



2023-
2024

Squannacook River Rail Trail Guidelines and Specifications for Construction Contractors

Phase 4 - Crosswinds Drive to Fisherman's Parking Lot



Squannacook Greenways Inc.

2023-2024

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ENGINEERING PLANS

The following plans may be downloaded from the Squannacook Greenways web site at http://www.sqgw.org/engineering_plans.html.

- Overall map of the rail trail route
- Typical cross-section

The following plans are also available:

- MBTA Valuation maps showing locations of culverts
(http://www.sqgw.org/valuation_maps.html)
- Townsend Wetland Resource Area maps 1-9
(http://www.sqgw.org/townsend_wetland_maps.html)
- Groton Wetland Resource Area Map
http://www.sqgw.org/pdf/Groton_Erosion_Control.pdf

REGULATORY AND LEGAL DOCUMENTS

1. *Best Management Practices for Controlling Exposure to Soil during the Development of Rail Trails* - Massachusetts Department of Environmental Protection (DEP)
(https://www.mass.gov/files/documents/2016/08/nw/railtra_i_0.pdf)
2. Certificate of the Secretary of Energy and Environmental Affairs on the Environmental Notification Form (ENF)
(http://www.sqgw.org/pdf/15876_mepa_Squannacook_River_Rail_Trail.pdf)
3. Natural Heritage & Endangered Species Program (NHESP) determination letter - Massachusetts Division of Fisheries and Wildlife
(http://www.sqgw.org/pdf/03-13131_Townsend_Groton.pdf)
4. Order of Conditions - Townsend Conservation Commission - MassDEP #308-669
South Middlesex Registry of Deeds, Book 73032, page 574
Extended to 7/24/25
(http://www.sqgw.org/pdf/Order_of_Conditions_Townsend.pdf)
5. Order of Conditions - Groton Conservation Commission - MassDEP #169-1180
South Middlesex Registry of Deeds, Book 71747, page 202
Extended to 9/25/24
(http://www.sqgw.org/pdf/169-1180_OOC_Squannacook_Rail_Trail_FINAL.pdf)
6. MBTA lease #13509
(<http://www.sqgw.org/pdf/MBTALease2015.pdf>)

Section 1. Background

The Squannacook River Rail Trail (SRRT) is located in Groton and Townsend, Massachusetts on the former Greenville branch of the Boston and Maine Railroad. The corridor is leased for 99 years from the MBTA by Squannacook Greenways, Inc., a non-profit organization dedicated to the trail and its connectivity to the surrounding community.

The entire rail trail will be approximately 3.7 miles long, beginning at the Bertozzi Wildlife Management Area in Groton and heading northwest to Townsend, where it runs approximately parallel to route 119 to the town center, ending at the intersection of Depot Street. Approximately 2.8 miles are in Townsend and 0.9 miles in Groton.

See overall map of entire rail trail route in Townsend and Groton at:

http://www.sqgw.org/engineering_plans.html

The finished trail is a multi-use stone dust (3/8" minus aggregate hard pack) rail trail. It is ten feet wide, within a 20 foot wide corridor. The corridor is relatively straight and has an elevation change from one end to the other of 32 feet.

Six valuation maps covering the entire 3.7-mile length of the Squannacook River Rail Trail are available at the URL provided in the Table of Contents. These maps can also be found at the Massachusetts Registry of Deeds and are referenced from the MBTA's main deed, which may be found in the South Middlesex Registry of Deeds, Book 13156, Page 034, dated Feb 16, 1977.

Squannacook Greenways has been building the rail trail over four construction years, completing approximately one-quarter of the trail each year. The first phase of construction, from Depot Street to Old Meetinghouse Road in Townsend, was completed in 2020-2021. The second phase, from Old Meetinghouse Road to Harbor Pond in Townsend, was completed in 2021–2022. The third phase, from the north crossing of Crosswinds Drive to the Bertozzi Wildlife Management Area (WMA) in Groton, was completed in 2022–2023.

This document addresses the fourth and final phase of construction, from the north crossing of Crosswinds Drive in Groton to Route 119 in Townsend Harbor at the informal dirt parking area known as the fisherman's parking lot.

Section 2. Phase Four Construction

This document addresses the fourth and final phase of construction, approximately 0.9 miles from the north crossing of Crosswinds Drive in Groton to Main Street (Route 119) in Townsend Harbor east of Shepherd's at the informal dirt parking area known as the fisherman's parking lot.

For Townsend see Maps 2 and 3 of the Wetland Resource Area Maps at:

http://www.sqgw.org/townsend_wetland_maps.html

For Groton, see the Wetland Resource Area Map at:

http://www.sqgw.org/pdf/Groton_Erosion_Control.pdf

Project design and engineering, environmental permitting, tree and brush removal, and rail removal have already been completed. Erosion controls are the responsibility of Squannacook Greenways and are not part of this bid.

The construction project addressed by this document involves, at a minimum, the following major tasks:

1. Set up a staging area for equipment and materials.
2. Clear stumps and remaining vegetative debris from the corridor.
3. Restore drainage and stabilize corridor as needed.
4. Remove organic soil material from the trail surface and store it temporarily on site for reuse along the edges of the trail.
5. Remove and properly dispose of ties.
6. Level and grade the sub-base, applying additional aggregate and/or sand over the original base as needed.
7. Install, compact, and grade the new hard pack wearing surface.
8. Screen the organic soil material and back fill, grade, and seed along trail shoulders.

All work will must be done within the period from November 7, 2021 to March 15, 2022 to fulfill permitting requirements for the Natural Heritage & Endangered Species Program (NHESP).

Areas of special interest include the raised bed areas that experienced embankment erosion and culverts in need of repair and drainage restoration. Areas of special environmental concern include the trail's proximity to wetlands and the Squannacook River. The wetland mitigation plan affects construction in many areas of the trail. There are also areas of riverbank that require restoration.

This Construction Guidelines document is to be used to establish the required work, the order in which it should be performed, and the specifications required to construct the trail by construction contractors.

Section 3. Regulatory and Legal Requirements

Regulatory and legal requirements for construction of the Squannacook River Rail Trail are addressed in several documents, which are listed in the Table of Contents. These documents are available on the Squannacook Greenways website at the URLs listed in the Table of Contents. Contractors are advised to download and understand these documents before bidding. **The selected contractor must be thoroughly familiar and comply with all of these documents.** In addition, the Orders of Conditions are required to be kept on site at all times during construction.

Note that this project has been ruled by the Massachusetts Department of Labor to NOT be covered by the prevailing wage law.

3.1. Environmental Requirements

Because of its location in Estimated Habitat of Rare Wildlife, this rail trail project is regulated under the Massachusetts Endangered Species Act. All construction shall take place between the dates of November 7 and March 15 to avoid impacts to sensitive habitat, as stipulated under the Natural Heritage & Endangered Species Program (NHESP).

In addition, the project shall comply with Orders of Conditions issued by the Townsend and Groton Conservation Commissions. Much of the construction work is within 100-foot wetland buffer zone or 200-foot riverfront area, requiring special measures to protect the resource areas. These areas have been professionally delineated and plans developed for placement of erosion control barriers. Squannacook Greenways has cleared much of the brush and installed straw wattles. The contractor will not be responsible for installing or removing wattles. No construction activity shall occur outside of the erosion control barriers.

The project shall comply with Best Management Practices created by the Massachusetts Department of Environmental Protection (DEP) to manage construction risks associated with development of former railroad rights-of-way into rail trails. No soil shall be removed from the rail corridor and excavation shall be kept to a minimum to prevent exposure to potentially contaminated soil.

Note that Best Management Practices require that we “hire an independent environmental monitor or task existing staff to oversee the Construction Contractor.” This will be the sole responsibility of Squannacook Greenways and should not be included in this contract.

3.2. Accessibility Requirements

The specifications in this document for the rail corridor and parking areas adhere to the accessibility guidelines in the U.S. Forest Service Trail Accessibility Guidelines (FSTAG 2013) and the Massachusetts 521 CMR: Architectural Access Board CMR 23.00 Parking and Passenger Loading Area (2016).

Section 4. Staging Areas

4.1. Objective

One or more staging areas shall be developed as part of this contract and used for construction. The contractor shall clear the areas of remaining trees and brush and grade the sites as needed for equipment access, material storage, and loading.

- **Crosswinds Driver (Groton)** – A staging area is available on the west side of Crosswinds Drive along the rail corridor.
- **Fisherman's parking lot (Townsend)** – A staging area is available along Main Street (Route 119), east of Shepherd's.

4.2. Regulatory Requirements

- 4.2.1. Proper environmental safeguards (e.g. erosion control barriers installed by Squannacook Greenways) shall be in place throughout the construction and use of staging areas.
- 4.2.2. No soil shall be removed from the rail corridor.
- 4.2.3. Any excavation shall be kept to a minimum to prevent exposure to potentially contaminated soil on the rail corridor.
- 4.2.4. Erosion control barriers (wattles) shall be preserved during construction and no construction activity shall be done outside of the barriers.

4.3. Construction Specifications

- 4.3.1. The contractor shall establish a project plan and obtain approval from Squannacook Greenways.
- 4.3.2. Access to the trail is via roadways and staging areas. No other access shall be used without permission of Squannacook Greenways.
- 4.3.3. All equipment traffic shall be on the rail bed and there shall be no heavy equipment traffic or other disturbance on the surrounding lands.
- 4.3.4. Ties are to be staged on and under 10-ml polyethylene sheeting, properly secured, at staging areas.
- 4.3.5. Immediately following construction, all staging materials shall be removed and the areas restored to a clean condition. The contractor shall remove and properly dispose of the sheeting used to cover ties general cleanup of tie staging area.
- 4.3.6. The contractor shall remove and properly dispose of all debris, rail spikes, broken ties, etc. associated with this project.
- 4.3.7. Staging areas shall be graded and reseeded with native grasses following construction.

Section 5. Corridor Remediation

5.1. Objective

Several locations have erosion damage that require repairs to the riverbank, rail corridor, and culverts. For the location of culverts, see the Valuation Maps at http://www.sqgw.org/valuation_maps.html.

5.2. Regulatory Requirements

- 5.2.1. Proper environmental safeguards (e.g. erosion control barriers) must be in place throughout construction.
- 5.2.2. No soil shall be removed from the rail corridor.
- 5.2.3. Any excavation must be kept to a minimum to prevent exposure to potentially contaminated soil on the rail corridor.
- 5.2.4. All required permits from local, state, and federal regulatory agencies must be acquired and copies supplied to Squannacook Greenways.

5.3. Construction Specifications

- 5.3.1. A project plan must be established and approved by the Squannacook Greenways.
- 5.3.2. Access points for equipment, material stock piles, and loading shall be limited to the staging areas defined in this specification.

5.4. Bank Restorations

- 5.4.1. In areas where erosion or other causes have reduced the ballast, additional crushed stone topped with four inches of processed gravel shall be added to restore the original grade.
- 5.4.2. The south embankment adjacent to the Squannacook River near the fisherman's parking area east of Shepherd's has experienced a few erosion gullies on the river bank that need repair by carefully placing stone or other appropriate measures.
- 5.4.3. Repairs are needed to the berm in Groton.

5.5. Culvert repairs

- 5.5.1. The washed-out area above culvert No. 42.37, on the north side of the trail east of Harbor Village in Townsend, must be repaired by filling with approximately three tons of

erosion control crushed stone.



Figure 1: Erosion above culvert No. 42.37 east of Harbor Village

- 5.5.2. The washed out area above culvert No. 43.89, on the north side of the trail east of Shepherd's in Townsend, shall be repaired by filling with approximately 16 tons of processed gravel or crushed stone and covered with erosion control stone. Any known internal channels shall also be filled.



Figure 2: Washed out area above culvert No. 43.89 east of Shepherd's in Townsend

Section 6. Removal of Stumps and Vegetative Debris

6.1. Objective

See plan for Typical Cross-Section at:

http://www.sqgw.org/engineering_plans.html

A professional tree clearing service was hired to remove trees and vegetation from the entire rail corridor during the 2019-2020 construction season. Subsequently, volunteers cleared much of the woody debris, brush, small trees, and other obstructions from the corridor to open a walking path. The construction contractor shall remove remaining stumps, brush, and woody debris as necessary.

6.2. Regulatory Requirements

- 6.2.1. Proper environmental safeguards (e.g. erosion control barriers installed by Squannacook Greenways) must be in place throughout tree and brush removal.
- 6.2.2. No soil shall be removed from the rail corridor.
- 6.2.3. Any excavation shall be kept to a minimum to prevent exposure to potentially contaminated soil on the rail corridor.

6.3. Specifications

- 6.3.1. All woody debris, brush, and other vegetation shall be cut and removed from the area within 10 feet from the existing rail centerline to create a 20-foot wide corridor.
- 6.3.2. An overhead clearance of 11 feet shall be established for construction and emergency vehicles.

6.4. Recommended procedures

- 6.4.1. Work crews should identify invasive plants such as Japanese knotweed, bittersweet, burning bush, and multi-flora rose. These plants shall not be removed from the corridor but should be piled off the trail and left to decompose.
- 6.4.2. All remaining brush and other organic material remaining within 10 feet from the existing rail centerline shall be removed to create a 20-foot wide corridor.
- 6.4.3. An overhead clearance of 11 feet shall be established for construction and emergency vehicles.
- 6.4.4. Stumps within the 10 foot trail shall be removed and holes backfilled. If removal cannot be accomplished without causing significant soil disturbance, the stumps shall be ground in place.
- 6.4.5. Stumps outside the 10 foot trail (more than five feet from the centerline of the rails) may remain in place if trimmed flush to the ground.

- 6.4.6. Vehicles shall never leave the corridor onto private property without written consent of the owner.
- 6.4.7. Wood chips or comparable material shall be used to stabilize erosion areas with little or no top soil, such as the south embankment between Sterilite and the self-storage facility.
- 6.4.8. Large stones should be moved to the road crossings for use as temporary bollards to block side trails. The stones should be placed an appropriate distance apart to prevent access by all-terrain vehicles.

Section 5. Tie Removal

5.1. Objective

The contractor is responsible for removing the ties from the corridor, moving them to the staging area, and delivering them to an approved facility. The contractor is also responsible for removing and properly managing all debris associated with tie removal.

The ties shall be transported to an EPA-approved disposal facility (e.g., co-generation plant for incineration). The contractor is responsible for identifying and negotiating with facility and is responsible for disposal costs.

5.2. Regulatory Requirements

- 5.2.1. Proper environmental safeguards (e.g. erosion control barriers installed by Squannacook Greenways) shall be in place throughout the rail and tie removal.
- 5.2.2. No soil shall be removed from the rail corridor.
- 5.2.3. Any excavation shall be kept to a minimum to prevent exposure to potentially contaminated soil on the rail corridor.

5.3. Construction Specifications

- 5.3.1. The contractor shall establish a project plan and obtain approval from Squannacook Greenways.
- 5.3.2. Access points for equipment, material storage, and loading shall be limited to the staging areas defined in this specification. If other access from private property is necessary, written permission shall be obtained from the owner and copies supplied to the Squannacook Greenways.
- 5.3.3. All ties shall be removed from the corridor, including partial ties.
- 5.3.4. Ties shall have all steel spikes and plates removed to avoid extra fees.
- 5.3.5. Tie material shall be bundled and stored on site for as short a period as deemed reasonable. No ties removed from the bed shall remain on the corridor after March 15.
- 5.3.6. All bundled ties shall be transported to an EPA-approved facility (such as a biomass co-generation plant for incineration).
- 5.3.7. The contractor shall remove and properly dispose of all debris, broken ties, etc. associated with this project.

Section 6. Sub Base Preparation

6.1. Objective

See plan for Typical Cross-Section at:

http://www.sqgw.org/engineering_plans.html

All organic soil material on the trail surface shall be removed and stored on site for reuse in grading along the sides of the trail. If appropriate, soil shall be screened to remove roots and other debris.

Much of the rail corridor was built on sand rather than rock ballast. Where erosion or other causes have reduced the sub base, additional sand and/or crushed stone topped with four inches of processed gravel shall be added to restore the original grade. Existing drainage shall be restored and new drainage constructed where required.

The sub base shall then be graded at least 10 feet wide and compacted for use and in preparation for installation of the hard-pack stone-dust aggregate surface. Edges of the trail shall be built up and graded with soil material.

6.2. Regulatory Requirements

- 6.2.1. Proper environmental safeguards (e.g. erosion control barriers installed by Squannacook Greenways) shall be in place throughout for the duration of the sub base preparation.
- 6.2.2. No soil shall be removed from the rail corridor.
- 6.2.3. Any excavation shall be kept to a minimum to prevent exposure to potentially contaminated soil on the rail corridor.

6.3. Accessibility Specifications

The resultant trail shall meet the following U.S. Forest Service Trail Accessibility Guidelines:

- 6.3.1. Maximum running slope of 5% with no segment over 12%.
- 6.3.2. Maximum cross-slope of 5%.
- 6.3.3. No obstacles over two inches high.
- 6.3.4. No objects (signs, trees, etc.) protruding more than 4 inches into the trail within the 10 foot trail width.

6.4. Construction Specifications

- 6.4.1. The contractor shall establish a project plan and obtain approval from Squannacook Greenways.
- 6.4.2. Access points for equipment, material storage, and loading shall be limited to the staging areas defined in this specification.

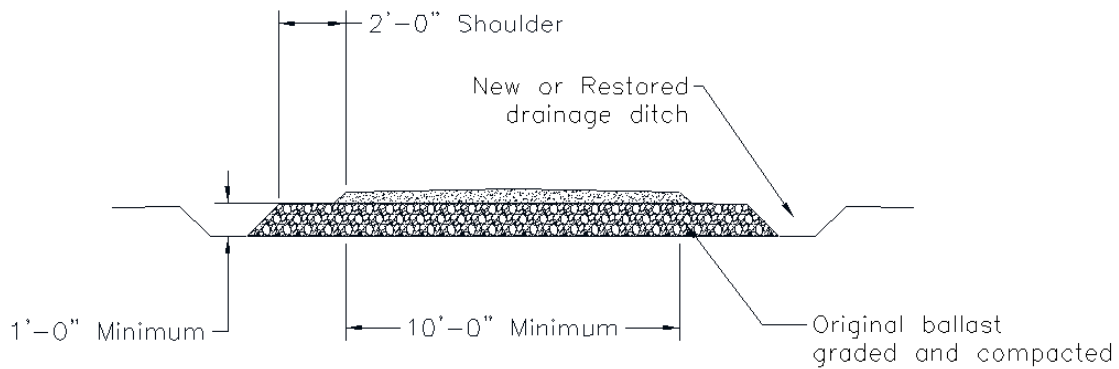


Figure 3: Drainage and sub base

6.5. Drainage

- 6.5.1. All sections of trail that are level or below the immediately surrounding grade shall have drainage ditches cleaned and restored.
- 6.5.2. Drainage ditches shall be approximately 12 inches below the finish grade of the compacted ballast.
- 6.5.3. Existing drainage ditches vary significantly regarding shoulder width. The two-foot minimum shoulder width may need to be reduced to one foot in some below-grade areas due to available space within ledge cutouts.
- 6.5.4. Drainage is not required on raised bed sections of the corridor where the bed is at least 12 inches above the immediately surrounding grade.
- 6.5.5. Organic material from drainage restoration shall be used to restore areas where topsoil has been eroded or scattered in areas where it may be beneficial.

6.6. Grading and Compaction of the Sub Base

- 6.6.1. The original ballast shall be graded level to a width of 10 feet.
- 6.6.2. The graded ballast shall follow the original grade of the existing rail.
- 6.6.3. The graded ballast shall be graded so that it is centered on the original placement of the rail bed.
- 6.6.4. Ballast shall not be pushed into drainage ditches when grading.
- 6.6.5. The graded ballast shall be compacted with a 12 ton minimum vibratory roller except where noted otherwise
 - 6.6.5.1. Do not vibrate directly above culverts.
- 6.6.6. The minimum depth of good quality original ballast and/or new crushed stone shall be at least six inches.

Section 7. Aggregate Hard Pack Surface Installation

7.1. Objective

See plan for Typical Cross-Section at:

http://www.sqgw.org/engineering_plans.html

A new trail surface of 3/8-inch minus aggregate hard pack is to be constructed on top of the repaired, compacted, and graded sub base. The hard pack trail shall be 10 feet wide, with a minimum thickness of four inches, and a crown to shed water. As a final step, soil along the trail edges shall be stabilized by reseeding with an erosion grass mix.

7.2. Regulatory Requirements

- 7.2.1. Proper environmental safeguards (e.g. erosion control barriers installed by Squannacook Greenways) must be in place throughout the surface installation.
- 7.2.2. No soil shall be removed from the rail corridor.
- 7.2.3. Any excavation shall be kept to a minimum to prevent exposure to potentially contaminated soil on the rail corridor.

7.3. Accessibility Specifications

The resultant trail shall meet the following U.S. Forest Service Trail Accessibility Guidelines:

- 7.3.1. Maximum running slope of 5% with no segment over 12%.
- 7.3.2. Maximum cross-slope of 5%.
- 7.3.3. No obstacles over two inches high.
- 7.3.4. No objects (signs, trees, etc.) protruding more than 4 inches into the trail.

7.4. Aggregate Specifications

The 3/8-inch minus aggregate hard pack shall meet the following specifications:

- 7.4.1. Shall consist of hard, durable particles and fragments of crushed stone and gravel.
- 7.4.2. Shall be free of (less than 0.5 %) organic material (wood, top soil, etc.).
- 7.4.3. Shall be free of (less than 0.5 %) lumps and/or balls of clay.
- 7.4.4. The hard pack shall be tested in accordance with ASTM D4318 and have a plasticity index limit of 6 and a liquid limit of 25
- 7.4.5. Gradation is achieved by crushing, screening and then blending as necessary. The material shall meet the following screen analysis by weight:

Sieve Designation	Percent Passing
1/2"	100%
3/8"	90-100%
No. 4	60-81%
No. 8	44-60%
No. 40	20-33%
No. 200	10-16%

7.5. Installation Specifications

- 7.5.1. The contractor shall establish a project plan and obtain approval from Squannacook Greenways.
- 7.5.2. Access points for equipment, material stock piles, and loading shall be limited to the staging areas defined in this specification.
- 7.5.3. Proper environmental safeguards (e.g. erosion control barriers installed by Squannacook Greenways) shall be established or existing safeguards inspected before work begins.
- 7.5.4. The hard pack material shall be delivered directly to the site via the previously compacted ballast trail. There shall be no vehicle traffic off of the trail.
- 7.5.5. The hard pack shall be spread centered on the previously graded and compacted trail to form a 10-foot wide path approximately six inches deep. Application may be by drop spreading or by use of an asphalt spreader for best results.
- 7.5.6. The hard pack shall be graded and compacted to have a center crown and have a slope of at least 1/4 inch per foot and not exceed 1/2 inch per foot (see Figure 4).
- 7.5.7. The hard pack shall be compacted with a 12 ton minimum vibratory roller except as noted.
 - 7.5.7.1. Do not vibrate directly over culverts.
- 7.5.8. The compacted hard pack depth shall be at least four inches at the edges and 5-1/4 inches at the center.
- 7.5.9. Edges of the trail shall be graded with soil and stabilized by reseeding with an erosion grass mix.

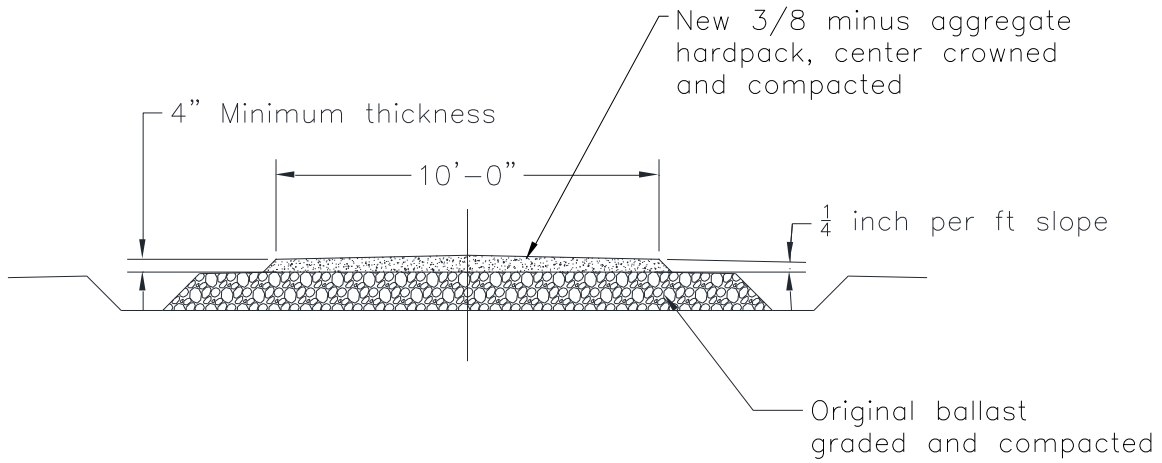


Figure 4: Hard pack installation

Section 8. Miscellaneous Reference Data

All dimensions, numbers, weights, values, etc. listed below are for the entire 3.7-mile rail corridor. These are estimates provided by Squannacook Greenways, Inc. for the convenience of the contractor. Squannacook Greenways does not warrant that these values are accurate. The contractor is responsible for verifying and establishing true values and should not rely on these estimates.

8.1. Miscellaneous Reference Data

- 8.1.1. The length of the entire trail is 3.7 miles.
- 8.1.2. Typical width of the leased MBTA corridor is approximately 80 feet, with some exceptions in the Townsend Harbor Pond area, near Sterilite, and near Depot Street. Most of the corridor will not be disturbed by construction.

8.2. Steel Rail

- 8.2.1. The steel rail weighs up to 85 lbs. per yard
- 8.2.2. The rail lengths are approximately 30 feet.

8.3. Rail Road Ties

- 8.3.1. The ties are approximately 6 inches x 8 inches x 8-1/2 feet long.
- 8.3.2. The ties weigh up to 200 lbs. each.
- 8.3.3. The ties are spaced approximately 19.5 inches apart.
- 8.3.4. The estimated number of ties on the 3.7 mile corridor is approximately 12,000.
- 8.3.5. The maximum total weight of ties to dispose of is 1,200 tons.
- 8.3.6. It is assumed the ties have no resale value.

8.4. 3/8-Inch Minus Aggregate Hard Pack

- 8.4.1. Hard pack has an estimated compacted density of 150 lbs./cu ft.
- 8.4.2. The 3.7 mile trail is estimated to require 1,526 tons of hard pack per mile.
- 8.4.3. The total hard pack required is estimated at 5,647 tons.