

## ADDENDUM NO. 1

**NOTICE is hereby given to prospective Bidders** of the following information, clarifications, and modifications to the Bidding Documents. The Bidding Documents remain unchanged except for modifications specifically indicated under Modifications. Bidders must acknowledge receipt of this Addendum in the Bid Form and comply with the requirements for submission of Bids as set forth in the Bidding Documents.

### **INFORMATION**

**The answers below are provided in response to questions and comments submitted by prospective Bidders.**

1. *With the headwall shown, there is no way to get a precast unit unless it was precast in sections and assembled onsite. Please confirm if precast sections is desired or cast in place.?*

Answer: The headwall may be installed as precast sections and assembled on site.

2. *Is there any flow data available so that we can design the bypass system?*

Answer: Streamflow through the culvert has been estimated using the United States Geological Survey's StreamStats. The StreamStats report for the project location is included as an attachment.

3. *Restoration – On the plans, it is called out for New England erosion control/restoration mix for bank restoration. Do you have a seed mix composition for general lawn restoration? Or any so long that it meets germination, purity, and weed content requirements?*

Answer: Provide a lawn seed mixture in accordance with the Massachusetts Department of Transportation Standard Specifications Section 765.40, M6.03.0-1. Specification Section 32 90 00 has been revised to include this seed mix. The seed mix for the Property Owner at 3 Richard Road will need to be coordinated directly with the owner.

4. *Is there a specific location on site we can put an asbestos material dumpster? Asbestos sub will need one for disposal of existing 8" sewer.*

Answer: The asbestos material dumpster may be located along the back on the cul de sac on Richard Road or at the end of the dead end on Winchester Drive.

5. *Is there any data to determine how long the ACM pipe sections are and are they assumed to be tongue and groove push on type or are they mechanically joined? This will determine the removal and disposal of the pipe.*

Answer: Based on the information available to the Town, the asbestos pipe sections are assumed to be 13 feet in length and tongue and groove.

6. *Is the sewer manhole at the end of Richard Rd a dead end manhole? Flow for the sewer bypass will only be required for up to 7 houses +/-?*

Answer: Yes, the sewer manhole at the end of Richard Road is a dead end manhole.

7. *Per the plans, it is full removal and replacement of driveways at #3, #4 and #5 Richard Rd?*

Answer: Correct, the driveways at #3, #4, and #5 Richard Roads will be fully removed and replaced.

## **MODIFICATIONS**

**NOTICE is hereby given that the Bidding Documents have been modified as follows.**

The following section(s) are **reissued** herewith in their entirety, have an Issue Date of July 10, 2024, contain(s) reference to “ADDENDUM NO. 1” in the footer, and text changes identified by double-underline for additions and ~~Strikeout~~ for deletions.

<b>Reissued Sections (with text changes shown)</b>	<b>Number of Pages</b>
Section 32 90 00, PLANTING	14

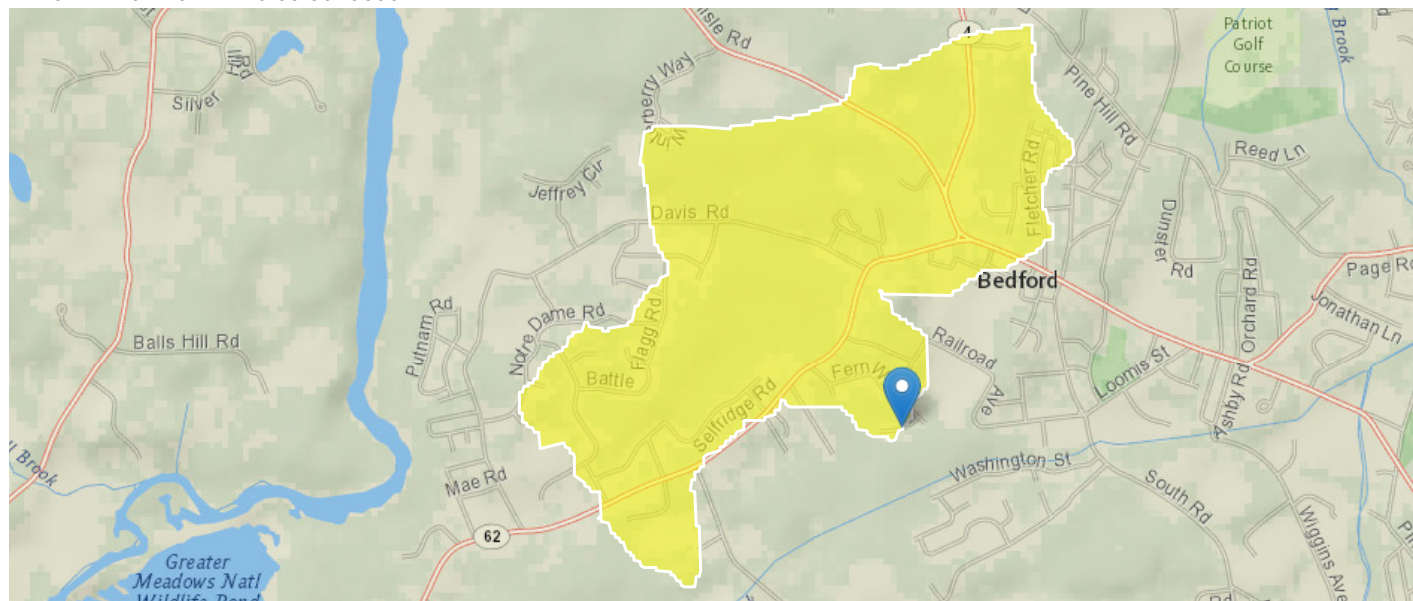
This Addendum and items listed above are provided to Bidders in Portable Document Format (.PDF) posted on the Owner’s website as indicated in the Invitation to Bid and will be available for examination at the Issuing Office. It is each Bidder’s responsibility to check the website for Addenda per the Instructions to Bidders.

### **Prepared and Issued by Owner:**

Town of Bedford, Massachusetts  
*In consultation with Woodard & Curran (Engineer)*

# StreamStats Report

**Region ID:** MA  
**Workspace ID:** MA20240129155307342000  
**Clicked Point (Latitude, Longitude):** 42.48556, -71.28816  
**Time:** 2024-01-29 10:53:30 -0500



[+ Collapse All](#)

## Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLDEM10M	Mean basin slope computed from 10 m DEM	2.508	percent
DRNAREA	Area that drains to a point on a stream	1.24	square miles
ELEV	Mean Basin Elevation	135	feet
LC06STOR	Percentage of water bodies and wetlands determined from the NLCD 2006	37.04	percent

## Peak-Flow Statistics

Peak-Flow Statistics Parameters [Peak Statewide 2016 5156]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.24	square miles	0.16	512
ELEV	Mean Basin Elevation	135	feet	80.6	1948
LC06STOR	Percent Storage from NLCD2006	37.04	percent	0	32.3

Peak-Flow Statistics Disclaimers [Peak Statewide 2016 5156]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

## Peak-Flow Statistics Flow Report [Peak Statewide 2016 5156]

Statistic	Value	Unit
50-percent AEP flood	20.4	ft <sup>3</sup> /s
20-percent AEP flood	34	ft <sup>3</sup> /s
10-percent AEP flood	45	ft <sup>3</sup> /s
4-percent AEP flood	60.6	ft <sup>3</sup> /s
2-percent AEP flood	73.3	ft <sup>3</sup> /s
1-percent AEP flood	86.9	ft <sup>3</sup> /s
0.5-percent AEP flood	101	ft <sup>3</sup> /s
0.2-percent AEP flood	122	ft <sup>3</sup> /s

*Peak-Flow Statistics Citations*

Zarriello, P.J., 2017, Magnitude of flood flows at selected annual exceedance probabilities for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2016–5156, 99 p. (<https://dx.doi.org/10.3133/sir20165156>)

## ➤ Bankfull Statistics

## Bankfull Statistics Parameters [Bankfull Statewide SIR2013 5155]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.24	square miles	0.6	329
BSLDEM10M	Mean Basin Slope from 10m DEM	2.508	percent	2.2	23.9

## Bankfull Statistics Parameters [Appalachian Highlands D Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.24	square miles	0.07722	940.1535

## Bankfull Statistics Parameters [New England P Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.24	square miles	3.799224	138.999861

## Bankfull Statistics Parameters [USA Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.24	square miles	0.07722	59927.7393

## Bankfull Statistics Flow Report [Bankfull Statewide SIR2013 5155]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	ASEp
Bankfull Width	13.6	ft	21.3
Bankfull Depth	0.878	ft	19.8
Bankfull Area	11.8	ft <sup>2</sup>	29
Bankfull Streamflow	19.6	ft <sup>3</sup> /s	55

## Bankfull Statistics Flow Report [Appalachian Highlands D Bieger 2015]

Statistic	Value	Unit
Bieger_D_channel_width	16.6	ft
Bieger_D_channel_depth	1.19	ft
Bieger_D_channel_cross_sectional_area	20.1	ft <sup>2</sup>

## Bankfull Statistics Disclaimers [New England P Bieger 2015]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

## Bankfull Statistics Flow Report [New England P Bieger 2015]

Statistic	Value	Unit
Bieger_P_channel_width	26.8	ft
Bieger_P_channel_depth	1.44	ft
Bieger_P_channel_cross_sectional_area	38.6	ft <sup>2</sup>

## Bankfull Statistics Flow Report [USA Bieger 2015]

Statistic	Value	Unit
Bieger_USA_channel_width	13.4	ft
Bieger_USA_channel_depth	1.26	ft
Bieger_USA_channel_cross_sectional_area	19.2	ft <sup>2</sup>

## Bankfull Statistics Flow Report [Area-Averaged]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	ASEp
Bankfull Width	13.6	ft	21.3
Bankfull Depth	0.878	ft	19.8
Bankfull Area	11.8	ft <sup>2</sup>	29
Bankfull Streamflow	19.6	ft <sup>3</sup> /s	55
Bieger_D_channel_width	16.6	ft	
Bieger_D_channel_depth	1.19	ft	
Bieger_D_channel_cross_sectional_area	20.1	ft <sup>2</sup>	
Bieger_P_channel_width	26.8	ft	
Bieger_P_channel_depth	1.44	ft	
Bieger_P_channel_cross_sectional_area	38.6	ft <sup>2</sup>	
Bieger_USA_channel_width	13.4	ft	
Bieger_USA_channel_depth	1.26	ft	
Bieger_USA_channel_cross_sectional_area	19.2	ft <sup>2</sup>	

*Bankfull Statistics Citations*

**Bent, G.C., and Waite, A.M., 2013, Equations for estimating bankfull channel geometry and discharge for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2013-5155, 62 p., (<http://pubs.usgs.gov/sir/2013/5155/>)**

**Bieger, Katrin; Rathjens, Hendrik; Allen, Peter M.; and Arnold, Jeffrey G.,2015, Development and Evaluation of Bankfull Hydraulic Geometry Relationships for the Physiographic Regions of the United States, Publications from USDA-ARS / UNL Faculty, 17p. ([https://digitalcommons.unl.edu/usdaarsfacpub/1515?utm\\_source=digitalcommons.unl.edu%2Fusdaarsfacpub%2F1515&utm\\_medium=PDF&utm\\_campaign=PDFCoverPages](https://digitalcommons.unl.edu/usdaarsfacpub/1515?utm_source=digitalcommons.unl.edu%2Fusdaarsfacpub%2F1515&utm_medium=PDF&utm_campaign=PDFCoverPages))**

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Application Version: 4.19.3

StreamStats Services Version: 1.2.22

NSS Services Version: 2.2.1

## SECTION 32 90 00

### PLANTING

#### PART 1 – GENERAL

##### 1.01 SUMMARY

- A. Section Includes
  - 1. Provide loam borrow, topsoil, seeding, and supporting materials and m planting trees, shrubs and groundcover, in accordance with this Section and applicable reference standards listed in Article 1.03.
- B. Related Requirements
  - 1. Section 31 00 00 – Earthwork
  - 2. Section 31 25 00 – Site Clearing

##### 1.02 PRICE AND PAYMENT PROCEDURES

- A. Measurement and payment requirements: per Division 01 General Requirements.

##### 1.03 REFERENCES

- A. Reference Standards
  - 1. American National Standards Institute (ANSI)
    - a. ANSI Z60.1 American Standard for Nursery Stock
  - 2. Association of Official Agriculture Chemists International (AOAC)
  - 3. ASTM International (ASTM)
    - a. ASTM D75 Standard Practice for Sampling Aggregates
    - b. ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
    - c. ASTM C136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
  - 4. MassDOT
    - a. Standard Specifications and Supplements, and Construction Details
  - 5. United States Department of Agriculture (USDA)

#### 1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination, Sequencing, and Scheduling: per Division 01 General Requirements.

#### 1.05 SUBMITTALS

- A. Submit in accordance with Division 01 General Requirements.
- B. Product Data
  - 1. Seeding and planting fertilizer showing composition and analysis
    - a. Fertilization rates for fertilizer product based upon soil testing, analysis, and recommendations
    - b. Receipt showing total quantity purchased for Project prior to installation
- C. Samples and Mockups: as specified in Article 1.06.
- D. Certificates: seeding and planting fertilizer composition and analysis.
- E. Manufacturer Instructions
- F. Source and Field Quality Control Submittals
  - 1. Suppliers' certified analysis in accordance with AOAC for non-standard products.
  - 2. Suppliers' certified analysis for soil amendments and fertilizer materials.
  - 3. Seed Supplier's certified statement for each grass seed mixture required, stating botanical and common name, percentage by weight, and percentages of purity germination and weed seed for each grass seed species.
  - 4. Certificates of agronomic rates from Supplier for organic matter used in loam borrow manufacturing process.
  - 5. Supplier's certifications for peat moss, limestone, acidulants, gypsum, additives needed to amend a specific soil.
- G. Provide submittals at least 30 days prior to ordering materials.
- H. Closeout and Maintenance Material Submittals: per Division 01 General Requirements.

#### 1.06 QUALITY ASSURANCE

- A. Provide in accordance with Division 01 General Requirements.



- B. Survey data of on-Site topsoil stockpiles plotted on a 20-scale plan of the Site, prepared by a registered surveyor or civil engineer
- C. Samples
  - 1. Loam borrow: 1 cubic foot representative sample per each 1,000 cubic yards of proposed stockpile of loam borrow for testing. Stockpile sampling: in accordance with ASTM D75.
  - 2. On-Site stockpiles of loam borrow: 25 one cubic foot representative samples selected for testing or from loam after it has been spread and amended. Take Samples from on-Site stockpiles and from spread and amended loam borrow from locations as directed by Engineer and packaged in presence of Engineer.
  - 3. Deliver samples to testing laboratories via overnight courier and have testing reports sent directly to Engineer.
    - a. Obtain testing for gradation, organic content, soil chemistry and pH by a certified laboratory.
    - b. Include the following tests.
      - 1) Sieve analysis: performed and compared to USDA Soil Taxonomy, by combined hydrometer and wet sieving using sodium hexametaphosphate as a dispersant in compliance with ASTM C136 after destruction of organic matter by H<sub>2</sub>O<sub>2</sub>. Provide a computer generated gradation curve from UMASS Laboratory to facilitate review and approval of sieve analysis.
      - 2) Determine percent of organics by loss on ignition of oven dried samples. Oven dry test samples minus #10 material to a constant weight at a temperature of 450 degrees F.
      - 3) Provide chemical analysis for nitrate nitrogen, ammonium nitrogen, phosphorus, potassium, calcium, magnesium, extractable aluminum, lead, zinc, cadmium, copper, soluble salts, and pH and buffer pH. Use a conductivity meter to measure soluble salts in 1:2 soil/water (v/v %). Nutrient tests: for available nutrients.
      - 4) Provide recommendations for soil additives to correct soil deficiencies, and additives necessary to complete planting work specified with soil analysis tests.
    - c. Provide biosolid compost testing to determine compost is mature, stable and suitable for use in a growing medium Woods End

Research Laboratory, PO Box 297, Mt. Vernon, Maine, 04352  
(207)-293-2457.

- d. Provide analysis by recognized laboratory for other materials in accordance with AOAC, where applicable.
4. Peat moss: 1-cubic foot sample.
5. Gypsum: 2-pound sample.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Provide in accordance with Division 01 General Requirements.
- B. Packing, Shipping, Handling, and Unloading
  1. Do not order or deliver material until submittals are approved.
  2. Package products with manufacturers certified analysis.

#### **1.08 SITE CONDITIONS**

- A. Existing Conditions: per Division 01 General Requirements.

### **PART 2 – PRODUCTS**

#### **2.01 LOAM BORROW**

- A. Provide in accordance with MassDOT Section 751 and MassDOT Construction Details.
- B. Type: MassDOT Section M1.05.0.
- C. Furnish sufficient loam borrow to complete loaming operations required for Project and as directed by Engineer. Obtain loam borrow from the following sources and meet requirements specified after testing and addition of necessary soil additives.
  1. Naturally well-drained areas that have never been stripped before and have a history of satisfactory vegetative growth. Comply with bylaws and Regulations regarding removal of topsoil.
  2. Commercial processing facility specializing in manufacturing of loam.

#### **2.02 TOPSOIL**

- A. Provide additional topsoil required to complete landscape work if quantity of stockpiled topsoil is insufficient.

- B. Furnish new topsoil, which is fertile, friable, natural loam surface soil found at a depth of not less than 4 inches from original ground surface, reasonably free of subsoil, clay lumps, brush, weeds and other litter, and free of roots, stumps, debris, and stones larger than 2 inches in any dimension.
- C. Obtain topsoil from local sources or from areas having similar soil characteristics as Site. Obtain topsoil only from naturally, well-drained Sites where topsoil occurs in a depth of not less than 4 inches. Do not obtain from bogs or marshes.

### **2.03 SEED AND SUPPORTING MATERIAL**

- A. Provide seed, limestone, fertilizers, plant materials, water for irrigation and soil conditioners in accordance with MassDOT Section 765.40 and MassDOT Construction Details, and ANSI Z60.1.
- B. If biosolid compost (Massachusetts Department of Environmental Protection-permitted material) is used as an organic component of proposed planting soil mixture, amount of organic material used shall not exceed agronomic rates for nitrogen and phosphorus for trees and shrubs, turf or ornamental perennials.

### **2.04 PLANTING TREES, SHRUBS AND GROUNDCOVER**

- A. Furnish in accordance with MassDOT Section 771.
- B. Type: per MassDOT Section M6.06.1

### **2.05 GRASS SEED**

- A. Furnish fresh, clean, new crop seed, complying with tolerance for purity and germination established by AOSA. Do not use wet, moldy, or damaged seed. Seed mixtures listed below are proportions by weight.
  - 1. Germination: minimum 80 percent.
  - 2. Purity: minimum 85 percent.
  - 3. Weed content: maximum 1 percent.
- B. New England Wet Mix (To be applied at wet areas as directed by Engineer).
  - 1. Lurid Sedge (*Carex lurida*)
  - 2. Blunt Broom Sedge (*Carex scoparia*)
  - 3. Blue Vervain (*Verbena Hastata*)
  - 4. Hop Sedge (*Carex lupulina*)
  - 5. Green Bulrush (*Scirpus atrovirens*)
  - 6. Redtop Panic Grass (*Panicum rigidulum*)

7. Tufted Hairgrass (*Deschampsia cespitosa*)
  8. Tickseed Sunflower/Bur Marigold (*Bidens aristosa*)
  9. Creeping Spike Rush (*Eleocharis palustris*)
  10. Soft Rush (*Juncus effesus*)
  11. Fringed Sedge (*Carex crinita*)
  12. Square Stemed Monkey Flower (*Mimulus ringens*)
  13. Swamp Aster (*Aster puniceus*)
  14. Boneset (*Eupatorium perfoliatum*)
  15. Rattlesnake Grass (*Glyceria Canadensis*)
  16. Swamp Milkweed (*Asclepias incarnata*)
  17. Common Sneezewood (*Helenium autumnale*)
  18. Ditch Stonecrop (*Penthorum sedoides*)
- C. New England Conservation Seed Mixture
1. Acceptable level of quality: equivalent to that manufactured by New England Wetland Plants.
  2. Big Bluestem (*Andropogon gerardii*)
  3. Switchgrass (*Panicum virgatum*)
  4. Little Bluestem (*Schizachyrium scoparium*)
  5. Canada Wild Rye (*Elymus canadensis*)
  6. Fox Sedge (*Carex vulpinoidea*)
  7. Partridge Pea (*Chamaecrista fasciculata*)
  8. Fringed Bromegrass (*Bromus ciliatus*)
  9. Pennsylvania Smartweed (*Polygonum pennsylvanicum*)
  10. Common Milkweed (*Asclepias syriaca*)
  11. Showy Tick-Trefoil (*Desmodium canadense*)
  12. New England Aster (*Aster novae-angliae*)
  13. Flat-top Aster (*Aster umbellatus*)
  14. Nodding Bur Marigold (*Bidens cernua*)

D. Lawn Mixture

1. Per MassDOT Section 765.40, M.03.0-1

**2.06 FERTILIZER**

- A. Bone meal: commercial, raw or steamed, finely ground; minimum of 4 percent nitrogen and 20 percent phosphoric acid.
- B. Superphosphate: commercial, phosphate mixture, soluble; minimum of 20 percent available phosphoric acid.
- C. Fertilizer: commercial grade complete fertilizer of neutral character, consisting of fast and slow release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition.
  - 1. Nitrogen, phosphorous and potassium in amounts recommended in topsoil analysis reports from a qualified soil testing agency.
  - 2. Minimum 1 pound per 1,000 square feet of actual nitrogen, 4 percent phosphorous and 2 percent potassium by weight.

**2.07 EROSION AND SEDIMENTATION CONTROL**

- A. Anti-erosion mulch: clean, seed-free threshed straw of wheat, rye, oats, or barley. Do not use hay.
- B. Erosion control mesh: uniform, open-weave jute matting or flexible vinyl mat. Acceptable level of quality: equivalent to Mira Mat erosion control.
- C. Acceptable level of quality for re-vegetation mat: equivalent to TenCate Mirafi.

**2.08 SOURCE QUALITY CONTROL**

- A. Provide in accordance with Division 01 General Requirements.

**PART 3 – EXECUTION**

**3.01 GENERAL**

- A. Avoid damage to utilities, buildings and private property.
- B. Do not disturb property markers.
- C. Immediately report damage to Engineer.
- D. Complete landscape work immediately as portions of Site become available, working within seasonal limitations for each kind work. Notify Engineer before planting if conditions detrimental to plant growth are encountered.

- E. Plant or install materials during normal planting seasons for each type of landscape work required, and as specified in Section 32 72 00.
- F. Use topsoil stockpiled for re-use as specified in Section 31 00 00.

### **3.02 LOAM BORROW**

- A. Place loam borrow at designated locations where plant material is to be installed or re-installed in accordance with MassDOT Section 751 and MassDOT Construction Details and Drawings, or as directed by Engineer.
- B. Protect loam borrow delivered to Site from erosion and spread immediately. Cover material that sits on-Site for more than 24 hours with tarpaulin or other soil erosion system acceptable to Engineer, and surround with silt fence as shown on Drawings.
- C. Do not handle, plant or use loam borrow if wet or frozen. Use moist loam borrow.

### **3.03 PLANTING TREES, SHRUBS AND GROUNDCOVER**

- A. Provide in accordance with MassDOT Section 771 and MassDOT Construction Details.
- B. Type: per MassDOT Section M6.06.1
- C. Prune injured roots or branches to make clean-cut ends prior to planting, utilizing clean, sharp tools, removing only injured or diseased branching.
- D. Remove planting containers, baskets, and non-biodegradable materials from root balls during planting. Cut natural fiber burlap from around trunk of trees and folded down against root ball prior to backfilling.
- E. Position trees and shrubs at intended locations shown on Drawings and obtain Engineer's approval prior to excavating pits, making necessary adjustments as directed.
- F. Dig planting pits with level bottoms with width twice the diameter of root ball. Rest root ball on undisturbed grade. Backfill each plant pit in layers with thoroughly mixed, prepared soil; 1-part peat moss; 1-part composted cow manure by volume; 3 parts topsoil by volume.
  - 1. Provide 21-gram planting tablets, acceptable level of quality: equivalent to Agriform.
    - a. 2 tablets per 1-gallon plant
    - b. 3 tablets per 5-gallon plant
    - c. 4 tablets per 15-gallon plant

- d. Larger plants: 2 tablets per 1/2-inch caliper of trunk
- G. Fill prepared soil around ball of plant halfway and insert plant tablets. Complete backfill, and water thoroughly.

### **3.04 FINE GRADING**

- A. Clean subgrade of stones greater than 2 inches and all debris immediately prior to dumping and spreading loam borrow and remove from Site. Do not rake to edges and bury. Obtain Engineer's approval of subgrade conditions prior to spreading loam borrow.
- B. Spread and thoroughly incorporate soil additives into layer of loam borrow by harrowing or other approved methods. Incorporate the following soil additives.
  - 1. Ground limestone or acidulants: as required by soil analysis to achieve required pH specified. Spread limestone at rate required by soil analysis up to maximum limit of 200 pounds per 1,000 square feet. Make a surface application of limestone not in excess of 50 pounds per 1,000 square feet to established planting area during the season after Final Acceptance if recommendations of soil analysis require rates of application greater than 200 pounds per 1,000 square feet.
  - 2. Fertilize at rate and analysis recommended by soil analysis.
  - 3. Use biosolid compost, peat moss, sand or other soil amendments as required by soil analysis.
- C. Prepare loam borrow by scarifying, harrowing, or tilling loam to integrate soil additives into top 6 inches of loam after loam borrow and required additives have been spread. Remove large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter. Remove all stones over 1-inch in diameter from top 6 inches of loam bed from unscreened soils. Remove smaller stones in excessive quantities as directed.
- D. Set sufficient grade stakes for checking finished grades. Set stakes in bottom of swales and at top of slopes. Do not deviate more than one-tenth of foot from indicated elevations. Connect contours and spot elevations with an even slope. Finish grades: smooth and continuous with no abrupt changes at top or bottom of slopes.
- E. Fill depressions caused by settlement or rolling during compaction process with additional loam borrow and regrade surface and roll until finish is smooth and even corresponding to required grades.
- F. Install loam borrow in successive horizontal lifts no thicker than 6 inches in turf areas and 12 inches in plant bed areas to desired compaction as indicated. Install soil at a higher level to anticipate any reduction of loam borrow volume due to

compaction, settling, erosion, and decomposition during Warranty Period. Obtain full depths of loam borrow for plant beds by digging holes in loam borrow at same frequency as for compaction testing.

1. Compact loam to specified density.
  2. Maximum dry density for topsoil and loam: determined in accordance with ASTM D698. Achieve the following percentages of minimum to maximum dry densities for fill materials or prepared subgrades.
    - a. Fills within plant beds, tree pits and treeways: minimum 80 percent; maximum 85 percent for areas in top 18 inches of finished grade.
  3. Scarify surface area of each lift by raking prior to placing next lift.
- G. Compact each lift to reduce settling, but not enough to prevent movement of water and feeder roots through the soil in addition to range cited above. Loam borrow in each lift: firm underfoot and make only slight heel prints. Loam borrow at completion of installation: firm, even resistance when a soil sampling tube is inserted from lift to lift. Perform percolation tests after placement of each lift to determine if soil has been over compacted using the following percolation test procedure.
1. Dig a hole in installed soil minimum of 4 inches in diameter. Holes in 6-inch lift in turf areas: 4 inches deep. Holes in 12-inch lifts in plant beds: 8 inches deep. Do not penetrate through lift being tested.
  2. Fill hole with water and let it drain completely. Immediately refill hole with water and measure rate of fall in water level.
  3. Till soil to a depth required to break over compaction if water drains at a rate less than 1-inch per hour.
  4. Perform a minimum of 1 soil percolation test per 10,000 square feet of turf area, and 2,500 square feet of tree and shrub planting area as directed.
- H. Select equipment and phase installation of loam borrow so wheeled equipment does not travel over subsoil, placed fills or ordinary borrow, or already installed soil. Movement of tracked equipment over these soils will be reviewed and considered by Engineer for approval. If Engineer determines that wheeled equipment must travel over already installed soil, provide a written description of sequencing of Work that ensures compacted soil is loosened and uncompacted as Work progresses, or place 1-inch thick steel plate ballast or approved equivalent over length and width of any travelway to cover loam borrow to protect it from compaction.
- I. Grade disturbed areas outside limit of Work, smooth and spread with minimum 6 inches of loam borrow to finished grade.



- J. Maintain stockpiles of existing on-Site topsoil until final placement of existing on-Site topsoil and loam borrow is approved. Provide survey data plotted on a 20-scale plan of the Site prepared by a registered surveyor or civil engineer, showing volume of stockpiles of existing on-Site topsoil. Remove excess, unused existing on-Site topsoil from Site and legally dispose of upon approval.

### **3.05 SEED AND SUPPORTING MATERIAL**

- A. Install and apply seed and supporting materials at rates of application in accordance with MassDOT Section 765.40 and MassDOT Construction Details and the Drawings.

### **3.06 HYDROSEEDING NEW AREAS**

- A. Mix specified seed and pulverized mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application.
- B. Apply slurry using an approved machine. Seed and suitable corn fiber mulch may be applied in 1 operation. Mix materials with water in machine and agitate to keep mixture uniformly suspended. Use spraying equipment that will distribute slurry uniformly at required rates.
- C. Mulch areas with anti-erosion mulch with mulch blower at rate of 1,200 pounds per acre on level grades, 2,000 pounds on slopes if mulch is not part of slurry, immediately following hydroseeding.
- D. Seed only areas that can be mulched on same day.

### **3.07 SEEDING NEW AREAS**

- A. Sow seed using a spreader or seeding machine. Do not seed when wind velocity exceeds 5 miles per hour. Distribute seed evenly over entire area by sowing equal quantity in 2 directions at right angles to each other.
- B. Do not sow immediately following rain or when ground is too dry.
- C. Seed application rate
  - 1. New England Conservation Seed Mix: 1 pound per 1,750 square feet.
  - 2. All others: 1 pound per 1,000 square feet.
- D. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

### **3.01 PROTECTION OF SEEDED SLOPES**

- A. Protect seeded slopes against erosion with erosion netting or other acceptable methods.

- B. Spread specified mulch after completion of seeding operations to form a continuous blanket not less than 1-1/2 inches' loose measurement over seeded areas.
- C. Anchor mulch by spraying with asphalt emulsion at rate of 10 to 13 gallons per 1,000 square feet. Prevent damage or staining of construction or other plantings adjacent to mulched areas.
- D. Cover seeded slopes with jute matting where grade is 3:1 or greater. Roll matting down over slopes without stretching or pulling.
- E. Lay matting smoothly on soil surface, burying top end of each section in narrow 6-inch trench. Leave 12-inch overlap from top roll over bottom roll. Leave 4-inch overlap over adjacent section.
- F. Staple outside edges and overlaps at 36-inch intervals.
- G. Lightly dress slopes with topsoil to ensure close contact between matting and soil.
- H. Unroll matting in direction of flow in ditches. Overlap ends of strips 6 inches with upstream section on top.

### **3.02 FIELD QUALITY CONTROL**

- A. Provide in accordance with Division 01 General Requirements.
- B. Replace rejected Work and continue specified maintenance until re-inspected by Engineer and accepted. Remove rejected plants and materials promptly from Site.

### **3.01 CLEANING**

- A. Keep pavement, sidewalks, and walkways clean. Maintain protection during installation and maintenance periods.

### **3.02 CLOSEOUT ACTIVITIES**

- A. Provide in accordance with Division 01 General Requirements.

### **3.03 MAINTENANCE**

- A. Provide maintenance of grass seeded areas immediately after planting.
- B. Maintain grass by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, re-grading, and replanting as required to establish smooth, acceptable lawn areas free of eroded or bare areas.
- C. Maintain grassed areas to establish acceptable lawn until Final Completion or for a minimum of 180 days, whichever is longer, by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, re-grading, and replanting as required to establish a smooth, acceptable lawn, free of eroded or bare areas.

- D. Maintain trees and shrubs until Final Completion, or for a minimum of 180 days, whichever is longer.

**END OF SECTION**

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