TOWN OF GLASTONBURY
BID NO. GL-2017-04

HEBRON AVENUE ROUNDABOUT AT NEW LONDON TURNPIKE

ADDENDUM NO. 1
JULY 28, 2016

BID DUE DATE: AUGUST 2, 2016 11:00 A.M.

The attention of bidders submitting proposals for the above-referenced project is called to the following Addendum to the specifications. The items set forth herein, whether of omission, addition, substitution or other change, are all to be included in and form a part of the proposed Contract Documents for the work. Bidders shall acknowledge this Addendum in the Bid Proposal by inserting its number on Page BP-1.

Make the following modifications to the Contract Documents:

BID PROPOSAL FORM:
The bid proposal form is hereby replaced with the attached. ALL BIDDERS MUST USE THE REVISED BID PROPOSAL FORM.

CONSTRUCTION PLANS:
Sheets TS-1, PLN-1, UTI-1, TC-1B, TC-2A, TC-2B, TC-2C, TC-2D, and CD-2 are hereby replaced with the attached versions of the plans. Items that have changed on the plans are identified with revision notes.

SPECIAL PROVISIONS:

SECTION 1.08 PROSECUTION AND PROGRESS is hereby modified as follows:
All references to a specific number of calendar days for each stage in the specification are hereby deleted since they conflict with the required contract completion date of November 30, 2016.

ITEM 0202000A EARTH EXCAVATION is hereby modified as follows:
Basis of Payment, first paragraph is replaced with the following:
"Removal and disposal of existing drainage structures shall be paid for at the contract unit price as listed in the bid proposal for "Rock Excavation and Disposal" as described elsewhere in these specifications."

ITEM 202100A ROCK EXCAVATION AND DISPOSAL is hereby modified as follows:
General, first paragraph is replaced with the following:
"The Contractor shall excavate rock and remove existing drainage structures (as defined below), if encountered, to the lines and grades indicated on the drawings or as directed, shall dispose of the excavated material, and shall furnish acceptable material for backfill in place of the excavated rock"

ITEM 0303001A CONCRETE FOR WALL is hereby modified as follows:
Method of Measurement is replaced with the following:
"This work will not be measured for payment but rather shall be included in the lump sum price for ITEM 0601651A RETAINING WALL, including all equipment, materials, tools, labor and incidental expenses thereto."

ITEM 0507001A TYPE "C" CATCH BASIN is hereby modified as follows:
Basis of Payment, last paragraph is replaced with the following:
"The work associated with removal and disposal of existing catch basins shall be measured and paid for under the item "Rock Excavation and Disposal" as listed in the bid proposal. The payment for removal and disposal of existing catch basin shall include all materials, tools, equipment, and labor necessary to complete the excavation and removal of these units in conformity with the plans, or as specified. "

ITEM 0601651A RETAINING WALL is hereby modified as follows:
Basis of Payment, is replaced with the following
"This work will be paid for at the contract lump sum for "Retaining Wall", complete in place, which price shall include all work shown within the pay limits shown on the plans for the retaining wall including but not limited to the following:

1. Excavation for the wall
2. The furnishing, placing and compacting of pervious structure backfill within the maximum payment lines.
3. Processed stone leveling pad.
4. Stone facing and bluestone cap.
5. Any other work and materials shown on the plans for the construction of the wall.
6. All Class F concrete as described under item 0303001A CONCRETE FOR WALL is included in the lump sum price of this item.

The price shall also include all materials, equipment, tools and labor incidental thereto.

If bedrock or large boulders (greater than one cubic yard) are encountered in the excavation, the payment for it's removal will be made under the item "Structure Excavation - Rock" "

ITEM 0921001A CONCRETE SIDEWALKS is hereby modified as follows**:**
Add the following to Basis of Payment:
"Concrete Sidewalk–8-inch Thick" shall be measured and paid for at the contract unit price per square foot as contained in the Bid Proposal, which price shall include the processed stone base course underneath sidewalks, excavation, grading, wire mesh reinforcement, and all other materials and all labor, tools, and equipment necessary for completion of the work.

ITEM 0944000A TOPSOIL is hereby modified as follows:
Item is renamed to "FURNISHING AND PLACING TOPSOIL". Basis of Payment is replaced with the following:

"Furnishing and Placing Topsoil: This work will be paid for at the contract unit price per square yard for "Furnishing and Placing Topsoil" which price shall include all materials, equipment, tools, labor and work incidental thereto.

Pay Item	Pay Unit
Furnishing and Placing Topsoil	S.Y. "

ITEM 1118021A REMOVAL AND/OR RELOCATION OF TRAFFIC SIGNAL EQUIPMENT Is hereby modified as follows**:**
Description: Add the following sentence "Relocate traffic signal equipment to provide required operations during Stage 1A of the construction and shown on the construction plans or as directed by the Engineer."

Construction Methods: Replace the first paragraph with the following: "Schedule/coordinate the removal and/or relocation of existing traffic signal equipment with the installation of new or temporary equipment to maintain uninterrupted traffic signal control. This includes but is not limited to vehicle signals and detectors, pedestrian signals and pushbuttons, co-ordination, and pre-emption."

ITEM 1118051A TEMPORARY SIGNALIZATION SITE NO. 1 is hereby renamed to "TEMPORARY SIGNALIZATION". All references to "SITE NO. 1" are hereby deleted.

ITEM 12101XXA TRAFFIC PATTERN XD is hereby modified as follows:
Item number shall be 1210111A. All references to "Streetprint" in the Method of Measurement and Basis of Payment sections are hereby replaced with "Traffic Pattern XD".

The following special provisions are hereby replaced in their entirety with the attached versions:
ITEM 08130XXA GRANITE STONE CURBING (all granite curb items)
ITEM 0950050A IRRIGATION SYSTEM
ITEM 1003621A TREE UPLIGHTS

The following new Special Provisions/Items are hereby added to the contract:
ITEM 0303052A GRANITE PAVERS ON STRUCTURAL SOIL
ITEM 0406002A TEMPORARY PAVEMENT
ITEM 0406285A FINE MILLING OF HMA (0"-4")
ITEM 0507601A MANHOLE
ITEM 0507771A RESET CATCH BASIN
ITEM 0905019A REMOVE AND REBUILD EXISTING STONEWALL

The following Special Provisions are hereby deleted from the contract:
ITEM 0213100A STRUCTURAL FILL
ITEM 0212094A PROCESSED TRAPROCK BASE
ITEM 0402901A GRANITE BLOCK PAVING
ITEM 0507004A REMOVE EXISTING CATCH BASIN
ITEM 0507495A MODIFY EXISTING CATCH BASIN
ITEM 0950019A TURF ESTABLISHMENT LAWN

QUESTIONS AND ANSWERS

Q1-1:	Item 097006 Trafficperson (Municipal Police Officer) has no dollar amount assigned to it.
A1-1:	The allowance is now shown in the revised Bid Proposal Form included as part of this addendum
Q2-1:	Item 12101XX Traffic Pattern XD is for asphalt imprinting. Where is it located and what is the pattern and color?
A2-1:	This item is located on New London Turnpike in advance of the splitter islands, approximate stations 601+25 and 604+25 and is to be provided in a brick color and running bond pattern as described in the Special Provisions.
Q3-1:	On Drawings TC-2A through TC-2D it says to provide temp. access across the roundabouts in the area where traffic is being re-routed. This does not seem feasible unless traffic is interrupted and if so will this be through trafficpersons or Temporary Signalization?
A3-1:	The Drawings have been revised to provide temporary pedestrian access in the areas between the island construction and the work zone barriers.
Q4-1:	There is no electric service details provided for the uplights. Per the spec. the Power company is going to take care of all this?
A4-1:	The Contractor shall coordinate with Eversource for the service connection for the lights, as indicted in the special provisions. The Contractor shall provide conduit for the service connection. Revised special provision is attached.
Q5-1:	Sheet D-1 Detail of Brick Crosswalk at Island shows Structural Soil Mix (36” Depth) under granite curb- appears to be mislabeled and should be concrete.
A5-1:	The leader that identifies the “STRUCTURAL SOIL MIX” should be pointing to the material directly under the granite block pavers.
Q6-1:	What is the purpose of the temporary pavement widening on Sheet TC-1A? What is the asphalt and base thickness of this temporary widening?
A6-1:	A special provision for Temporary Pavement has been included in the bid as part of this addendum. Temporary pavement shown on the staging plans may or may not be needed depending on the Contractor’s means and methods of accomplishing this work. Final locations for temporary pavement will be subject to review and approval by the Engineer.

END OF ADDENDUM NO. 1

TOWN OF GLASTONBURY * 2155 MAIN STREET * GLASTONURY * CT

BID / PROPOSAL NO: **GL-2017-04** **DATE DUE:** **08-02-16**

DATE ADVERTISED: **07-13-16** **TIME DUE:** **11:00 AM**

NAME OF PROJECT: **Hebron Avenue Roundabout At New London Turnpike**

In compliance with this Invitation to Bid, the Bidder hereby proposes to provide goods and/or services as per this solicitation in strict accordance with the Bid Documents, within the time set forth therein, and at the prices submitted with their bid response.

It is the responsibility of the Bidder to clearly mark the outside of the bid envelope with the Bid Number, Date and Time of Bid Opening, and it also **THE RESPONSIBILITY OF THE BIDDER TO CHECK THE TOWN'S WEBSITE BEFORE SUBMITTING BID FOR ADDENDA POSTED PRIOR TO BID OPENING.**

THE BIDDER ACKNOWLEDGES RECEIPT OF THE FOLLOWING ADDENDA AS REQUIRED:

Addendum #1 _____(Initial/Date) Addendum #2 _____ (Initial/Date) Addendum #3 _____(Initial/Date)

OTHER ITEMS REQUIRED WITH SUBMISSION OF BID PROPOSAL:

The following bid checklist describes items required for inclusion with the above-referenced bid proposal package. It is provided for the convenience of the bidders and, therefore, should not be assumed to be a complete list.

_____ 1. Included Bid Bond as per Section 10 of the Information for Bidders.

_____ 2. Included Disclosure of Past and Pending Mediation, Arbitration, and Litigation cases against the Bidder or its Principals as per Section 17 of the Information for Bidders.

_____ 3. Included Qualifications Statement as per Section 22 of the Information for Bidders.

_____ 4. Checked Town web site for Addenda and acknowledged Addenda on page BP-1.

_____ 5. Acknowledged Code of Ethics on page BP-7.

_____ 6. Included CHRO **Bidder Contract Compliance Monitoring Report**.

_____ 7. State of Connecticut DAS Contractor **Update Statement** (required with bid) as per Section 24.

_____ 8. State of Connecticut DAS Contractor **Prequalification Certificate** (required upon award)

_____ 9. Clearly marked envelope with Bid Number, Date, Time of opening, Bidder's Company Name and address.

BIDDER NAME:_____

LINE NO.	ITEM NO.		ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	EXT
1	0000151	A	CLEARING AND GRUBBING	L.S.	1		
2	0202000	A	EARTH EXCAVATION	C.Y.	2220		
3	0202100	A	ROCK EXCAVATION AND DISPOSAL	C.Y.	50		
4	0202451	A	TEST PIT EXCAVATION	C.Y.	5		
5	0202513	A	REMOVAL OF CONCRETE SIDEWALK	S.Y.	637		
6	0202529		CUT BITUMINOUS CONCRETE PAVEMENT	L.F.	212		
7	0207000		BORROW	C.Y.	100		
8	0209001		FORMATION OF SUBGRADE	S.Y.	3968		
9	0212000	A	SUBBASE	C.Y.	921		
10	0212300	A	PROCESSED STONE BASE	C.Y.	135		
11	0218001	A	SEDIMENT CONTROL SACK	EA.	14		
12	0219001		SEDIMENTATION CONTROL SYSTEM	L.F.	300		
13	0303050	A	BRICK PAVERS ON 8" CONCRETE BASE SLAB	S.F.	3652		
14	0303051	A	GRANITE PAVERS ON 8" CONCRETE BASE SLAB	S.F.	255		
15	0303052	A	GRANITE PAVERS ON STRUCTURAL SOIL	S.F.	3272		
16	0303060	A	8" REINFORCED CONCRETE BASE SLAB FOR PAVERS	S.F.	3907		
17	0406002	A	TEMPORARY PAVEMENT	S.Y.	1045		
18	0406010-1	A	BITUMINOUS CONCRETE CLASS 1	TON	606		

BIDDER NAME:_____

LINE NO.	ITEM NO.		ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	EXT
19	0406010-4	A	BITUMINOUS CONCRETE CLASS 4	TON	1212		
20	0406236		MATERIAL FOR TACK COAT	GAL	703		
21	0406285	A	FINE MILLING OF HMA (0" TO 4")	S.Y.	796		
22	0507001	A	TYPE "C" CATCH BASIN	EA.	9		
23	0507006	A	REPLACE CATCH BASIN TOP	EA.	4		
24	0507601	A	MANHOLE	EA.	3		
25	0507771	A	RESET CATCH BASIN	EA.	4		
26	0507781	A	RESET MANHOLE TOP	EA.	10		
27	0507821	A	CONVERT CATCH BASIN TO TYPE “C-L” CATCH BASIN	EA.	1		
28	0507831	A	CONVERT CATCH BASIN TO MANHOLE	EA.	3		
29	0601651	A	RETAINING WALL	L.S.	1		
30	0651012	A	15" R.C. PIPE	L.F.	172		
31	0813021	A	5" X 14” GRANITE STONE CURBING	L.F.	100		
32	0813031	A	5" X 14” GRANITE CURVED STONE CURBING	L.F.	200		
33	0813042	A	5" X 20" GRANITE STONE CURBING	L.F.	893		
34	0813052	A	5" X 20" GRANITE CURVED STONE CURBING	L.F.	1792		
35	081305X	A	5" X 20" GRANITE CURBING - MOUNTABLE	L.F.	374		
36	0905019	A	REMOVE AND REBUILD EXISTING STONE WALL	L.S.	1		
37	0921001	A	CONCRETE SIDEWALKS	S.F.	5127		

BIDDER NAME:_____

LINE NO.	ITEM NO.		ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	EXT
38	0921002	A	CONCRETE SIDEWALK (8" THICK)	S.F.	606		
39	0921005	A	CONCRETE SIDEWALK RAMP	EA.	8		
40	0922001	A	BITUMINOUS CONCRETE SIDEWALK	S.Y.	172		
41	0922501	A	BITUMINOUS CONCRETE DRIVEWAY	S.Y.	169		
42	0944000	A	FURNISHING AND PLACING TOPSOIL	S.Y.	1504		
43	0944105	A	STRUCTURAL SOIL	C.Y.	364		
44	0949063	A	PENNISETUM ALOPECUROIDES 'HAMELN' HAMELN DWARF FOUNTAIN GRASS 2 GAL	EA.	108		
45	0949074	A	MICROBIOTA DECUSSATA SIBERIAN CARPET CYPRESS OAK - 1' HGT B.B.	EA.	129		
46	0949467	A	ROSA 'KNOCKOUT' KNOCKOUT ROSE - 3' HGT CONT	EA.	2		
47	0949493	A	GINKGO BILOBA ' PRINCETON SENTRY' 3"-3 1/2" CAL. B.B.	EA.	7		
48	0949606	A	ROOT BARRIER	L.F.	1100		
49	0949769	A	ACER RUBRUM "RED SUNSET" RED MAPLE 3"-3 1/2" CAL. B.B.	EA.	13		
50	0949803	A	ILEX CRENATA 'GREEN LUSTRE' GREEN LUSTRE HOLLY 2 1/2'-3' B.B.	EA.	28		
51	0949881	A	LIQUIDAMAR STYRACIFLUA SWEET GUM 3"-3 1/2" CAL. B.B.	EA.	14		
52	0949921	A	GERANIUM 'ROZANNE' ROZANNE GERANIUM - 1 GAL	EA.	40		
53	0949925	A	CERCIDIPHYLLUM JAPONICUM KATSURA TREE 3"-3 1/2" CAL. B.B.	EA.	1		

BIDDER NAME:_____

LINE NO.	ITEM NO.		ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	EXT
54	0949987	A	EUONYMUS KIAUTSCHOVICUS 'MANHATTEN' MANHATTEN EUONYMUS- 4-8' HGT CONT	EA.	6		
55	0949954	A	QUERCUS ROBUR "FASTIGIATA" FASTIGIATE ENGLISH OAK 3"-3 1/2" CAL. B.B.	EA.	10		
56	0949999	A	PINE BARK MULCH	S.Y.	248		
57	0950005	A	TURF ESTABLISHMENT	S.Y.	2618		
58	0950008	A	GRAVEL MULCH	S.Y.	23		
59	0950050	A	IRRIGATION SYSTEM	L.S.	1		
60	097XXXX	A	FLEXIBLE DELINEATOR POST	EA.	21		
61	0970006	A	TRAFFICPERSON (MUNICIPAL POLICE OFFICER)	EST	1	$120,000	$120,000
62	0970007	A	TRAFFICPERSON (UNIFORMED FLAGGER)	HR.	100		
63	0971001	A	MAINTENANCE AND PROTECTION OF TRAFFIC	L.S.	1		
64	0975003		MOBILIZATION	L.S.	1		
65	0976001		BARRICADE WARNING LIGHTS - LOW INTENSITY	DAY	1000		
66	0977001		TRAFFIC CONE	EA.	208		
67	0978002		TRAFFIC DRUM	EA.	13		
68	0979003	A	CONSTRUCTION BARRICADE TYPE III	EA.	4		
69	0980001		CONSTRUCTION STAKING	L.S.	1		
70	1002121	A	UPLIGHT CONCRETE FOUNDATION	EA.	3		

BIDDER NAME:_____

LINE NO.	ITEM NO.		ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	EXT
71	1003621	A	TREE UPLIGHTS	L.S.	1		
72	1008467		3" RIGID METAL CONDUIT	L.F.	400		
73	1010021		CONCRETE HANDHOLE - TYPE II	EA.	8		
74	1010905		RESET CONCRETE HANDHOLE	EA.	1		
75	1118012	A	REMOVAL AND/OR RELOCATION OF TRAFFIC SIGNAL EQUIPMENT	L.S.	1		
76	1118051	A	TEMPORARY SIGNALIZATION	L.S.	1		
77	1131001		CHANGEABLE MESSAGE SIGN	DAY	100		
78	1206023	A	REMOVAL AND RELOCATION OF EXISTING SIGNS	L.S.	1		
79	1208932	A	SIGN FACE - SHEET ALUMINUM (TYPE IV RETROREFLECTIVE SHEETING)	S.F.	113		
80	1209005		PAINTED PAVEMENT MARKINGS 4" WHITE	L.F.	2044		
81	1209007		PAINTED PAVEMENT MARKINGS 4" YELLOW	L.F.	2071		
82	1209009		PAINTED PAVEMENT MARKINGS 12" WHITE	L.F.	254		
83	1209050		PAINTED PAVEMENT MARKINGS (GENERAL)	S.Y.	104		
84	1210111	A	TRAFFIC PATTERN XD	S.Y.	36		
85	1210101	A	4" WHITE EPOXY RESIN PAVEMENT MARKINGS	L.F.	2044		
86	1210102	A	4" YELLOW EPOXY RESIN PAVEMENT MARKINGS	L.F.	2071		
87	1210104		8" WHITE EPOXY RESIN PAVEMENT MARKINGS	L.F.	161		
88	1210105	A	EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS	S.F.	89		

BIDDER NAME:_____

LINE NO.	ITEM NO.		ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	EXT
89	1210106		12" WHITE EPOXY RESIN PAVEMENT MARKINGS	L.F.	254		
90	1211001		REMOVAL OF PAVEMENT MARKINGS	S.F.	2024		
91	1220013	A	CONSTRUCTION SIGNS - BRIGHT FLUORESCENT SHEETING	S.F.	236		
92	1302060	A	ADJUST GATE BOX (GAS)	EA.	1		
93	1302061	A	ADJUST GATE BOX (WATER)	EA.	2		

TOTAL BASE BID AMOUNT: $_____
(Numeric)

WRITTEN TOTAL BASE BID AMOUNT:_____

CODE OF ETHICS:
I/We have reviewed a copy of the Town of Glastonbury's Code of Ethics and agree to submit a Consultant Acknowledgement Form if I/We are selected. Yes_____ No_____ *

***Bidder is advised that effective August 1, 2003, the Town of Glastonbury cannot consider any bid or proposal where the Bidder has not agreed to the above statement.**

Respectfully submitted:

Type or Print Name of Individual	**Doing Business as (Trade Name)**
Signature of Individual	**Street Address**
Title	**City, State, Zip Code**
Date	**Telephone Number/Fax Number**
E-Mail Address	**SS# or TIN#**

(Seal – If bid is by a Corporation)

Attest

ITEM # 0303052A GRANITE PAVERS ON STRUCTURAL SOIL

Description:

A. Work of this Section includes setting new granite paving including:

1. Granite paving units in patterns indicated, with sand-swept joints, and laid down on a sand setting bed over Structural Soil.

B. Sequence paving and surfacing installations with work specified in other sections and shown on drawings, to receive materials for installation, and to match other materials of Project when furnished as specified in this Section.

C. Preparation of sand **s**etting bed and provision of steel edge restraints for complete installation.

D. Providing Field Samples/Mock-ups constructed to show portions of complete construction as representative of finished work:

1. Granite paving at tree pit on structural soil in a sand setting bed with sand joints.

Required Submittals:

A. Samples: Furnish not less than ten individual granite pavers of each size, type and color as samples, showing extreme variations in color and texture. Do not order granite for the project until Engineer's approval of field sample panel.

B. Manufacturer's Product Data shall be submitted for the following items:
   a. Submit Material Certification and Analysis Report for sand along with a one pound sample.
   b. Mortar joint and setting bed
   c. Pavement edging

B. Statements of Qualifications: Submit to identify and exhibit qualifications as specified in Article 4.02.03, herein.

C. Field Sample/Mock-ups**:** Construct at earliest possible time and at approved location before proceeding with respective work. Provide and construct to show appearance, workmanship, and finish of the granite paving, complete and in coordination with work of other Sections in these Specifications, as applicable:

1. Granite Pavement**:** Install paving surfacing mockups for both types of granite pavement. Size shall be a minimum 5 feet by 5 feet. Mock-up shall be complete and shall illustrate all base course construction, setting methods, final surface texture granite paver size and finish, and jointing representative of design conditions. Coordinate with material requirements as specified for all other adjacent and related materials.

2. The Field Samples/Mock-ups surfacing must be approved by Owner/Designer before actual paving work may proceed. If necessary, remove and reconstruct Field Sample/Mock-up surfacing until approved. Approved sample surfacing shall serve as standard of acceptance for paving and surfacing work of this Section.

Quality Assurance

A. Installer Qualifications: Installations of paving system shall be by firm that can exhibit proof of a minimum five (5) years of prior successful experience with paving installations of equivalent type and similar scope of this Project.

1. Paving Installation Foreman: Installation firm for paving and surfacing of this Project shall have on staff a supervising Foreman assigned full time to this Project, beginning with the provision of mock-up installations, who shall be a competent, English-speaking supervisor, and who shall have at least 10 years' stone installation experience.

2. Use numbers of skilled workmen equal to work requirement or occasion. The skilled workmen shall be thoroughly trained and experienced in the necessary crafts, and shall be completely familiar with the specific requirements and methods needed for performance of the work in this Section.

Product Handling and Protection

A. Store, handle and protect all materials from damage, moisture, dirt and intrusion of foreign matter. Component materials such as sand shall be stored with provisions for good drainage.

B. Protect paver units until ready for installation. Handle paving materials to prevent chipping, breakage, soiling or other damage.

C. Store granite paving units on wood skids or pallets, covered with non-staining, waterproof membrane, sheeting, or enclosure to protect them from detrimental weather conditions. Place and stack skids to distribute weight evenly and to prevent breakage or cracking. Allow air to circulate around the pavers during extended periods of storage.

Project / Site Conditions

A. Environmental Requirements:

- Prevent wind or rain disturbance of setting materials, protect from stormwater sheet flow from adjacent areas, and generally maintain optimum installation conditions.

- Do not install paving in conditions of standing water. Surface and subsurface drainage must be assured at all times.

- Cold Weather Protection:

a. Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen sub-grade or setting beds.

b. Temperature: Do not install paving systems when the ambient temperature is below 40° F, or when there is frost in the base course, or at any other time when weather conditions are unsuitable for the type of material being placed.

Stone Materials

A. Characteristics and Quality:

- Stone shall be sound stock, and free from defects impairing strength, durability or appearance, such as cracks, seams, starts, holes, flaws or imperfections which have been patched or filled.

- Stone shall be uniformly consistent in color, value, graining texture, and other features to the extent inherent in each stone type.

- Units shall be clean, split-face cobbles, 4" deep, and with 4"x 4" face sizes.

Color: light gray.

4. Stone shall be cut to sizes, shapes, dimensions, and details shown on the drawings for each type and condition. There shall be no deviation from jointing shown or specified.

5. Exposed surfaces and edges of stone units shall be free from cracks, broken corners, chipped edges, scratches, or defects affecting appearances. No patching or hiding of defects will be permitted.

6. Shop Cutting, Drilling and Fitting: Include all cutting, drilling, and fitting of stone required to accommodate the work of other trades and to fit conditions on-site. In cutting and fitting, carefully cut and grind edges to a neat, tight, fit. Cutting shall be in such a manner so as not to impair strength or appearance.

Installation Materials

A. Sand Setting Bed Material: Provide clean, washed natural sand aggregate with material and grading in accordance with ASTM C-33.

B. Structural Soil Composition: As specified under "Structural Soil" in Item #0944105A.

C. Sand Joint Treatment (Filler): Sand shall conform to the following gradation in accordance with ASTM C144-84 and shall be a combination of manufactured sand and natural sand:

Sieve Size	**Percent Fines by Weight**
No. 4	100
No. 8	95 – 100
No. 16	70 – 100
No. 30	40 – 75
No. 50	20 – 40
No. 100	10 – 25
No. 200	0 – 10
% Fracture, by weight, Minimum:	75
Sand Equivalent, Minimum	40

1. The fracture requirement shall be at least two mechanically fractured faces and will apply to material retained on each sieve size No. 50 and above.

2. Color of Sand: Provide natural light color (not white) selected and approved by Owner/Designer, and as determined by color selection of joint filler.

3. Mortar for bedding and joints shall conform to CT DOT 11.04. It shall be non- staining. Use light gray cement color as approved by Owner / Engineer. Provide one source used to suit conditions specified.

   a) Color of cement for final joint treatment: Use light gray cement color as approved by Owner/Designer.

D. Water – shall be potable and free of injurious contaminants.

E. Geotextile Filter Fabric
Acceptable products include but are not limited to:

A. "Hydronet Filter Fabric", Atlantic Geotextiles
20100 E 35th Drive, Aurora, CO 80011-8160
800-233-1510 or 303-373-1234
woven recycled polypropylene

B. "Filter Fabric", Invisible Structures, Inc.
20100 E 35th Drive, Aurora, CO 80011-8160
800-233-1510 or 303-373-1234
100% recycled HDPE non-woven filter fabric

B. "Hydronet Filter Fabric", EnviroSafe Products Corporation
355 Eisenhower Pky; Livingston, NJ 07039
973-535-1414
100% recycled PET & PVC

B. Or approved equal.

F. Edge Restraint

1. Steel Edging
   a. Acceptable Manufacturers:

      1. Border Concepts Inc., Charlotte, NC 28247 [www.BorderConcepts.com]
      2. The J.D. Russell Company, Fraser, MI 48026 [www.jdrussellco.com]
      3. Ryerson Co., Jersey City, NJ [www.jtryerson.com]
      4. Or approved equal.

   b. Provide ¼ inch thick by 5-inch deep edging with 15-inch long steel stakes. Color: Black as provided by manufacturer.

Surface Preparation

A. Layout of Work: Accurately lay out paving work to patterns and conditions shown on drawings and encountered on the site, and specified for installation. Provide additional control points and stakeouts as required to effect correct alignments and grade elevations. Advise Owner / Engineer of any discrepancies or on-site conditions detrimental to critical layouts and obtain approved correction.

B. When ready for setting, all paving units shall be clean and free from stain, dirt, or dust. If necessary, rinse well with clean water.

C. Verification of Structural Soil Installation:

B. Verify base course has been installed and compacted to proper depths and density as specified in Item #0944105A.

D. Acceptability of Concrete Base:
   a. Contractor shall examine the reinforced concrete base slab to determine its adequacy to receive the granite paving. Concrete shall have cured fully. Evidence of inadequate concrete base shall be immediately brought to the attention of the Engineer. Start of work shall constitute acceptance of the concrete base slab.

Paving Surface Installations

A. General:

- Pattern: Lay granite pavers in patterns indicated on drawings.

2. Granite pavers shall be cut or drilled as appropriate to conditions to fit around items penetrating grade and to adjust pattern/slope conditions of paving design as approved. Cut around site objects only, such as lights, manholes, etc. Execute cutting with a high-speed masonry saw producing squared, clean, and sharp edges.

   b. Granite pavers which are cut or split, such as required to accommodate utility elements or other adjacent conditions, shall have a minimum 4" depth, with a 2"x3" face size.

3. The surface edge of one paver unit shall be level with the next adjacent pavers so that no voids, rocking motions, or tripping hazards are encountered. In addition, comply with specified tolerances.

4. Tolerances

   a. Variation of Slope and Grade: Check slope and grade of installed paving units with a 12-foot long straightedge. Surface shall be true to grades and slopes indicated within 1/8" in 10 feet.

   b. Offset at Joints: Do not exceed plus or minus 1/32".

   c. Joint width: Maximum 3/4".

B. Dry Setting Bed Over Structural Soil

1. Install geotextile fabric over compacted base course (structural soil).

2. Provide a uniform bedding plane parallel to the finished pavement surface. The bed material shall be screeded to a surface tolerance of plus or minus 3/16-inch, giving a compacted thickness of 1 inch. The screeded course will be compacted with a light vibratory roller. The compacted bed material shall then be screeded again to a depth of 1/4-inch.

3. Pavers shall be installed to fit together accurately with joint widths as indicated on Drawings.

4. After a substantial area has been installed, a plate vibrator with soft protective pad shall be used to compact the paving stones into place and to vibrate the setting bed material up into the joints.

5. Joint Treatments:

   a. If joint treatment installations are performed more than two (2) days after paver unit installation, or at such other times as conditions warrant, use a powered air blower to clean paving joints of debris before applying joint treatment.

   b. For sand joints: Initial joint filler treatment of sand shall be spread and broom swept over the installed pavers. Next, at least one pass of the plate vibrator shall be made to consolidate the joint material in the joints. Sand shall then be swept into the joints

until joints are filled flush to the top of the paving stones. Sweep excess material clean from the paving surface.

C. Installation of Edge Restraint

1. Lay edging on compacted Structural Soil Planting base course perpendicular to curb line to form tree pit to the dimensions shown on the plans and details.

2. Anchor each length of edge restraint with stakes at 12" centers and at corners.

D. Mortar Setting Bed over 8" Reinforced Concrete Base for Pavers

1. The reinforced concrete base shall have a clean, even surface.

2. Granite pavers shall be set on a mortar bed and settled into place using a heavy wooden rammer (or similar) to the line and grade required. Pavers shall be straight and true for full depth on mortar bed.

3. For mortar joints: Fog spray paving surface and filled joints lightly with water. After settlement of joint filler, repeat procedure of joint filler installation and add cement to sand and fog spray until joints are completely filled and compacted flush to surface. Verify complete filling after a period of at least 5 days and repeat filling procedure as necessary. Upon approved completion of the foregoing, the cobble paver surfaces shall be cleaned and washed down.

Cleaning and Repairing

A. Remove all cement, mortar, or stains from granite paving surface not more than six (6) days after installation of joint treatment. Use clean water and stiff bristle brushes to clean cement stains. Do not use wire brushes, acid type cleaning agents, or other cleaning compounds with caustic or harsh fillers.

B. Protect finished granite paving surface from ongoing construction activity. If construction activity must cross surfaces of finished paved surfaces, place clean plywood or planks in the lane of traffic flow and restrict traffic to protected areas.

C. Replace or repair defective, broken or damaged pavers or system components. Defective setting beds shall be removed and replaced. Unfilled or defective joints shall be repaired in compliance with specification requirements for installations.

1. System defects shall include, but not be restricted to, non-solid foundations, heaving, loosening under service conditions, uneven joints, uneven settling, stains, marks, evidence of improper bedding or alignment, and other imperfections of material and workmanship impairing performance, suitability for intended use or appearance.

Method of Measurement:

A. Granite Pavers on Structural Soil will be measured on a per square foot basis, complete, in-place as shown on the Drawings, as specified herein, and as directed by the Engineer. The Structural Soil will be measured for payment under other items.

Basis of Payment:

A. Granite Pavers on Structural Soil will be paid for at the contract unit price per square foot for "Granite Pavers on Structural Soil" which will be full compensation for furnishing and installing granite pavers, sand setting bed and sand joint filler, complete and in-place.

Pay Item	Pay Unit
Granite Pavers on Structural Soil	SF

ITEM #0406002A - TEMPORARY PAVEMENT

Description: Work under this item shall consist of placing temporary pavement at the locations shown on the contract drawings or as directed by the Engineer. Temporary pavement shall include a minimum 8 inches of processed aggregate base and 4 inches of Bituminous Concrete pavement and temporary bituminous concrete curbing.

The temporary pavement shall be provided in areas between the existing edge of pavement and front of sidewalks as shown on the plans and directed by the Engineer during the Stage 1A of construction and at other times as needed.

Materials: The materials to be used in the construction of temporary pavement shall be those indicated on the plans and in the details or ordered by the Engineer. Processed Aggregate Base shall conform to the requirements of CTDOT Form 816 Article M.05.01. Bituminous Concrete shall conform to the requirements of CTDOT Form 816 Article M.04.01. of the type and thickness specified. Temporary curbing shall conform to the requirements of CTDOT Form 816 Article M.04, Bituminous Concrete Class 3.

Construction Methods:

A. The Contractor, upon completing the backfilling of the trenches in pavement used by traffic will be required to construct a temporary pavement.

B. The Contractor shall provide temporary pavement in the areas as shown on the drawings and in particular, Stage 1A of the Temporary Traffic Control Plans.

C. The methods employed in placing the bituminous pavement and all equipment, tools, machinery and other plant equipment used in handling materials and executing any part of the work shall conform to all requirements of CTDOT Form 816 Article 4.06.03. The completed and compacted temporary pavement shall match the adjacent grade of the existing pavement and meet or surpass the uniformity of the adjacent surface and its roughness or riding quality. Replacement of the temporary pavement will be required at no additional cost where the pavement surface is not smooth or the compacted thickness of the bituminous concrete is deficient by more than ½".

D. It shall be the responsibility of the Contractor to maintain and repair temporary bituminous pavement surfaces until such time as the temporary pavements have been replaced with the construction of permanent pavements. The Contractor shall at all times maintain the temporary pavements in a safe and satisfactory condition and all maintenance and repairs of permanent and temporary pavements shall be provided by the Contractor at no additional expense.

E. All curbing, street fixtures and such other appurtenant work damaged or displaced as a result of the Contractor's operations shall be repaired or replaced and restored by the Contractor in a manner satisfactory to the Engineer at no cost.

F. Payment for temporary pavement shall be made only to the limits shown on the plans and as directed.

Method of Measurement: This work will be measured for payment by the square yard of temporary pavement applied to the limits shown on the plans or ordered by the Engineer and after verification of the proper depth of bituminous concrete pavement thickness by the Engineer.

Basis of Payment: The temporary pavement will be paid for at the contract unit price per sqare yard for "Temporary Pavement" complete in place and approved which price shall include all pavement structure, curbing, materials, tools, equipment and labor incidental thereto. No separate payments will be made for curbing, excavation and disposal of materials, furnishing, placing, and compaction of processed aggregate base, or the cleaning, saw cutting, and tack coating of the existing pavement. The costs for these items shall be included in the contract unit price.

Pay Item	Pay Unit
Temporary Pavement	SY

ITEM #0406285A – FINE MILLING OF HMA (0”-4”)

Description: This work shall consist of the milling, removal, and disposal of existing bituminous concrete pavement.

Construction Methods: The Contractor shall remove the bituminous concrete material using means acceptable to the Engineer. The pavement surface shall be removed to the line, grade, and existing or typical cross-section shown on the plans or as directed by the Engineer.

The bituminous concrete material shall be disposed of offsite by the Contractor at an approved disposal facility unless otherwise stated in the Contract.

Any milled surface, or portion thereof, that is exposed to traffic shall be paved within five (5) calendar days unless otherwise stated in the plans or Contract.

The equipment for milling the pavement surface shall be designed and built for milling bituminous concrete pavements. It shall be self propelled with sufficient power, traction, and stability to maintain depth and slope and shall be capable of removing the existing bituminous concrete pavement.

The milling machine shall be equipped with a built-in automatic grade averaging control system that can control the longitudinal profile and the transverse cross-slope to produce the specified results. The longitudinal controls shall be capable of operating from any longitudinal grade reference, including string line, contact ski (30 feet minimum), non-contact ski (20 feet minimum), or mobile string line (30 feet minimum). The transverse controls shall have an automatic system for controlling cross-slope at a given rate. The Engineer may waive the requirement for automatic grade or slope controls where the situation warrants such action.

The rotary drum of the machine shall use carbide or diamond tipped tools spaced not more than ⅝ inch apart. The forward speed of the milling machine shall be limited to no more than 45 feet/minute. The tools on the revolving cutting drum must be continually maintained and shall be replaced as warranted to provide a uniform pavement texture.

The machine shall be equipped with an integral pickup and conveying device to immediately remove material being milled from the surface of the roadway and discharge the millings into a truck, all in one operation. The machine shall also be equipped with a means of effectively limiting the amount of dust escaping from the milling and removal operation.

When milling smaller areas or areas where it is impractical to use the above described equipment, the use of a lesser equipped milling machine may be permitted when approved by the Engineer.

Protection shall be provided around existing catch basin inlets, manholes, utility valve boxes, and any similar structures. Any damage to such structures as a result of the milling operation is the Contractor's responsibility and shall be repaired at the Contractor's expense.

To prevent the infiltration of milled material into the storm drainage system, the Contractor shall take special care to prevent the milled material from falling into the inlet openings or inlet grates. Any milled material that has fallen into inlet openings or inlet grates shall be removed at the Contractor's expense.

Surface Tolerance: The milled surface shall provide a satisfactory riding surface with a uniform textured appearance. The milled surface shall be free from gouges, longitudinal grooves and ridges, oil film, and other imperfections that are a result of defective equipment, improper use of equipment, or poor workmanship. The Contractor, under the direction of the Inspector, shall perform random spot-checks with a Contractor supplied ten-foot straightedge to verify surface tolerances at a minimum of five (5) locations per day. The variation of the top of two ridges from the testing edge of the straightedge, between any two ridge contact points, shall not exceed ⅜ inch. The variation of the top of any ridge to the bottom of the groove adjacent to that ridge shall not exceed ⅜ inch. Any unsatisfactory surfaces produced are the responsibility of the Contractor and shall be corrected at the Contractor's expense and to the satisfaction of the Engineer.

The depth of removal will be verified by taking measurements every 250 feet per each pass of the milling machine, or as directed by the Engineer. These depth measurements shall be used to monitor the average depth of removal.

Where a surface delamination between bituminous concrete layers or a surface delamination of bituminous concrete on Portland cement concrete causes a non-uniform texture to occur, the depth of milling shall be adjusted in small increments to a maximum of +/- ½ inch to eliminate the condition.

When removing bituminous concrete pavement entirely from an underlying Portland cement concrete pavement, all of the bituminous concrete pavement shall be removed leaving a uniform surface of Portland cement concrete, unless otherwise directed by the Engineer.

Any unsatisfactory surfaces produced by the milling operation are the Contractor's responsibility and shall be corrected at the Contractor's expense and to the satisfaction of the Engineer.

No vertical faces, transverse or longitudinal, shall be left exposed to traffic unless the requirements below are met. This shall include roadway structures (catch basins, manholes, utility valve boxes, etc.). If any vertical face is formed in an area exposed to traffic a temporary paved transition shall be established according to the requirements shown on the plans. If the milling machine is used to form a temporary transition, the length of the temporary transition shall conform to Special Provision Section 4.06 - Bituminous Concrete, "Transitions for Roadway Surface," the requirements shown on the plans, or as directed by the Engineer. At all

permanent limits of removal, a clean vertical face shall be established by saw cutting prior to paving.

Roadway structures shall not have a vertical face of greater than one (1) inch exposed to traffic as a result of milling. All structures within the roadway that are exposed to traffic and greater than one (1) inch above the milled surface shall receive a transition meeting the following requirements:

For roadways with a posted speed limit of 35 mph or less*:

1. Round structures with a vertical face of greater than 1 inch to 2.5 inches shall be transitioned with a hard rubber tapered protection ring of the appropriate inside diameter designed specifically to protect roadway structures.
2. Round structures with a vertical face greater than 2.5 inches shall receive a transition of bituminous concrete formed at a minimum 24 to 1 (24:1) taper in all directions.
3. All rectangular structures with a vertical face greater than 1 inch shall receive a transition of bituminous concrete formed at a minimum 24 to 1 (24:1) taper in all directions.

*Bituminous concrete tapers at a minimum 24 to 1 (24:1) taper in all directions may be substituted for the protection rings if approved by the Engineer.

All roadway structure edges and bituminous concrete tapers shall be clearly marked with fluorescent paint. The paint shall be maintained throughout the exposure to traffic.

The milling operation shall proceed in accordance with the requirements of the "Maintenance and Protection of Traffic" and "Prosecution and Progress" specifications, or other Contract requirements. The more stringent specification shall apply.

Prior to opening an area which has been milled to traffic, the pavement shall be thoroughly swept with a sweeper truck. The sweeper truck shall be equipped with a water tank and be capable of removing the millings and loose debris from the surface. The sweeper truck shall operate at a forward speed that allows for the maximum pickup of millings from the roadway surface. Other sweeping equipment may be provided in lieu of the sweeper truck where acceptable by the Engineer.

Any milled area that will not be exposed to live traffic for a minimum of 48 hours prior to paving shall require a vacuum sweeper truck in addition to, or in lieu of, mechanical sweeping. The vacuum sweeper truck shall have sufficient power and capacity to completely remove all millings from the roadway surface including any fine particles within the texture of the milled surface. Vacuum sweeper truck hose attachments shall be used to clean around pavement structures or areas that cannot be reached effectively by the main vacuum. Compressed air may be used in lieu of vacuum attachments if approved by the Engineer.

Method of Measurement: This work will be measured for payment by the number of square yards of area from which the milling of asphalt has been completed and the work accepted. No area deductions will be made for minor unmilled areas such as catch basin inlets, manholes, utility boxes and any similar structures.

The depth of removal will be calculated by taking measurements at a minimum every 250 feet per each pass of the milling machine, or as directed by the Engineer. The average depth of each section will determine which payment item is applicable.

Basis of Payment: This work will be paid for at the Contract unit price per square yard for "Fine Milling of HMA (0 to 4 inches). This price shall include all equipment, tools, labor, and materials incidental thereto.

No additional payments will be made for multiple passes with the milling machine to remove the bituminous surface.

No separate payments will be made for cleaning the pavement prior to paving; providing protection and doing handwork removal of bituminous concrete around catch basin inlets, manholes, utility valve boxes and any similar structures; repairing surface defects as a result of the Contractors negligence; providing protection to underground utilities from the vibration of the milling operation; removal of any temporary milled or paved transition; removal and disposal of millings; furnishing a sweeper truck and sweeping after milling. The costs for these items shall be included in the Contract unit price.

Pay Item	Pay Unit
Fine Milling of HMA (0" – 4")	S.Y.

ITEM # 0507601A MANHOLE

Description: The Contractor shall furnish all materials and shall construct all the sanitary or storm drain manholes required as part of this Contract, including the frames, covers, steps, inverts, and materials necessary for fastening the frame to the concrete manhole structure.

Materials: Manholes shall conform in shape, size, dimensions, materials, and other respects to the details indicated on the drawings, or as ordered by the Engineer.

All manholes shall have concrete bases. Invert channels will be formed of brick and mortar at the base unless otherwise specified by the Engineer.

Manhole walls (barrels) shall be either of Class A concrete or pre-cast concrete sections. The top three feet of manholes (the dome) shall be built of either Class A concrete or a precast concrete section. Should the Contractor elect to build the domes of manholes in streets with Class A concrete or a precast concrete section, the top six inches of the dome shall be built of brick to permit adjustment of the frame to meet the street surface.

The inverts shall conform accurately to the size of the adjoining pipes. Side inverts shall be curved and main inverts (where direction changes) shall be laid out in smooth curves of the longest possible radius which is tangent to the centerlines of adjoining sewers.

The cast-iron frames and covers shall be the standard frame and cover as indicated on the drawings. The frames and covers shall be set by the Contractor to conform accurately to the grade of the finished pavement, existing ground surface, or as shown on the drawings.

Class A concrete shall conform to the requirements specified under the Form 816..

Precast Concrete Sections and Bases:

a) Precast concrete sections, if used, shall conform to the ASTM Tentative Specifications for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe Designation C76-63T, Class III, with the following exceptions and additional requirements:

b) There shall be one line of circular reinforcement having an area of at least 0.25 square inches per linear foot of barrel.

c) The barrel shall be not less than five inches thick.

d) Type II cement shall be used except as otherwise approved.

e) Manhole steps shall be as specified under “Manhole Steps”. Steps shall be cast into the section as it is made.

f) Sections shall be steam cured and shall not be shipped until at least seven days after having been cast.

g) Precast manhole bases will have precast rubber boots designed to conform to the changes in the line as specified by the plans.

h) No more than two lift holes may be cast or drilled in each section.

i) The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the inside of the barrel.

j) Acceptance of the sections will be on the basis of material tests and inspection of the completed product.

k) All precast units shall have O-ring rubber of mastic gasket joints.

l) Domes may be precast eccentric sections of similar construction. If precast concrete sections are used, the tops of the bases shall be suitable shaped by means of accurate bell-ring forms to receive the barrel sections.

Setting Precast Manhole Sections: Precast reinforced concrete manhole sections shall be set so as to be vertical and with sections and steps in true alignment. Joint surfaces of the base or previously set section shall be covered with lubricant and an O-ring installed before the new section is placed or an equivalent.

All holes in sections used for their handling shall be thoroughly plugged with non-shrink mortar. The non-shrink mortar shall be one part cement to one and one-half parts sand/mixed slightly damp to the touch (just short of "balling"); hammered into the holes until it is dense and an excess of paste appears on the surface; and then finished smooth and flush with the adjoining surfaces.

The non-shrink mortar for the above-noted use and for use in sealing of sewer pipe at manholes can be Embeco Mortar (premixed) as manufactured by Master Builders or an approved equal product.

Brick: The brick shall be sound, hard, and uniformly burned brick, regular and uniform in shape and size of compact texture and satisfactory to the Engineer.

Brick intended for use below ground level shall conform to ASTM Specifications for sewer brick, Serial Number C-32.

Rejected brick shall be immediately removed from the work and brick satisfactory to the Engineer substituted.

Mortar for Brickwork: The mortar shall be composed of Portland cement, hydrated lime, non-shrink agent, and sand in which the volume of sand shall not exceed three times the sum of the volumes of cement and lime. The proportions of cement and lime shall be as directed and may vary from 1:1/4 for dense, hard-burned brick to 1:3/4 for softer brick. In general, mortar for Grade SA Brick shall be mixed in the proportions of 1:1/2:4-1/2.

Cement shall be Type II Portland cement as specified for concrete masonry.

Hydrated lime shall be type S conforming to the ASTM Standard Specification for Hydrated Lime for Masonry Purposes, Designation C207-49. 4X Hydrate made by the New England Lime Co. will meet this specification.

The sand shall comply with the specifications for "Fine Aggregate" for concrete masonry except that all of the sand shall pass a No. 8 sieve.

Construction Methods:

Trench excavation, backfill and dewatering for these items shall be according to the special provisions for "EARTH TRENCH EXCAVATION AND BACKFILL" and "TRENCH DEWATERING", included elsewhere in these specifications.

Laying Brickwork: Only clean bricks shall be used in brickwork for manholes. The brick shall be moistened by suitable means as directed until they are neither so dry as to absorb water from the mortar nor so wet as to be slippery when laid.

Each brick shall be laid in a full bed and joint of mortar without requiring subsequent grouting, flushing, or filling and shall be thoroughly bonded as directed. All exposed interior brickwork shall be wiped clean once installed.

Manhole water tables are to be slightly sloped toward the invert (3/4-inch per foot).

Plastering and Curing Brick Masonry: Outside faces of brick masonry shall be plastered with mortar from ¼-inch to 3/8-inch thick. If required, the masonry shall be properly moistened prior to application of the mortar. The plaster shall be carefully spread and troweled so that all cracks are thoroughly worked out. After hardening, the plaster shall be carefully checked by being tapped for bond and soundness. Unbonded or unsound plaster shall be removed and replaced.

Brick masonry and plaster shall be protected from too rapid drying by the use of burlaps kept moist, or by other approved methods, and shall be protected from the weather and frost, all as required.

Coating: The exterior surfaces of all manholes shall be given two coats of bituminous waterproofing material. The material shall be Minwax Fibrous Brush Coat made by the Minwax Co., Inc., New York, NY: Tremco 121 Foundation Coating made by the Tremco Manufacturing Co., Cleveland, OH: Inertol No. 7 made by the Inertol Co., Inc., Newark 5, NJ: or approved equal products. The waterproofing material shall be applied by brush or spray and in accordance with the instruction of the manufacturer. Time shall be allowed between coats to permit sufficient drying so that the application of the second coat has no effect on the first coat.

Alterations of Existing Manholes or Pipe: Where called for on the plans, directed by the Engineer, or necessary for the new construction, existing manholes and pipes shall be altered as required. Alterations shall include, but not be limited to, cutting new entrances into manhole for pipe, cutting or plugging existing pipe, making necessary changes in invert or steps, adjusting frames by raising or lowering, and proper control of waste material in active lines. Payment for this item will be made at the contract unit price. Payment shall include all costs and labor incidental to altering the structure to the required end result.

Manhole Frames and Covers: The Contractor shall furnish all cast-iron manhole frames and covers conforming to the details shown on the drawings, or as herein specified. The castings shall be of good quality, strong, tough, even-grained cast iron, smooth, free from scale, lumps, blisters, sandholes, and defects of every nature which would render them unfit for the service for which they are intended.

Contact surfaces of covers and frames seats shall be machined to prevent rocking of covers.

All castings shall be thoroughly cleaned and subject to a careful hammer inspection.

Sanitary sewer manhole covers shall have the word “SEWER” embossed in three-inch letters as shown on the standard details.

Storm drainage manhole covers shall have the word “STORM” and “DRAIN” embossed in three-inch letters as shown on the standard details.

Castings shall be at least Class 25 Conforming to the ASTM Specification for gray Iron Castings, Designation A48 as amended to date.

Setting Manhole Frames and Covers: Manhole frames shall be set with the tops conforming accurately to the grade of the pavement or finished ground surface or as indicated on the drawings as directed. Frames shall be set concentric with the top of the masonry and in a full bed of mortar so that the space between the top of the manhole masonry and the bottom flange of the frame shall be completely filled and made watertight. A thick ring of mortar extending to the outer edge of the masonry shall be placed all around the bottom and over the top of the flange. The mortar shall be smoothly finished and have a slight slope to shed water away from the frame.

Manhole covers shall be left in place in the frames on completion of other work at the manholes. Manholes located off of the traveled roadway shall have their frames lagged to the manhole wall.

Stubs in Manholes: Stubs placed as specified and indicated on the drawings shall be either short pieces cut from the bell ends or shall be four feet, zero inch-length of reinforced concrete pipe with bulkheads. Stubs shall be set accurately to the required line and elevation and encased in the manhole masonry as shown on the drawings. Where booted-type manholes are used, no stub will be necessary. The boot shall be properly plugged. Any uncalled for boot shall be removed and the hole properly sealed with brick or a boot may be plugged if the Engineer so directs.

Drop Inlet to Manhole: Drops for sanitary sewer manholes shall be accomplished in conformity with the details found elsewhere within these documents and in accordance with the provisions of these specifications for the various materials and work which constitute the complete structure.

Manhole Steps: Unless otherwise indicated, manhole steps shall be installed as shown within the Town of Glastonbury details for plastic manhole steps or an approved equal product. The steps shall be thoroughly clean and dry before being built into the masonry.

Measurement: Where the bid item for manholes is broken into categories by height, the height of the manhole shall be measured by the linear foot of vertical height. The vertical height will be the difference in elevation between the top of the frame and the elevation of the invert measured along the vertical centerline of the manhole.

When drop inlets are included in the Contract, they shall also be broken down by height and will be measured per vertical linear feet. No measurement for payment will be made for excavation, backfilling, crushed stone base, sheeting, shoring and bracing ordered left in place, concrete, damp-proofing, manhole steps, manhole frames and covers, items incidental to the construction, but costs associated with these items shall be included in the contract unit price bid for each depth classification of the manhole.

Payment: Manholes will be paid for at the contract unit price for each “Manhole” as listed in the Bid Proposal, which shall include all materials, tools, equipment, and labor necessary to complete the excavation and installation of units in conformity with the plans, or as specified, including excavation, removal and replacement of pavement and base material, saw cutting, and pervious backfill.

Rock excavation, when encountered during the course of this work, will be paid for at the contract unit price per cubic yard for "Rock Excavation" as listed in the Bid Proposal.

ITEM # 0507771A RESET CATCH BASIN

ITEM # 0507781A RESET MANHOLE TOP

General: Under this item shall be included the alteration or reconstruction of existing catch basins and manholes in conformity with the lines, grades, dimensions, and details shown on the plans, or as ordered, and in accordance with the provisions of these specifications for the various materials and work which constitute the completed structure.

Construction Methods: Frames, covers and tops which are to be reset shall be removed from their present beds, the walls or sides shall be rebuilt to conform to the requirements of the new construction and the tops, frames and covers reset, or the grates or covers may be raised by extensions of suitable height approved by the Engineer.

Method of Measurement: Resetting tops, frames and covers will be measured as units. When resetting tops, frames and covers, there will be no measurement for excavation; cutting, removal and replacement of pavement; pervious material and backfill.

Payment: Reset Units will be paid for at the contract unit price each of the type specified, respectively, complete in place, which price shall include excavation, pervious material, backfill, cutting of pavement, removal and replacement of pavement structure, extensions, concrete masonry units, mortar, and all materials, equipment, tools and labor incidental thereto.

ITEM # 0813021A 5" X 14" GRANITE STONE CURBING

ITEM # 0813031A 5" X 14" GRANITE CURVED STONE CURBING

ITEM # 0813042A 5" X 20" GRANITE STONE CURBING

ITEM # 0813052A 5" X 20" GRANITE CURVED STONE CURBING

ITEM # 081305X 5" X 20" MOUNTABLE GRANITE STONE CURBING

8.13.01 Description:

This curbing shall include excavating in front and back of existing curb, removing curb, stockpiling curb to be reset or disposing of the existing curb as determined by the Engineer, and saw cutting and excavating old concrete or other foundation. This item shall also include saw cutting and excavating for; furnishing and placing new processed trap rock; class 'C' concrete foundation and backfill for full length of granite stone curb; furnishing and setting to line and grade new granite stone curb, new granite curved stone curb; mountable curbing for truck apron, furnishing and placing new backfill, concrete and processed trap rock; caulking curb joints; making all necessary pavement repairs and grading behind the curb where necessary.

Deleted: class 'C' concrete at joints for straight granite stone curb;

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Deleted: and radial granite curb driveway return

Deleted: and radial granite curb driveway return

This item also includes transition lengths (curved or straight) when matching existing top of curb elevations at the beginning and ends of curbing limits or at sidewalk ramps. The transition length of curb shall be one continuous 6 foot length. No additional payment(s) will be made for transition lengths.

This item shall include trimming damaged ends of existing curb stones and cutting existing curb stones to a shorter length, both trimming and cutting to produce a new end which is square with the planes of the top and face of the curb. This item shall also include cutting curb stones horizontally in locations where the depth of curb stones must be reduced to clear obstacles or utilities.

5" Granite Stone Curbing and 5" Granite Curved Stone Curbing shall only be used in areas where needed to clear existing utility conflicts upon approval of the Engineer.

Refer to typical sections for installation details.

Required Submittals

Material Samples:

Submit material samples for granite curb in accordance with the contract general requirements.

8.13.02 Materials:

All new granite curb supplied for use shall be 5" x 20", 5" x 14" and shall conform to the following:

Deleted: or radial granite curb driveway return

General: Curbstones shall be hard and durable granite of light color and uniform texture neither stratified nor laminated. Curbstones shall be free from seams, cracks and evidence of weakening or disintegration and shall be of a good smooth splitting appearance. Granite shall come from a quarry previously approved by the Engineer.

Should the Contractor request use of granite from a quarry not previously approved, he shall submit samples sufficiently in advance of need to allow the Engineer opportunity to judge the stone both as to quality and appearance. All curbstones for a given project shall come from one quarry and be all of one

type. Granite when tested shall have a French coefficient of wear of not more than 32. Test sample shall conform to the requirements of ASTM C-615-03.

Dimensions: Straight curb shall be 5 inches by 20 inches or 5 inches by 14 inches (as ordered by the Engineer) depth shall be nominal depth plus or minus 1 inch, minimum curb length to be 6 feet (except for closures to be not less than 4 feet) minimum width at bottom to be nominal width minus 1 inch for two thirds the length with an absolute minimum of minus 2 inches for the remaining one third.

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All curbs to be set on radius 75 feet or less shall be 5 inches by 20 inches or 5 inches by 14 inches (as ordered by the Engineer) cut to arc with radian joints, depth shall be 20 inches plus or minus 1 inch (14 inches plus or minus 1 inch), minimum length to be 4 feet, minimum width at bottom to be 5 inches for two thirds the length with an absolute minimum of 4 inches for the remaining one third.

Straight curb to be set on radius over 75 feet to 500 feet shall be 5 inches with ends trimmed so that face and top joint fit properly, depth to be 20 inches plus or minus 1 inch (14 inches plus or minus 1 inch), minimum length to be 4 feet, maximum length to be 6 feet, minimum length at bottom to be 5 inches for two thirds the length with absolute minimum of 4 inches for the remaining one third.

Finish: The curbstone shall have a top surface free from wind and drill holes, it shall be sawed to an approximately true 1/8 inch. The front and back arris lines shall be straight and true with no variation from a straight line greater than 1/8 inch. On the back surface there shall be no projection for 3 inches down which would fall outside a batter of 4 inches in 12 inches from the back arris line. The front face shall be at right angles to the plane of the top or battered not more than one inch in twelve inches, and shall be quarry split or sawn, free from drill holes in the exposed face. The front face shall have no projections greater than 3/4 of an inch or depression greater than 1/2 inch measured from the vertical plane of the face through the top arris line for a distance of 8 inches down from the top.

For the remaining distance there shall be no projections or depressions greater than 1 inch measured in the same manner. The arris lines at the ends shall be pitched with no variation from the plane of the face greater than 1/8 inch. The ends of all stones shall be square with the planes of the top and face, and so finished that when the stones are placed end to end as closely as possible, no space more than 1/4 inch shall show in the joint for the full width of the top and down on the face for 8 inches. On curb stones having a length of 6 feet or more, the remainder of the end may break back not over 6 inches, on shorter curbstones, they shall not break back more than 4 inches. The bottom surface shall be sawn or quarry split to an approximately true plane. Half drill holes will not be permitted in the arris line of the back. Front arris line may be rounded to a radius not over 1/2 inch. If sawn, the curbstone shall be thoroughly cleaned of any iron rust or iron particles.

Granite curb returns shall be 20 inches deep and shall conform to the detail shown in the contract drawings and all material requirements in this specification.

Small processed trap rock: Course and fine aggregates shall be combined and mixed by approved methods so that the resulting material shall conform to the following gradation requirements:

Small ¾" Process Traprock:

Square Mesh Sieves	% Passing by Weight
Pass 1"	100
Pass 3/4"	90-100
Pass 3/8"	50-90
Pass #4	35-70
Pass #10	15-55
Pass #100	2-12
Pass #200	0-5

Course aggregate shall consist of sound, tough, durable fragments of rock of uniform quality throughout. It shall be free from soft disintegrated pieces, mud, dirt, organic or other injurious material. When tested by means of the Los Angeles abrasion machine using AASHTO method T-96-02, it shall not have a loss of more than 50 percent. When the fraction of the dry sample passing the No. 100 sieve is greater than 8% by weight, the sample shall be washed and the amount obtained by washing shall be added to the amount obtained by dry sieving. The resultant total amount of material passing the No. 100 sieve shall meet the above range.

Fine aggregate shall be natural sand, stone sand, screenings or any combination thereof. The fine aggregate shall be limited to material 95 percent of which passes a No. 4 sieve. The material shall be free from clay, loam and deleterious materials. Fine aggregate shall meet the material requirements of article M.05.01 of the State of Connecticut, Department of Transportation, Standard Specification for Roads, Bridges and Incidental Construction, Form 816, 2004 as amended.

Concrete: All materials for this work shall conform to the requirements of Section M.03 of the State of Connecticut Standard, Department of Transportation, Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004, as amended, for Class “C” concrete.

Caulk: Caulking compound shall be a material which complies with ASTM C-920, Type S, Grade NS, Class 25 sealing compound, polyurethane based elastomeric, single component, moisture cured sealant, capable of 25% joint movement. The color of the compound shall be cement mortar gray.

Mountable granite curbing shall be provided in accordance with these provisions as well as the details on the drawings.

8.13.03 Construction Methods:

All curbing installations shall be laid out in the field and prior to placement of concrete footings, be approved by the Engineer. The contractor shall notify the Engineer at least two business days in advance of final curbing layout for approval prior to concrete placement.

The curbing shall be marked in the field by a licensed land surveyor in accordance with the detailed coordinates for the curb lines, radii’s and recessed curbing points.

Excavation: The Contractor shall excavate to a depth of 36” below the top of finished curb grade. The street pavement shall be removed to a width of at least 6” in front of the curb to facilitate proper setting and backfilling. Bituminous concrete and macadam pavement in front and back of the curb shall be cut to neat straight lines before excavation to minimize pavement damage.

Where there is good sod behind the curb, the sod shall be removed before excavation and saved for re-use.

Where there is a dummy joint 18” to 24” behind the curb, the Engineer may require the Contractor to saw the joint prior to excavating behind the curb. Saw cutting will be included in this item.

Where concrete base pavement is encountered excavation shall include removal of all existing concrete or other foundations. Saw cutting the concrete base shall also be included in this item.

Where the distance between the back of the curb and sidewalk is 12” or less, or where trees are encountered immediately behind the curb, the Engineer may order the Contractor to excavate by hand to avoid damage to the walk or trees.

Setting Curb: The curb shall be set to line and grade established by the Engineer. Maximum variation from established line and grade shall be 1/4". The finished curb shall present a neat appearance free from irregularities of line and grade.

For curved stone curb, masonry blocking used to hold the curb in place shall be allowed to remain when backfilling is completed.

Foundation and Backfill: All foundation and backfill shall be placed in layers not over six inches thick and each layer shall be thoroughly compacted using motor driven powered vibratory compactor.

Deleted: For radial granite curb driveway return, all blocking used to hold the curb in place shall be removed before backfilling is completed.¶

For granite stone curbing, all curb joints shall be set in concrete 6" from either edge and shall not be less than 6" below bottom of the curb.

For curve granite stone curb, cement concrete shall be placed as foundation and backfill material around the curb in accordance with the standard detail drawings. The Contractor shall use a very stiff mix and shall spade and tamp to eliminate all voids, especially under the curb.

For curve granite stone curb, where a concrete surface is to be placed behind a curb, the concrete backfill shall be placed in back of the curb to 5" below top of curb for 5" concrete sidewalks, and 8" below top of curb for sidewalk ramps as applicable and in front of the curb to the base of the pavement encountered which is five inches below gutter grade for flexible base and 9" below top of curb for rigid base.

For curve granite stone curb, where bituminous surface is to be replaced behind the curb, concrete backfill shall be placed in back of the curb to 6" below top of curb, new processed trap rock shall be placed on top of the concrete to two inches below the top of the curb and shall be thoroughly compacted.

For granite stone curbing, backfill shall be placed in back of the curb to six inches below the top of the curb for loam and seeding and concrete walk, and two inches below for bituminous surface. Backfill in front of the curb shall be placed to 5" below gutter grade in streets with flexible base pavement and to 11" below gutter grade in streets with concrete base pavement.

For mountable curbing, it shall be installed as shown on the typical sections for proper mounting and backing of the curbing within the truck apron and northeast and southeast corners. Pavers shall be set flush with the top of the curbing with expansion joint and sealant as shown on the details.

Caulking: All curb joints shall be filled with caulking compound with either pneumatic or ratcheted hand gun or with other equipment as approved by the Engineer. At approximately 50-foot intervals, a 1/2-inch joint shall not be filled with caulking compound but left free for expansion.

Cutting or Trimming: The contractor shall employ appropriate cutting tools to produce a clean, square, and plumb cut for a neat appearance when reset. For vertical cuts, the ends shall be finished so that when stones are placed end to end as closely as possible, no space more than one half inch wide shall show in the joint for the full width of the top or down on the face for 9". The remainder of the joint may break back not more than 4" from the plane of the joint. The Engineer may require the cut to be made with the stone in place in the ground. Horizontal cuts shall be made in a manner that allows for a 2" vertical clearance of the object or utility interference with the bottom of the curb stone. Horizontal cuts which exceed 1/3 the depth of the stone to be cut require the engineers approval prior to cutting.

In the trimming and cutting of damaged curbstones, the portion cut off shall be kept to a minimum.

If in making a cut, the Contractor damages the curb so as to make it unusable, the Contractor shall furnish, at no cost to the Town a piece of suitable curb cut to proper length to replace the damaged curb.

8.13.04 Methods of Measurements:

This work will be measured for payment by the actual number of linear feet of stone curbing or curved stone curbing installed and accepted.

Measurement shall be made along the top arris line of face of curb. Curbing to be set on a radius of 100 feet or less will be measured for payment as curved stone curb.

Cutting or trimming existing or proposed curb will not be measured for payment.

Deleted: The work for radial granite curb driveway return will be measured for payment by the number of each Radial Granite Curb Driveway Return installed and accepted by the Engineer.¶

8.13.05 Basis of Payment:

Payment for this work will be made at the contract unit price per linear foot for 5" Granite Stone Curbing, 5" Granite Curved Stone Curbing, "5" x 20" Granite Stone Curbing", or "5" x 20" Granite Curved Stone Curbing", as the case may be, of the type and size specified, complete in place, which price shall include all materials, concrete footing, equipment, tools and labor incidental thereto, and all excavation, backfilling, disposal of surplus material and all drainage openings.

There will be no direct payment for furnishing, placing and compacting processed traprock, cutting or trimming existing or proposed curb, beveling or rounding the ends of the ends of the curbing, pointing the joints with mortar, concrete footing, repair of disturbed areas in front and back of curb and the 12" maximum grassed area in back of curb, but the cost of this work shall be considered as included in the general cost of the work.

Deleted: Payment for this work will be made at the contract unit price per each "Radial Granite Curb Driveway Return," installed and accepted, including all equipment, materials, tools, labor and incidental expenses.¶

Pay Item	Pay Unit
5" x 14" Granite Stone Curbing	L.F.
5" x 14" Granite Curved Stone Curbing	L.F.
5" x 20" Granite Stone Curbing	L.F.
5" x 20" Granite Curved Stone Curbing	L.F.
5" x 20" Mountable Granite Stone Curbing	L.F.

ITEM #0905019A – REMOVE AND REBUILD EXISTING STONE WALL

Description: This work shall consist of removing, storing, and reconstructing to the approximate original lines, dimensions, and appearance, rubble stones laid without the use of mortar forming standard stone walls located at the southwest corner of the project intersection.

Materials: Stones for this work shall consist of the stones which comprise the original wall. Should additional stones be necessary, such stones shall be the same rubble stones of suitable size and quality satisfactory to the Engineer and shall match the existing stones in appearance, texture and size.

Construction Methods: The existing stone wall shall be documented such that it may be reconstructed to the approximate size in the relocated condition. The wall shall be carefully dismantled in such a manner as to avoid damage to existing stones. The stones shall be stored securely until the wall is reconstructed. During reconstruction, the earth along the lines of the proposed relocated wall shall be excavated to a depth of not less than 6 inches and leveled off and stepped as necessary in a satisfactory manner so that the first or base course of stones may be stably embedded. All stones shall be laid on their natural beds. The wall shall be reconstructed in the style and appearance of the existing wall condition.

Method of Measurement: This work, being paid on a lump sum basis, will not be measured for payment. If additional stones are necessary to rebuild the relocated wall to the existing dimensions, they shall not be measured for extra payment but shall be included for payment under this item.

Basis of Payment: This work will be paid for at the Contract lump sum price for “Remove and Rebuild Existing Stone Wall”, complete in place, which price shall include materials, equipment, tools, labor and work incidental thereto; also all necessary excavation, refilling, storage of wall, and disposal of surplus material.

ITEM # 0950050A IRRIGATION SYSTEM

09.50.01 Description:

Deleted: 49

This item shall include furnishing all labor, materials, supplies, equipment, tools and transportation, and perform all operations in connection with and reasonably incidental to the complete installation of the irrigation system, and guarantee/warranty as shown on the drawings, conformance with Metropolitan District Commission Standard Specification and Details and as specified herein. Items of work specifically included are:

Coordination of Utility Locates ("Call Before You Dig")

Excavation, installation, and backfill of tap into MDC water main

Excavation, installation, and backfill of water meter enclosure in the central island

Verification of existing static pressure

Maintenance period

Irrigation pipe, couplings, spigots

Backflow preventer, enclosure, concrete pad

Deleted: Electrical connections

Required Submittals:

A. Deliver four (4) copies of all required submittals to the Engineer per Control of Work.

B. Materials List: Include pipe, fittings, mainline components, water emission components, control system components. Quantities of materials need not be included.

C. Manufacturers' Data: Submit manufacturers' catalog cuts, specifications, and operating instructions for equipment shown on the materials list.

D. Shop Drawings: Submit shop drawings called for in the installation details. Show products required for proper installation, their relative locations, and critical dimensions. Note modifications to the installation detail.

E. Project Record Drawings: Submit project record (as-built) drawings to Owner prior to commencement of maintenance period.

9.50.02 Materials:

Deleted: 49

Spigots shall be as shown on the Drawings or equal thereto in quality, construction, and performance as approved by the Engineer.

Riser and Swing Joints

All spigots shall be mounted on PVC swing joints. Joint compound approved by fitting manufacturer shall be used on movable fittings.

Feeder Lines

Reduction in feeder lines to spigots shall be made at the riser. Where short feeders are not sized they shall be of same size as shown for spigots. No feeder shall be smaller than 3/4-in for any spigot.

Gate Valves

All gate valves 3-in in diameter and smaller shall be domestic manufacture type or equal. Unless otherwise shown, they shall be rated for 100 psi steam and 150 psi water, oil or gas. The body, bonnet, stem stuffing box and packing nut shall be brass.

Polyvinyl Chloride Pipe

Polyvinyl chloride pipe and fittings shall be rigid high impact Type 1, Schedule 40, meeting commercial standard CS-207-60 and physical characteristics shall conform to latest ASTM Specifications D256, D696, D695, D785, D792, and D1599. Such pipe shall be unplasticized rigid polyvinyl chloride pipe as manufactured by U.S. Pipe and Foundry; Celanese Plastics Co.; Plastiline, Inc., or equal. Fittings shall be unplasticized "Sloan" rigid polyvinyl chloride pipe fittings. R & G Sloane Mfg. Division; Celanese Plastics Co.; Plastiline, Inc. or equal.

The jointing and installation of polyvinyl chloride pipe and fittings shall conform strictly to the manufacturer's recommendations. All PVC joints to have clean solvent welds.

Galvanized Steel Pipe

All galvanized steel pipe and fittings shall be standard weight and conform to ASTM A53. All burrs shall be removed and pipe ends shall be reamed out to size of bore. Pipe joint cement shall be used only on male threads.

Irrigation Meter Box

Meter box to be per drawings.

Concrete Thrust Blocks

Concrete thrust blocks shall be installed at all high stress areas.

9.50.03 Construction Methods:

EXCAVATION AND BACKFILLING

A. All excavation, backfill and grading necessary to complete the work shall be made by the Contractor and included in bid price of the work. Edge of trench shall not run closer than 6-in to edge of pavement. Heads shown at edge of pavement shall be located by use of lateral stubs off main line.

All PVC branch lines shall have a minimum cover of 12-in, all main lines 18-in, and all pipe under roadways 24-in.

Deleted: Electric Controller and Wiring¶
The controller shall be as shown on the Drawings or equal having a 26 volt output to operate electric valves of 3.75 watt requirement. It shall have a 48 hour dial with 0 to 60 minute timing per station, and each of the stations to have individual switch for cutting out if required. The controller shall be housed in the location shown on the Drawings.¶
All wiring in the same trench shall be color coded to differentiate each system. Bradey markers shall also be attached to wires at both the controller and each valve to facilitate servicing and maintenance. ¶
Electric Valves¶
The electric valves shall be 24 Volts, normally closed type as shown on the Drawings or equal. Valves to have flow control adjusting stem and built-in regulator for control of closing time. Valve to have bleeder valve to open electric valve manually. Closing time shall not be less than 4 seconds.¶
Valve Boxes¶
All electric valves to be housed in valve boxes. Valve boxes shall be extension type of proper length for trench depth with material and construction conforming to AWWA Specifications (Nelson VB-12 or equal). A valve number shall be stenciled on the inside of the valve box lid to correspond with that valve number and system at the controller.¶

Deleted: 49

Roadway Crossings

The sleeves under pavement shall be Schedule 40 PVC. The PVC irrigation pipe, according to the size as indicated on the plan will be placed inside the Schedule 40 PVC sleeve prior to placement of the sleeve. The PVC irrigation line shall be capped on both ends to prevent foreign material from entering the pipe.

The pipe sleeves shall extend at least 12-in beyond the curb line into the planting area. The PVC irrigation lines shall extend at least two feet into the planting area. All sleeves shall have a minimum cover of 24-in. The ends of all sleeves shall be marked and flagged to prevent them from being lost.

All excavation, except as directed, shall be backfilled to the original grade, or such grade as shown on the Drawings or directed. Backfilling shall be carefully placed around pipe and in areas shown on the Drawings as "Compacted Fill" with materials approved by the Engineer in layers not over 6-in thick and thoroughly compacted by hand tampers weighing not less than 20 pounds, or by approved mechanical tampers. Ponding will be permitted only with the written permission of the Engineer, providing sufficient water is used uniformly throughout the operation. The Contractor will be charged for all water furnished by the Owner. No ponding will be permitted adjacent to walls. No backfilling with bulldozers will be permitted adjacent to pipe lines. In no case will backfilling be permitted to be placed so as to damage the work. No rock will be permitted in the backfill within one foot of any pipe. The backfilling shall be done so as to prevent after-settlement, and shall be left with a smooth surface. Should the work be suspended for any reasons for any considerable time, the excavation shall be backfilled at the Contractor's expense when so ordered by the Engineer. Backfill around polyvinyl chloride pipe shall be carefully placed by experienced labor and thoroughly consolidated without shock to the pipe, and carried up uniformly on both sides of the pipe. After backfilling is complete, all excess materials shall be disposed of by the Contractor. No excess material shall be placed in any public right-of-way except with the written permission of the Owner.

DELAY OF INSTALLATION

Any spigots to be installed at tree locations shall not be installed until tree has been planted.

CLEANING AND TESTING OF SYSTEM

Prior to installing spigots, the lines shall be thoroughly flushed with water to remove all stone and sand particles from the system. Threaded caps shall be installed on all risers, beginning with the one closest to the water source and working out to the end of all lateral lines. Backfilling of the trench may begin at this time, however, all pipe joints and riser connections shall be left exposed for leakage testing.

Prior to installation of heads and swing joints and at the direction of the Engineer all head locations within a representative portion of the system shall be capped off and the following hydrostatic leakage test shall be performed.

The pressure required for hydrostatic leakage tests shall be 100 psi. The Contractor shall provide temporary plugs and blocking necessary to maintain the required test pressure. Corporation cocks at least 3/4-in in diameter shall be provided at each pipe dead end in order to bleed air from the line.

Hydrostatic pressure and leakage test shall conform with Section 13 of AWWA C600-54T Specification with the exception that the Contractor shall furnish all gauges, meters, pressure pumps and other equipment needed to test the line.

Deleted: Wiring from 110 Volt source to controller to be in conduit, wiring from controller to electric valves to be direct burial irrigation wire of the size specified on the landscaping and irrigation Drawings. Individual hot wires and grounds shall be run from the controller to each electric valve. All wiring in trench shall be bundled and placed to the side of the pipe. ¶

Pipe lines shall be filled with water and all air removed and a pressure of 100 psi shall be maintained in the pipe for the period of not less than two hours by means of a force pump to be furnished by the Contractor. Accurate means shall be provided for measuring the water required to maintain this pressure. The amount of water required is a measure of the leakage. Each individual system excluding the main feed lines, when tested under a pressure of 100 psi, shall show a leakage not exceeding 60 gallons per 24 hours. All visible leaks at exposed joints and all leaks evident at the surface where pipe is covered shall be repaired and leakage minimized, regardless of total leakage, as shown by test. The amount of allowable leakage on the individual loops (main feed lines) shall not exceed that allowed in AWWA C600. Lines which fail to meet tests shall be repaired and retested as necessary until test requirements are complied with. Defective materials, pipes, valves and accessories shall be removed and replaced. Additional pipe lines may be tested in other sections as directed by the Engineer, by shutting gates or installing temporary plugs as required.

INSPECTIONS

In all cases, where inspection of the system work is required and/or where portions of the work are specified to be performed under the direction and/or inspection of the Engineer, at least 24 hours advance notice of the time when such inspection and/or direction is required shall be given the Engineer.

All necessary re-excavation or alterations to the system needed because of failure of the Contractor to have the required inspections shall be performed at the Contractor's expense.

ADJUSTMENTS TO SYSTEM

At the end of 90 days from acceptance, the Contractor shall check the entire irrigation system and adjust where necessary.

GUARANTEES

All labor and materials shall be guaranteed by the Contractor against all defects and malfunctions due to faulty workmanship or defective material for a period of one year from the date of final acceptance by the Owner. The Contractor shall furnish the Owner with a certificate of this guarantee. Upon being informed by the Owner of any defects or malfunctions, the Contractor shall make all necessary repairs and/or replacements in a reasonably expedient manner at no additional cost to the Owner.

Emergency repairs, when necessary, may be made by the Owner without relieving the Contractor of his guarantee obligation.

The Contractor shall be obligated to repair any settling of backfilled trenches which may occur during the guarantee period. The Contractor is also obligated to restore any and all damaged plant-ings, paving, or improvements within the period of guarantee.

If the Contractor does not respond to the Owner's request for repair work within a period of 3 days, the Owner may proceed with such necessary repairs and charge the Contractor for all expenses incurred in the repair work.

WARRANTY AND GUARANTEE CERTIFICATES

The Contractor shall furnish a certificate of warranty registration and a guarantee of work and materials for a one year period from date of final acceptance of the system.

Final payment for the system shall not be made unless this certification is presented to the Owner.

9.50.04 Method of Measurement:

Deleted: 49

All irrigation system required for this work shall be measured for payment as a lump sum, for the "Irrigation System" completed and accepted, including all equipment, materials, tools, labor and incidental expenses thereto.

9.50.05 Basis of Payment:

Deleted: 49

This work will be paid for at the contract unit price lump sum for “Irrigation System”, complete in place, which price shall include all materials, tools, equipment, labor and work incidental thereto.

Pay Item	Pay Unit
Irrigation System	LS

ITEM #1003621A – TREE UPLIGHTS

10.03.01 Description:

Work under this item shall consist of furnishing and installing three (3) uplights for tree located in the center of the roundabout at location shown on the plans and details. The work shall include furnishing and installing all three uplights, power pipe, inline fuse, coordinating with Eversource utility representatives, conduit for connection to service location, and service connection fees. Installation shall include installing the lights plumb, connection of power supply, installing inline fuse, wiring, attaching the ground connection to the concrete bases and verifying the proper operation of the fixture(s) and GFI receptacle to the satisfaction of the engineer.

Required Submittals

Material Certificate of Compliance:

Submit material certificate of compliance for uplights, power pipes and transformers in accordance with the contract general requirements.

Shop Drawings:

Submit shop drawings for uplights, power pipes and transformers in accordance with the contract general requirements.

10.03.02 Materials:

Uplight:

DeltaStar (catalog #DS-LED-e66-MFL-A9-BZW-12-11-A-360SL) with Power Pipe System (catalog #PP-J-18-T-Tre20-B-BZW-SF) as manufactured by B-K Lighting, Madera, California or equal.

In-grade Transformer:

In-grade transformer shall be catalog #75VA HP2RM with inline fuse as manufactured by B-K Lighting, Madera, California or equal. Transformer shall be installed in concrete base per manufacturers recommendations.

Concrete Bases:

All materials for this work shall conform to the requirements of Section M.03 of the State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004, for Class “F” concrete.

Test for air content of fresh concrete shall be made during construction. Because of effects of mixing and vibration, samples for air content preferably should be taken from concentrate after it has been placed by qualified technicians per ASTM C-231- 03 or C-238-51.

The concrete producer will be required to show that his plant and equipment meet all requirements as established by ASTM designation C-94-04, and shall also be currently approved by the State of Connecticut, Department of Transportation.

All concrete mix used must be accompanied by a certification issued by the concrete producer showing the time of day on the batch slip and the composition of the concrete mix; that is the amount and type of cement; water; kind of air-entering admixture and the retarder admixture if any; and also a certification that the mix will attain the minimum compressive strength of 4,000 psi in 28 days.

Any concrete mix without the time of day stamped on the accompanying batch slip will be receded immediately. Also the concrete mix shall must be placed within 1 1/2 hours of the time of day stamped on the batch slip, otherwise it will be rejected.

10.03.03 Construction Methods:

Construction methods for this work shall be in accordance with the manufacturer's recommendations. The contractor shall be responsible for coordinating all necessary prerequisite work with Eversource. This shall include, but not be limited to installing uplights per manufacturers recommendations, coordinating and verifying new conduit installations to the service location and service connection fees. Eversource shall be responsible for pulling new wiring from energy source to first uplight location through the provided conduit and energizing new lighting system. The contractor shall be responsible for installing all underground conduit in accordance with Eversource requirements. The contractor shall include a minimum of 100 feet of 3 inch rigid metal conduit under the center island and roadway between the first uplight and the service source, which shall be the nearest utility pole.

10.03.04 Method of Measurement:

This work will be measured as lump sum for the "Tree Uplights" of the type and size specified, complete and accepted in place.

10.03.05 Basis of Payment:

This work will be paid for at the Contract lump sum unit price for "Tree Uplights" of the type and size specified, complete in place, which price shall include all materials, conduit, coordination efforts, connection fees and labor.

Pay Item	Pay Unit
Tree Uplight	Lump Sum