



**Technical Specifications**

Swampscott Rail Trail

*Beach Bluff to Marblehead Town Line*

*Swampscott, Massachusetts*

April 6, 2020

Prepared by:

Stantec Consulting Services Inc.

## **ALL CONTRACT ITEMS**

Unless otherwise amended by these Technical Specifications or the Contract Drawings, all work under this contract shall conform to the requirements of the applicable "Sections" of *The Commonwealth of Massachusetts, Department of Transportation Standard Specifications for Highways and Bridges*, 2020 Edition; the 2017 MassDOT Construction Standard Details; the *1990 Standard Drawings for Signs and Supports*; the *1996 Construction and Traffic Standard Details* (as relates to the Pavement Markings details only); the *2015 Overhead Signal Structure and Foundation Standard Drawings*; the 2009 *Manual on Uniform Traffic Control Devices (MUTCD)* with Massachusetts Amendments and the *Standard Municipal Traffic Code*; the *1968 Standard Drawings for Traffic Signals and Highway Lighting*; the latest edition of *American Standard for Nursery Stock*; and any and all amendments or addenda thereto, hereinafter referred to as the "Standard Specifications".

The following items reflect special conditions particular to this Contract. As such, they amend and/or supplement the provisions governing the item as described in the Standard Specifications.

The Contractor's attention is directed to the necessity of making his own investigation in order to assure that no damage to existing structures, drainage lines, traffic signal conduits, etcetera, will occur.

The Contractor shall notify Massachusetts DIG SAFE and procure a Dig Safe Number for each location prior to disturbing existing ground in any way. Contact the Dig Safe Call Center by dialing 811 or 1-888-344-7233 or online at [www.digsafe.com](http://www.digsafe.com).

The Contractor is hereby notified that they are ultimately responsible for constructing all project elements in strict compliance with the current AAB/ADA rules, regulations, and standards.

All construction elements in this project associated with sidewalks, walkways, cuts are controlled by 521 CMR - Rules and Regulations of the Architectural Access Board (AAB).

The AAB Rules and Regulations specify maximum slopes and minimum dimensions required for construction acceptance. There is no tolerance allowed for slopes greater than the maximum slope nor for dimensions less than the minimum dimensions.

## **REFERENCES**

Where references are made in these Specifications to standard specifications, codes, etc., of the U.S. Government, State or local authorities, or professional and industrial

societies and associations, the applicable portions thereof shall govern as fully as if they were printed in their entirety, herein, and shall include all revisions thereto issued as of the date of the Notice to Contractors pertaining hereto. Comply with the requirements of the following codes and industry standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern. The following references are used herein and shall mean:

The Commonwealth of Massachusetts, Department of Transportation Standard Specifications for Highways and Bridges, 2020 Edition.

Access MassDOT Highway Information related to Construction, Design/Engineering, Contractor/Vendor Information, Approved Materials and Fabricators, Manuals, Publications and Forms at: <http://www.mass.gov/massdot/highway> (select Highway Construction Resources)

## UTILITY CONTACT INFORMATION

The Contractor shall notify and coordinate with each known utility prior to disturbing existing ground in any way.

National Grid Electric Attn: Sandra Annis 548 Haydenville Road Leeds, MA 01053 O: 413-582-7424 E: <a href="mailto:Sandra.annis@nationalgrid.com">Sandra.annis@nationalgrid.com</a>	National Grid Gas Attn: Melissa Owens 40 Sylvan Road Waltham, MA 02451 O: 781-907-2845 E: <a href="mailto:Melissa.owens@nationalgrid.com">Melissa.owens@nationalgrid.com</a>	MBTA Attn: Christine Bresnahan 10 Park Plaza – Rm 5170 Boston, MA 02116 O: 617-222-3361 E: <a href="mailto:cbresnahan@mbta.com">cbresnahan@mbta.com</a>
Verizon Attn: Karen Mealey 385 Myles Standish Blvd. Taunton, MA 02780 O: 774-409-3160 E: <a href="mailto:karen.mealey@verizon.com">karen.mealey@verizon.com</a>	Comcast Cable Corporation Attn: Wendy Brown PO Box 6505, 5 Omni Way Chelmsford, MA 01824 O: 978-848-5163 E: <a href="mailto:wendy_brown@comcast.net">wendy_brown@comcast.net</a>	Crown Castle Attn: Mark Bonanno 80 Central Street Boxborough, MA 01719 O: 508-616-7818 E: <a href="mailto:mark.bonanno@crowncastle.com">mark.bonanno@crowncastle.com</a>
MWRA (Water) Attn: Ralph Francesconi 2 Griffin Way Chelsea, MA 02150 O: 617-305-5827 E: <a href="mailto:ralph.francesconi@mwra.state.ma.us">ralph.francesconi@mwra.state.ma.us</a>	Swampscott Fire Alarm Attn: Kevin Breen 76 Burrill Street Swampscott, MA 01907 O: 781-595-4050 E: <a href="mailto:kbreen@town.swampscott.ma.us">kbreen@town.swampscott.ma.us</a>	Swampscott DPW Attn: Gino Cresta, Jr. 22 Monument Avenue Swampscott, MA 01907 O: 781-596-8860 E: <a href="mailto:gcresta@town.swampscott.ma.us">gcresta@town.swampscott.ma.us</a>

<b>ITEM 101.</b>	<b>CLEARING AND GRUBBING</b>	<b>ACRE</b>
<b>ITEM 102.</b>	<b>SELECTIVE CLEARING AND THINNING</b>	<b>ACRE</b>

All work performed under these Items shall be in accordance with the relevant provisions of Section 101 of the Standard Specifications for Highways and Bridges.

<b>ITEM 102.51</b>	<b>INDIVIDUAL TREE PROTECTION</b>	<b>EACH</b>
<b>ITEM 102.52</b>	<b>TEMPORARY TREE PROTECTION FENCE</b>	<b>FOOT</b>

**DESCRIPTION**

**GENERAL**

Examine all other Items of the MassDOT Standard Specifications, Standard Special Provisions and Special Provisions for requirements that may affect the Work of this Item whether or not such work is specifically mentioned.

The work under these items shall conform to the relevant provisions of Sections 101, 644 and 771 and the following:

The purpose of these items is to prevent damage to branches, stems and root systems of existing individual trees as well as shrubs and other quality vegetation to remain, and to ensure their survival. To the extent possible, to avoid soil compaction within the root zone, construction activities including, but not limited to, vehicle movement, excavation, embankment, staging and storage of materials or equipment shall not occur underneath the canopy (drip line) of trees to remain. Where these activities will occur within 10 feet of the canopy of trees or where directed, the Contractor shall take the appropriate protective measures specified herein.

Individual Tree Protection, Item 102.51, shall be used when construction activities are likely to occur within the canopy of individual trees or where there may be any risk of damage to trees.

Temporary Tree Protection Fence, Item 102.52 shall be used to protect areas of existing trees or other areas of quality vegetation that is to remain.

The Contractor shall be solely responsible for judging the full extent of the work requirements, including, but not necessarily limited to any equipment and materials necessary for providing tree protection.

Incidental to the cost of these items, the Contractor shall retain the services of a certified arborist, who shall make recommendations as to the specific appropriate treatment of trees within or near the work zone.

Prior to any construction activities, the Contractor and Arborist shall walk the site with the Engineer and Town Tree Warden to identify which trees will require protection and to determine approved measures. The Arborist shall make recommendations as to appropriate methods to trees. The Engineer will have final decision as to trees and methods.

The Contractor is responsible for the protection of all existing trees and plants within and immediately adjacent to the construction area that are not designated to be removed for the length of the construction period.

## **SUBMITTALS**

Incidental to this item, the Contractor shall provide to the Engineer one (1) copy American National Standards Institute (ANSI) Standard Z-133.1 and A300 Standard Practices for Tree, Shrub, and Other Woody Plant Maintenance, Part 1: Pruning. These references shall be kept by the Engineer at his office for the length of the Contract.

Prior to start of work, the Contractor shall submit to the Engineer the name and certification number of the Massachusetts Certified Arborist referenced herein. Cost for Certified Arborist for all activities pertaining to this Item shall be incidental to this item.

## **REFERENCES**

Where references are made in these Specifications to standard specifications, codes, etc., of the U.S. Government, State or local authorities, or professional and industrial societies and associations, the applicable portions thereof shall govern as fully as if they were printed in their entirety, herein, and shall include all revisions thereto issued as of the date of the Notice to Contractors pertaining hereto. Comply with the requirements of the following codes and industry standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern. The following references are used herein and shall mean:

MassDOT Standard Specifications: Commonwealth of Massachusetts, Massachusetts Department of Transportation/Highway (formerly Massachusetts Highway Department and Department of Public Works), "Standard Specifications for Highways and Bridges," latest edition and including all applicable Supplemental Specifications, Standard Special Provisions and Special Provisions.

## **MATERIALS**

Fence and temporary fence posts shall be subject to the approval of the Engineer.

Fencing for individual plants shall be polyethylene fencing or chain link fence (new or used).

Staking for individual tree protection fencing shall be steel posts or 2x4 lumber as directed and approved by the Engineer.

Wood chips shall conform to provisions of Wood Chip Mulch under Materials Section M6.04.3.

Trunk protection shall be 2x4 cladding, at least 8 feet in length, clad together with wire. Alternative materials shall be at the approval of the Engineer. Alternative materials shall provide adequate protection from anticipated construction activities and shall not injure or scar trunk. Trunk protection shall include burlap to separate trunk cladding from bark.

Temporary Tree Protection Fence shall be brightly colored polypropylene barricade or wooden snow fencing for tree protection or safety fencing as shown on the Contract drawings or as directed by the Engineer. Fencing shall be a minimum of 4 feet high and supported by steel or hardwood stakes spaced at a maximum of 8 feet on center or by other means acceptable to the Engineer. Fencing shall be materials and fastenings sufficient to provide sturdy and highly visible separation of the construction activities from the trees and existing plantings to be preserved.

Incidental to these items, the Contractor shall provide water for maintaining plants in the construction area that will have exposed root systems for any period during construction.

## **CONSTRUCTION METHODS**

To the extent possible, to avoid soil compaction within the root zone, construction activities including, but not limited to, vehicle movement, excavation, embankment, staging and storage of materials or equipment shall not occur underneath the canopy (drip line) of trees to remain. Where these activities will occur within 10 feet of the canopy of trees, the Contractor shall provide Individual Tree Protection as specified herein.

For individual tree protection, the Contractor shall set posts and fencing at the limits of the tree canopy. Where construction activities closer to the trees is unavoidable, the contractor shall tie branches out of the way and place wood chips to a depth of 6 inches on the ground to protect the root systems. The Contractor shall wrap the area of the trunk

of the tree with burlap prior to armoring with 2x4 cladding. Cladding for tree trunks shall extend from the base of the tree to at least 8 feet from the base.

To the extent possible, temporary landscaped fencing shall be installed at the limit of tree canopy and shall be staked and maintained vertical for the length of the contract.

Where excavation within canopy is unavoidable, the Contractor shall use equipment and methods that shall minimize damage to the tree roots, per recommendations of the Certified Arborist. Such methods may require root pruning prior to, as well as during, any excavation activities.

All fencing, trunk protection, branch protection, and woodchips shall be maintained throughout the duration of the contract. Protective fencing shall be repaired and woodchip mulch replaced as necessary during the duration of the contract at no additional cost.

### ***CUTTING AND PRUNING***

Some pruning of roots and branches may be a necessary part of construction. Pruning will be performed on the same side of the tree that roots have been severed.

The Contractor shall retain the services of a Massachusetts State Certified Arborist to oversee any cutting of limbs, stem or roots of existing trees. All cuts shall be clean and executed with an approved tool. Under no circumstances shall excavation in the tree protection area be made with mechanical equipment that might damage the existing root systems.

Any tree root area exposed by construction shall be covered and watered immediately. Exposed tree roots shall be protected by dampened burlap at all times until they can be covered with soil.

### ***WATERING***

Water each tree within the construction area where work is in progress twice per week until the surrounding soil of each tree is saturated for the duration of construction activities.

### ***REMOVAL OF PROTECTION***

After all other construction activities are complete, but prior to final seeding, wood chips, temporary fencing, branch protection, and trunk protection materials shall be removed and disposed off site by the Contractor at no additional cost.

### ***TREE DAMAGE***

The Contractor shall be held responsible for the health and survival of the existing trees in the immediate vicinity of the of the construction area. Damage that, in the Engineer's opinion, can be remedied by corrective measures shall be repaired immediately. Broken limbs shall be pruned according to industry standards. Wounds shall not be painted. Trees or shrubs that are damaged irreparably shall, at the Engineer's discretion, be replaced per the requirements of Division I of these Special Provisions. Cost of replacement trees shall be borne by the Contractor.

### **COMPENSATION**

Where the plans show specific, individual trees to remain and where grading or other disturbance is shown within the drip line of these trees or where the Engineer determines that an individual tree must be protected, these trees shall be protected and paid for under Item 102.51 Individual Tree Protection per each tree protected.

Temporary landscape fence will be measured for payment under Item 120.52 by the foot of fence installed, complete in place.

Where the plans show specific, individual trees to remain and where grading or other disturbance is shown within the drip line of these trees or where the Engineer determines that an individual tree must be protected, these trees shall be protected and paid for under Item 102.51, Individual Tree Protection.

Payment under these items shall be scheduled throughout the length of contract: 30 percent of value shall be paid upon installation, 30 percent approximately halfway through the contract, and the remainder to be paid at the end of the contract after completion of construction operations that would disturb plants and after the protection materials have been removed and properly disposed of off-site by the Contractor.

Compensation for Individual Tree Protection will be paid for at the contract unit price per each under Item 102.51. This item shall include full compensation for all labor, equipment, materials, and incidentals for the satisfactory completion of the work, including the services of a certified arborist, water and fertilizer, and the subsequent removal and satisfactory disposal of the protective materials upon completion of the contract.

Where construction disturbance, such as grading activities, will occur within the limits of the canopy of groups of trees, these trees shall be protected and paid for under Item 102.52, Temporary Tree Protection Fence.



Temporary Tree Protection Fence will be paid for at the Contract unit price per linear foot. This item shall include full compensation for all labor, equipment, materials, and incidentals for the satisfactory completion of the work, including the services of a certified arborist, water and fertilizer, and the subsequent removal and satisfactory disposal of the protective materials upon completion of the contract.

Cost of wood chips, as required, shall be incidental to these items.

<b>ITEM 120.</b>	<b>EARTH EXCAVATION</b>	<b>CUBIC YARD</b>
<b>ITEM 121.</b>	<b>CLASS A ROCK EXCAVATION</b>	<b>CUBIC YARD</b>

All work performed under these Items shall be in accordance with the relevant provisions of Section 120 of the Standard Specifications for Highways and Bridges.

<b>ITEM 129.5</b>	<b>TRACK EXCAVATION</b>	<b>FOOT</b>
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**DESCRIPTION**

Work under this Item shall consist of the removal and disposal of railroad tracks as shown on the Plans and as required by the Engineer. This includes all labor, equipment, materials, and protection necessary to remove the steel track, tie plates, spikes, pins, rail anchors, timber cross ties, timber switch ties, signs, junction boxes, wire, signal crossings, and other rail infrastructure and hardware.

**CONSTRUCTION METHODS**

All materials shall be approved for removal prior to the Contractor commencing activities. All materials removed will become the property of the Contractor and shall be disposed of in accordance with all local, State, and Federal regulations. No stockpiling of rail materials within the Right-of-Way shall be allowed without prior approval from the Engineer. In areas of the project where the track has already been removed and the timber cross ties remain, their removal will be subsidiary to this item.

**COMPENSATION**

***METHOD OF MEASUREMENT***

Measurement shall be made by the FOOT of single track removed. The measurement will be along the centerline between the 2 rails that form the single track. A single track is defined as a pair of rails, ties, and all connecting hardware.

***BASIS OF PAYMENT***

Track excavation will be paid for at the contract unit price per FOOT and shall be considered full compensation for all labor, tools, equipment, materials, testing, loading, transportation, approvals, and permits necessary for the completion of the work. Disposal of treated wood products shall be paid for under Item 184.1, Disposal of Treated Wood Products.

<b>ITEM 141.1</b>	<b>TEST PIT FOR EXPLORATION</b>	<b>CUBIC YARD</b>
<b>ITEM 144.</b>	<b>CLASS B ROCK EXCAVATION</b>	<b>CUBIC YARD</b>

All work performed under these Items shall be in accordance with the relevant provisions of Section 120 of the Standard Specifications for Highways and Bridges.

<b>ITEM 150.</b>	<b>ORDINARY BORROW</b>	<b>CUBIC YARD</b>
<b>ITEM 151.</b>	<b>GRAVEL BORROW</b>	<b>CUBIC YARD</b>

All work performed under these Items shall be in accordance with the relevant provisions of Section 150 of the Standard Specifications for Highways and Bridges.

<b>ITEM 170.</b>	<b>FINE GRADING AND COMPACTING</b>	<b>SQUARE YARD</b>
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All work performed under these Items shall be in accordance with the relevant provisions of Section 170 of the Standard Specifications for Highways and Bridges.

<b>ITEM 180.01</b>	<b>ENVIRONMENTAL HEALTH AND SAFETY PROGRAM</b>	<b>LUMP SUM</b>
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**DESCRIPTION**

The work shall consist of ensuring the health and safety of the Contractor’s employees and subcontracting personnel, the Engineer, their representatives, the environment, and public welfare from any on-site chemical contamination present in air, soil, water and sediment.

The Contractor shall prepare and implement a site-specific Environmental Health and Safety Plan (EHASP) which has been approved and stamped by a Certified Industrial Hygienist (CIH) and includes the preparer's name and work experience. The EHASP shall include appropriate components required by OSHA Standard 29 CFR 1910.120(b) and the Massachusetts Contingency plan (MCP) 310 CMR 40.0018 and must comply with all applicable state and federal laws, regulations, standards and guidelines, and provide a degree of protection and training appropriate for implementation on the project. The EHASP shall be a dynamic document with provision for change to reflect new

information, new practices or procedures, changing site environmental conditions or other situations which may affect site workers and the public. The EHASP shall be developed and implemented independently from the standard construction HASP required to work on all MassDOT construction projects.

Health and safety procedures provided by the Contractor shall comply with all the appropriate regulations that address employee working conditions, including but not limited to standards established by OSHA and National Institute for Occupational Safety and Health (NIOSH). Equipment used for the purpose of health and safety shall be approved by and meet pertinent standards and specifications of the appropriate regulatory agencies.

A copy of the most up-to-date version of the EHASP shall be maintained on-site at all times by the Contractor. The on-site copy shall contain the signature of the Engineer and a representative of the town, Contractor, and Subcontractors involved with on-site activities. The employee's signature on the EHASP shall be deemed prima facie evidence that the employee has read and understands the plan. Updated copies of signature sheets shall be submitted to the Engineer.

The EHASP shall specify a Contractor Site Safety and Health Officer responsible for implementation of the EHASP and to oversee all construction activities, including handling, storage, sampling and transport, which require contact with or exposure to potentially hazardous materials.

The level of protection required to ensure the health and safety of on-site personnel will be stipulated in the EHASP. The Site Safety and Health Officer shall implement the EHASP based on changing site and weather conditions, type of operation or activity, chemical compounds identified on-site, concentration of the chemicals, air monitoring data, physical state of the hazardous materials, potential duration of exposure to hazardous materials, dexterity required to perform work, decontamination procedures, necessary personnel and type of equipment to be utilized.

During implementation of the EHASP, a daily log shall be kept by the Site Safety and Health Officer and a copy shall be provided weekly to the Engineer. This log shall be used to record a description of the weather conditions, levels of personal protection being employed, screening data and any other information relevant to on-site environmental safety conditions. The Site Safety and Health Officer shall sign and date the daily log.

## **METHOD OF MEASUREMENT AND BASIS OF PAYMENT**

Preparation and implementation of the Environmental Health and Safety Program, including the monitoring, protection and storage of all contaminated materials, as well as

subsequent modifications to the EHASP, will be measured and paid for at the LUMP SUM Bid Price.

Payment of 50% of the Environmental Health and Safety Program contract price will be made upon the initial acceptance of the EHASP by the Engineer. Payment of the remaining 50% of the Environmental Health and Safety Program contract price will be made upon completion of the work. The bid price shall include preparation and implementation of the EHASP as well as the cost for its enforcement by the Site Safety and Health Officer along with any necessary revisions and updates. The work of implementing the Environmental Health and Safety Program includes work involving, but not limited to, the monitoring, protection, and storage of all contaminated materials.

**ITEM 180.02      PERSONAL PROTECTION LEVEL C UPGRADE      HOUR**

The work shall consist of providing appropriate personal protective equipment (PPE) for all personnel in an area either containing or suspected of containing a hazardous environment.

Contingencies for upgrading the level of protection for on-site workers will be identified in the EHASP and the Contractor shall have the capability to implement the personal protection upgrade in a timely manner. The protective equipment and its use shall be in compliance with the EHASP and all appropriate regulations and/or standards for employee working conditions.

Personal Protection Level C Upgrade will be measured and paid only upon upgrade to Level C and will be at the contract unit price, per HOUR, per worker, required in Level C personal protection. No payment will be made to the Contractor to provide Level D PPE.

**ITEM 180.03      LICENSED SITE PROFESSIONAL SERVICES      HOUR**

Within limited areas of the project site, soils, sediments and/or groundwater may be contaminated. A Licensed Site Professional (LSP) shall be required to provide the services necessary to comply with the requirements of the MCP. These services may include sampling, analysis and characterization of potentially contaminated media, preparation of Immediate Response Action (IRA) Plans, Utility-Related Abatement Measure (URAM) and Release Abatement Measure (RAM) Plans, Imminent Hazard Evaluations, status reports, transmittal forms, release notification forms, risk assessments, completion statements, and related documents required pursuant to the Massachusetts Contingency Plan (MCP). LSP hours related to the characterization and disposal of contaminated soil and/or sediment are incidental to the disposal items. An

estimate of LSP services to be provided shall be submitted to the Engineer for approval before any LSP activity begins.

The name and qualifications of the LSP and all environmental technicians to be assigned to the project shall be submitted to the Engineer for approval at least four weeks prior to initial site activities. The LSP shall have a current, valid license issued by the Massachusetts Board of Registration of Hazardous Waste Site Cleanup Professionals. The LSP shall have significant experience in the oversight of MCP activities at active construction sites. Qualification packages for the LSP and each technician shall include a resume, all recent work assignments with responsibilities identified (previous 5 years), and applicable training and certifications. A list of all Notices of Noncompliance, Notice of Audit Findings and Enforcement Orders issued by the DEP shall be submitted for all work assignments listed for the LSP and environmental technicians.

The LSP shall evaluate soil and/or sediment with discoloration, odor, and presence of petroleum liquid or sheening on the groundwater surface, or any abnormal gas or materials in the ground which are known or suspected to be oil or hazardous materials. Excavated soil and sediment which is suspected of petroleum contamination shall be field screened using the jar headspace procedures according to established DEP Guidance. All field screening equipment must be pre-approved by the Engineer. The LSP shall ensure proper on site calibration of all field screening instrumentation.

The Engineer shall be contacted immediately when observations or any field screening results verify contamination requiring further analysis, and/or enhanced management of suspect soil and/or sediment. Any enhanced management of contaminated soil to ensure proper stockpiling and storage is incidental to the LSP Services item. The LSP shall adequately characterize subsurface conditions prior to backfill in areas where contaminated material has been excavated. The Engineer shall approve the locations of the testing sites prior to the sampling.

Contaminated soil, sediment and/or groundwater shall be handled in accordance with all applicable state and federal statutes, regulations and policies. The LSP shall adequately characterize contaminated media for comparison to the requirements of the MCP. The Contractor and the LSP shall be aware of the reporting requirements for releases of oil and/or other hazardous material (OHM) as set forth in federal and state laws and regulations, and shall both be held responsible for performing the work in accordance with all applicable Federal and State laws and regulations. The LSP shall maintain written records in a clear and concise format which tracks the excavation, stockpiling, analysis and reuse/disposal of all suspect contaminated soils, sediments and groundwater. These records shall be up-to-date and available to the Engineer on a bi-weekly basis. The LSP shall review and summarize the laboratory data from any analyses performed on contaminated media. A report shall be delivered to the Engineer outlining the material

sampling methods, laboratory analysis results and proposed course of action. The laboratory report together with Chain of Custody forms for all analytical results shall be submitted to the Engineer within 14 days after completion of such analyses.

The LSP and Contractor shall be held responsible for the submission of all MCP-related documents to the Engineer at least 14 days in advance of any timeframe specified in the MCP and for the timely submission of data and tracking information as noted within this Item. All documents prepared under this Item must be reviewed and signed by the approved LSP. The Contractor and LSP shall be responsible for all fines, penalties and enforcement requirements imposed by applicable regulatory agencies for failure to meet regulatory and contract timeframes. No compensation will be provided for such fines, penalties and enforcement actions.

The Contractor and the LSP shall be aware of the reporting requirements for releases of oil and/or other hazardous material (OHM) as set forth in federal and state laws and regulations, and shall both be held responsible for performing the work in accordance with all applicable Federal and State laws and regulations.

If the Contractor causes a release of OHM, the Contractor shall be responsible for assessing and remediating the release in accordance with all pertinent State and Federal regulations, including securing the services of a LSP, at his own expense.

The LSP shall coordinate all activities involving both the Town and the DEP through the Engineer. Any notification of release shall be approved by the Department before submittal to the DEP, except if an imminent hazard condition exists as defined in 309 CMR 4.03(4)(b).

## **LABORATORY TESTING IN SUPPORT OF LSP SERVICES**

Laboratory testing provides for analytical testing in support of LSP services related to maintaining MCP compliance, such as delineating the extent and type of contamination present. Sampling and testing for disposal purposes are not included.

In order to maintain compliance with the MCP or other regulatory requirements, the LSP shall request approval from the Engineer to obtain samples from various locations and depths within the project area and to perform laboratory analyses on those samples. The samples shall be delivered to a DEP-certified laboratory using proper chain-of-custody documentation for analyses which, depending upon site conditions and suspected and/or identified contaminants of concern, may include, but are not limited to, metals, polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, polycyclic aromatic hydrocarbons (PAHs), extractable petroleum hydrocarbons (EPHs) and volatile petroleum hydrocarbons

(VPHs). Subsequent testing, depending upon initial results, may be required for Toxicity Characteristic Leaching Procedure (TCLP) analyses (EPA Method 1311) for metals.

### **METHOD OF MEASUREMENT AND BASIS OF PAYMENT**

LSP Services for work under this item will be measured per person, per HOUR of service provided by LSP, Environmental Technicians and other approved personnel. Travel time shall not be included in the billable hours. LSP hours related to soil/sediment disposal (disposal characterization, landfill acceptance, disposal package preparation, etc.) shall be incidental to disposal items.

The quantity and type of laboratory tests must be approved by the Engineer beforehand. The contractor will be reimbursed upon satisfactory written evidence of payment. The contractor may be required to obtain cost estimates from three DEP certified laboratories for the Engineer to choose the service provider. Laboratory testing related to soil/sediment disposal (disposal characterization, landfill acceptance, disposal package preparation, etc.) shall be incidental to disposal items.

LSP Services will be paid at the Contractor bid price for each HOUR, or fraction thereof, spent to perform the work as described above. The bid price shall be a blended rate that includes the cost of the LSP, environmental technicians and other personnel, the performance of all work tasks and field screening, including required equipment, materials and instrumentation, and production of all documentation described above. All requests for payment must be accompanied by the following information: the names of the personnel associated with the work charged under LSP Services, dates and hours worked, work conducted, including, where appropriate, locations as identified on the construction plans, and a copy of the field diary for the dates submitted.

Laboratory Testing will be reimbursed upon receipt of paid invoices for testing approved by the Engineer.

<b>ITEM 181.11</b>	<b>DISPOSAL OF UNREGULATED SOIL</b>	<b>TON</b>
<b>ITEM 181.12</b>	<b>DISPOSAL OF REGULATED SOIL – IN STATE FACILITY</b>	<b>TON</b>
<b>ITEM 181.13</b>	<b>DISPOSAL OF REGULATED SOIL – OUT-OF-STATE FACILITY</b>	<b>TON</b>
<b>ITEM 181.14</b>	<b>DISPOSAL OF HAZARDOUS WASTE</b>	<b>TON</b>

**DESCRIPTION**

***GENERAL***

The work under these Items shall include the transportation and disposal of contaminated material excavated or excavated and stockpiled. It shall also include the cost of any additional laboratory analyses required by a particular disposal facility beyond the standard disposal test set.

Excavation of existing subsurface materials may include the excavation of contaminated soils. The Contractor shall be responsible for the proper coordination of characterization, transport and disposal, recycling or reuse of contaminated soils. Disposal, recycling or reuse will be referred to as “disposal” for the remainder of this specification unless otherwise stated. However, regardless of the use of the term herein, there will be no compensation under these items for reuse within the project limits. The Contractor will be responsible for coordinating the activities necessary for characterization, transport and disposal of contaminated soils. Such coordination will include the Engineer and his/her designee overseeing management of contaminated materials. Contaminated soils must be disposed of in a manner appropriate for the soil classification as described below and in accordance with the applicable laws of local, state and federal authorities. The Contractor shall be responsible for identifying a disposal facility(s) licensed to accept the class of contaminated soils to be managed and assure that the facility can accept the anticipated volume of soil contemplated by the project. The Contractor shall be responsible for hiring a Licensed Site Professional (LSP) and all ancillary professional services including laboratories as needed for this work. The Contractor will be responsible for obtaining all permits, approvals, manifests, waste profiles, Bills of Lading, etc. subject to the approval of the Engineer prior to the removal of the contaminated soil from the site. The Contractor and LSP shall prepare and submit to the Engineer for approval all documents required under the Massachusetts Contingency Plan (MCP) and related laws and environmental regulations to conduct characterization, transport, and disposal of contaminated materials.



## **CLASSES OF CONTAMINATED SOILS:**

The Contractor and its LSP shall determine, in accordance with Items 180.1 through 180.6, if soil excavated or soil to be excavated is unregulated soil or contaminated soil as defined in this section. Such materials shall be given a designation for purposes of reuse or disposal based on the criteria of the Massachusetts Contingency Plan (MCP). Soils and sediments which are not suitable for reuse will be given a designation for purposes of off-site disposal based on the characterization data and disposal facility license requirements. The Classes of Contaminated Soils are defined as follows:

*UNREGULATED SOIL* consists of soil, fill and dredged material with measured levels of oil and hazardous material (OHM) contamination at concentrations below the applicable Reportable Concentrations (RCs) presented in the MCP. Unregulated soil consists of material which may be reused (or otherwise disposed) as fill within the Commonwealth of Massachusetts subject to the non-degradation criteria of the MCP (310 CMR 40.0032(3), in a restricted manner, such that they are sent to a location with equal or higher concentrations of similar contaminants. Disposal areas include licensed disposal facilities, approved industrial settings in areas which will be capped or covered with pavement or compost topsoil and seeded, and for purposes of this project should be reused as fill within the project site construction corridor whenever possible. The material cannot be placed in residential and/or environmentally sensitive (e.g. wetlands) areas. Under no circumstances shall contaminated soils be placed in an uncontaminated or less contaminated area (including the area above the groundwater table if this area shows no sign of contamination). The Contractor shall submit to the Engineer the proposed disposal area for unregulated soils for approval. If such a disposal area is not a licensed disposal facility, the Contractor shall submit to the Engineer analytical data to characterize the disposal area sufficiently to verify that the unregulated material generated within the construction project limits is equal to or less than the contaminant levels at the disposal site and meets the non-degradation requirements of the MCP. In addition, the Contractor shall provide written confirmation from the owner of the proposed disposal area that s/he has been provided with the analytical data for both the materials to be disposed as well as the disposal site characterization and that s/he agrees to accept this material. **A Material Shipping Record or Bill of Lading, as appropriate, shall be used to track the off-site disposal of unregulated soil and a copy, signed by the disposal facility or property owner, shall be provided to the Engineer in order to document legal disposal of the unregulated material.** The cost of on-site disposal of unregulated soil within the project area will be considered incidental to the item of work to which it pertains.

**Regulated Soil** consists of materials containing measurable levels of OHM that are equal to or exceed the applicable Reportable Concentrations for the site as defined by the MCP, 310 CMR 40.0000. Regulated soil which meets the MCP reuse criteria of the applicable soil/groundwater category for this project area may be reused on site provided that it

meets the appropriate geotechnical criteria established by the Engineer. Regulated Soil may be reused (as daily or intermediate cover or pre-cap contouring material) or disposed (as buried waste) at lined landfills within the Commonwealth of Massachusetts or at an unlined landfill that is approved by the Massachusetts Department of Environmental Protection (DEP) for accepting such material, in accordance with DEP Policy #COMM-97-001, or at a similar out-of-state facility. It should be noted that soils which exceed the levels and criteria for disposal at in-state landfills, as outlined in COMM-97-001, may be shipped to an in-state landfill, but require approval from the DEP Division of Solid Waste Management and receiving facility. An additional management alternative for this material is recycling into asphalt. Regulated Soils may also be recycled at a DEP approved recycling facility possessing a Class A recycling permit subject to acceptance by the facility and compliance with DEP Policy #BWSC-94-400. **Regulated Soil removed from the site for disposal or treatment must be removed via an LSP approved Bill of Lading, Manifest or applicable material tracking form.** This type of facility shall be approved/permitted by the State in which it operates to accept the class of contaminated soil in accordance with all applicable local, state and federal regulations.

**Hazardous Waste** consists of materials which must be disposed of at a facility permitted and operated in full compliance with Federal Regulation 40 CFR 260-265, Massachusetts Regulation 310 CMR 30.000, Toxic Substances Control Act (TSCA) regulations, or the equivalent regulations of other states, and all other applicable local, state, and federal regulations. All excavated materials classified as hazardous waste shall be disposed of at an out-of-state permitted facility. This facility shall be a RCRA hazardous waste or TSCA facility, or RCRA hazardous waste incinerator. This type of facility shall be approved/permitted by the State in which it operates to accept hazardous waste in accordance with all applicable local, state and federal regulations and shall be permitted to accept all contamination which may be present in the soil excavate. The Contractor shall ensure that, when needed, the facility can accept TSCA waste materials i.e. polychlorinated biphenyls (PCBs). Hazardous waste must be removed from the site for disposal or treatment via an LSP approved Manifest.

### ***MONITORING/SAMPLING/TESTING REQUIREMENTS***

The Contractor shall be responsible for monitoring, sampling and testing during and following excavation of contaminated soils to determine the specific class of contaminated material. Monitoring, sampling and testing frequency and techniques should be performed in accordance with Items 180.1 through 180.6. Additional sampling and analysis may be necessary to meet the requirements of the disposal facility license. The cost of such additional sampling and analysis shall be included in the bid cost for the applicable disposal items. The Contractor shall obtain sufficient information to demonstrate that the contaminated soil meets the disposal criteria set by the receiving facility that will accept the material. No excavated material will be permanently placed

on-site or removed for off-site disposal until the results of chemical analyses have been received and the materials have been properly classified. The Contractor shall submit to the Engineer results of field and laboratory chemical analyses tests within seven days after their completion, accompanied by the classification of the material determined by the Contractor, and the intended disposition of the material. The Contractor shall submit to the Engineer for review all plans and documents relevant to LSP services, including but not limited to, all documents that must be submitted to the DEP. Copies of the fully executed Weight Slips/Bills of Lading/Manifests/Material Shipping Records or other material tracking form received by the Contractor from each disposal facility and for each load disposed of at that facility, shall be submitted to Engineer and the Contractor's LSP within three (3) days of receipt by the Contractor. The Contractor is responsible for preparing and submitting such documents for review and signature by the LSP or other appropriate person with signatory authority, three (3) days in advance of transporting soil off-site. The Contractor shall furnish a form attached to each manifest or other material tracking form for all material removed off-site, certifying that the material was delivered to the site approved for the class of material. If the proposed disposition of the material is for reuse within the project construction corridor, the Contractor shall cooperate with the Engineer to obtain a suitable representative sample(s) of the material to establish its structural characteristics in order to meet the applicable structural requirements as fill for the project.

**All material transported off-site shall be loaded by the Contractor into properly licensed and permitted vehicles and transported directly to the selected disposal or recycling facility and be accompanied by the applicable shipping paper. At a minimum, truck bodies must be structurally sound with sealed tail gates, and trucks shall be lined, and loads covered with a liner, which shall be placed to form a continuous waterproof tarpaulin to protect the load from wind and rain.**

#### ***DECONTAMINATION OF EQUIPMENT***

Tools and equipment which are to be taken from and reused off site shall be decontaminated in accordance with applicable local, state and federal regulations. This requirement shall include, but not be limited to, all tools, heavy machinery and excavating and hauling equipment used during excavation, stockpiling and handling of contaminated material. Decontamination of equipment is considered incidental to the applicable excavation item, Item 180.4 and this Item.

#### ***REGULATORY REQUIREMENTS***

**The Contractor shall be responsible for adhering to regulations, specifications and recognized standard practices related to contaminated material handling during excavation and disposal activities. The Owner shall not be responsible at any time**

**for the Contractor's violation of pertinent State or Federal regulations or endangerment of laborers and others. The Contractor shall comply with all rules, regulations, laws, permits and ordinances of all authorities having jurisdiction including, but not limited to, Massachusetts Department of Environmental Protection, the U.S. Environmental Protection Agency, Federal Department of Transportation (DOT), Massachusetts Water Resources Authority (MWRA), the Commonwealth of Massachusetts and other applicable local, state and federal agencies governing the disposal of contaminated soils.**

All labor, materials, equipment and services necessary to make the work comply with such regulations shall be provided by the Contractor without additional cost to The Owner. Whenever there is a conflict or overlap within the regulations, the most stringent provisions are applicable. The Contractor shall reimburse The Owner for all costs it incurs, including penalties and/or for fines, as a result of the Contractor's failure to adhere to the regulations, specifications, recognized standard practices, etc., that relate to contaminated material handling, transportation and disposal.

## **SUBMITTALS**

### **I. Summary of Sampling Results, Classification of Material and Proposed Disposal Option.**

**The following information, presented in tabular format, must be submitted to the Engineer for review and approval prior to any reuse on-site or disposal off-site. This requirement is on-going throughout the project duration. At least two weeks prior to the start of any excavation activity, the Contractor shall submit a tracking template to be used to present the information as stipulated below. Excavation will not begin until the format is acceptable to the Engineer.**

Characterization Reports will be submitted for all soil, sediment, debris and groundwater characterized through the sampling and analysis programs required under Items 180.4, 180.6, and 181.11 – 181.14. Each report will include a site plan which identifies the sampling locations represented in the Report. The Construction Plan sheets may be used as a base plan to record this information. The Sampling Results will be presented in tabular format. Each sample will be identified by appropriate identification matching the sample identification shown on the Chain of Custody Record. The sample must also be identified by location (e.g. grid number or stockpile number). For each sample, the following information must be listed: the classification (unregulated, regulated, etc.), proposed disposal option for the stockpile or unit of material represented, and, all analytical results. Each Characterization Report will include the laboratory analytical report and Chain of Custody Record for the samples included in the Report.

## **II. Stockpiling, Transport, and Disposal.**

**At least two weeks prior to the start of any excavation activity, the Contractor shall submit, in writing, the following for review and shall not begin excavation activity until the entire submittal is acceptable to the Engineer.**

A. Excavation and Stockpiling Protocol:

Provide a written description of the management protocols for performing excavation and stockpiling and/or direct loading for transport, referencing the locations and methods of excavating and stockpiling excavated material in accordance with Items 180.1 through 180.5.

B. Disposal and Recycling Facilities:

1. Provide the name, address, applicable licenses and approved waste profile for disposal and recycling location(s) where contaminated soil will be disposed. Present information substantiating the suitability of proposed sites to receive classifications of materials intended to be disposed there, including the ability of the facility to accept anticipated volumes of material.
2. Provide a summary of the history of compliance actions for each disposal/recycling facility proposed to be used by the Contractor. The compliance history shall include a comprehensive list of any state or federal citations, notices of non-compliance, consent decrees or violations relative to the management of waste (including remediation waste) at the facility. Material should not be sent to facilities which are actively considered by the DEP, USEPA or other responsible agency to be in violation of federal, state or local hazardous waste or hazardous material regulations. The Engineer reserves the right to reject any facility on the basis of poor compliance history.

C. Transportation:

The name, address, applicable license and insurance certificates of the licensed hauler(s) and equipment and handling methods to be used in excavation, segregation, transport, disposal or recycling.

## **III. Material Tracking and Analytical Documentation for Reuse/Disposal.**

**The following documents are required for all excavation, reuse and disposal operations and shall be in the format described. At least two weeks prior to the start of any excavation or demolition activity, the Contractor shall submit the tracking templates required to present the information as stipulated below. Excavation or demolition will not begin until the format is acceptable to the**

**Engineer. All soils, sediments and demolition debris must be tracked from the point of excavation to stockpiling to onsite treatment/processing operations to off-site disposal or onsite reuse as applicable.**

- 1) Demolition Debris. Demolition debris must be tracked if the debris is stockpiled at a location other than the point of origin or if treatment or material processing is conducted. Identification of locations will be based on the station-offset of the location. The tracking table will identify date and point of generation, any field screening such as PID or dust monitoring, visual observations/comments, quantity, and stockpile ID/processing operation location. For each unit of material tracked, the table will also track reuse of the material on-site, providing reuse date, location of reuse as defined by start and end station, width of reuse location by offset, the fill elevation range, quantity, and finish grade for said location. For demolition debris, which is not reused on site, the table will also track disposal of the material as defined by disposal date, quantity and disposal facility. The table must provide a reference to any analytical data generated for the material.
- 2) Soil/Sediment. Soil excavation will be identified based on the station-offset of the excavation location limits. The tracking table will identify date and point of generation, any field screening such as PID or dust monitoring, visual observations, quantity, and stockpile number/location. For each unit of material tracked, the table will also track reuse of the material on-site and disposal of the material offsite using the same categories identified for demolition debris above.

**METHOD OF MEASUREMENT AND BASIS OF PAYMENT FOR ITEMS 181.11 THROUGH 181.14:**

Disposal of contaminated soil shall be measured for payment by the TON of actual and verified weight of contaminated materials removed and disposed of. The quantities will be determined only by weight slips issued by and signed by the disposal facility. The most cost-effective, legal disposal method shall be used.

Item 181.11 Measurement and payment for Disposal of Unregulated Soil shall be under the Contract Unit Price by the weight, in Tons (TON), of contaminated materials removed from the site and transported to and disposed of at an approved location or licensed facility, and includes any and all costs for approvals, permits, fees and taxes, additional testing/characterization required by the facility beyond the standard disposal test set, decontamination procedures, transportation and disposal.

Item 181.12 Measurement and payment for Disposal of Regulated Soil – In-State Facility shall be under the Contract Unit Price by the weight, in Tons (TON), of contaminated materials removed from the site and transported to and

disposed of at an approved in-state facility, and includes any and all costs for approvals, permits, fees and taxes, testing/characterization required by the facility beyond the standard disposal test set, decontamination procedures, transportation and disposal.

Item 181.13 Measurement and payment for Disposal of Regulated Soil - Out-of-State Facility shall be under the Contract Unit Price by the weight, in Tons (TON), of contaminated materials removed from the site and transported to and disposed of at an approved out-of-state facility, and includes any and all costs for approvals, permits, fees and taxes, testing/characterization required by the facility beyond the standard disposal test set, decontamination procedures, transportation and disposal.

Item 181.14 Measurement and payment for Disposal of Hazardous Waste shall be under the Contract Unit Price by the weight, in Tons (TON), of hazardous waste removed from the site and transported to and disposed of at the licensed hazardous waste facility, and includes any and all costs for approvals, permits, fees and taxes, testing/characterization required by the facility beyond the standard disposal test set, decontamination procedures, transportation and disposal.

**ITEM 184.1                      DISPOSAL OF TREATED WOOD PRODUCTS                      TON**

**DESCRIPTION**

Work under this item shall include the disposal of treated wood railroad ties and all treated existing wood product removed under Item 129.5, Track Excavation and as required by the Engineer.

This item shall include all costs for sampling, laboratory testing, loading, transportation and disposal of the treated wood. The Contractor is required to submit disposal manifests to the Engineer prior to the completion of the project. All aspects of this Item are to be completed in accordance with state and federal regulations.

**COMPENSATION**

Measurement and payment shall be by the weight, in tons, of treated timber removed from the site and subsequently accepted at a licensed facility. The work shall be considered full compensation for all labor, tools, equipment, materials, testing, loading, transportation, approvals, and permits necessary for the completion of the work.

<b>ITEM 440.</b>	<b>CALCIUM CHLORIDE FOR ROADWAY DUST CONTROL</b>	<b>POUND</b>
<b>ITEM 443.</b>	<b>WATER FOR ROADWAY DUST CONTROL</b>	<b>MGL</b>

All work performed under these Items shall be in accordance with the relevant provisions of Section 440 of the Standard Specifications for Highways and Bridges.

<b>ITEM 482.3</b>	<b>SAWING ASPHALT PAVEMENT</b>	<b>FOOT</b>
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All work performed under this Item shall be in accordance with the relevant provisions of Section 482 of the Standard Specifications for Highways and Bridges.

<b>ITEM 655.3</b>	<b>WOOD RAIL FENCE</b>	<b>FOOT</b>
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### **DESCRIPTION**

Work shall consist of furnishing and installing wood rail fence fastened to wood posts at locations where indicated on the Plans and as required by the Engineer in conformance with the dimensions and details shown on the Plans and the relevant provisions of Section 600 of the Standard Specifications and the following:

### **MATERIALS**

All timber posts and rail components shall conform with the following:

- Commercial lumber grade No. 1 or better after treatment;
- AASHTO M 133;
- Minimum tabulated design bending value of 1350 psi
- All timber shall be Southern Yellow Pine, seasoned and pressure treated as specified herein. All timber shall be square with nominal dimensions as indicated on the Plans, select structural grade, surfaced four sides (S4S) and shall conform to the requirements of the "Standard Grading Rules for Southern Yellow Pine" of the Southern Products Association.
- Variations in the size of any dimension shall not be more than 1/4"
- All timber components shall be pressure treated with waterborne preservative according to requirements of AWPA U1. Use Category UC3b for exterior construction not in contact with the ground and Category UC4a for items in contact with the ground.
- Do not use preservative chemicals containing arsenic or chromium. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not contain colorants, bleed through, or otherwise adversely affect finishes;



- All timber components shall be fabricated (including but not necessarily limited to cutting, drilling, dapping and chamfering) prior to treatment.
- Use a process that includes water-repellent treatment.
- After treatment, redry materials using a Kiln or air dry to a maximum moisture content of 19%.
- Mark treated materials with treatment quality mark of an inspection agency certified by the American Lumber Standard Committee's (ALSC) Board of Review.
- Pressure treated wood shall be marked in accordance with AASHTO M133 standards.
- Round head bolts including nuts and washers shall be sized as indicated and hot dipped galvanized.
- Damaged post and rail elements will not be accepted.

## **CONSTRUCTION METHODS**

Wood rail fence shall be installed at the locations and according to the details as shown on the Plans. Wood fence posts shall be set plumb in augered holes, backfilled, as required, and compacted to the lines and grades shown on the Plans. Backfill shall gravel borrow and shall be as specified under Item 151. Posts shall not be driven.

The Contractor is cautioned that within the limits of this project, buried utilities, which may be energized, may be present.

The Contractor shall be required to furnish extra length posts at transition areas or where field conditions warrant. These posts shall be of such length that the minimum depth in the ground, as shown on the Plans, is maintained.

Rails shall be butt joined together and securely bolted with round headed steel carriage bolts to the posts. No washers shall be installed at the bolt heads, but shall be installed at the nuts. The back face of the bolt head shall rest against the front of the post. The nut and washer shall be countersunk in the post so the threaded end of the bolt does not protrude beyond the face of rail. The members shall be sized so that there are at least two bolt threads visible beyond the end of the nut.

Lag bolts shall be countersunk into smaller predrilled holes. Finish head of lag bolt shall have less than 1/8 inch of head protruding above the face of rail.

Wood rail fence and wood rail fence with guardrail shall be installed with a continuous horizontal and vertical line parallel with finish grade to the dimensions indicated on the Plans.



## CONSTRUCTION METHODS

All existing and new catch basin structures within the limits of work shall have sediment collection sacks installed and maintained in good working order until the completion of all construction activities within the drainage collection area of each drainage structure. Sediment collection sacks shall be replaced if damaged, if no longer working properly and / or as required by the Engineer.

Refer to construction plan details showing the sediment collection sack device. Contractor shall be responsible for field measuring all existing and new drainage structures to ensure that the proper size sediment collection sack is provided for each structure.

Sediment removed from the silt sacks shall be handled in accordance with the requirements of Section 227.

## COMPENSATION

### *METHOD OF MEASUREMENT*

Item 697.1, Silt Sacks, shall be measured per each sediment collection sack actually installed in a catch basin.

### *BASIS OF PAYMENT*

Item 697.1, Silt Sacks, shall be paid at the contract unit price bid per each sediment collection sack, which payment shall be considered as full compensation for all labor, tools, equipment, materials, removal & disposal of all sediments collected and incidental work required to complete the work as required.

<b>ITEM 701.</b>	<b>CEMENT CONCRETE SIDEWALK</b>	<b>SQUARE YARD</b>
<b>ITEM 701.2</b>	<b>CEMENT CONCRETE WHEELCHAIR RAMP</b>	<b>SQUARE YARD</b>

The work under this Item shall conform to the relevant provisions of Section 700 of the Standard Specifications and the following:

### DESCRIPTION

Cement Concrete placed under Item 701. Cement Concrete Sidewalk and Item 701.2 Cement Concrete Wheelchair Ramp shall be 6 inches deep.

Detectable warning panels placed under Item 701.2 Cement Concrete Wheelchair Ramp shall be yellow in color.

## **COMPENSATION**

### ***METHOD OF MEASUREMENT***

Item 701. Cement Concrete Sidewalk and Item 701.2 Cement Concrete Wheelchair Ramp shall be measured per SQUARE YARD actually installed, complete in place.

### ***BASIS OF PAYMENT***

Payment for Item 701., Cement Concrete Sidewalk, at the contract bid price per square yard shall include all materials, labor, and equipment to install the sidewalk at the required material depth, complete in place.

Payment for Item 701.2, Cement Concrete Wheelchair Ramp, at the contract bid price per square yard shall include the detectable warning panel and all materials, labor, and equipment to install the wheelchair ramp at the required material depth, complete in place.

## **ITEM 704.2                      STABILIZED STONEDUST SURFACE                      SQUARE YARD**

### **DESCRIPTION**

The work under these items consists of constructing accessible Stabilized Stonedust Surface on a prepared sub-base.

Pre-installation conference: A pre-installation conference is required for the work of this Section.

### **SUBMITTALS**

The contractor shall submit the following submittals:

- a. Sieve analysis of proposed decomposed granite material to ensure it meets grading requirements.
- b. Specifications of the stabilizer products proposed to be used.
- c. Sample of the decomposed granite, one 5-lb bag of specified mix with stabilizer product for approval to ensure color will be compatible with project site.
- d. Provide certification that the ratio of stabilizer to decomposed granite is acceptable to both the stabilizer manufacturer and the decomposed granite manufacturer.
- e. Provide certification that the stabilizer manufacturer approves the decomposed granite particle size as compatible with the stabilizer product.

- f. Mock-up: Prepare a sample finished trail section using all specified materials and edging. Sample section shall be full width of trail, and length equal to 2 times width.
  - Sample will demonstrate all construction and hydration methods.
  - A representative from the manufacturer shall be on-site during mockup and installation activities.
  - Sample trail section shall be approved in writing by the Engineer before the project trail is constructed.

## **WEATHER RESTRICTIONS**

Do not install or work with material during inclement conditions or if material is wet or frozen.

Do not install decomposed granite during rainy conditions or below 40 degrees Fahrenheit and falling.

## **ACCEPTANCE**

Finished surface of pathway shall be smooth, uniform and solid. There shall be no evidence of chipping or cracking. Dried, cured, compacted pathway shall be firm throughout profile with no spongy areas. Loose material shall not be present on the surface initially. Any significant irregularities in path surface shall be repaired to the uniformity of entire installation.

## **WARRANTY AND MAINTENANCE**

Contractor shall provide, for a period of sixty days following substantial completion, unconditional maintenance and repairs of the stabilized surfacing as required.

Submit a written warranty executed by the installer agreeing to repair or replace components of stabilized surfacing that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:

1. Premature wear and tear, provided the material is maintained in accordance with manufacturer's written maintenance instructions.
2. Improper drainage.
3. Failure of system to meet performance requirements.

## **MATERIALS**

### ***DECOMPOSED GRANITE PAVEMENT:***

Aggregate stone for decomposed granite paving shall conform to the following:

- a. Clean, hard, durable particles or fragments of select crushed granite stone. Fines shall be evenly mixed throughout the aggregate. When produced from gravel, 50

percent, by weight, of the material retained on a No.4 sieve shall have one fractured face.

- b. Color shall be approved by the Engineer.
- c. The portion retained on the No.4 sieve shall have a maximum percentage of wear of 50 at 500 revolutions as determined by AASHTO T96-77.
- d. The portion passing a No.50 sieve shall have a maximum liquid limit of 25 and a maximum plasticity index of 7, as determined by AASHTO T89-81 and AASHTO T90-81, respectively.
- e. The crushed aggregate screenings shall be free from clay lumps, vegetable matter and deleterious material.
- f. Size shall be 3/8" to No.200 crushed granite screenings conforming to the following crushed stone sieve analysis for percentage of weight passing a square mesh sieve, ASTM C 136 – Method for Sieve Analysis for Fine and Course:

<b>SIEVE DESIGNATION</b>	<b>RANGE OF % PASSING</b>
No. 3/8"	100%
No. 4	95 – 100%
No. 8	75 – 80%
No. 16	55 – 65 %
No. 30	40 – 50%
No. 50	25 – 35%
No. 100	15 – 20%
No. 200	10 – 15%

Stabilizer binder for decomposed granite paving shall be mixed at the aggregate suppliers and conform to the following:

- 1. Binder shall be a natural, non-toxic, non-staining, environmentally safe, organic binder that is a colorless, odorless concentrated powder specifically manufactured to bind crushed granite or crushed aggregate. The powder shall be of a size that not more than 10% is retained on a U.S. Standard #40 mesh sieve.
- 2. Provide Organic-Lock by Envirobond Products Corp, Tel: 866-636-8476, [www.envirobond.com](http://www.envirobond.com) or approved equal. Stabilizer shall be provided factory mixed with the aggregate stone.
- 3. Mix Ratio: The estimated ratio for crushed granite pavement shall be approximately 35 lbs of stabilizer per ton of compacted aggregate screenings.

4. Mix ratio is approximate. The final mix ratio shall be determined by the stabilizer supplier by testing the specific granite approved for use on this project.

## **INSTALLATION**

The Contractor shall examine previous work, related work, and conditions under which this work is to be performed and notify the Contracting Officer in writing of all deficiencies and conditions detrimental to the proper completion of this work. Beginning work means Contractor accepts substrates, subgrades, previous work, and conditions.

### ***FORMWORK:***

Install plywood formwork at the outer edges of the installation. Top of formwork shall conform to proposed finish grade.

Set elevation of formwork by instrumentation.

### ***DECOMPOSED GRANITE PAVEMENT:***

Stabilizer shall not be applied during, prior to, or immediately following rainfall or when the temperature is 40 degrees Fahrenheit and falling. Inclement weather and cold to freezing temperatures will cause an unsatisfactory installation.

Pre-hydration of stabilized decomposed granite: Mix stabilized decomposed granite with water in a drum vessel or equivalent in compliance with the manufacturer's instructions. Placing of dry stabilized decomposed granite and water with hoses, sprinklers or other such devices shall not be allowed.

Place the stabilized decomposed granite on prepared aggregate base and rake smooth using a steel tine rake to desired grade and cross section.

Do not install deeper than 3 inches in one lift, and install in equal lifts. Compact each lift separately. Allow each layer after compaction to dry out.

Compaction: Roll each lift with a 1 ton roller.

Do not compact until moisture content of installed material is approved by the Manufacturer's Representative.

After completion do not allow any traffic of any kind on the finished surface course until it is completely dried through. Curing period is dependent on weather conditions. The Contractor shall expect a period up to two weeks. The stabilized crushed stone paving must completely dry out one time before it can be put into service.

## **REPAIRS**

Loose gravel on the surface, or unconsolidated crushed aggregate screenings below the surface, is evidence of improper bonding due to poor mixing or insufficient watering. Test the loose material for adequate stabilizer by wetting, then tamping, and allowing it to dry. If the material is still unconsolidated, stabilizer did not get mixed adequately throughout the crushed aggregate screenings. If the material is now solid, initial watering was insufficient.

Excavate damaged area to the depth of the stabilized decomposed granite and square off sidewalls. If area is dry, moisten damaged portion lightly. Pre-blend the dry required amount of stabilizer powder with the proper amount of aggregate in a concrete mixer. Compact with an 8" to 10" hand tamp or 250 to 300 pound roller. Keep traffic off areas for 12 to 48 hours after repair has been completed.

Any significant irregularities shall be smoothed out prior to final acceptance of work. Smoothing shall be accomplished by rewetting/saturating rough areas thoroughly, and then rolling the paving again with a heavy roller (2000 lbs, minimum) powered walk-behind or small rider. Wackers are not recommended.

## **MAINTENANCE**

Remove debris, such as paper, grass clippings, leaves or other organic material by mechanically blowing or hand raking the surface as needed. Any plowing program required during winter months shall involve the use of a rubber baffle on the plow blade or wheels on the plow that lifts the blade 1/4" off the paving surface.

1. If cracking occurs, simply sweep fines into the cracks, water thoroughly and hand tamp with an 8" – 10" hand tamp plate.
2. The Contractor shall monitor the site during the maintenance period and redistribute loose material, water thoroughly to a depth of 1" and re-compact with a power roller of no less than 1000 lbs.

## **METHOD OF MEASUREMENT**

The method of measurement shall be by the square yard of installed Stabilized Stonedust Surface.

## **BASIS FOR PAYMENT**

Item 704.2 will be paid by the square yard, installed complete-in-place which will include all aggregate, polymer enhanced binder, testing, amending, placing, spreading, and



compacting of polymer enhanced aggregate material. Gravel borrow and fine grading and compacting will be paid for separately under items 151 and 170 respectively.

**ITEM 748. MOBILIZATION LUMP SUM**

All work performed under this Item shall be in accordance with the relevant provisions of Section 748 of the Standard Specifications for Highways and Bridges.

**ITEM 751. LOAM BORROW CUBIC YARD**

All work performed under this Item shall be in accordance with the relevant provisions of Section 750 of the Standard Specifications for Highways and Bridges.

**ITEM 765. SEEDING SQUARE YARD**

All work performed under this Item shall be in accordance with the relevant provisions of Section 765 of the Standard Specifications for Highways and Bridges.

**ITEM 832. WARNING-REGULATORY AND ROUTE MARKER – SQUARE FOOT ALUMINUM PANEL (TYPE A)**

All work performed under these Items shall be in accordance with the relevant provisions of Sections 828 of the Standard Specifications for Highways and Bridges.

**ITEM 847.1 SIGN SUP (N/GUIDE)+RTE MKR W/1 BRKWAY EACH POST ASSEMBLY - STEEL**

All work performed under these Items shall be in accordance with the relevant provisions of Sections 840 of the Standard Specifications for Highways and Bridges.

**ITEM 850.41 ROADWAY FLAGGER HOUR**

**ITEM 852. SAFETY SIGNING FOR TRAFFIC MANAGEMENT SQUARE FOOT**

**ITEM 853.1 PORTABLE BREAKAWAY BARRICADE TYPE III EACH**

**ITEM 859. REFLECTORIZED DRUM DAY**

All work performed under these Items shall be in accordance with the relevant provisions of Section 850 of the Standard Specifications for Highways and Bridges.

**ITEM 864.04                      PAVEMENT ARROWS AND LEGENDS                      SQUARE FOOT**  
**REFLECTORIZED WHITE (THERMOPLASTIC)**

**ITEM 866.112                      12 INCH REFLECTORIZED                      FOOT**  
**WHITE LINE (THERMOPLASTIC)**

All work performed under these Items shall be in accordance with the relevant provisions of Sections 850 and 860 of the Standard Specifications for Highways and Bridges.

**ITEM 874.                                      STREET NAME SIGN                                      EACH**

All work performed under these Items shall be in accordance with the relevant provisions of Sections 828 of the Standard Specifications for Highways and Bridges.

# **APPENDIX A**

## **DEPARTMENT OF ENVIRONMENTAL PROTECTION**

### **BEST MANAGEMENT PRACTICES FOR CONTROLLING EXPOSURE TO SOIL DURING THE DEVELOPMENT OF RAIL TRAILS**



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Commissioner

## Best Management Practices for Controlling Exposure to Soil during the Development of Rail Trails

This document summarizes **Best Management Practices (“BMPs”)** that should be considered before, during, and after former railroad lines are converted to recreation trails. These BMPs have been developed to eliminate or minimize potential exposures to residual oil or hazardous materials commonly found along railroad rights-of-way being converted to rail trails. This document also identifies locations and conditions for which the application of BMPs alone may not be sufficiently protective of public health and the environment.

These BMPs have been developed specifically for situations where a municipality has acquired a property interest in a rail corridor from the Massachusetts Bay Transportation Authority (MBTA) in order to convert the corridor to a rail trail<sup>1</sup>. This fact sheet is relevant to municipalities: (1) with specific knowledge of a release of oil or hazardous materials through testing or other means and/or (2) without specific knowledge of a release, that seek to prevent the exposure of persons to oil or hazardous materials that may be present in such corridor until a responsible person conducts response action under MGL Chapter 21E.

### Background Information

The waxing and waning of railroad activity in Massachusetts over the past century has left the Commonwealth a legacy of under-utilized rights-of-way that may be redeveloped for new rail service (such as the Amtrak Downeaster and the Greenbush line) or recreational trails (such as the Minuteman Trail or the Mass Central Rail-Trail).

When active, these railroad lines were important transportation corridors serving the citizens and industries of Massachusetts. Now many communities are actively seeking to convert former railroad lines to create new links -- trails that link:

- commuter’s homes to workplaces;
- children’s schools to the playgrounds;
- tourists’ curiosity to the region’s history; and
- communities to their neighbors.

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<sup>1</sup> More specifically, only for those situations addressed under Chapter 46 of the Acts of 2003

This information is available in alternate format. Call Debra Doherty, ADA Coordinator at 617-292-5565. TDD Service - 1-800-298-2207.

Many former rail lines were abandoned years ago and appear to be nearly reclaimed by nature. Other lines run parallel to active lines, or reveal rusted rails threading through industrial areas. In some instances adjacent industrial activities, historic loading practices, leaks during material transfers or storage, and repair activities have contaminated soil with oil or hazardous materials. In addition, residual contamination is often found along the length of the line, incidental to the maintenance and use of the railway itself.

Redevelopment of former rail lines to recreational trails can be accomplished in a way that protects public health and the environment. It requires recognizing potential problems and implementing actions to safeguard nearby residents, workers, and trail users throughout the life of the project.

### **Residual Contamination from Railroad Operations**

Some historic railroad operations involved the use of chemicals that may have resulted in presence today of contamination. The most commonly reported contamination along rail lines includes metals, pesticides<sup>2</sup> (such as lead arsenate), and constituents of oil or fuel (petroleum products). These chemicals have been associated with normal railroad operations and are likely to be found anywhere along the line. For example, it would not be uncommon to find arsenic (up to ten times natural background levels) present in the soil along a right-of-way from old railroad ties dipped in an arsenic solution, arsenic weed-control sprays, and arsenic-laced slag used as railroad bed fill<sup>3</sup>. Lubricating oil and diesel that dripped from the trains are likely sources of the petroleum product found along the lines. Other sources of contaminants associated with historic railroad operation may include coal ash from engines, creosote from ties, and polynuclear aromatic hydrocarbons (“PAHs”) from the diesel exhaust.

The BMPs outlined in this document are specifically designed to be protective of public health and provide a practical alternative to extensively testing for and possibly removing these “typical” residues expected from the historic operation of a rail line<sup>4</sup>.

In some instances, a rail corridor may have been open for a relatively short time, during a period of time or in a region where chemicals were not used by the rail operator. Application of the BMPs would not provide any significant benefit in those instances. In the absence of good historic information, the only sure way to know whether residuals pose a risk to trail users is to collect environmental samples along the corridor. Location-specific sampling results may then be used to modify these measures or obviate the need for their use.

### **Elevated Contamination from Railroad Operations or Other Sources**

Several potential sources of contamination along a rail line may pose significant health and environmental risks worthy of closer examination. These sources include operations at switching and repair yards, railroad accidents involving hazardous cargoes, and releases of chemicals on rail spurs and properties that abut rail lines, but which are unrelated to the railroad operations. The latter two examples may

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<sup>2</sup> The application of pesticides consistent with their labeling is excluded from the definition of a “release” under M.G.L. Chapter 21E.

<sup>3</sup> Sampling along the abandoned Greenbush Line in the Fall of 2003, prior to its rehabilitation for commuter rail service, indicates the presence of arsenic concentrations up to 205 mg/kg, with 16% of the results greater than the MCP S-1 soil standard of 30 mg/kg, and 25% greater than the *proposed* standard of 20 mg/kg.

<sup>4</sup> Consistent with Section 8C of Chapter 46 of the Acts of 2003 (<http://www.state.ma.us/legis/laws/seslaw03/sl030046.htm>), the BMPs described in this document suitably prevent access to the residual oil or hazardous materials expected to be present along a railroad right-of-way.

involve almost any chemical, such as the phosphorus trichloride released in an April 3, 1980, tank car incident in Somerville, or the asbestos released from the Zonolite processing plant in Easthampton. The contamination in rail yards is somewhat more predictable, including petroleum; metals; pesticides and organic compounds emanating from equipment cleaning areas; fueling areas; maintenance and repair activities; and the railroad beds themselves.

An MCP Phase 1<sup>5</sup> level of investigation, tailored to the nature of the contaminant and source, would be appropriate to address these sources of elevated chemical contamination. A Phase 1 Preliminary Investigation would typically contain sufficient information in the following areas to determine the need for a Response Action or further detailed investigation:

- General Disposal Site Information (description of location and potential receptors in the area);
- Disposal Site Map (description of the property itself, with buildings, drains, and sampling locations noted);
- Disposal Site History (description of ownership, releases, chemical use, management of waste, compliance history);
- Site Hydrogeological Characteristics (description of groundwater flow, borings, wells, and the results of any investigations);
- Nature and Extent of Contamination (description of evidence of releases, laboratory results, thickness of NAPL, approximate location of contamination);
- Migration Pathways and Exposure Potential (description of contamination in air, water, soil, and discussion of potential human and environmental receptors);
- Evaluation for Immediate Response Actions; and
- Conclusions.

The results of such an investigation would be used to determine appropriate measures to implement to eliminate or reduce current and future exposure to the contaminated soils. Such measures could be similar to the BMPs proposed in this guidance, more extensive than these BMPs, or less stringent, depending on the outcome of the investigation.

### **Identifying Areas of Concern**

As described above, locations along rail corridors could exhibit a wide range of chemical contamination, depending on the use of the line and adjacent properties. Trail developers can conduct historic research to categorize segments of a rail corridor by level of concern.

DEP has identified four categories of interest for the purpose of implementing the soil BMPs. Any given rail-trail may be comprised of one or more of these areas.

#### Residential, undeveloped or rural rights-of-way

These are stretches along a rail line that border historically residential, undeveloped or rural properties. These areas are likely to have been affected only by the normal operation of the rail line, with a residual level of contamination. The BMPs outlined in this document are considered appropriate for these locations, absent evidence of a specific release.

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<sup>5</sup> The general content of a Phase I “Initial Site Investigation Report” is described in the Massachusetts Contingency Plan, 310 CMR 40.0483.

### Stations and crossings

These relatively small stretches along a right-of-way would be expected to be associated with contamination elevated over the residual levels, due to more frequent/intense use of pesticides to improve sight lines and greater frequency/intensity of human activities. The BMPs outlined in this document are considered appropriate for these locations, absent evidence of a specific release.

### Industrial corridors

Many rail-trails include segments that pass through industrial areas, even the predominantly rural trails of western and central Massachusetts. These stretches have a higher *potential* for contamination within the right-of-way that is unrelated to the historic railroad use. The BMPs outlined in this document may not be sufficiently protective of public health and the environment at these locations. A preliminary review is recommended in order to establish whether site-specific concerns indicate a need for further investigation, including soil testing. Absent a site-specific concern, the BMPs outlined in this document are considered appropriate for these locations.

### Switching and Repair Yards

As discussed earlier, switching and repair yards have a greater range of potential contaminants of concern and a higher likelihood that the contaminants are present at significant levels. The BMPs outlined in this document are not considered sufficient by themselves to protect public health and the environment at these locations, absent further investigation.

Figure 1 outlines the decision-making steps trail developers should follow in identifying locations of interest along the corridor they are developing and whether the BMPs apply without the need for further site investigation, including soil testing.

## **Goals of Best Management Practices**

DEP's goals in publishing BMPs for use in developing rail-trails include:

- promoting rail-trail conversions that are both health-protective and cost-effective<sup>6</sup>;
- recognizing the potential presence of oil or hazardous material along the right-of-way;
- recognizing the potential health and environmental risks associated with developing the right-of-way;
- expediting trail development to prevent (or minimize) risk to current users of "beaten paths" along inactive rail corridors;
- preventing (or minimizing) exposures to oil or hazardous material before, during, and after construction of rail-trails; and
- preventing (or minimizing) off-site migration of contaminants before, during, and after the construction of rail-trails.

These BMPs are intended to be applied to those rail corridor segments where residual contamination from historic railroad operations is assumed to be present. Trail developers always have the option to conduct soil testing to rule-out the presence of contamination and tailor soil management practices to actual site conditions.

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In addition to reducing risk of exposure to contaminants, the focus of this guidance, trails promote public health by encouraging active and healthy lifestyles.

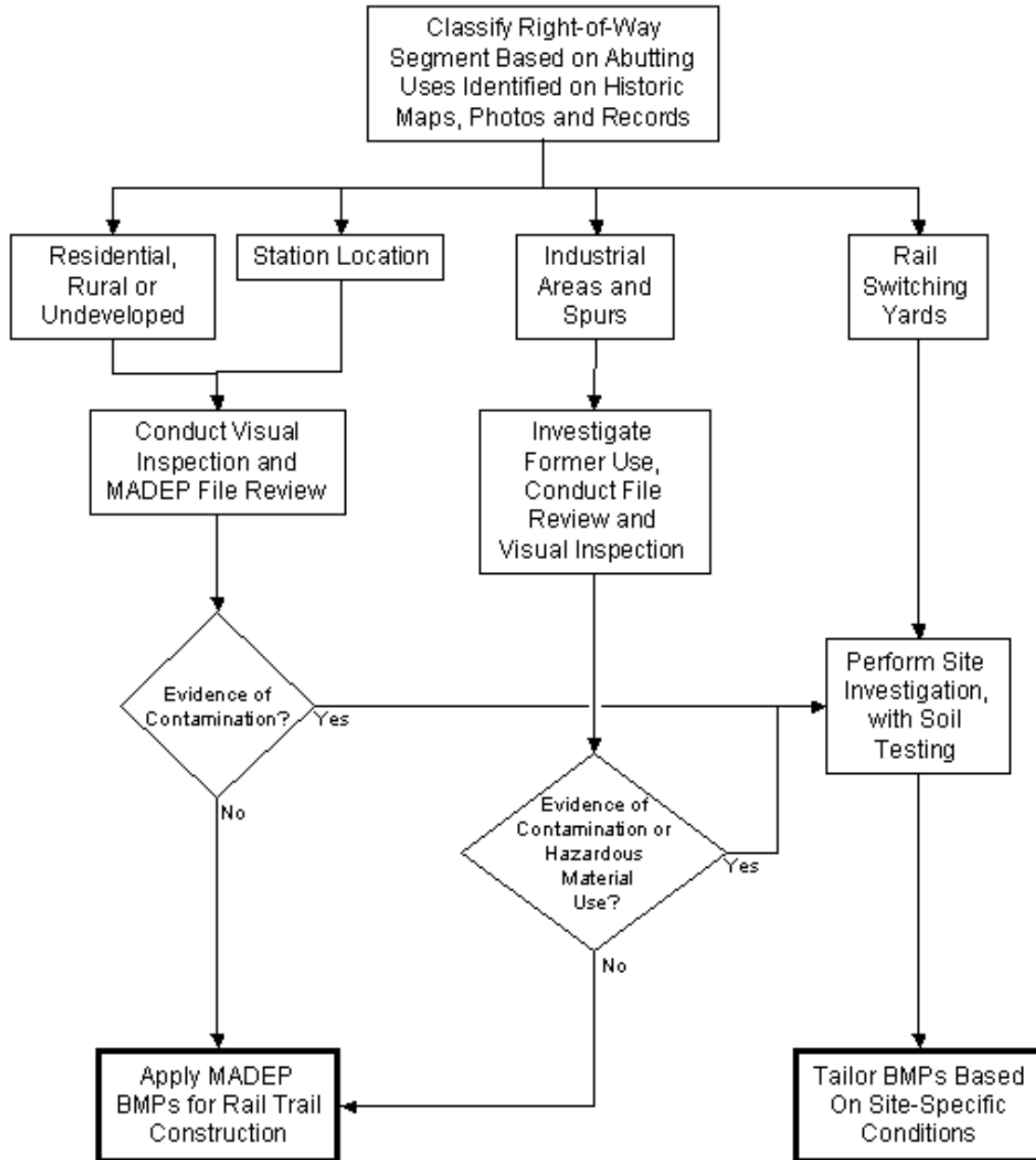


The application of these BMPs to any portion of a rail corridor converted to residential use in conjunction with rail trail development is not appropriate. Only a site-specific investigation, including soil testing, can determine whether conversion to residential use is health protective.

Figure 1

### Application of MADEP Best Management Practices at Rail Trail Conversions

(Pursuant to Section 8C of Chapter 46 of the Acts of 2003)



## **BMP Applicability**

These BMPs were developed primarily for residential or rural rights-of-way, and stations and crossings. The BMPs will also be applicable in many industrial corridors, but those locations may need case-by-case review to determine the likelihood of contamination beyond the residual levels assumed here.

DEP does not believe that these BMPs are, by themselves, sufficient and appropriate for use without more extensive site investigation in industrial areas with known or likely non-railroad sources, or in rail yards.

Note that the focus of these BMPs is the potentially contaminated soil along the right-of-way and the human exposures and environmental exposures that may result from improperly managing that soil at or near the surface. This document is not intended to be a summary of all environmental requirements, such as wetlands permitting or Underground Storage Tank (UST) removal that may apply to a project. Municipalities developing rail trails are also obligated to contain the further release or threat of release of oil or hazardous materials from any structure or container within the corridor.

## **Phases of Project/Exposures of Concern**

Rail-trail development occurs in three main phases, or time periods. Each phase has unique exposures that must be considered to identify appropriate BMPs. These phases are pre-construction, construction, and post-construction.

### **Pre-Construction Phase**

The pre-construction phase covers the period up to the time construction actually begins. Depending on project finances and construction sequences, this phase may last several years as communities seek funds to develop a project. Trail design also occurs during the Pre-construction Phase.

While the right-of-way is not a designated rail-trail at this point, a potential may exist for people to be exposed to contaminated soil on or from the right-of-way. Dirt bikers, hikers, or children taking shortcuts, and adjacent residents may receive runoff or dust from the rail bed in its unimproved condition. Many future rail-trails also serve as utility corridors. Workers repairing or installing subsurface utilities (such as sewer lines) may have the highest potential for exposure, albeit short-term.

During trail design, developers should identify which soils will be handled during construction and plan the areas where people will congregate once the trail has been completed.

As the final grades are established, areas for playgrounds identified, and trailheads located, long-term exposures may be created to any contaminated soil remaining along the trail. By following the design guidelines provided below, designers can ensure that any long-term exposures are eliminated or minimized.

If any soil will be excavated from the right-of-way and reused off-site, the potential for exposure should also be considered.

## **Construction Phase**

The construction phase has the potential to create significant exposures to contaminated soil as the old rail line is cleared, the right-of-way is prepared, and the trail is constructed. While construction activities may be sporadic and short-term on any given stretch of the line, the project itself may continue for many months, or even longer than a year.

The receptors of concern during the construction phase include:  
demolition workers (clearing the brush; and removing the rails, ties, ballast, and debris);  
construction workers (grading and shaping the trail; and creating, moving, and dissipating soil stockpiles);  
adjacent residents (inhaling dust generated from the project; exploring the partially-built trail; coming in contact with soil pushed onto their property, etc...); and  
environmentally sensitive areas/species.

## **Post –Construction Phase**

After construction, trail managers must monitor activities along the trail corridor to ensure that the steps taken to reduce exposure remain effective. Trail managers should be involved in decisions to excavate material from the trail corridor to ensure that users are protected both during and after such excavation. Workers repairing or installing subsurface utilities (such as sewer lines) may have the highest potential for exposure, albeit short-term. Maintenance activities will be necessary to ensure the integrity of the trail surface, structures and landscaping that help serve to eliminate exposures.

## **Recommended BMPs**

Absent analytical evidence to the contrary, all soil along the right-of-way should be presumed to have at least residual levels of lead, arsenic, and PAHs from historic railroad operations, as described above. The following BMPs should be considered for the pre-construction, construction, and post-construction phases of rail-trail development, as appropriate.

### **Pre-Construction**

1. Conduct a thorough, pre-construction paper review of the right-of-way and adjacent properties.
  - Investigate the rail line history; locate old stations, crossings, spurs, and rail yards. The Valuation Plans and historic aerial photos for the properties abutting the rail line can provide much of this information<sup>7</sup>.
  - Investigate site use and the history of adjacent properties; identify commercial and industrial stretches. The Valuation Plans and Sanborn Insurance maps can provide much of the information for the snapshot in time when they were developed. Local historical societies may have information on leading local industrialists and their local businesses.
  - Review the existing list of known or suspected disposal sites to see if any are located along the right-of-way<sup>8</sup>

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<sup>6</sup>Rails-to-Trails Conservancy provides additional guidance in its publication “Acquiring Rail Corridors” p 95-97. ([http://www.trailsandgreenways.org/resources/development/acquis/arc\\_book.asp](http://www.trailsandgreenways.org/resources/development/acquis/arc_book.asp))

- Inquire with neighbors, fire department personnel or the local historical society for further information on train crashes, accidents, and other incidents that may have released chemicals.<sup>9</sup>
2. Conduct a thorough, visual inspection of the right-of-way, looking for:
    - contaminated soil as evidenced by discoloration, odors, differences in soil properties, pipes, or buried debris;
    - signs of illegal dumping of waste from businesses or industry (not simply household trash);
    - stressed vegetation or “dead zones”;
    - areas of soil run-off, both away from the right-of-way and toward the right-of-way;
    - signs of wind erosion sufficient to create a dust inhalation exposure;
    - signs of public use of the existing right-of-way (condoned or trespassing), such as dirt-bike trails, play forts, beverage cans, and fire pits.
  3. Control current (pre-construction) exposures to soil in areas of concern by implementing one or more of the following measures, as indicated by site conditions:
    - install signs to redirect people from areas of concern; or
    - strategically place barriers to control use in the areas of concern; or
    - implement other measures to eliminate contact with soils in areas of concern.

In the event these three measures do not prove successful, trail developers should consider covering areas of exposed soil or planting bushes (such as puckerbrush) to divert people away from areas of concern.

### **Design Guidelines to Reduce Exposure**

While developing the design for the trail, the design engineer or architect should follow these guidelines in order to reduce potential exposures.

1. Within the tread way<sup>10</sup> and in areas designated for recreational use along the trail (such as rest areas, picnic areas, and playgrounds), eliminate contact with potentially contaminated soil by implementing one or more measures, as appropriate:
  - Place potentially contaminated soil under pavement or an equivalent layer of compacted stone dust; or
  - Place potentially contaminated soil under at least 12 inches of clean fill and mark with a geosynthetic barrier immediately above the potentially contaminated soil; or
  - Remove and appropriately dispose of potentially contaminated soil off-site. Replace with clean material (soil, stone dust, wood chips, etc.) to establish the path and maintain grade.

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<sup>7</sup>The Massachusetts DEP databases (<http://Mass.Gov/dep/cleanup/sites/sdown>) have spills information from the early 1980’s and list known and suspected locations of contamination by street address. If evidence exists that an off-site source may have contaminated the right-of-way, further investigation is needed. DEP files may contain sufficient information to determine whether the right-of-way has been affected.

<sup>8</sup>If evidence exists that an incident may have contaminated the right-of-way, further investigation is indicated. DEP files may contain sufficient information to determine the extent of the problem.

<sup>9</sup>The tread way includes any area intended for active use including jogging side paths and equestrian trails

2. Outside of the tread way, control contact with potentially contaminated soil by implementing one or more measures to minimize or eliminate contact with potential residual contamination, including:
  - Design landscaping, including the nature, location, and density of plantings, that channels recreational users of the trail to the tread way, disrupts the creation of informal tread ways (such as single track trails) and directs users away from potentially contaminated soil;
  - Create areas of congregation, such as benches, rest areas, and scenic areas, that draw recreational users of the trail and encourage congregation away from potentially contaminated soil;
  - Install signs informing users of upcoming congregation areas and/or advising users to remain on the path;
  - Stabilize the soil through plantings, grading, or other erosion control measures;
  - Install guardrails, curbing, or fences in areas to encourage users to stay the tread way; or
  - Implement other design features that would minimize or eliminate contact with residual contamination in the soil.
  
3. The design should identify areas where potentially contaminated soil will be removed and areas within the corridor where such soils can be safely stored temporarily so that the Construction Contractors can re-use as much material on-site as possible.

### **During Construction**

The following BMPs presume the trail construction includes excavation, movement, placement and grading of soil. Trail construction activities that involve no movement of soil may be carried out with the application of standard dust control measures, such as spraying soil with water.

The following guidelines should be followed during construction involving soil grading and excavation and be incorporated into the construction bid documents in order to ensure the proper handling of soils during trail construction:

1. Hire an independent environmental monitor or task existing staff to oversee the Construction Contractor<sup>11</sup>. The monitor will:
  - Verify that construction-related plans and training are in place before construction begins ;
  - Oversee all excavation,
  - Visually inspect material that will be moved, and
  - Ensure proper management of soil along the right-of-way and the implementation of BMPs.

During construction, the environmental monitor should be present whenever known contaminated soil will be excavated and should inspect construction-related BMPs several times each week.

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<sup>10</sup>For example, a municipality may enter into an agreement with Mass Highway to manage a trail construction funded with federal transportation appropriations. The agreement should require that the construction contract include provisions requiring the contractor to follow the BMPs and the directions of the independent environmental monitor.

2. Minimize or eliminate exposure of construction workers to potentially contaminated soil.
  - Prepare site-specific soil management and health and safety plans.
  - Have employees and subcontractors complete a safety-training program covering the potential hazards associated with working with contaminated soil likely to be present along a rail line, before excavation work begins.
  - Educate employees and subcontractors in identifying contaminated soil and on handling and disposal procedures for contaminated soil.
  - Hold regular meetings to discuss and reinforce the health and safety procedures.
  - Prevent visible dust during excavation, transportation, and placement operations. Implement dust control measures, such as spraying soil with water, during excavation or grading operations. Exercise caution to prevent soil spillage during transport.
  
3. Minimize or eliminate exposure of adjacent residents and curious trespassers to potentially contaminated soil.
  - Prevent visible dust during excavation, transportation, and placement operations. Implement dust control measures, such as spraying soil with water, during excavation or grading operations. Exercise caution to prevent soil spillage during transport.
  - Install temporary signs and/or security fence to surround and secure areas where potentially contaminated soil may pose an Imminent Hazard to human health.
  - Avoid temporary stockpiling of potentially contaminated soils. Take the following precautions stockpiling, as necessary:
    - Identify long-term stockpile locations that are away from residences, schools or playgrounds;
    - Cover the stockpile with plastic sheeting or tarps to prevent dust generation and erosion;
    - Install a berm, hay bales, and/or silt fences around the stockpile to prevent runoff from leaving the area;
    - Do not stockpile in or near storm drains or watercourses; and
    - Clean-up materials should be staged near the storage area.
  
4. Minimize or eliminate the migration of potentially contaminated soil off-site.
  - Protect gutters, storm drains, catch basins, and other drainage system features on the site with hay bales and/or silt fences during construction. They should be cleaned following the completion of site work.
  - Prevent visible dust during excavation, transportation, and placement operations. Implement dust control measures, such as spraying soil with water, during excavation or grading operations.
  - Exercise caution to prevent soil spillage during transport.
  - Stabilize exposed areas of potentially contaminated soil and prevent run-off.
  
5. Prevent new leaks and spills and notify DEP, as appropriate, if they occur.
  
6. Transport and dispose potentially contaminated soil in accordance with the applicable rules and regulations of the United States Department of Transportation (USDOT), the United States Environmental Protection Agency (USEPA), and the Massachusetts Department of Environmental Protection (MADEP) (the specifications for the off-site management of contaminated soil supersede the procedures outlined in this BMP).

## **Post- Construction**

1. Establish a protocol to ensure that future workers performing maintenance or construction within the right-of-way are made aware of the need for appropriate BMPs, including:
  - Posting of signage indicating that a permit from the trail manager is necessary before any excavation of the corridor begins.
  - Sending notice of the existence of such requirement to easement holders and the municipal engineer and/or public works department; and
  - Developing Standard Operating Procedures with local utilities, easement holders, DPWs, and other municipal offices for work in the right-of-way.
2. Establish a procedure for the trail manager to periodically travel the corridor and inspect the integrity of the trail surface, structures and landscaping and require appropriate action to correct any problems observed.

## **DEP Contact**

For further information, please contact Paul Locke in the DEP Bureau of Waste Site Cleanup at (617) 556-1160 or [Paul.Locke@state.ma.us](mailto:Paul.Locke@state.ma.us).