CITY OF NEWTON, MASSACHUSETTS

CONTRACT DOCUMENTS
FOR

WASHINGTON STREET PILOT PROJECT

APRIL 8, 2024

City of Newton

1000 Commonwealth Avenue

Newton Centre, MA 02459

Incorporation of Applicable Provisions of the Massachusetts General Laws

Certain provisions of the Massachusetts General Laws are applicable to Construction contracts including, but not limited to, those contained in Chapter 30 and Chapter 149. All applicable provisions of the Massachusetts General Laws are incorporated into the Contract as if fully set forth herein, and shall prevail over any conflicting provisions of the General or Supplemental Conditions.

All work under this contract shall be done in conformance with the City of Newton Standard Details, City of Newton Specifications, and City of Newton Engineering Directives, Massachusetts Department of Transportation Standard Specifications for Highways and Bridges dated 2024, the 2017 Construction Standard Details, the 2015 Overhead Signal Structure and Foundation Standard Drawings, the 1990 Standard Drawings for Signs and Supports; the 2024 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; the Plans and these Special Provisions. Where conflicts exist, the City of Newton Standards and Specifications shall govern.

Scope of Work

This Project proposes a road diet with traffic calming and complete street improvements on Washington Street between Chestnut Street and Lowell Avenue within the City of Newton. These improvements include installation of modular traffic islands and floating bus stops, modular concrete curb bases, flex posts, pavement markings, signage, and traffic signal timings and video detection zone adjustment. Additionally, the project will involve changes to existing parking meters along Washington Street. All work shall occur within the public right of way. Any work proposed outside of public right of way must be coordinated with the City of Newton's Department of Public Works.

ITEM 697.1 **SILT SACK** **EACH**

GENERAL

This work shall consist of furnishing, installing, maintaining, and removing inlet protection for catch basins (sediment control device) as directed by the City and as shown on the Contract drawings.

MATERIALS

Inlet protection shall be manufactured from a specially designed woven polypropylene geotextile and sewn by a double needle machine, using a high strength nylon thread.

Inlet protection will be manufactured to fit the opening of the catch basin or drop inlet. Inlet protection will have the following features: two dump straps attached at the bottom to facilitate the emptying of inlet protection; inlet protection shall have lifting loops as an integral part of the system to be used to lift inlet protection from the basin; inlet protection shall have a restraint cord approximately halfway up the bag to keep the sides away from the catch basin walls, this yellow cord is also a visual means of indicating when the bag should be emptied. Once the strap is covered with sediment, inlet protection should be emptied, cleaned and placed back into the basin.

CONSTRUCTION METHODS

To install inlet protection in the catch basin, remove the grate and place the bag in the opening. Hold out approximately six inches of the bag outside the frame. This is the area of the lifting straps. Replace the grate to hold the bag in place. When the restraint cord is no longer visible, the bag is full and should be emptied.

To remove the inlet protection, take two pieces of 1” diameter rebar and place through the lifting loops on each side of the bag to facilitate the lifting of the inlet protection.

To empty inlet protection, place it where the contents will be collected. Place the rebar through the lift straps (connected to the bottom of the bag) and lift. This will turn the bag inside out and empty the contents. Clean out and rinse. Return the bag to its original shape and place back in the basin.

Inlet protections are reusable. Once the construction cycle is complete, remove inlet protection from the basin and clean. Inlet protection should be stored out of the sunlight until needed on another project.

ITEM 708 SHRUBTUB PLANTER WITH WATER & CARE SYSTEM EACH

GENERAL

The work under this Item shall conform to the relevant provisions of Sections 476, "Cement Concrete Pavement", and Section 430, "Cement Concrete Base Course" of the Standard Specifications and the following:

Work under this item consists of furnishing, and installing furniture in a vertical and level position.

Protection of installed furniture shall be for the duration of the construction activities unless otherwise directed.

SUBMITTALS

Submittals: in accordance with Section 5.0, Control of the Work.

Product Data: Submit most recent printed specifications and installation instruction from manufacturers for:

Shrubtub Planter with Water & Care System

MATERIALS

SHRUBTUB PLANTER WITH WATER & CARE SYSTEM
Planter shall be STUB-PL-D235-93-CT, as manufactured by Streetlife, Herengracht 36, 2312 LD Leiden, The Netherlands, phone #484-496-8280, Contact: Alexander van Zweeden, Sales Advisor US, phone 484-496-8280 (until 11am EST)
email:avanzweeden@streetlife.com, website: streetlife.nl

TT-Bottom Up Large
Water &Care system for tree tubs

Size: 93" DIA
Material: untreated Corten steel, delivered unweathered Mounting: Free Standing

CONSTRUCTION METHODS

SHRUBTUB PLANTER WITH WATER & CARE SYSTEM

Provide and install planter as per drawings and manufacturer's recommendations.

Install in conformance to applicable ADA guidelines and End User's established Accessibility policies.

ITEM 708 (Continued)

METHOD OF MEASUREMENT

ITEM 708, SHRUBTUB PLANTER WITH WATER & CARE SYSTEM. shall be measured for payment per the Unit EACH complete in-place as shown on the Drawings and as specified herein to consist of all labor materials and equipment, maintenance, and all other incidentals, or as required by the Engineer.

BASIS OF PAYMENT

ITEM 708, SHRUBTUB PLANTER WITH WATER & CARE SYSTEM. will be paid for at the contract unit price EACH as specified above. The unit price shall constitute full compensation for complete compliance with requirements of this item, including all labor, materials, tools, equipment and incidentals required for the installation as detailed and where indicated or required by the Engineer. The work includes furnishing and installing each item complete in place, including concrete, anchoring hardware and fasteners, cleaning, protecting the items from damage and all incidental work not included for payment elsewhere.

ITEM 751.2 PLANTING SOIL- AMMEND WITH COMPOST CUBIC YARD
ITEM 751.3 PLANTING SOIL- IMPORTED CUBIC YARD

GENERAL

This work under these items shall consist of furnishing and installing planting bed soil in planting beds and lawn root zone soil in seeded lawn areas in accordance with the Contract Drawings, as specified herein and as directed by the Engineer

Definitions

Subgrade: Soil material and levels resulting from the approved rough grading work.

1. Cultivation of subgrade areas prior to amending is included in this Section.
2. Subgrade soil(s): Subgrade soil shall be existing soil or other materials which are either undisturbed or have been placed resulting from the approved rough grading work and are located in the planting areas.

Planting Soils: Planting Soils are composed of a blend of three base components: base loam, organic material and sand. The quality of the blend depends on the quality of the original components. Contractor responsible for locating and obtaining approval of sources for base loam, organic material and sand that meet the Specification requirements. Contractor is then responsible for mixing the components referred to as mediums. Approximate mixing ratios are provided, but may req-uire adjustment, depending on the final materials and with the approval of the Engineer or their representative, in order to meet Specification requirements for each blend.

1. Base Components

    a. Base Loam: a natural growing medium.
    b. Organic Material or Compost: a fully decomposed organic material.
    c. Sand: uniformly graded medium to coarse sand.

Testing, Submittals, Mock-ups and Inspections

Submittals: in accordance with Section 5.0, Control of the Work.

Experience: submit written documentation confirming Contractor has a minimum of five years of landscape construction experience completing projects of similar scope, complexity and value and consisted of manufactured soils.

References: submit a minimum of three reference including project address, dollar value, owner's name and contact information.

Critical Path Processing - Soils Testing Report Submittals:

1. Contractor responsible for recognizing that these critical project materials warrant

ITEM 751.2 and 751.3 (Continued)

timely and serious attention, that the testing process to achieve approved materials shall be considered a lead time item, and that under no circumstance shall failure to comply with all specification requirements be an excuse for "staying on project construction schedule" or for expedient substitution of unacceptable material(s).

Product Data: submit most recent printed information from manufacturer.

1. Organic Material: identify the material(s) from of which is it composed and identify the location where material was composted.
2. Fertilizers
3. Ground Limestone
4. Superphosphate

Certificates: Submit certification that soil blend components and soil mediums meet environmental standards of the State of Massachusetts for use in residential zones.

Testing: Testing is required at the following intervals:

Submit 1 gallon planting soil samples in two phases. Submit samples concurrent with horticultural soil test reports in both phases. Submit as phase one, planting soil base components for approval. Only after approval of phase one components, submit as phase two, soil blend mixes / mediums for approval. All reports must be from recent analyses, less than 90 days old, and represent materials that are available for delivery to the site.

Phase One Submittals of Planting Soil Base Components:

1. Base Loam
2. Organic Amendment Materials (Compost)
3. Sand

Phase Two Submittals of Planting Soil: mixing and batching of soils to be submitted in the same manner as bulk soils and will be prepared prior to delivery to site.

1. Planting Bed Soil
2. Lawn and Meadow Root Zone Soil

Submit reports for each of the above samples: Submit sample from each proposed source for testing and approval. Deliver samples to both the testing laboratory and the project soil scientist and pay costs. Send report directly to Owner's Representative.

Soil Sample Submittals: Sampling shall be done by the Contractor. The size of the samples and method of sampling shall be as follows: Samples shall be representative of the material to be brought to the site. Each sample shall be a Composite Sample, which consists of 5 separate sub samples taken from a minimum of (5) different locations at each source and mixed together to make the test sample.

ITEM 751.2 and 751.3 (Continued)

Contractor shall schedule this testing in order to permit reasonable time for testing, evaluation, and approvals prior to scheduled installation.

Test Reports: Submit certified reports for tests as described in this Section.

Mechanical gradation (sieve analysis) shall be performed and compared to the USDA Soil Classification System. Percent clay (0.002 mm) shall be reported separately in addition to silt (ASTM D-422-63, hydrometer method).

The silt and clay content shall be determined by a Hydrometer Test of soil passing the #270 sieve.

Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium Magnesium, Aluminum, Iron, Manganese, Lead, Cation Exchange Capacity, Soluble Salts, acidity (pH) and buffer pH.

Tests shall be conducted in accordance with Recommended Soil Testing Procedures for the Northeastern United States, 2nd Edition, Northeastern Regional Publication No. 493; Agricultural Experiment Stations of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont and West Virginia; Revised - December 15, 1995. Referenced Document may be obtained on the web at http://ag.udel.edu/extension/Information/Soil_Testing/title-95.htm. Tests include the following:

1. Test for soil Organic Matter by loss of weight on ignition, as described in Northeastern Regional Publication No. 493, p. 59.

2. Test for soil CEC by exchangeable acidity method as described in Northeastern Regional Publication No. 493, p. 64.

3. Test for soil Soluble Salts shall be by the 1:2 (v:v) soil:water Extract Method as described in Northeastern Regional Publication No. 493, p. 74.

4. Test for Buffer pH by the SMP method as described in Northeastern Regional Publication No. 493, p.

5. Certified reports on analyses from producers of composted organic materials are required, particularly when sources are changed. Analyses will include all tests for criteria specified in “Organic Amendment (Compost).

6. Density Tests: ASTM D6938 - 10 Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth). ASTM D698 Test Method For Laboratory Compaction Characteristics Of Soil Using Standard Effort.

    a. In-place density tests shall be carried out at a rate of one test per 2,000 square feet for each type of material placed.

b. Testing Agencies: The following firms are acceptable testing agencies for laboratory testing of the various components.

c. Leaf Yard Waste Compost Stability Test and Pathogens/ Metals/ Vector Attraction: Woods End Research Laboratory, P.O. Box 297, Mt. Vernon, ME, 04352, tel: 201.293.2457, fax: 201.293.2488.

d. Leaf Yard Waste Compost/ All other tests except those listed above: University of Massachusetts, West Experiment Station, Amherst, MA 01003, tel: 413.545.2311, fax: 413.545.1931.

e. Mechanical Gradation and Chemical Analysis, All Components and Soil Mixes: University of Massachusetts, West Experiment Station, Amherst, MA 01003, tel: 413.545.2311, fax: 413.545.1931 or Hummel & Co. Inc., 35 King Street, P.O. Box 606, Trumansburg, NY 14886, tel: 607.387.5694.

7. Test results: test data and recommendations for soil amendments including but not limited to: nitrogen, phosphorus, potassium and limestone.

8. Samples: Prior to ordering the below listed materials, submit representative samples to the Engineer for selection and approval. Do not order materials until Engineer's approval has been obtained. Delivered materials shall closely match the approved samples.

   a. Organic amendment (Compost): duplicate samples of 1 gallon.
   b. Base Loam: duplicate samples of 1 gallon.
   c. Coarse Sand: duplicate samples of 1 gallon.
   d. Planting Bed Soil, after approval of individual components: duplicate samples of 1 gallon.
   e. Lawn and Meadow Root Zone Soil, after approval of individual components: duplicate samples of 1 gallon.
   f. ¾-inch Crushed Stone: duplicate samples of 1 gallon.

Sources for Soil Components and Soils: Submit information identifying the source for soil components and the firm responsible for mixing of soil mixes.

Soil components and soils shall be supplied by them same single supplier.

Soil components and soils shall be supplied by one of the following:

1. Read Custom Soils, 125 Turnpike Street, Canton, MA 02021, www.readcustomsoils.com, phone #800-924-5335, contact: Terry Driscoll
2. Dexter & Harpell, 2352 Main Street, Concord, MA 01742, phone # 978-897-4901, contact: Tom Dexter.

3. New England Specialty Soil, 435 Lancaster St., Leominster, MA 01454 www.nesoils.com, phone # 978-466-1844, fax # 978-466-1882, contact: Ed Downing.

Engineer shall have the right to reject soil supplier.

Soil medium supplier shall have a minimum of five years experience at supplying custom planting soil mixes.

Submit supplier name, address, telephone and fax numbers and contact name.

Submit certification that accepted supplier is able to provide sufficient quantities of materials and mixes for the entire project.

Inspection

Do not place planting soil on subgrade prior to inspection and approval of Engineer of subgrades for compliance with scarification, de-compaction and re-compaction specifications. Contractor shall request inspection before proceeding.

Do not place planting soil on sand or sand and gravel drainage blanket prior to inspection and approval of Engineer of drainage blankets for compliance with depth and connection with associated drainage line specifications. Contractor shall request inspection before proceeding.

Do not install plant material prior to inspection and approval of Engineer of planting soils for compliance with depth and compaction specifications. Request inspection before proceeding

Delivery, Storage and Handling

In addition, the following provision is established: Material shall not be handled or hauled, placed or compacted when it is wet as after a heavy rainfall or is frozen. Soil shall be handled only when the moisture content is less than at field capacity. The Engineer and the Soil Scientist shall be consulted to determine if the soil is too wet to handle.

Store and handle packaged materials in strict compliance with manufacturer's instructions and recommendations. Protect all materials from weather, damage, injury and theft.

Sequence deliveries to avoid delay. On-site storage space is permissible only with written notice from Construction Manager. Deliver materials only after preparations for placement of planting soil have been completed.

Prohibit vehicular and pedestrian traffic on or around stockpiled planting soil.

Soil that is to be stockpiled longer than two weeks, whether on or off site, shall not be placed in mounds greater than six feet high. If soil stockpiles greater than six feet high are present

longer than two weeks then the contractor shall break down and disperse soil so that mounds do not exceed the six-foot height restriction for longer than two weeks.

Vehicular access to the site is restricted. Before construction, the Contractor shall submit for approval a plan showing proposed routing for deliveries and site access.

Soil Moisture Content- Do not work soil when moisture content is so great that excessive compaction will occur, nor when it is so dry that dust will form in the air or that clods will not break readily, nor when it is frozen. Apply water, if necessary, to bring soil to an optimum moisture content for tilling and planting.

1. Field Tests

    a. Form soil in palm of hand, if soil retains shape and crumbles upon touching, the soil may be worked.
    b. If the soil will not retain shape it is too dry and should not be worked.
    c. If the soil retains shape and will not crumble, it is too wet and should not be worked.
    d. If the soil glistens or free water is present after lightly patting the sample, the soil is too wet and should not be worked.

MATERIALS

Soil Materials

General

1. Soil materials shall fulfill the requirements as specified and be tested to confirm the specified characteristics.

2. Samples of individual components of soil mixes in addition to blended soil mixes including mulch materials shall be submitted by the Contractor for testing and analysis to the approved testing laboratory. Comply with specific materials requirements specified.

    a. No base component material or soil components for soils shall be used until certified test reports by an approved agricultural chemist have been received and approved by the Engineer.
    b. Make soil amendments and resubmit test reports indicating amendments until approved.

3. Engineer may request additional testing by Contractor for confirmation of soil quality and/or soil amendments at any time until completion.

Base Loam

Base Loam shall be imported and be free of subsoil, large stones, earth clods, sticks, stumps,

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clay lumps, roots or other objectionable, extraneous matter or debris. Base Loam shall also be free of quack-grass rhizomes, Agropyron Repens, and the nut-like tubers of nutgrass, Cyperus Esculentus, and all other primary noxious weeds. Base Loam shall not be delivered or used for planting while in a frozen or muddy condition. Base Loam for mixing shall conform to the following grain size distribution for material passing the #10 sieve:

Percent Passing U.S. Sieve Size Number	Minimum	Maximum
10	---	100
18	85	100
35	70	95
60	50	85
140	36	53
	270	32 42
	0.002mm	3 6

The ratio of the particle size for 80% passing (D80) to the particle size for 30% passing (D30) shall be 8 or less (D80/D30 < 8). Maximum size shall be one-inch largest dimension. The maximum retained on the #10 sieve shall be 20% by weight of the total sample. Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422 after destruction of organic matter by ignition. The organic content shall be between 4.0 and 8.0 percent by weight.

Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium Magnesium, Aluminum, Iron, Manganese, Lead, Cation Exchange Capacity, Soluble Salts, acidity (pH) and buffer pH.

Coarse Sand

Sand for Sand-Based Structural Soil and Drainage Medium below planting soils shall be uniformly graded medium to coarse sand consisting of clean, inert, rounded to sub-angular grains of quartz or other durable rock free from loam or clay, mica, surface coatings and deleterious materials with the following gradation.

Percent Passing U.S. Sieve Size Number	Minimum	Maximum
10	100	--
18	60	80
35	25	45
60	8	20
140	0	8
270	0	3
0.002mm	0	0.5

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Maximum size shall be one-inch largest dimension. The maximum retained on the #10 sieve shall be 20% by weight of the total sample. The ratio of the particle size for 70% passing (D70) to the particle size for 20% passing (D20) shall be 3.5 or less (D70/D20 <3.5). Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422 after destruction of organic matter by ignition. pH shall be less than 7.5.

Organic Amendment (Compost)

Organic Matter for amending planting soils shall be a stable, humus-like material produced from the aerobic decomposition and curing of Leaf Yard Waste Compost, composted for a minimum of one year (12 months). The leaf yard waste compost shall be free of debris such as plastics, metal, concrete or other debris. The leaf yard waste compost shall be free of stones larger than 1/2", larger branches and roots. Wood chips over 1" in length or diameter shall be removed by screening. The compost shall be a dark brown to black color and be capable of supporting plant growth with appropriate management practices in conjunction with addition of fertilizer and other amendments as applicable, with no visible free water or dust, with no unpleasant odor, and meeting the following criteria as reported by laboratory tests.

1. The ratio of carbon to nitrogen shall be in the range of 12:1 to 25:1.

2. Stability shall be assessed by the Solvita procedure. Protocols are specified by the Solvita manual (version 4.0). The compost must achieve a maturity index of 6 or more as measured by the Solvita scale. Stability tests shall be conducted by Woods End Research Laboratory, Mt. Vernon, Maine.

2. Pathogens/Metals/Vector Attraction reduction shall meet 40 CFR Part 503 rule, Table3, page 9392, Vol. 58 No. 32, and Commonwealth of Massachusetts 310 CMR 32.00 (for applications to soils with human activity).

3. Organic Content shall be at least 20 percent (dry weight). One hundred percent of the material shall pass a 3/8-inch (or smaller) screen. Debris such as metal, glass, plastic, wood (other than residual chips), asphalt or masonry shall not be visible and shall not exceed one percent dry weight. Organic content shall be determined by weight loss on ignition for particles passing a number 10 sieve according to procedures performed by the West Experiment Station at the University of Massachusetts, Amherst or equal as follows. A 50-cc sub-sample of the screened and mixed compost is ground to pass the number 60 sieve. Two to three grams (+ 0.001g) of ground sample, dried to a constant weight at 105 degrees C is placed into a muffle furnace. The temperature is slowly raised (5C/minute) to 450C and maintained for three hours. The sample is removed to an oven to equilibrate at 105C and the weight is taken. Organic matter is calculated as loss on ignition.

4. pH: The pH shall be between 6.5 to 7.2 as determined from a 1:1 soil-distilled water suspension using a glass electrode pH meter American Society of Agronomy Methods of Soil Analysis, Part 2, 1986.

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5. Salinity: Electrical conductivity of a one to five soil to water ratio extract shall not exceed 2.0 mmhos/cm (dS/m).

6. The compost shall be screened to 3/8 inch maximum particle size and shall contain not more that 3 percent material finer that 0.002mm as determined by hydrometer test on ashed material.

7. Nutrient content shall be determined by the University of Massachusetts Soil Testing Laboratory or equivalent laboratory and utilized to evaluate soil required amendments for the mixed soils. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Aluminum, Magnesium, Iron, Manganese, Lead, Soluble Salts, Cation Exchange Capacity, soil reaction (pH), and buffer pH.

Planting Bed Soil

Planting Bed Soil shall consist of a blend of approximately one part by volume of Coarse Sand, one part by volume of Base Loam and one part by volume of Organic Amendment. Blending of the components shall be carried out with earth moving equipment prior to placement. The components shall be blended to create a uniform mixture as determined by the Engineer

The final blended Planting Bed Soil shall conform to the following grain size distribution for material passing the #10 sieve:

Percent Passing by Weight U.S. Sieve Size Number	Minimum	Maximum
10	100	-
18	73	90
35	54	74
60	33	53
140	22	34
270	18	24
0.002mm	2.5	6

Maximum size shall be one inch largest dimension. The maximum retained on the #10 sieve shall be 20% by weight of the total sample.

Ratio of the particle size for 80% passing (D80) to the particle size for 30% passing (D30) shall be 7 or less. (D80/D30 <7)

Saturated hydraulic conductivity of the mix: not less than 2 inches per hour according to ASTM D5856-95 (2000) when compacted to a minimum of 86% Standard Proctor, ASTM 698.

Organic content: between 5.0 and 7.0 percent by weight.

ITEM 751.2 and 751.3 (Continued)

Lawn and Meadow Root Zone Soil

Lawn and Meadow Root Zone Soil shall consist of a blend of approximately two parts by volume of Coarse Sand to one part by volume Base Loam to one half part by volume Organic Amendment (2S:1L:1C) to create a uniform blend which meets the following requirements.

Gradation for Material Passing the Number 10 Sieve:

% Passing by Weight U.S. Sieve Size Number	Minimum	Maximum
10	100	-
18	70	90
35	45	72
60	26	40
140	14	20
270	11	14
0.002mm	2	4

Maximum size shall be one-inch largest dimension. The maximum retained on the #10 sieve shall be 15% by weight of the total sample.

Ratio of the particle size for 70% passing (D70) to the particle size for 20% passing (D20) shall be 5.0 or less. (D70/D20 <5.0)

Saturated hydraulic conductivity of the mix: not less than 4 inches per hour according to ASTM D5856-95 (2000) when compacted to a minimum of 88% Standard Proctor, ASTM 698.

Organic content: between 4.0 and 5.0 percent by

weight. The pH shall be between 6.2 and 6.8.

CONSTRUCTION METHODS

Pre-Installation Examination and Preparation

Coordinate activities with other project contractors so that there is no soil disturbance from traffic or other construction activities subsequent to placement.

Pre-Installation Examination Required: The Contractor shall examine previous work, related work, and conditions under which this work is to be performed and shall notify Engineer in writing of all deficiencies and conditions detrimental to the proper completion of this work. Beginning work means Contractor accepts substrates, previous work, and conditions. The Contractor shall not place any planting soil until all work in adjacent areas is complete and approved by the Engineer and Soil Scientist.

ITEM 751.2 and 751.3 (Continued)

Examination of Subgrade: The subgrade shall be examined by the Contractor prior to the start of soil placement and planting. Any deficiencies shall be noted and related to the Engineer in advance of commencing work.

writing prior to acceptance of the subgrade by the Landscape Contractor. Deficiencies include, but shall not be limited to the following:

1. Construction debris present within the planting areas.

2. The subgrade is at incorrect depths for installing the designed soil profile and drainage layer.

3. Incomplete irrigation and/or subsurface drainage installation.

4. Subgrade not compacted to levels specified.

5. Subgrade must infiltrate water at the rate of at least one inch per hour.

6. Standing water or muddy subgrade conditions.

Subgrade Compaction Mitigation

Coordinate the following scarification work to eliminate subgrade compaction with the site Earthwork Specifications done as a result of Construction Operations when located in lawn and planting areas. After the subgrade has been loosened and re-compacted, request approval from Engineer prior to placing Planting Soils. The Contractor shall not place any planting soil until all subgrade preparation work is complete and approved in writing by the Engineer.

Heavy Site Subgrade Compaction Mitigation:

1. Heavily compacted areas such as but not limited to temporary parking areas, material stockpile areas, temporary roadways, construction areas and areas around the building and garage and other similar areas.

2. Prior to establishing the final subgrade of Earthwork material, these areas shall be dug up or ripped to a depth of (18) inches to break up the compacted subgrade, then re- compacted with two passes of the tracks of a wide track bulldozer size D-6 or smaller, or other approved equipment.

3. General Site Subgrade Compaction Mitigation for all lawn and planting areas that are not heavily compacted and would be mitigated as specified in Item 1 above:

4. Immediately prior to placing planting soils, the entire subgrade shall be loosened by raking or using the teeth of a backhoe or other suitable equipment. After the soils have been loosened and inspected, planting soils may be spread by using a wide track bulldozer size D-5 or smaller or may be dumped and spread with the bucket of a backhoe from the edge of the loosened area. No rubber-tired equipment or heavy

equipment except for a small bulldozer shall pass over the subsoils (subgrade) after they have been loosened. If the Contractor plans to utilize such areas for any use of heavy equipment,

this work should be carried out prior to beginning the process of loosening soils or filling in that area. Subgrade areas shall be re-compacted to 84 to 88% Standard Proctor.

Preparation and Mixing of Planting Soil Mixes

Examine soil and remove foreign materials, stones and organic debris over 1/2" in size.

Correct deficiencies in soil as directed by horticultural soil test results. If lime is to be added, it shall be mixed with dry soil before fertilizer is added and mixed.

Planting soil mixtures shall be produced with equipment that blends together each component in a thorough and uniform manner.

Preparation and mixing shall be accomplished when the soil moisture content is less than field capacity and at a moisture content approved by the Engineer.

Incorporate pre planting fertilizer into top two inches of lawn root zone Soil at a rate of 20 pounds per 1000 square feet following placement and grading.

Incorporate pre plant fertilizer at a rate of 30 pounds per cubic yard of planting bed Soil. Amendment rate will be 6 times square foot application rate per cubic yard of planting mixture.

Backfilling of Planting Soil Layers

Soil Placement Preparation:

1. Verify plumbing for the irrigation system has been installed and accepted.

2. Notify Engineer of soil placement operations at least seven calendar days prior to the beginning of work.

3. Place plant stock simultaneously with the planting soil. The Engineer will stake trees and shrubs during placement of the planting soil.

4. Verify that the subgrade passes the minimum water infiltration requirement.

Placement of Planting Bed Soil and Lawn and Meadow Root Zone Soil.

1. Immediately prior to placing Planting Bed Soil thoroughly compact subgrade area.

2. Spread Planting Bed Soil in lifts not greater than twelve inches and compact to a

density between 84 and 86 percent Standard Proctor Maximum Dry Density. The surface area of each lift, including the subgrade after it has been compacted, shall be scarified by raking prior to placing the next lift.

3. Place and spread Planting Soil to a depth greater than required such that after settlement, finished grade conforming to the lines, grades and elevations shown on the Drawings. Ensure proper drainage in an uninterrupted pattern free of hollows and pockets.

4. Remove stiff clods, lumps, brush, roots, stumps, litter and other foreign material and stones over one inch in diameter and dispose of legally off site.

Testing, Submittals, Mockups and Protection

Protect newly graded areas from traffic, freezing and erosion. Keep free of trash, debris or construction materials from other work.

Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or compaction due to subsequent construction operations or weather conditions. Scarify or remove and replace material to a depth as directed by the Engineer; reshape and re-compact at optimum moisture content to the required density.

Where settling occurs, before final acceptance or during the warranty period, remove finish surfacing, backfill with additional approved material, compact to specified rates, and restore any disturbed areas to a condition acceptable to the Owner.

Coordination and Excess Materials

Coordinate activities with other project contractors so that there is no soil disturbance from traffic or other construction activities subsequent to placement.

Excess Planting Soil Mixtures and Materials: Remove excess planting Soils and materials from the site at no additional cost to Owner unless other wise requested.

Post-Installation Testing

In-place density testing is required in all areas. The standard test for surface and subsurface density shall be ASTM D-1556.

METHOD OF MEASUREMENT

Item 751.2, Planting Soil- ammended will be measured per cubic yard as determined by the Engineer.

Item 751.3, Planting Soil- Imported will be measured per cubic yard as determined by the

Engineer.

BASIS OF PAYMENT

Item 751.2, Planting Soil- Ammended will be paid for at the contract unit price, per cubic yard, which includes full compensation for labor, equipment, materials and incidental costs to complete the work.

Item 751.3 Planting Soil - Imported will be paid for at the contract unit price, per cubic yard, which includes full compensation for labor, equipment, materials and incidental costs to complete the work.

ITEM 770.2 PLANTING MAINTENANCE LUMP SUM

GENERAL

This work under this item shall include Plant maintenance including pruning, drainage, irrigation, fertilizing, weed and pest control, and adjusting tree guys, guaranty, and replacement of unacceptable plants, providing Owner with Maintenance Manual, except as amended and supplemented as indicated on Contract Drawings, as specified herein and as directed by the Engineer.

SUBMITTALS

Materials List: provide list of materials to be used in maintenance; materials shall be the same as approved in related sections:

Fertilizers, soil amendments, testing

See Item 751.2 Planting Bed Soil.

Plants materials, mulch, and related materials

See Item 775.030 through 796.206.

Pest and Disease Treatment

Submit plan for pest and disease treatment; identify proposed materials and methods. Explain why a problem does or may exist.

Maintenance Manual

Provide a maintenance manual to Owner describing operations for on-going upkeep of the installed plants. The manual shall address itself to specified types and uses of plants installed, and provide information for care of both newly installed plants and long-term maintenance.

Provide specific information on the following items:

Watering: Watering season; diagnosis of watering need; frequency of watering; amount; time of day; methods and equipment; equipment maintenance.

Fertilization: Fertilizing seasons; analysis for fertilizer selection; application rates and methods; preparation and conditions; application times; application equipment; post-application operations and care; precautions for fertilizer use.

Liming: Liming season; analysis for liming; application rate; method and equipment for application.

ITEM 770.2 (Continued)

Pruning: Pruning goals and purposes; methods and techniques (relate to species); equipment; season; cleanup and disposal; precautions.

Mulching of beds: Depths of mulch; refreshment and replacement of mulch.

Miscellaneous plant maintenance: Weeding and weed control; pest and disease control; leaf and litter removal; bed edging; professional assistance for plant care; and plant replacement as necessary.

Include a month-by-month calendar of maintenance procedures, indicating operations listed above.

Submit a copy of maintenance manual to Engineer for approval. Submit prior to planting completion. Engineer may request revisions to manual to meet intent of project design.

Submit three copies of manual to Owner at acceptance meeting for planting work. Acceptance shall not be granted until manual has been submitted and approved.

MATERIALS

Materials utilized during the maintenance period shall be the same specified in the work of the related sections:

Fertilizers, Soil Amendments, Testing, see Item 751.2 Planting Bed Soil and Item 751.21 Lawn Root Zone Soil.

Plants, mulch, and related materials

See Item 776.836.

Biological, horticultural, herbicidal and Other Pest Control

Shall be by a licensed pest control operator, with authority to purchase, utilize, and specify agricultural chemicals and agricultural products. Use the least hazardous, least intrusive materials and methods.

Equipment

Vehicles: in good working order so oil and grease does not stain pavements and poison plantings. Signs identifying the vehicles shall be clearly displayed.

Machinery: in good working order so oil and grease does not stain pavements and poison plantings.

ITEM 770.2 (Continued)

Water

Furnished by Contractor, suitable for irrigation and free from ingredients harmful to plant life, until available from on-site source. Hose and other watering furnished by Contractor.

CONSTRUCTION METHODS

Substantial Completion

Upon completion of planting, request Engineer's review to determine if work is substantially complete. If work is complete, Engineer will issue a letter of Substantial Completion that identifies the effective dates of the start of the One-Year Maintenance Period.

If work is not substantially complete, Engineer will make a list of outstanding work to be done on a timely schedule agreed upon by Contractor and Engineer.

Contractor shall notify Engineer when outstanding work is accomplished and ready for review. When outstanding work is complete, in the judgment of Engineer, a letter of Substantial Completion will be issued.

One Year Maintenance Period

Maintain plantings until the end of One-Year Maintenance Period and until the receipt of the Letter of Preliminary Acceptance.

Preliminary Acceptance

After the One-Year Maintenance Period including initial one-year guaranty, work will be reviewed for completeness and start of second year Guaranty Period for plantings.

Plantings shall be in thriving and vigorous condition at the time of review for Preliminary Acceptance. If plantings are acceptable, Engineer will issue a Letter of Preliminary Acceptance establishing the effective date of the one-year Guaranty Period.

If plantings are not thriving, in the judgment of Engineer, remedial actions by Contractor will be required to repair or replace plantings.

Remedial work shall be done immediately and in accordance with related work of other sections.

At the conclusion of remedial work, Engineer will review work and extend the Maintenance Period an additional 90 days to incorporate new plantings.

Final Acceptance

At the completion of the second year of the Guaranty Period, plantings will be reviewed.

ITEM 770.2 (Continued)

Plantings shall be in thriving and vigorous condition at the time of review for Final Acceptance. If plantings are acceptable, Engineer will issue a Letter of Final Acceptance.

If plantings are not thriving, in the judgment of Engineer, remedial actions by Contractor will be required to replace plantings.

Remedial work shall be done immediately and in accordance with related work of other sections.

At the conclusion of remedial work, Engineer will review work and extend the Guaranty Period until plantings are deemed acceptable.

Replace plants that are dead or, as determined by Engineer, are in an unhealthy or unsightly condition, and have lost their natural shape due to dead branches, or other causes.

End of Guaranty Period: one year from date of Preliminary Acceptance, Engineer will review plantings. If plantings are acceptable, Engineer will issue a letter of Final Acceptance. If plantings are unacceptable, plantings shall be replaced until condition of plantings are acceptable as determined by Engineer.

Upon receipt of letter of Final Acceptance, the project becomes responsibility of the DCR.

Examination

Verification of Conditions: in the event field conditions are not as shown on Drawings and outlined in the Specifications, notify Engineer in writing.

Preparation

Agricultural Chemicals: protect site improvements from contact with agricultural chemicals, soil amendments, and fertilizers.

Pruning

Prune with approval of Engineer. Remove dead branches, rubbing branches, and branch work growing towards the centers of tree and shrubs.

Drainage

Observe drainage in plant pits with hand soil augur.

Verify plant pits are draining; plant pits not draining shall be identified on the plan and brought to the attention of Engineer.

ITEM 770.2 (Continued)

Plants

Maintain plants in vigorous condition throughout maintenance period.

Replace plants that are missing, dead, not true to name or size as specified, or not in satisfactory growth, as determined by Engineer. Replace plants found unacceptable within one month or in first month of next growing season, whichever comes first.

Plants must show a minimum of 75% healthy head with obvious growth since planting. Signs of disease, injury, or damage shall have been successfully treated or plant shall be rejected as determined by Engineer.

Replacements plants shall be same kind and size as specified in plant list. Furnish and plant. Cost of replacement borne by Contractor except where it can be shown loss resulted from vandalism, fire, theft, or other causes beyond Contractor's control. Restore areas damaged or disturbed by replacement operations to their original condition.

Watering

Refer to 776.836, for watering requirements during the maintenance period and guaranty

period.

Plant Basins

Keep foot tamped and shaped earth dikes around plantings.

Tree Stakes and Guys

Tree stakes: maintain plumb; adjust flexible ties.

Guys: maintain wires taut; adjust turnbuckles; keep flags on wires.

Finish Grade

Maintain finish grades around plantings, at pavement edges, and at irrigation fixtures.

Mulch

Maintain mulch at 2” depth in planting areas with the exception of at stems and trunks of plants where mulch to be placed to a 0” depth and increasing to a depth of 2” at edge of root balls and beyond.

Treatment of Pests and Diseases

Spray for both insect pests and diseases during maintenance period with permission of

ITEM 770.2 (Continued)

Engineer. Apply herbicides, insecticides and fungicides as prescribed by their manufacturer and in accordance with The Commonwealth of Massachusetts laws. Contractor shall possess from the Commonwealth of Massachusetts the proper registrations and permits for application of materials or have applications made by approved, qualified firm holding registrations and permits. Furnish copies of permits in connection with materials to Engineer. Spraying to be considered only after full consideration has been given to alternative pest control strategies. The least toxic approach to pest control shall be used.

Adjusting

Re-set settled plants to proper grade and position. Restore planting saucer and adjacent

material.

Field Quality Control

Post Plant Soil Tests: See Item 776.836.

Cleaning

Clean up, remove and dispose of off-site excess planting mixture, soil and debris generated under work of this section.

Remove and dispose of stakes, guys and other accessories at end of guaranty period.

Wash and sweep clean site improvements and building surfaces. Clean spills and overspray immediately.

Repair damage caused by maintenance operations.

Protection

Protect work of this section until Final Acceptance.

Protect planted areas and soils from compaction by construction traffic and from contamination by construction materials.

METHOD OF MEASUREMENT

ITEM 770.2, PLANTING MAINTENANCE shall be measured for payment per the Unit LUMP SUM complete in-place as shown on the Drawings and as specified herein to consist of all labor materials and equipment, maintenance, and all other incidentals, or as required by the Engineer.

ITEM 770.2 (Continued)

BASIS OF PAYMENT

ITEM 770.2, PLANTING MAINTENANCE will be paid for at the contract unit price LUMP SUM as specified above. The unit price shall constitute full compensation for complete compliance with requirements of this item, including all labor for one-year of maintenance and two-year guaranty, all equipment, materials, tools, and other incidental work and construction methods to complete Planting Maintenance as indicated and specified herein, or as required by the Engineer.

ITEM 772.1	**THUJA OCCIDENTALIS - 8-10' HT**	**EACH**
ITEM 772.2	**THUJA OCCIDENTALIS -10-12' HT**	**EACH**
ITEM 776.9	**ACER PENSYLVANICA 8-10' HT**	**EACH**
ITEM 778.2	**BETULUS POPULIFOLIA- 8-10' HT**	**EACH**
ITEM 778.3	**BETULUS POPULIFOLIA -10-12' HT**	**EACH**
ITEM 782.537	**CERCIS CANADENSIS 8-10' HT**	**EACH**
ITEM 783	**MAGNOLIA VIRGINIANA 10-12' HT**	**EACH**
ITEM 784	**PICEA GLAUCA – 8-10' HT**	**EACH**
ITEM 784.1	**PICEA GLAUCA – 10-12' HT**	**EACH**
ITEM 786.5	**JUNIPERUS VIRGINIANA 24-30" B&B**	**EACH**
ITEM 789.334	**MYRICA PENSYLVANICA – 24-30" B&B**	**EACH**
ITEM 794.332	**RHUS AROMATICA 'GROW LOW' -24"-2 GALLON**	**EACH**
ITEM 794.735	**ILEX GLABRA -30-36" B&B**	**EACH**
ITEM 794.736	**ARONIA MELANOCARPA – 30-36" B&B**	**EACH**
ITEM 794.738	**CLETHRA ALNIFOLIA – 30-36" B&B**	**EACH**
ITEM 795.1	**VIBURNUM DENTATUM – 3-4' B&B**	**EACH**
ITEM 796	**SCHIZACHYRIUM SCOPARIUM- 2 GALLON**	**EACH**

GENERAL

This work shall consist of furnishing, planting and/or transplanting specified trees, shrubs, vines and ground cover to locations as shown on the plans and/or as directed by the Engineer.

The work shall include excavation of pits, placing of backfill mixture, mulching, watering, staking or guying, wrapping for transport, adding fertilizing and/or other soil amendments, seeding, weeding, watering, care of the plants, and replacement of unsatisfactory plants and materials during the life of the contract.

The Contractor performing work under this Section shall have five years continuous experience and expertise in management, handling and installation of ornamental plant material in large-scale landscape construction projects. Site foreman shall have at least five years' experience, able to read and interpret plans, and shall be on-site during all times of plant installation.

The work under these items shall conform to the relevant provisions of the American Nursery Standards and, Section 751.2-751.3, " Planting Soils" and Section 770.2, "Planting Maintenance" of the Standard Specifications, except as amended and supplemented as indicated on the drawings and as specified below and as directed by the Engineer.

ITEM 772.1 through 796. (Continued)

Definitions

Balled and Burlapped Stock: Exterior plants dug with firm, natural balls of earth in which they are grown, with ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of tree or shrub required; wrapped, tied, rigidly supported, and drum-laced as recommended by ANSI Z60.1.
Container-Grown Stock: Healthy, vigorous, well-rooted exterior plants grown in a container with well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for kind, type, and size of exterior plant required.

Finish Grade: Elevation of finished surface of planting soil..

Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.

Submittals

Submittals: in accordance with Section 5.0, Control of the Work.

Product Data: Submit most recent printed information from manufacturers for:

1. Antidesiccant
2. Liquid Seaweed Concentrate
3. Plant Growth Biostimulant
4. Mycorrhizae Granules

Samples: Submit samples of:

1. Organic Mulch: Submit one cubic foot sample and manufacturer/supplier's name.
2. Tree Stabilization System.

Certificates:

1. Submit certification of Massachusetts state arborist.

Landscape Contractor:

1. Submit in writing planting subcontractor including name, address, telephone number, experience on projects of a similar size and complexity, a minimum of three references and supervisor for planting subcontractor.

Plant List:

1. Within 30 days of award of Contract, submit plant list for review by Engineer which includes:

a. plant materials proposed for project and corresponding nursery source where plants are to be selected.
b. written documentation indicating nursery(s) have available the plants in the species, quantity and size(s) shown on Drawings.
c. for plants indicating names of plants in accordance with American Joint Committee on Horticultural Nomenclature.

2. Schedule for review at nursery source by Engineer with Contractor present.

3. Substitutions: plant list shall indicate unavailable materials and document a thorough search for materials. For unavailable materials list sources contacted with telephone number, date and person's name at source.

Schedules

1. Submit planting schedule for approval.

Quality Assurance

Planting shall be performed by a certified landscape contractor with a minimum of five years planting work experience on projects of a similar size and complexity and under full time supervision of a qualified supervisor.

Pruning shall be performed by a Massachusetts certified and/or an International Society of Arboriculture certified arborist. Pruning shall comply with ANSI A300 pruning standards.

Pre-Construction Meeting

At the project pre-construction meeting, the following items relating to the work of this Item shall be specifically discussed:

1. Nursery sources for plant materials.
2. Schedule of plant tagging, delivery and installation.
3. Review benchmark dates at which time Engineer's designated Landscape Architect should make site visits.

Selection and Inspection of Plants

Plants shall be selected by Engineer at place of growth for conformity to specification requirements as to quality, size and variety prior to purchase and planting. Such approval shall not impair right of inspection and rejection upon delivery at site or during progress of work. Cost of replacement shall be borne by Contractor.

Source Limitations

1. Plants shall come from the same nursery.

ITEM 772.1 through 796. (Continued)

2. Plants shall have been grown under climatic conditions similar to those in the locality of the project for at least the previous two years. Unless approved by the Engineer, plants shall have been grown at a latitude not more than 325 km (200 miles) north or south of the latitude of the project unless the provenance of the plant can be documented to be compatible with the latitude and cold hardiness zone of the planting location.

3. Color photographs of representative plant material shall be submitted for initial review of alternate nursery sources. Photographs are to include a scale rod or other measuring device and be taken from an angle that depicts the size and condition of the typical plant to be furnished. Photographs must show actual plant material available for selection at that time.

Plant Selection / Coordination

1. For trees, within 90 days of the Notice to Proceed, submit tree sources and schedule selection and tagging of trees so Engineer can tag trees for project at place of growth. Engineer with perform one trip to the nursery(s) to select and tag trees and a second trip to the nursery(s) review and confirm the acceptability of the trees immediately prior to digging for delivery to the site. Source information shall state the place of growth and the approximate quantity of trees available for inspection. The Engineer may refuse inspection

at this time if, in his or her judgment, sufficient quantities of plants are not available for inspection.

2. For shrubs and other plants, submit plant sources by January 1 of the planting year for Spring plantings, and July 1 for Fall plantings, schedule selection and tagging of shrubs so Engineer can tag representative shrubs for project at place of growth. Source information shall state the place of growth and the approximate quantity of trees available for inspection The Engineer may refuse inspection at this time if, in his or her judgment, sufficient quantities of plants are not available for inspection.

3. Inform Engineer of selection schedule a minimum of one month (30 day minimum) in advance of selection/tagging dates so Engineer can make proper travel arrangements. If Contractor fails to provide one month (30 day minimum) notice, any additional travel expenses shall be back-charged to Contractor. If Engineer has to make additional trips to select/tag plants in the event that inadequate, insufficient or unacceptable plant material was available at the inspection location, then additional travel expenses to be backcharged to Contractor.

4. If nurseries and/or stock submitted for review are not acceptable to Engineer, submit alternate sources within seven (7) business days.

5. If Contractor cannot locate the plant material specified in the Drawings, Contractor shall enlist a plant broker to locate the material. Submit a report from the plant broker

describing alternate sources of availability or lack thereof for the specified plant material and sizes.

6. Trips to nurseries shall be efficiently arranged to allow Engineer to maximize his/her viewing time. Only undug trees (trees that are in the ground) shall be considered for approval. Engineer may choose to attach their seal to each plant, or representative samples. Each tree may have a specific location and orientation on the proposed plan that the Contractor shall follow closely during installation.

7. Plant material that has been sealed shall be secured by Contractor within ten (10) business days of Engineer having reviewed or sealed the material.

8. Engineer's seals shall not be removed until plantings have been approved by Engineer. Removal of seals prior to Engineer's review of plantings shall be considered grounds for rejection of plant material.

Expenses

1. Contractor to pay for Engineer travel expenses: air fare, car rental, automobile mileage and tolls; meals and overnight accommodations if necessary, for Engineer during time period required to select and tag plant material. Planting subcontractor shall provide representative to travel with Engineer while tagging plant material.

Plant Shipment to Site/ On Site Review

1. Notify Engineer a minimum of five business days prior to each shipment of proposed arrival of plant material on site.

2. Layout tree locations, bed outlines and individual planting on site for inspection by Engineer prior to planting. Arrange for adequate manpower and equipment on site at time of plant material inspection and installation to provide complete staked layout and to unload, open and handle plant material during inspection.

Project/ Site Conditions

Environmental Requirements: do not deliver or handle soils when dry, wet, or frozen.

1. Field Test

a. Form soil in palm of hand, if soil retains shape and crumbles upon touching, the soil may be worked.
b. If the soil will not retain shape it is too dry and should not be worked.

If the soil retains shape and will not crumble, it is too wet and should not be worked.

Planting Season: planting seasons shall be those indicated below. Plants planted

ITEM 772.1 through 796. (Continued)

out-of- season shall receive special attention as directed. Out-of-season planting and or transplanting shall be at Contractor's risk and expense. No planting shall be done in frozen or muddy ground or when snow covers ground, or soil is otherwise in an unsatisfactory condition for planting.

1. Seasons for Planting:

Spring:
Deciduous materials – April 1 to June 15/ Evergreen Materials – April 1 to June 15

Fall:
Deciduous materials – September 1 - October 15/ Evergreen Materials – September 1 - October 15

2. Variance: If special conditions exist that warrant a variance in the above planting dates, a written request shall be submitted to the Engineer a minimum of 4 weeks prior to the scheduled planting date stating the special conditions and the proposed variance. Permission for the variance will be given if warranted in the opinion of the Engineer and at no additional cost to the Owner.

Substantial Completion

See Item 770.2 Planting

Maintenance. One-Year

Maintenance Period

See Item 770.2 Planting Maintenance.

Preliminary Acceptance

See Item 770.2 Planting

Maintenance. Guarantee

See Item 770.2 Planting

Maintenance. Final Acceptance

See Item 770.2 Planting Maintenance.

ITEM 772.1 through 796. (Continued)

MATERIALS

Materials shall meet the requirements specified in the following Subsections of Division III, Materials with the amendments and supplements contained herein: Loam Borrow.....M1.05.0
Organic Soil Additives.....M1.06.0
Inorganic Amendments.....M6.01.0
Fertilizer.....M6.02.0
Wood Chip Mulch.....M6.04.3
Aged Pine Bark Mulch.....M6.04.5
General Planting.....M6.06.0
Nursery Stock – General M6.06.1
Wrapping for Transport M6.07.1
Materials for Guying and Staking.....M6.08.0
Water for Irrigation M6.09.0

Plants

1. Plant Identification and Standards: Nomenclature conforms to current edition of Standardized Plant Names, published by American Joint Committee on Horticultural Nomenclature. Plants conform to varieties and sizes specified in plant list, and to code of standards set forth by American Association of Nurserymen, Inc. in American Standard for Nursery Stock, ANSI Z60.1 - latest edition. Substitutions shall not be permitted without consent of DCR Project Manager. Plants shall be properly identified with plant labels securely attached to plants, in order to identify plants on site. Information regarding sources of plant material shall be furnished to Engineer.

2. Plant List: If there are discrepancies between the quantities shown on plant list and work shown on Drawings, Contractor shall supply plants necessary to complete work as intended on Drawings. Where size of plant on the plant list is a variation between a minimum and maximum dimension, the sizes of plants furnished shall be equal to average of two dimensions. Where a single dimension is given, dimension represents
3. the minimum size of plants to be furnished.

ITEM 772.1 through 796 (Continued)

4. General Plants: Unless specified otherwise, plants shall be nursery grown under climatic conditions similar to those in locality of project and shall have been previously been transplanted or root pruned at least once in last three years. Plants shall possess a normal balance between height and spread. Plants shall be typical of their species and variety with a normal habit of growth, densely foliated when in leaf, and a well- developed branch structure with a fibrous, healthy root system with no girdling roots. Plants shall be sound and healthy, free from dead wood, defects, disfiguring knots, sun scald, injuries or abrasions of roots or bark. Plants shall be freshly dug. No heeled-in plants or plants from cold storage shall be used. Parts of plant shall be moist and show active green cambium when cut. Plants shall be free of plant diseases, insects, pests, eggs, larvae, and forms of infestations.

5. Balled and Burlapped Plants: Plants designated on plant list as "B&B" shall be healthy, vigorous, well-rooted exterior plants dug with firm, natural balls of earth in which they are grown, with ball size not less than diameter and depth to encompass fibrous and feeding root system necessary for healthy development of plants recommended by ANSI Z60.1 For type and size of tree or shrub required; wrapped, tied, rigidly supported, and drum-laced as recommended by ANSI Z60.1. Balls shall be wrapped firmly with biodegradable material and bound carefully with twine or cord.

6. Tree balls may also be placed in a wire basket of diameter suitable for the size of the root ball. No plant shall be accepted when ball of earth surrounding roots has been badly cracked or broken, either before or during process of planting, or after burlap, ropes, etc., required for transplanting have been unfastened. Plants and root balls shall remain intact as a unit during operations. Plants that cannot be planted at once mustbe protected and watered.

7. Container-Grown Stock: Healthy, vigorous, well-rooted exterior plants grown in a container with well-established root system reaching sides of container and maintaining a firm ball when removed from container without being in a rootbound condition. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for kind, type, and size of exterior plant required. Container plants shall have been acclimatized for one growing season in container. Plants shall remain in container until planted.

8. Trees: Trees to be hand dug and balled and burlapped rootballs. Trees, except when a clump form is designated, shall be straight and symmetrical with a crown having a persistent single, main leader, and growing from a single, unmutilated crown of roots. No part of trunk shall be conspicuously crooked as compared with normal trees of same variety. Trunk shall be free from sunscald, frost cracks, or wounds resulting from abrasions, fire, or other causes. No pruning wounds shall be present having diameter of more than two inches (2") and wounds must show vigorous bark on edges. Pruning wounds over 3/4 inch in diameter must be completely calloused over. Evergreen trees shall be branched to within one foot of ground. Height of trees, measured from crown of roots to top of top branch, and caliper,

measured as specified herein, shall not be less than minimum size designated in plant list. Take caliper measurements 6 in. above ground on trees up to and including 4 in. caliper, and at 12 in. above ground for larger sizes.

9. Plants larger than those specified in the Plant List may be used if approved by Engineer but use of such plants shall not increase the Contract Price. If use of larger plants is approved, spread of roots or ball of earth shall be increased in proportion to size of plant.

Planting Additives

1. Liquid Seaweed Concentrate: Dry, water soluble seaweed extract powder from Ascophym nodosum. Stress-X as manufactured by North Country Organics, Bradford, Vermont 05033. Phone: 802.222.4277.

2. Plant Growth Biostimulant: Dry, water soluble plant growth biostimulant made form beneficial bacteria humic extracts, cold water sea kelp extract, essential amino acids, vitamins, root growth factors and sugars. Bio- Magic as manufactured by North Country Organics, Bradford, Vermont 05033. Phone: 802.222.4277.

3. Mycorrhizae granules: transplant granules for inoculating plants with beneficial mycorrhizal fungi prior to planting. Myco-Magic as manufactured by North Country Organics, Bradford, Vermont 05033. Phone: 802.222.4277.

Aged Pine Bark Mulch

Shredded granular outer bark of evergreen trees and minimum of hardwood bark and shall be aged for period of at least 6 months and not longer than two years. Bark mulch shall not have be subjected to anaerobic conditions and must be partially decomposed and dark brown in color, Bark chunks shall average 1/2 inch to 2 inches in length and no chunks three inches or more in size and thicker than 1/4 inch shall be left on site. Moisture content shall be 40 percent or more, retained with normal watering and/or rainfall. Mulch shall be free of dirt, leaves, twigs, and other materials deleterious to plant life. Mulch shall not contain chipped construction materials.

Post Planting Fertilizer

1. Complete, fertilizer made from all-natural ingredients complying with State and Federal fertilizer laws. Fertilizer shall contain the following available plant food by weight, unless soil test indicates a different recommended composition.

    a. Pro Gro 5-3-4 manufactured by North County Organics, Bradford, Vermont 05033. Phone: 802.222.4277.

    b. Fertilizer to be delivered in original unopened standard size bags showing weight, analysis ingredients and manufacturer’s name.

ITEM 772.1 through 796 (Continued)

Water

Furnished by the Contractor, suitable for irrigation and free from ingredients harmful to plan life. Water and watering equipment required for work shall be furnished by the Contractor for the entire maintenance period as specified in Item 770.2, Planting Maintenance.

Tree Stabilization System

Contractor is responsible for providing a guying and staking system as shown on Drawings to maintain plants in a plumb condition and in order to withstand the environmental conditions of the site.

Planting Bed Medium

See Item 751.1 – Planting Bed

Medium. Sand Borrow

See Item 154 – Sand

Borrow. Antidesiccant

Antidesiccants: emulsions or materials which provide a protective film over plant surfaces permeable enough to permit transpiration and specifically manufactured for that purpose. Antidesiccant shall be delivered in manufacturer's containers and used according to manufacturer's instructions.

Chemicals, Herbicides, Fungicides and Insecticides

Provide chemicals, herbicides, fungicides and insecticides as needed for fungus or pest control. Chemicals and insecticides shall be approved by Massachusetts Department of Environmental Protection for intended used and application rates. No pesticides shall be used on site without knowledge and approval of Engineer. Pesticides shall be handled by State licensed operators only.

CONSTRUCTION METHODS

Examination

Verification of Conditions: in the event field conditions are not in conformance with Contract Documents, notify DCR Project Manager in writing.

Preparation

1. Protection:

ITEM 772.1 through 796 (Continued)

a. Contact "Dig Safe" prior to doing excavation on site. If work is to be done around underground utilities, appropriate authority of utility must be notified of impending work. Hand excavate areas adjacent to utilities. Contractor shall be responsible for damages done by himself or his personnel to existing utilities, which shall be repaired or paid for by Contractor.

b. Dust Control: upon acceptance of finish grades provide dust control.

c. Erosion Control: upon acceptance of finish grades provide erosion control.

d. Agricultural Chemicals: protect site improvements from contact with agricultural chemicals, soil amendments, and fertilizers.

Digging, Handling and Protection of Plants

1. Dig balled and burlapped (B&B) plants with firm natural balls of earth, of sufficient diameter and depth to include fibrous roots and conforming to standards of American Nurserymen Association. No synthetic burlap will be accepted. No plant moved with a ball will be accepted if ball is cracked or broken before or during planting operations.

2. Protect roots or balls of plants from sun and drying winds.

3. Set plants on ground in shady location and protect with soil, bark mulch, or other acceptable materials, balled and burlapped plants which cannot be planted immediately upon delivery. Water stored plants and regularly verify rootballs are moist. Engineer will reject stored plants found with dried rootballs.

4. Open bundles of plants immediately and plants and separate before roots are covered. Care shall be taken to prevent air pockets among roots. During planting operations, bare roots shall be covered with canvas, hay or other suitable material. No plant shall be bound with wire or rope as to damage the bark or break branches.

Obstructions Below Ground

1. If rock, underground construction work, or other obstructions are encountered in plant pit excavation work, alternate locations may be selected by Engineer at no additional cost to Owner.

2. Where locations cannot be changed, obstruction shall be removed, subject to Engineer’s approval, to a depth of not less than three feet (3') below grade and no less than six inches (6") below bottom of ball or roots when plant is properly set at required grade.

3. Contractor shall be paid extra for removal of rock or underground obstructions encountered. See payment items in Section 31 00 00 –

ITEM 772.1 through 796. (Continued)

Earthwork.

Preparation and Placement of Planting Soils

See Item 751.2 Planting Bed

Soil. Planting Operations

1. Stake out locations of plants and secure Engineer's approval before excavating plant pits.

2. Excavating

   a. Place tree next to tree pit excavation and remove burlap from top of root ball. If trunk flair is not visible gently loosen and remove soil with a blunt tool or air spade until trunk flair and large horizontal lateral roots are located. Use care not to damage root system. Following removal of excess soil over root ball measure depth of root ball to determine depth of tree pit excavation.

   b. Dig tree pits and plant pits by hand and take care not to disturb utilities. If utilities are disturbed during planting operation, Contractor shall repair damage at Contractor's expense.

   c. Excavate plant pits with sloping sides so planting hole is saucer shaped. Plant pit shall be no deeper than root ball.

   d. Tree pits shall be four times diameter of soil ball in width.

Setting, Backfilling and Fertilizing

1. In the event trees are containerize in wire baskets, lay tree on its side and cut the bottom of the cage off, roll the tree into the hole and remove the sides of the wire basket.

2. Set plants in center of pits plumb, straight and at an elevation where after settlement the root flare and lateral roots of plant will be at surrounding finished grade. Root ball shall not be broken. When trees are set, compact base material under the root balls to fill voids and support plants at proper height. Remove wire basket, burlap and rope from upper two thirds of balls and have Designer inspect removal prior to backfilling.

3. Sprinkle michorrhizal granules continuously around perimeter of root ball as well as incorporating granules into top of rootball following removal of top 1/3 of burlap in accordance with manufacturer's recommend

4. Mix liquid seaweed concentrate or plant growth bio-stimulant with water at a rate of 3 grams of liquid seaweed concentrate powder per gallon of water or 1 teaspoon of plant growth biostimulant per gallon of water.

ITEM 772.1 through 796 (Continued)

5. Backfill hole around plants to two-thirds full, firm soil, flood with water mixed with additives, after water has drained away backfill to finished grade without additional firming. Immediately after plant pit is backfilled, a shallow basin slightly larger than pit shall be formed with ridge of soil to facilitate and contain water.

Drainage Test

Perform drainage test at tree locations.

1. After excavation, fill pit twice successively with water.

2. Water shall drain out of plant pit minimum 2 inches per hour.

3. Plant pits draining slower than 2 inches per hour will require provision for drainage, to be reviewed and approved by Engineer.

Documentation: Note on the planting plan pits that pass drainage test and plants that fail drainage test. For pits failing drainage test, provide drainage provision as approved by Engineer, re-test, and install plants upon passing of drainage test.

Field Quality Control

Observation:

1. Engineer to review plant pits without positive drainage.

2. Engineer to review plant pit excavation and planting.

Guying and Staking

Contractor is responsible for maintaining plants in upright, vertical position and for maintaining guying and staking materials.

Pruning

Prune trees and shrubs only with approval of DCR Project Manager. Prune according to American Nurserymen's' Association Standards to preserve natural character of plant and as directed by DCR Project Manager. No leaders shall be cut.

Pruning shall be done with clean, sharp tools. Dead wood or suckers and broken or badly bruised branches shall be removed back to live bud, branch, or stem.

Mulching

Immediately after planting operations are completed, cover tree pits with a two-inch layer of specified mulch. Taper depth of mulch to be two inches at mulched perimeter and decreasing in depth toward trunk to be flush where trunk or stem meets root ball. Do not place mulch against trunk or stem.

ITEM 772.1 through 796. (Continued)

Watering

Flood plants with water twice within first 24 hours of time of planting, and water plants during the maintenance period at least twice per week. Contractor shall be responsible for watering all plants during the guaranty period at least once per week, until Final Acceptance, except when the ground is frozen. At each watering thoroughly saturate the soil around each tree or shrub. If sufficient moisture is retained in soil, as determined by Engineer, required watering may be reduced. Each tree will require a minimum of ten gallons of water.

Post Plant Fertilizer

Apply uniform application of Post Planting Fertilizer (5-3-4) at a rate of 5 lbs. per 1,000 square feet, 30 days after planting.

Cleaning

1. Wash and sweep clean paving and site improvements. Clean spills and overspray immediately. Remove and dispose off-site excess planting mixture, soil and debris.
2. Following Preliminary Acceptance at the end of the One-Year Maintenance Period of planting areas, remove materials and equipment not required for other planting or maintenance work. Materials and equipment remaining on site shall be stored in locations which do not interfere with Owner's maintenance of accepted lawns or other construction operations.

MEASUREMENT AND PAYMENT

Plantings shall be measured for payment per the Unit EACH, which price shall include materials, equipment, labor, and incidentals to provide plant pit excavation, soil wetting agents, mycorrhizal fungi planting, plant protection, aged pine bark mulch (including placement), watering, maintenance, disposal of unsuitable soils, and all other incidentals required for furnishing and installing the plantings in accordance with the drawings, and as directed by the Engineer. Payment will not be approved until satisfactory completion of the Maintenance Period.

Planting Bed Medium including soil preparation, soil amendments, planting mix preparation, loam for planting mix will be paid for under Item 751.1 – Planting Soil.

BASIS OF PAYMENT

Plantings will be paid for at the contract unit price EACH as specified above. The unit price shall constitute full compensation for labor, equipment, materials and incidental costs to complete the work.

ITEM 816.01 TRAFFIC SIGNAL RECONSTRUCTION LUMP SUM
LOCATION NO. 1
WASHINGTON STREET AT CHESTNUT STREET

ITEM 816.02 TRAFFIC SIGNAL RECONSTRUCTION LUMP SUM
LOCATION NO. 2
WASHINGTON STREET AT LOWELL AVENUE

GENERAL

The work to be done under these items consists of furnishing and the installation of new traffic control signal system, complete with vehicle detection and all equipment, materials and incidental costs necessary to furnish, install and program a complete and functioning traffic control system as specified and as shown in the contract documents.

All work under these items shall conform to the relevant provisions of Section 800 of the Standard Specification, the 2024 Manual on Uniform Traffic Control Devices (MUTCD), and the following technical provisions:

Traffic Signal Cabinet

All equipment installed within the controller cabinets shall be compliant with existing, approved, state and national standards.

Software

All video detection system software shall be supplied with the latest available revision. Any software upgrades released by the manufacturer shall be supplied at no additional cost to the Municipality for a period of five years after acceptance of the traffic signal installation.

All other equipment, materials, and incidental costs necessary to provide a complete, fully operational traffic signal system as specific herein and as shown on the plans. A list of required major traffic signal system items is included on the plans. All equipment installed shall be listed on the MassDOT "Qualified Traffic Control Product List" and compatible with the City of Newton traffic signal equipment.

Existing traffic signal equipment at Location Nos. 1 and 2 shall be continuously operational and retained unless as otherwise described and shown on the plans. All existing traffic signal equipment removed shall remain the property of the City unless the Contractor is notified in writing by the Engineer or as specified herein or as shown on the plans.

Remove and Stack (Locations 1 and 2)

All traffic control signal equipment that is to be removed and stacked shall be transported to a location designated by the City Engineer or his designee. Any traffic control signal equipment damaged as a result of the Contractor's operations, shall be replaced, or restored to its original condition by the Contractor at his own expense.

ITEM 816.01 & 816.02 (Continued)

Existing traffic control signals and appurtenances shall only be removed once the proposed traffic control signal is operational and accepted, or provision made for temporary traffic control and the Engineer has given approval for their removal.

All costs related to the removal and resetting, stacking, or discarding operations at Location Nos. 1 and 2 shall be considered incidental to this Item.

Documentation

Each programmable local hardware component shall be initially programmed by the Contractor based on information contained on the plans.

Note: Three bound sets of hard copy programming per device shall be supplied to the City by the CONTRACTOR.

Upon final acceptance of the signal by the City, the CONTRACTOR shall supply 8½"x11" or 11"x17" laminated copy of the traffic signal design plan and sequence and timing chart to be left in the cabinet documentation envelope mounted on the inside of the cabinet door.

As-Built Traffic Layout Plans and Signal Permit

It will be the responsibility of the Contractor to provide As-Built traffic signal layout plans and/or Traffic Signal Permit, indicating all signal equipment, detectors, conduits, pull boxes, complete with as-built timing and sequence, major item list, power-pole number, and meter number. Upon final acceptance of the traffic signal installation and/or traffic signal reconstruction by the City, the Contractor shall provide the final As-Built/Permit Plan in hard copy and electronic AUTOCAD files to the City prior to returning the ownership of the signal system to the City. If desired, the Contractor may hire an ENGINEER or the DESIGN ENGINEER for a fee to prepare the Traffic Signal Permit and electronic version. These plans shall also be delivered to the City.

METHOD OF MEASUREMENT

Work under Items 816.01 and 816.02 will be measured by the Contract Lump Sum, which shall include all labor, materials, equipment, and incidental costs required to complete the work.

BASIS OF PAYMENT

Work under Items 816.01 and 816.02 will be paid at the respective Contract Lump Sum, which price shall include all labor, materials, equipment, and incidental costs required to complete the work.

No separate payment will be made for the maintenance of existing signal installations during construction, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 834.183 REFLECTORIZED FLEXIBLE DELINEATOR POST 36" WHITE OR YELLOW - ADHESIVE MOUNT EACH

GENERAL

The following sections provide detailed specifications for the furnishing and delivery of flexible delineator posts, associated hardware, and components that will be part of the work needed to complete the installation.

SUBMITTALS

1. For the type of product indicated, include construction details, material descriptions, dimensions of individual components, finished, field-assembly requirements and installations details.
2. Submit finish samples with factory-applied finishes for each type of finish indicated for review and verification.

PRODUCTS

Provide flexible delineator posts manufactured by the following companies, or approved equal:

Pexco
764 South Athol Road
PO Box 659
Athol, MA 01331
978-249-5344
www.pexco.com

SHUR-TITE Products
PO Box 965
Hutto, TX 78634
512-218-9500
www.shur-tite.com

Transpo Industries, Inc.
20 Jones Street
New Rochelle, NY 10901
914-636-1000
https://transpo.com/

Provide Modular Raised Curb with 36” Posts as manufactured by the following company, or approved equal:

Impact Recovery Systems
Tuff Curb
www.impactrecovery.com

Pexco
FG 300 Curb System
www.pexco.com

DETAILED PRODUCT REQUIREMENTS

Flexible Delineator posts:

1. The post shall be thermoplastic polyurethane, round post, three (3) inches in diameter. The post shall be thirty six (36) inches in height. The flexible delineator post shall consist of a flexible, durable, non-discoloring material capable of recovering from 100 impacts at 70 mph. The color of the flexible delineator post shall match the color of the applicable pavement marking edge lines. The post shall be compliant with the *Manual on Uniform Traffic Control Devices* (MUTCD), latest edition and National Cooperative Highway Research Program (NCHRP) Report 350 accepted. Two 3” width impact resistant bands of retro reflective sheeting shall be applied by the manufacturer to provide 360 degree of

ITEM 834.183 (Continued)

coverage surrounding the flexible delineator post, with the top band being a maximum of 2" from the top of the tube. The sheeting shall be of appropriate color to meet requirements of MUTCD.

2. Acceptable types of anchoring systems are as follows:
   a. In-ground Anchor – This anchor shall be of durable material to be designed of embedment in either Concrete or Bituminous Concrete and inserted with a flexible post delineator. The post will be securely fastened, spun, or locked to the embedded anchor. The post shall be provided with an O-ring to minimize accumulation of debris and to facilitate ease of replacement. It is intended that when a post is no longer serviceable it can be removed and a new post inserted in the same anchor cup and secured into place. A cap for a flush pavement surface when the post is removed shall be provided for each post.

   b. Surface Mount – This anchor shall be a surface mount held in position on Concrete or Bituminous Concrete with anchor bolts. It shall provide a fastening or locking mechanism compatible with the post. The post shall be inserted into surface mount base which will fastened securely to a surface. It is intended that when the post is no longer serviceable it can be removed and a new post inserted in the same base and secured into place.

   c. Adhesive Mount – This anchor shall be surface mount held in position on Concrete or Bituminous Concrete with a durable bonding epoxy glue. It shall provide a fastening or locking mechanism compatible with the post.

3. The post shall pass a Flexibility Test at 100 degrees F.
4. All posts shall be provided with supplementary components necessary for complete installation.
5. All materials shall be new, of good quality and without defects that would lessen the quality of product.
6. Posts that are not compatible will be rejected.

ORDERING INFORMATION

The following information must be included with each order of flexible delineator posts.

1. Color of post
2. Width and number of retro reflective bands
3. Length of post above ground, in inches;
4. Quantity of posts
5. Method of fastening or securing the post to the ground.

The following information must be included with each order of Modular Raised Curb with 36" Posts.

ITEM 834.183 (Continued)

1. Color of curb and post
2. Length of curb sections
3. Width and number of retro reflective bands
4. Length of post above curb, in inches;
5. Quantity of posts and curb sections
6. Quantity of joiners and end caps, as needed.
7. Method of fastening or securing the curb to the ground.
8. Method of attaching posts to curb.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Measurement and payment for flexible delineator posts will be made at the contract unit price per each flexible delineator post and anchor or, in the case of replacement posts, the posts, furnished, delivered and installed. Price and payment shall constitute full compensation for complete compliance with requirements of this item, including materials, delivery, and installation.

Acceptance of the posts and reflective sheeting used on the posts furnished under the specification will be prepared by the fabricator (vendor) stating that the materials in the shipment are essentially the same or of equal material. Contractor shall assume all risk of delivery and shall make all arrangements for delivery and installation.

ITEM 834.287 12” PRECAST CONCRETE CURBING FOR BICYCLE LANES EACH (10’ SECTION)

GENERAL
Work under these items shall consist of furnishing and installing 12” precast concrete curbing for bicycle lanes (10’ section) as shown in the plans and details.

MATERIALS
Concrete shall be 5,000 psi, sulfate resistant with fiber reinforcement.
Reinforcing steel shall be #5 corrosion resistant rebar per the plans and details.
Two flexible reflective markers shall be placed on each 12” precast concrete curbing 10’ section as shown on the plans and details.

CONSTRUCTION METHODS
Precast concrete curbing for bicycle lanes shall be placed in line with the drawings. The Contractor shall install precast concrete bicycle delineators on a reasonably flat surface and secure the units using #5 corrosion resistant rebar hand driven to depths indicated in the plans and details.

METHOD OF MEASUREMENT
Item 834.287 shall be measured by each unit furnished and installed in accordance with the plans, specifications, and directions of the City.

BASIS OF PAYMENT
Payment for Item 834.287 shall be per EACH section installed and shall include the cost of all labor, materials, equipment, and all incidental expenses necessary to complete the work, all in accordance with the plans and specifications, to the satisfaction of the City.

ITEM 864.41 GREEN COLORIZED PAVEMENT MARKINGS SQUARE FOOT

DESCRIPTION

Work under this item consists of furnishing and installing Green Colorized Pavement Markings at the locations shown on the plans or as directed by the Engineer. All work shall conform to Subsection 860 and the following.

MATERIALS

Green Colorized Pavement Markings are composed of Epoxy, Methyl Methacrylate (MMA), or Preformed Thermoplastic Materials.

The initial daytime chromaticity coordinates for green colorized pavement shall fall within the area created by the following coordinates:

Initial Daytime Chromaticity Coordinates (Corner Points) for Green Colorized Pavement Markings				
	1	2	3	4
x	0.230	0.266	0.367	0.444
y	0.754	0.460	0.480	0.583

The surface of the Green Colorized Pavement Markings shall provide a minimum skid resistance value of 55 British Pendulum Number (BPN) when tested in accordance with ASTM E303.

The Contractor shall provide a Certificate of Compliance verifying the product supplied meets the specified daytime chromaticity requirements and friction requirements prior to installation.

CONSTRUCTION METHODS

The Contractor shall supply Shop Drawings to the Engineer for approval a minimum of 30 days in advance of installation. Shop Drawings shall include the product manufacturer's instructions, material safety data sheets (MSDS) for all components including any primers and sealers, and all tools, equipment, and procedures to be used for the installation. No work shall commence until the Shop Drawings have been approved.

It shall be the responsibility of the Contractor to prepare the surface prior to the installation of any Green Colorized Pavement Markings. Any joints or cracks in the pavement shall be pre-treated per the manufacturer's recommendation. The surface shall be clean and dry prior to installation of the system. If additional surface preparation is recommended by the manufacturer, such as the installation of a primer or preheating, it shall be completed per the manufacturer's specifications. All surface preparation shall be considered incidental to the cost of the item.

Any existing pavement markings that conflict with the Green Colorized Pavement Markings shall be removed by the Contractor in advance of installation; installation of colorized pavement markings over existing pavement markings shall not be allowed. All existing pavement markings that are to remain, castings, curbs, and rumble strips within the vicinity of the colorized pavement application shall be covered and protected by the Contractor.

ITEM 864.41 (CONTINUED)

Existing pavement markings damaged by the Green Colorized Pavement Markings installation shall be removed and replaced by the Contractor at no additional cost.

The Contractor shall follow all installation instructions from the manufacturer, including allowable ranges of temperature and humidity for installation, unless otherwise approved by the Engineer.

Upon completion of installation, a sealer shall be applied if recommended by the manufacturer. The sealer shall be installed per the manufacturer's specification. The application of a sealer shall be considered incidental to the cost of the item.

The Contractor shall maintain protection of the Green Colorized Pavement Markings installation from vehicle and foot traffic throughout the minimum cure time recommended by the manufacturer.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 864.41 Green Colorized Pavement Markings will be measured by the Square Foot, complete in place.

Green Colorized Pavement Markings will be paid for at the respective contract unit price per Square Foot. The contract prices shall include all material, labor, and equipment required or incidental to the completion of the work.

ITEM 874.2 TRAFFIC SIGNS REMOVED AND RESET EACH

DESCRIPTION

Work under this Item shall conform to the relevant provisions and amendments of Section 840 of the MassDOT "Standard Specifications for Highway and Bridges" and the following:

The work shall consist of removing and resetting the existing regulatory, warning, and directional signs and their supports to new locations as shown on the Plans or as directed by the City.

After removal, the Contractor shall stockpile the signs and their supports in a secure location until they are ready to be reset. The Contractor shall exercise caution during the removal, stockpiling and resetting operations. Signs panels and/or supports that have been designated by the Engineer for reuse, that are damaged or lost either directly or indirectly during the removal, stockpiling and resetting operations shall be replaced by the Contractor at his expense.

Materials for traffic signs removed and reset shall be the existing signs and supports. If in the opinion of the Engineer, the existing sign panel and/or support are unsuitable for reuse, a new sign panel and/or support of a sign and composition equal to the existing sign panel and/or support, shall be furnished, as required by the Engineer. The sign shall be mounted in accordance with the Manual on Uniform Traffic Control Devices, the MassDOT Amendment to the Manual on Uniform Traffic Control Devices, and the 1990 Standard Drawings for Signs and Supports.

When the visibility of the relocated sign panels is obstructed by trees and other vegetation, the Contractor shall clear the obstruction to ensure proper sight distance. All obstruction clearing shall be done within the City of Newton highway layout, as approved by the Engineer.

Traffic sign panels and supports designated for removal and resetting shall be cleaned before being reset.

The supports and existing foundations shall be removed to a depth of at least 6 inches below finished grade in grass area, at least 12 inches below finished graded in sidewalk and driveway areas, and 36 inches in roadway areas. The holes shall be backfilled with gravel. Where necessary, the surface shall be restored to match the existing condition or as required by the Engineer.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Payment under Item 874.2 shall be at the Contract Bid Price per Each and shall be full compensation for all labor, tools, equipment, materials, including any additional or replacement of mounting hardware, sign and support cleaning, support foundation removal, gravel backfill and restoration of the surface as well as transportation and all incidental expenses necessary to complete the work as shown on the Plans and as described in these Special Provisions.

If required by the Engineer, new sign posts for Traffic Signs shall be furnished, installed and paid for separately under the applicable Item 847.1.

ITEM 874.2 (CONTINUED)

If required by the Engineer, new Traffic Sign panels shall be furnished, installed, and paid for separately under the applicable Item 832.

ITEM 874.41 TRAFFIC SIGN REMOVED AND DISCARDED EACH

GENERAL

Work under this Section shall conform to the applicable provisions of Section 850 of the Standard Specifications and the following:

The work shall consist of removing and discarding of existing regulatory, warning, street name signs, and directional signs and supports as shown on the plans or as directed by the City. Signs and attached hardware shall be carefully removed from their supports. If signs are attached to existing light poles, utility poles or traffic poles, only the sign and attached hardware shall be removed and discarded.

The supports and existing foundations shall be removed to a depth of at least 6 inches below finished grade in grass area, at least 12 inches below finished graded in sidewalk and driveway areas, and 36 inches in roadway areas. The holes shall be backfilled with gravel. Where necessary, the surface shall be restored to match the existing condition or as required by the Engineer.

The signs and supports removed under this Item shall be properly and legally disposed of by the Contractor off-site.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 874.41 Traffic Signs Removed and Discarded, for this item will be measured on an Each basis.

Item 874.41 Traffic Signs Removed and Discarded, will be paid for at the Contract unit price of Each for sign removed and discarded. The unit bid price shall be full compensation for dismantling, loading, transporting and discarding of the signs and supports as designated above, the excavating and disposal of the existing foundation, and the supplying and placing of compacted gravel backfill where foundations and posts are removed, and the patching of the existing surface, including all labor, material and incidentals to complete the work as shown on the Plans and as required by the Engineer.

ITEM 875.1 PARKING METER REMOVED AND RESET EACH
ITEM 875.2 PARKING METER REMOVED AND STACKED EACH

GENERAL

This work shall consist of either removing and replacing existing parking meter posts or installing new parking meter posts as indicated on the Contract drawings or as directed by the Engineer.

MATERIALS

Parking meter posts shall be set plumb in concrete conforming to Division III, Materials M4.02.00 of the MassDOT Standard Specifications for 4,000 psi, 1 ½ inch, 565 Cement Concrete.

CONSTRUCTION METHODS

Before any meter poles are removed, the Contractor shall contact the DPW Transportation Division Parking Manager, who will have all existing meter heads removed and stored by the City's Parking Meter Crew. The Contractor shall remove and store the meter poles and shall ensure that meter poles are not damaged during removal, storage, or re-installation. The Contractor shall identify meter installation locations in the field and notify the DPW Transportation Division Parking Manager at least 5 business days before the poles are to be re-installed to enable a DPW Transportation Division staff member to confirm the locations. When resetting removed metered poles, the contractor must install each pole to a **height of 28 inches** above the sidewalk when cemented in. The Contractor shall notify the DPW Transportation Division Parking Manager no more than 48 hours after the meter poles have been re-installed to enable the City's Parking Meter Crew to re-install all meter heads to the newly mounted posts. The work shall consist of removing and stacking of existing parking meters as shown on the plans or as directed by the Engineer. Hardware shall be carefully removed from their supports.

Existing foundations shall be removed and disposed of and the hole shall be filled with gravel. The surface shall be patched with a material to match the existing ground or as required by the Engineer.

Before stacking, the parking meters shall be removed and temporarily stacked in a stockpile on the site for inspection by the City of Newton. Parking meters that the City has determined are sufficient for re-use shall be removed by the City. Parking meters not required by the City shall be removed and stacked by the Contractor away from the site.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 875.1 Parking Meter Removed and Reset will be measured on a per EACH basis. Item 875.2 Parking Meter Removed and Stacked will be measured on a per EACH basis.

Item 875.1 Parking Meter Removed and Reset will be paid for at the contract unit price per EACH meter reset which price shall constitute full compensation for furnishing and installing new parking meter posts, keying pins, anchor bolts all other labor, tools, equipment, materials and incidentals necessary to complete the work. Cost of cement concrete for post foundations will be included in this item.

ITEM 875.1 and 875.2 (Continued)

Item 875.2 Parking Meter Removed and Stacked will be paid for at the contract unit price per EACH meter removed and stacked which price shall constitute full compensation for dismantling, loading, transporting and stacking of the parking meter as designated above, the excavating and disposal of the existing foundation, and the supplying and placing of compacted gravel backfill where foundations and posts are removed, and the patching of the existing surface, including all labor, material and incidentals to complete the work as shown on the Plans and as required by the Engineer.

ITEM 998.1 MODULAR BUS PLATFORM LUMP SUM

GENERAL

The following sections provide detailed specifications for the furnishing and delivery of the modular bus platform, associated hardware, and components that will be part of the work needed to complete the installation.

MATERIALS

The modular bus platform shall be made up of a series of components that connect together to create an accessible bus stop platform. The main module components shall be hollow to reduce weight and be able to withstand impact and friction loads generated by bus wheels. Modular curb pieces shall be installed around the perimeter of the platform and shall have longitudinal retroreflective stripes for visibility during day and night. A ramp shall connect the modular platform to the existing sidewalk and shall allow for the free flow of stormwater beneath the ramp. Modular bus platforms shall include a bicycle lane access bridge at locations shown on the plans.

The surface of all components shall have a textured non-slip surface. Tactile warning surfaces shall be present at the boarding side of the platform.

The modular bus platforms shall allow for the flow of stormwater beneath the system so that the existing stormwater system is not impacted.

CONSTRUCTION METHODS

The physical configuration of the modular bus platform shall be installed as shown on the plans.

Each module shall be linked together and be anchored to the pavement. All curb pieces shall be anchored to the pavement. The ramp to the sidewalk shall be linked securely to the platform.

Manufacturer shall provide step by step detailed installation instructions for the modular bus platform system.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 998.1 Modular Bus Platform shall be measured per each fully furnished, delivered, and installed.

Price and payment for Item 998.1 Modular Bus Platform shall constitute full compensation for complete compliance with this item, including materials, delivery, and installation.

ITEM 998.2 MODULAR MEDIAN LUMP SUM

GENERAL

The following sections provide detailed specifications for the furnishing and delivery of modular median systems, associated hardware, and components that will be part of the work needed to complete the installation.

MATERIALS

The modular median shall be made up of durable modular units. Modular units shall be resistant to fuel and weather elements.

The surface of all components shall have a textured non-slip surface.

The perimeter of the modular median shall have yellow or white retroreflective pavement markings.

CONSTRUCTION METHODS

The physical configuration of the modular median shall be installed as shown on the plans.

Modular median systems shall be anchored to the pavement per the manufacturer's instructions.

Manufacturer shall provide step by step detailed installation instructions for the modular median system.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 998.2 Modular Median shall be measured per each fully furnished, delivered, and installed.

Price and payment for Item 998.2 Modular Median shall constitute full compensation for complete compliance with this item, including materials, delivery, and installation.