feet or more, top of vertical slope exceeding 3:1) – if less than 5 feet is available, a fence is recommended (with a 3-foot clearance)

General cost estimates for trail construction have also been developed. These cost estimates focus on the costs of converting a typical abandoned rail corridor (no major obstructions, rails and ties already removed, ballast in place, no major drainage issues) to a typical multi-use trail (10-foot width, 3-foot shoulders, unpaved with crushed stone surface). The unit costs are based on NHDOT Weighted Average Unit Prices for projects bid in 2003. This cost estimate uses costs from urban projects, which tend to have somewhat higher costs than rural projects. Therefore, these cost estimates are somewhat conservative.

**Table 4-1 Typical Rail to Trail Conversion Cost Estimate**

Item	Description	Unit Cost	Unit	Trail Cost per Linear Foot
201.1	Clearing	\$ 5,692.31	acre	\$ 2.09
207.3	Earthwork and Excavation	\$ 11.65	cubic yd	\$ 6.90
209.4	Granular Backfill (Gravel Base)	\$ 11.50	cubic yd	\$ 6.81
304.3	Crushed Gravel	\$ 18.23	cubic yd	\$ 2.25
	Slope Stabilization			\$ 2.00
	Subtotal			\$ 20.06
	Contingency (35%)			\$ 7.02
<b>Total</b>				<b>\$ 27.08</b>

This results in a cost of approximately \$27 per linear foot for an unpaved trail, or \$145,000 per mile. For a paved trail, the cost would increase to about \$42 per linear foot, or \$225,000 per mile. This does not include the cost of any structures, which may be significant; bridge structures for a multi-use path could cost approximately \$1,000 per linear foot.

## Corridor Ownership, Management and Maintenance

### Discussion

The ownership and management structure of trails and corridors that could be developed or improved are important in determining what uses are permitted on a trail, how the trail is developed or improved, and how it is maintained. The trail system in New Hampshire has a variety of owners, management structures, and maintenance arrangements.

NHDOT owns the majority of the state-owned abandoned railroad corridors: 20 of the 23 corridors listed in Table 1 and described in Chapter 1 of this report. DRED owns the remaining three abandoned railroad corridors: the Profile Railroad, the Fremont Branch (the southern portion from Windham to Fremont), and the Greenville Branch.

Because DRED has the historical role and institutional structure for overseeing trails, it supervises the administration and maintenance of recreational uses along these inactive railroad corridors, including the NHDOT-owned corridors. A cooperative agreement between the two agencies spells out their respective roles. Most of the trail maintenance is done by local user groups and clubs, in particular snowmobile and ATV clubs. DRED programs that are supported by snowmobile and ATV licenses fund much of this maintenance, as well as minor trail improvements.

### Guidelines

1. The State of New Hampshire should work to ensure that the state owned abandoned rail corridors are reserved for current and future transportation and recreation uses. These uses may include multi-use trail functions as well as future rail service. In order to achieve this, the state-owned corridors should not be sold off to abutters: the State should retain ownership.

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2. NHDOT should continue to allow the abandoned railroad corridors to be managed by DRED (through a cooperative agreement) for recreational use when there is no present need for transportation use. NHDOT and DRED should continue to coordinate on planning, design, and usage issues for these corridors where there is a cooperative agreement.
3. The NHDOT should remain involved in trail planning for the abandoned rail corridors. For those corridors where there is a cooperative agreement between NHDOT and DRED, and the latter agency provides recreational management, any proposed improvements by a Town will be reviewed with DRED Trails Bureau. The Trails Bureau will review the proposal for consistency with Statewide Trails program, and a supplemental agreement would be executed between the Town and both state agencies.
4. State and local enforcement must be a consideration of facility management.

## Future Needs

### Discussion

In its early stages, the State Trails Plan study process included a discussion of identifying “high priority” corridors on a statewide basis for development and/or improvement as multi-use trails. However, as research and discussion revealed the complexity of the issues and the variability of corridor conditions, it became apparent that this type of priority setting was not a realistic expectation at this time. The inventory developed as part of this plan will be updated as appropriate and will assist in future facility planning.

The State Trails Plan includes general information about each corridor gathered through the nine regional transportation plans and the knowledge of the state agencies, Advisory Committee and the general public. Some responses suggested improvements to specific rail corridors. Many focused on washouts and other drainage problems, which impede trail use. Others focused on conflicts in facility uses – between motorized and non-motorized modes. A general need is to make surface improvements to better accommodate different uses. Where ballast remains in the rail bed, many recommended a surface of crushed stone. In areas where the ballast was mined, a gravel base would also be needed to make the trail accessible to a full array of users.

The NHDOT Bureau of Rail and Transit has identified the following corridors having potential for the resumption of rail service:

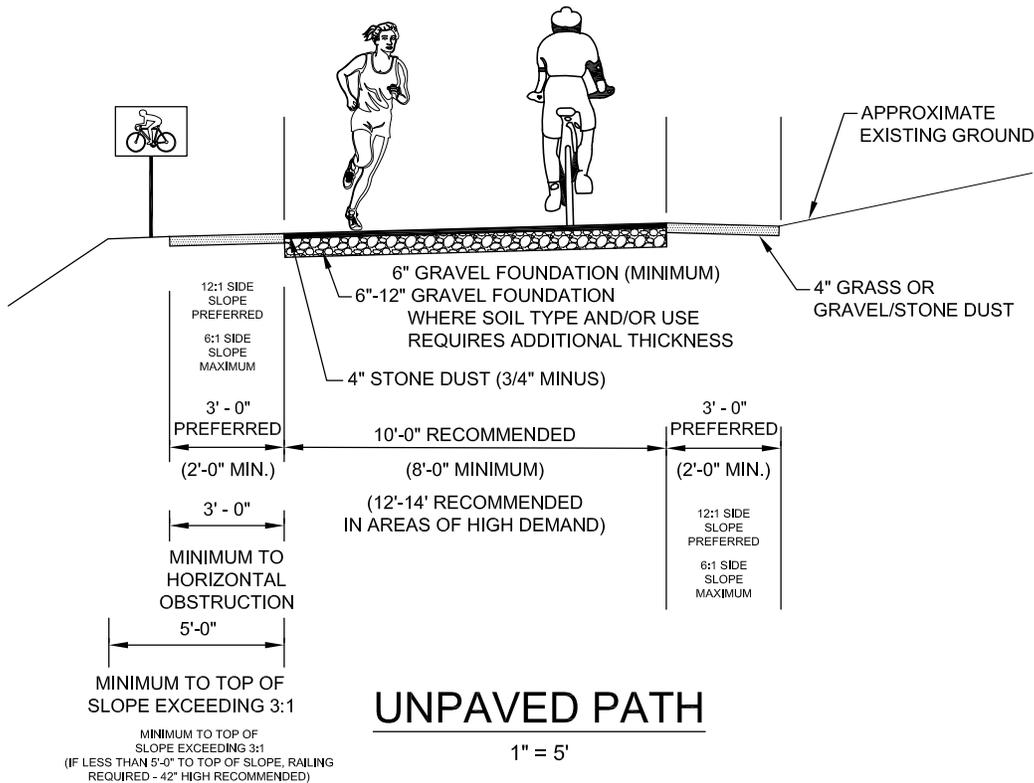
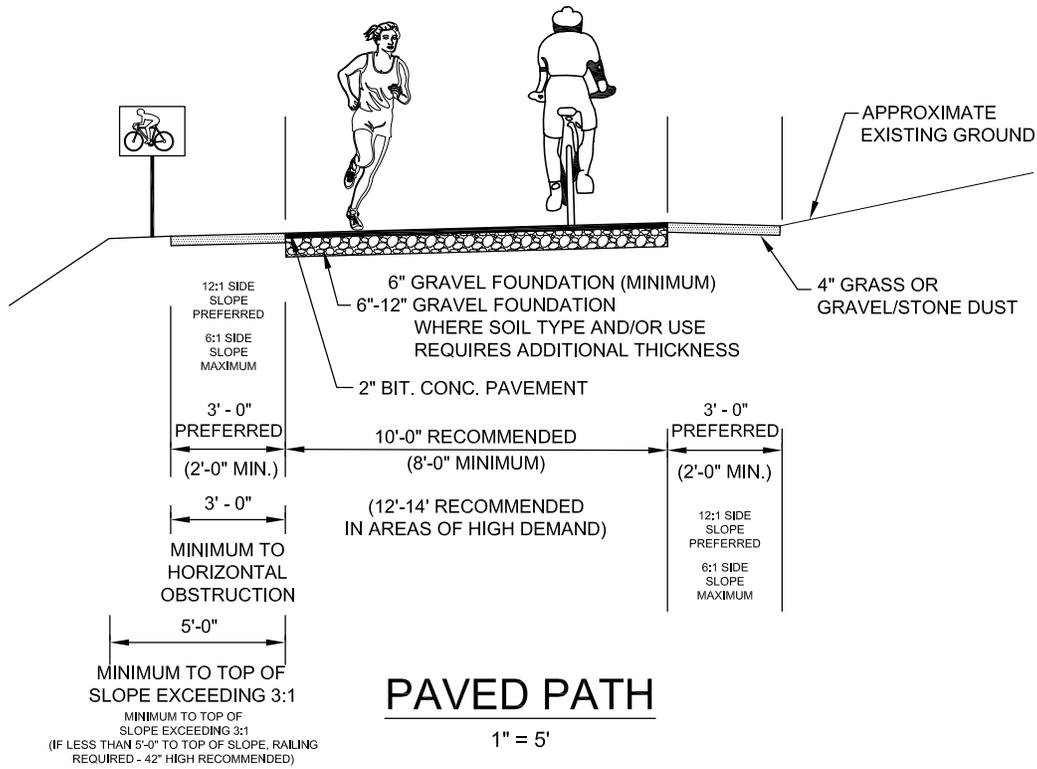
- Upper Coos Railroad (Whitefield to Jefferson) – freight rail
- Conway Branch – freight and passenger (excursion)
- Northern Railroad – Boston to Montreal High Speed passenger rail service
- Manchester and Lawrence Branch – freight and passenger (commuter)
- Hampton Branch – passenger (commuter)

### Guidelines

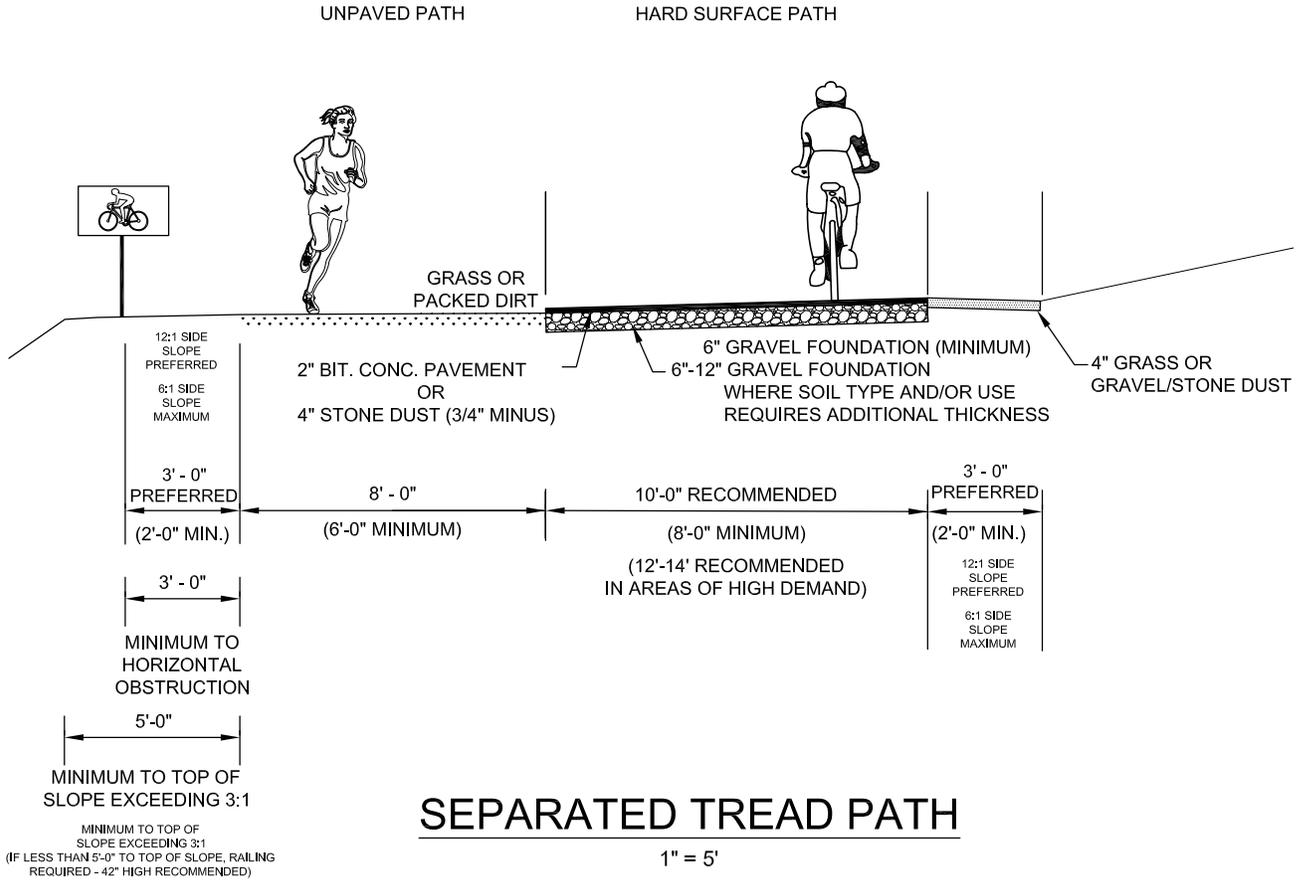
1. Regional planning commissions, municipalities, trail user groups, and the general public are encouraged to collectively assess the transportation, tourism and recreation potential of each of the state-owned abandoned rail corridors with the State. The process should include site walks of the corridors by state and local officials and interest groups. Public input should be considered.

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2. Trail improvements should focus on areas with the greatest potential for use and value to users, including:
  - a. Trails within villages (example: Blackmount Branch in Woodsville)
  - b. Trails between communities
  - c. Trails to important scenic and recreational areas (example: Berlin Branch)
  - d. Linkages to existing networks
3. NHDOT/DRED should help to facilitate trail development in abandoned rail corridors especially where the trail involves multiple jurisdictions and is of regional or statewide significance.
4. Trail related improvements to abandoned rail corridors should continue even if rail service may return in the future. Improvements such as drainage and brush clearing are consistent with State policy on rail preservation.
5. Funding alternatives for involving local private/public partnerships for facility development and other bicycle and pedestrian transportation projects should be found. Currently the primary funding sources Transportation Enhancement (TE) and Congestion Mitigation and Air Quality (CMAQ) are available in limited amounts.
6. As and when future rail corridors become available, the State should consider them for state ownership or assist communities in purchasing them.
7. Future facility planning should consider conflicts between different user groups and address their varying needs.



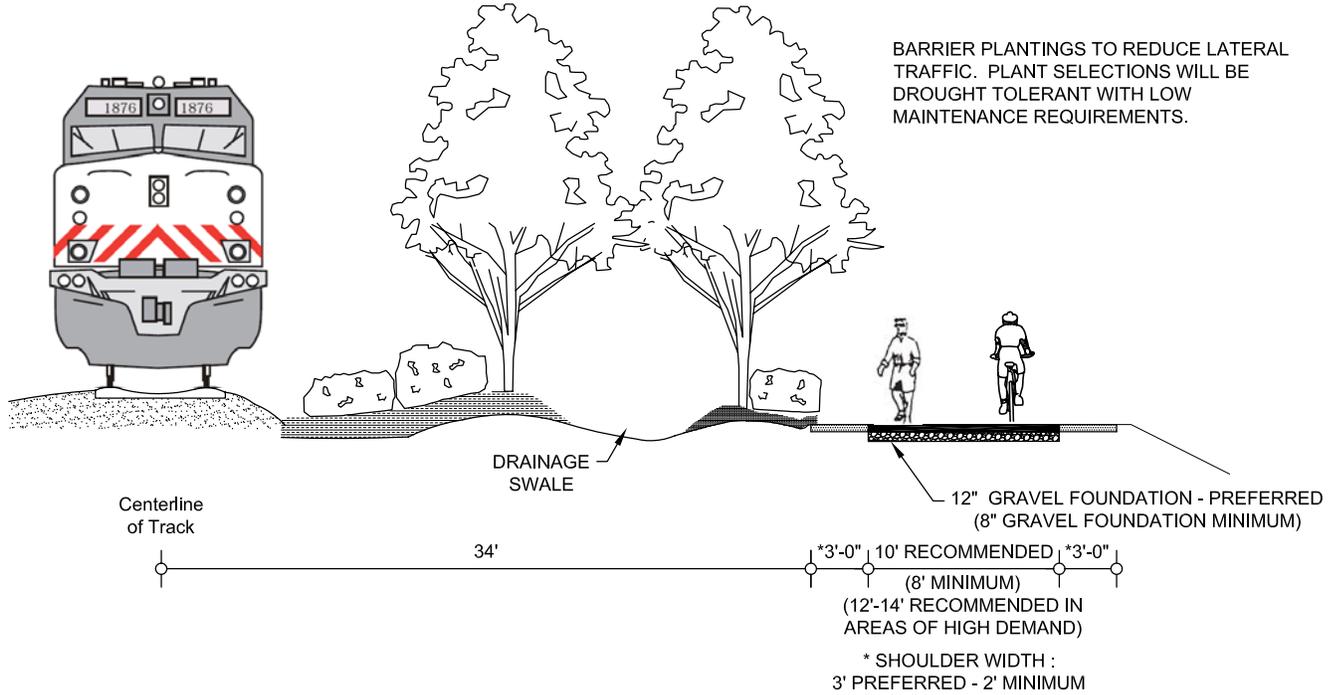
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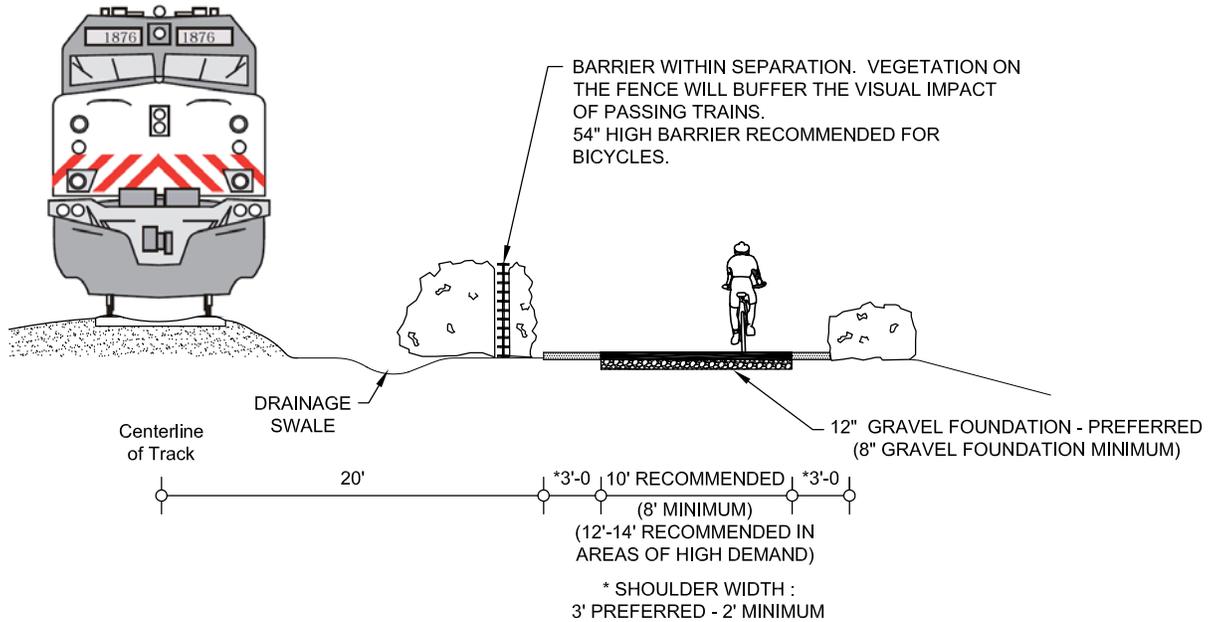
Off-Road Trails  
Typical Sections

Figure 4-2



## RAIL WITH TRAIL UNCONSTRAINED WIDTH

1" = 10'



## RAIL WITH TRAIL CONSTRAINED WIDTH

1" = 10'

Note: Rail-with-Trail development requires railroad company permission, and must be done with NHDOT cooperation. Rail-with-Trail design and development must be done in accordance with guidelines in Chapter 4.