

City of Torrington



ENGINEERING DEPARTMENT
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ADDENDUM No. 1

DATE ISSUED: AUGUST 31, 2016

RE: HIGHLAND AVENUE DRAINAGE IMPROVEMENTS (BID # HDI 027-090816)

All bidders are hereby advised of the following amendments to the Contract Bid Documents, which are hereby made an integral part of the specifications for the subject project, prepared by The City of Torrington, to the same extent as all other documents. All work shall conform to the standards and provisions of same.

Bids submitted shall be deemed to include the Contract Document information as shown in Addendum No. 1. General bidders shall notify sub-bidders that may be affected by this addendum as applicable. Bidders shall be required to acknowledge receipt of this Addendum in the space provided on the Bid Proposal Form, Page C-10A. Failure to acknowledge this Addendum by the Bidder may result in the rejection of their bid. Bidders are directed to review changes to all portions of the work as changes to one portion may affect the work of another.

1. **Replace Bid Form – Exhibit “A”** pages C-11A through C-11F with the attached revised Bid Form – Exhibit “A” pages C-11A through C-11F dated 08/31/2016.
2. **Replace Special Provision 01205 Storage and Protection**, page 01205-01 with the attached revised page 01205-01 dated 08/31/2016.
3. **Replace Special Provision 02220 Trenching, Backfilling, and Compacting** pages 02220-01 through 02220-07 with the attached revised pages 02220-01 through 02220-07 dated 08/31/2016.
4. **Replace Special Provision 02500 Storm Drainage** pages 02500-01 through 02500-09 with the attached revised pages 02500-01 through 02500-10 dated 08/31/2016.
5. **Replace Detail 4.1 Type “C-L” Catch Basin Detail on Drawing Sheet 009** with the attached revised **Detail 4.2 Type “C-L” Catch Basin Detail** dated 08/31/2016.

END OF ADDENDUM No. 1

BID FORM - EXHIBIT "A"

**HIGHLAND AVENUE DRAINAGE IMPROVEMENTS
TORRINGTON, CT**

The Bidders/Contractors shall bid all items within the Alternate Bid Section at the same unit price bid for the same items listed within the Base Bid Section. Any discrepancy in the Alternate Bid items unit prices shall revert to the Base Bid item's unit price bid as the unit prices to be used for awarding contract and payment. The sum of both the Base Bid Section Total and Alternate Bid Section(s) total(s) will be the basis for determining the low bid. Dependent on the overall total of the Base Bid and Alternate Bid prices received, the City of Torrington may or may not elect to do the work or a portion thereunder the Alternate Bid Section. Also, the City may request the successful Contractor perform other similar storm drainage construction work throughout the City on other streets if the unit prices bid herein are in the City's opinion favorable competitive bids and the Contractor agrees to perform the work at the unit prices bid herein.

The Contractor shall provide unit prices for the following items associated with project work.

BASE BID SECTION

Item No.	Total Est. Qty.	Description	Unit Price	Total Amount
1	L.S.	Maintenance and Protection of Traffic the price per lump sum of		
			Dollars and	
			Cents	
			\$	\$
2	4	Utility Conflict Resolution the price per each of		
			Dollars and	
			Cents	
			\$	\$
	3	1 Test Pit Excavation and Refill the price per each of		
			Dollars and	
			Cents	
			\$	\$
4	10	Trench Excavation - Rock the price per cubic yard of		
			Dollars and	
			Cents	
			\$	\$
5	10	Trench Excavation- Unsuitable Material the price per cubic yard of		
			Dollars and	
			Cents	
			\$	\$

Item No.	Total Est. Qty.	Description	Unit Price	Total Amount
6	5	New Pipe Connections the price per each of		
		Dollars and		
		Cents	\$	\$
7	3	Modify Existing Pipe Connections the price per each of		
		Dollars and		
		Cents	\$	\$
8	18	Modify Existing Structure - Pipe Opening the price per each of		
		Dollars and		
		Cents	\$	\$
9	300	Traffic Person (Uniformed Flagger) the price per hour of		
		FIFTY Dollars and		
		ZERO Cents	\$ 50.00	\$ 15,000.00
10	50	Uniform Municipal Police Officer the price per hour of		
		SIXTY Dollars and		
		ZERO Cents	\$ 60.00	\$ 3,000.00
11	9	Remove and Dispose of Catch Basin or Manhole the price per each of		
		Cents	\$	\$
12	30	Replace Storm Manhole Frame & Cover the price per each of		
		Dollars and		
		Cents	\$	\$
13	136	12" HDPE Pipe, Type S the price per linear foot of		
		Dollars and		
		Cents	\$	\$



Item No.	Total Est. Qty.	Description	Unit Price	Total Amount
14	218	15" HDPE Pipe, Type S the price per linear foot of		
		Dollars and		
		Cents	\$	\$
15	37	42" HDPE Pipe, Type S the price per linear foot of		
		Dollars and		
		Cents	\$	\$
16	671	6" HDPE N-12 ST Perforated Underdrain - Non-Paved Areas the price per linear foot of		
		Dollars and		
		Cents	\$	\$
17	21	Pre-Cast Catch Basin Type "C" Base, Type "C" Top, 0-8' depth the price per each of		
		Dollars and		
		Cents	\$	\$
18	10	Pre-Cast Catch Basin Type "C" Base, Type "C-L" Top, 0-8' depth the price per each of		
		Dollars and		
		Cents	\$	\$
19	1	Pre-Cast Catch Basin Type "C-L" Base, Type "C-L" Top, 0-8' depth the price per each of		
		Dollars and		
		Cents	\$	\$
20	1	Pre-Cast Catch Basin Type I Base, Double Grate Type "C-L" Top, 0-8' depth the price per each of		
		Dollars and		
		Cents	\$	\$
21	8	Pre-Cast Catch Basin Type II Base, Double Grate Type "C-L" Top, 0-8' depth the price per each of		
		Dollars and		
		Cents	\$	\$

Item No.	Total Est. Qty.	Description	Unit Price	Total Amount
22	3	Pre-Cast Catch Basin Type II Base, Double Grate Type "C" Top, 0-8' depth the price per each of		
		Dollars and		
		Cents	\$	\$
23	6	Catch Basin Type "C" Top Only the price per each of		
		Dollars and		
		Cents	\$	\$
24	8	Bulkhead Existing Pipe End the price per each of		
		Dollars and		
		Cents	\$	\$
⇒ 25	3	Paved Invert - Single Catch Basin the price per each of		
		Dollars and		
		Cents	\$	\$
26	5	6" HDPE Pipe Cleanout the price per each of		
		Dollars and		
		Cents	\$	\$
⇒ 27	32	Weep Pipe the price per linear foot of		
		Dollars and		
		Cents	\$	\$
⇒ 28	7	Paved Invert - Double Catch Basin or Manhole the price per each of		
		Dollars and		
		Cents	\$	\$
BASE BID SECTION TOTAL				\$

ALTERNATE BID SECTION

<u>Item</u> <u>No.</u>	<u>Total</u> <u>Est.</u> <u>Qty.</u>	<u>Description</u>	<u>Unit Price</u>	<u>Total Amount</u>
1- BEECHWOOD AVENUE				
1A	429	6" HDPE N-12 ST Perforated Underdrain - Paved Areas the price per linear foot of		
		_____ Dollars and _____ Cents	\$ _____	\$ _____
2A	197	12" HDPE Pipe, Type S the price per linear foot of		
		_____ Dollars and _____ Cents	\$ _____	\$ _____
3A	3	6" HDPE WYE with Stub Pipe the price per each of		
		_____ Dollars and _____ Cents	\$ _____	\$ _____
2- CHESTNUT AVENUE				
4A	354	6" HDPE N-12 ST Perforated Underdrain - Paved Areas the price per linear foot of		
		_____ Dollars and _____ Cents	\$ _____	\$ _____
5A	254	12" HDPE Pipe, Type S the price per linear foot of		
		_____ Dollars and _____ Cents	\$ _____	\$ _____
6A	3	6" HDPE WYE with Stub Pipe the price per each of		
		_____ Dollars and _____ Cents	\$ _____	\$ _____
ALTERNATE BID SECTION TOTAL				\$ _____

BID SUMMARY

BASE BID SECTION TOTAL \$ _____

ALTERNATE BID SECTION TOTAL \$ _____

TOTAL BID AMOUNT \$ _____

Total Bid Amount of above items to be inserted on "Bid Proposal" Form (Page C-10B)

END OF BID FORM

SECTION 01205

STORAGE AND PROTECTION

PART 1 - GENERAL

- 1.01 All excavated materials, construction equipment and new materials for the Work shall be placed so as not to injure the Work, or endanger persons and traffic, and to allow free access at all times to all parts of the Work including public utility installations.
- 1.02 Materials shall be stored at within the barricaded area in the street; on the north shoulder of the road just to the east of Allen Road (see plan for specific designated area - 10' clear zone to be maintained adjacent to edge of pavement); or at offsite premises that the Contractor obtains permission to use. Materials shall not be located on private property without submitting written consent of property owner. Location of all stored materials is subject to approval of the ENGINEER. Staging areas shall be restored to their original condition upon completion of the work.
- 1.03 The CONTRACTOR is advised that a temporary staging area is available for use at the northeast corner of Highland Avenue and Allen Road on the wide grass area between the edge of pavement and fence. The area is shown on the contract drawings and may be used to store materials and equipment for the duration of the contract only. The CONTRACTOR must maintain 10 feet of separation from the road edge of pavement and 10 feet of separation from all trees and any other natural features. The CONTRACTOR shall keep access by way of a 20-foot-wide entrance, the location to be determined by the ENGINEER prior to construction. The CONTRACTOR shall not store equipment or materials in this area or any other location of this contract during the winter shutdown period. 
- 1.04 The CONTRACTOR shall restore the grass surface of this area to same or better condition at the end of the contract. The surface shall have the same slope and grading as prior to construction. The CONTRACTOR shall not store equipment or materials in such a manner that it may pose a danger to the public and shall not cause visibility issues at the intersection of Allen Road. Construction vehicle traffic shall not impede or affect public traffic flow on Highland Avenue. Should traffic issues arise on Highland Avenue as a result of construction traffic turning in and out of the staging area, the CONTRACTOR may be required to provide Traffic Control Persons at the cost of the CONTRACTOR. 

PART 2 - N/A

PART 3 - N/A

PART 4 - MEASUREMENT AND PAYMENT

No payment will be made for the above-mentioned items, but shall be included in the overall cost of this contract's unit and lump sum prices bid.

END OF SECTION

STORAGE AND PROTECTION
01205-01

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SECTION 02220

TRENCHING, BACKFILLING, AND COMPACTING

PART 1 - SCOPE

The work covered by this section of the specifications consists of furnishing all labor, equipment, and materials, and in performing all operations in connection with excavation, trenching, backfilling, compaction, disposal of all unsuitable and surplus materials and grading for storm drains and appurtenances. This work also includes excavation and satisfactory disposal of material for the construction of drainage swales as shown on the drawings. Details of typical trench sections depicting excavation, filling and backfilling requirements are shown on the drawings.

PART 2 - EXCAVATION

2.01 GENERAL:

- A. The CONTRACTOR shall perform all excavations for pipes and appurtenant structures of every description and of whatever substances encountered, to the widths and depths indicated on the Drawings and as otherwise specified. During excavations, suitable material for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. All excavated materials not required or unsuitable for backfill shall be removed and wasted away from the site. Care shall be taken not to over excavate below the depths indicated unless authorized by the ENGINEER. Unauthorized over-depths shall be backfilled at the CONTRACTOR's expense with bank or crushed gravel material and shall be compacted to not less than 95% of maximum density as defined in PART 3 of this SECTION. Grading shall be done as necessary to prevent surface water from flowing into trenches or other excavations, and any water accumulating therein shall be removed by pumping or by other approved methods. Sanitary sewers shall not, at any time, be used for trench drainage.
- B. Unless otherwise specified, excavation shall be open cut, except that short sections-of a trench may be tunneled if, in the opinion of the ENGINEER, the pipe can be safely and properly installed and backfill can be properly tamped in such tunnel sections. Excavation for trenches shall be as set out in the following paragraphs.

2.02 TRENCH EXCAVATION - EARTH:

Trench excavation-earth shall comprise all materials including, but not limited to, clay, silt, sand, muck, gravel, hardpan, loose shale, pavements, pavement bases, stone in mass, sidewalks, and boulders measuring less than 1 cubic yard in volume.

2.03 TRENCH EXCAVATION - ROCK:

- A. Shall comprise the following: Boulders measuring 1 cubic yard or more in volume, rock material in ledges, bedded deposits, unstratified masses, and conglomerate deposits so firmly cemented that they possess the characteristics of solid rock that cannot be removed without systematic drilling and blasting, and unreinforced/reinforced concrete structures, concrete slabs, excluding sidewalks and paving.
- B. Where rock is encountered in the excavation; it shall be removed as required to permit construction as specified. Where explosives and blasting are used, all laws and ordinances of municipal, state and federal agencies relating to the use of explosives shall be complied with. All blasting shall be performed by licensed qualified personnel and proper precautions shall be taken to protect persons, property and the Work from damage or injury.
- C. When material is encountered with respect to which the CONTRACTOR may claim removal as Rock Excavation, such material shall be uncovered and exposed and the Engineer notified by the CONTRACTOR before proceeding with the excavation. The CONTRACTOR shall not proceed with the excavation of the material to be removed as rock excavation until elevation of this material has been measured and classified

TRENCHING, BACKFILLING, AND COMPACTING

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by the Engineer. Failure on the part of the CONTRACTOR to uncover such material, notify the Engineer and allow time for cross-sectioning the undisturbed surface of such material, will forfeit the CONTRACTOR's right to claim to any classification other than that allowed by the Engineer for the areas of work in which the deposits occur. Broken rock from blasting shall not be used for backfill in the sewer trenches.

- D. Rock shall be removed and paid for to a depth of 12 inches below the bottom of the pipe barrel within trench widths defined under section 5.02 Trench Excavation – Rock, and 12 inches below structure bottoms within vertical planes one foot outside of structure walls. Backfill will be with bank or crushed gravel placed in 8-inch lifts and thoroughly compacted. Under sanitary sewer pipe, backfill will be No. 6 crushed stone. All rock excavation shall not be used for backfill and shall be removed from the site.

2.04 EXTENT OF OPEN EXCAVATION:

The extent of excavation open at any one time will be controlled by the conditions, but shall always be confined to the limits prescribed by the ENGINEER. At no time shall excess trench be open if it creates a hazard. CONTRACTOR shall only open sufficient trench for pipe installation. The trench in the street right of way shall not be left open overnight and shall be completely backfilled at the end of each working day. In the grass areas and parking lot areas steel plates will be allowed to cover the trench overnight if the plate size and location is approved by the ENGINEER.

2.05 SEPARATION OF SURFACE MATERIALS:

From areas within which excavations are to be made, topsoil shall be carefully removed and separately stored to be used again for top soiling and seeding as directed; or if the CONTRACTOR prefers not to separate surface materials, he shall furnish topsoil at least equal in quantity and quality to that excavated.

2.06 CUTTING AND REMOVING PAVEMENT:

- A. The CONTRACTOR shall remove only as much existing pavement as necessary to do the Work. Where excavations are to be made in paved surfaces, he shall sawcut the pavement ahead of the excavation before breaking it with pavement-breaking apparatus. All pavement shall be cut with a pavement saw. Cutting and removal shall be done so as to produce relatively clean, uniform, vertical edges without damage to the remaining pavement.
- B. Pavement removed shall not be mixed with other excavated material, but shall be disposed of away from the site of the work before the remainder of the excavation is made.
- C. Existing pavements and base courses that are to remain shall be protected by the CONTRACTOR. All existing pavements and base courses which have been removed beyond indicated lines, or have been disturbed or damaged shall be restored or replaced by the CONTRACTOR to match existing pavements, base courses and grades, at no additional expense to the CITY.

2.07 TRENCH SUPPORT SYSTEMS:

- A. The CONTRACTOR shall furnish, put in place and maintain such sheeting, shoring, bracing, etc., as may be necessary to support the sides of the excavation and to prevent any movement of earth other than that intended to be accomplished by the excavation. Such sheeting, shoring and bracing shall be done as may be necessary for the protection of the Work and for the safety of personnel and shall comply with the safety precautions as outlined in the Associated General Contractors of America "Manual of Accident Prevention in Construction".
- B. The CONTRACTOR shall be held accountable and responsible for the sufficiency of all sheeting, shoring and bracing used and for all damage to persons or property resulting from the improper quality, quantity, strength, placing, maintaining or removal of the same.
- C. The CONTRACTOR shall leave in place, to be embedded in the backfill or concrete, only that sheeting, bracing, etc., which the ENGINEER may direct him in writing to leave in place. Where sheeting or bracing is left in place, it shall be cut off at elevations ordered by the ENGINEER. Elsewhere the removal of sheeting

and shoring shall be coordinated with backfilling operations so as not to impose additional loads on pipe or structures due to increased trench widths or collapse of trench sides. No direct payment will be made for sheeting, shoring, bracing, and compensation for such work and all expenses incidental thereto shall be considered as included in the unit prices bid for the various Items of this CONTRACT unless otherwise noted on the CONTRACT DOCUMENTS.

- D. There shall be no obligation on the part of the ENGINEER to issue orders for sheeting, staybracing or sheeting left-in-place and/or to pass upon sufficiency and adequacy of sheeting; nor shall the failure on the part of the ENGINEER to give such orders relieve the CONTRACTOR from liability for damages on account of injury to persons or damage to property occurring from or upon the Work and occasioned by negligence, or otherwise growing out of the CONTRACTOR'S failure to either install sufficient and adequate sheeting and/or staybracing or to leave in place in the excavation sufficient and adequate support to prevent the caving in or moving of the ground adjacent to the sides of the excavation during and after the backfilling operation.
- E.
 - 1. Wooden staybracing, shoring and sheeting shall be in conformance with the requirements of the applicable Safety Code.
 - 2. All steel sheeting shall be continuous and interlocking with materials conforming to the provisions of ASTM Specification A-328, approved equal or as specified.
- F. Trench side slope can be laid back and/or benched in strict accordance with the latest regulation of Occupational Safety and Health Administration (OSHA) for excavation.

2.08 DRAINAGE AND DEWATERING

- A. To insure proper conditions at all times during construction, the Contractor shall provide and maintain ample means and devices with which to intercept and/or remove promptly and dispose properly of all water entering trenches and other excavations. Excavations shall be kept dry until the structures, pipes and appurtenances to be built therein have been completed to such extent that they will not be floated or otherwise damaged. Means of water removal and disposal shall include drains, pumps and well point systems to the extent required by the quantity to be removed and to the extent required to prevent "boils" or softening of the foundation soils.
- B. All water pumped or drained from the work shall be disposed of in a suitable manner without undue interference with other work or damage to pavements, other surfaces, or property and to avoid pollution of existing water courses.

2.09 UNSUITABLE EXCAVATION – TRENCH

- A. Unsuitable Material defined as follows: debris, pieces of pavement, frozen material, organic matter, topsoil, all wet or soft muck, peat, silt or clay, ledge excavation or any material which, as determined by the Engineer, will not provide sufficient support or maintain the completed construction in a stable condition. 
- B. Whenever unstable soil, that is incapable of properly supporting the pipe or structure, is encountered below a depth of 6" inches below the bottom of the pipe barrel or below the bottom of a structure, as determined by the ENGINEER, such soil shall be removed to the full width of the trench and refilled with bank or crushed gravel material as hereinafter specified, placed in 8-inch lifts and thoroughly compacted.
- C. No excavation shall be made below the limits of the excavation called for on the plans or herein specified without prior approval by the ENGINEER.

2.10 TEST PIT EXCAVATION AND REFILL:

Where the Contractor is directed by the Engineer, in writing, to excavate test pits or other miscellaneous excavations not specified for payment elsewhere, the Contractor shall perform such excavation and refill with excavated material

as directed. The refill material shall be placed in 8" lifts and each lift shall be thoroughly compacted. Finish grade to be restored to match existing conditions.

2.11 EXCAVATION NEAR EXISTING STRUCTURES AND UTILITIES:

- A. Information shown on the Drawings as to location is from best available sources, but no guarantee is inherent or to be assumed that such information is accurate or complete. The Contractor shall exercise special care during his operations to avoid injury to underground utilities and structures. When necessary, the Contractor shall cooperate with and consult with representatives of the owner and the utility companies in order to avoid damage to the utility and structures. The Contractor shall furnish and erect suitable supports and shoring or other means of protection, where required. Hand methods of excavating shall be used around buried utilities.
- B. Where interferences are shown on the Contract Drawings or found during the work, it shall be the Contractor's responsibility to protect or to remove and re-install these facilities if required (or assist the utility company as necessary) to at least as good a condition as they were prior to the start of construction and to the satisfaction of the Engineer and/or utility company.
- C. The Contractor shall, at his own expense, preserve and protect from injury all property either public or private along and adjacent to the line of Work, and be responsible for and repair any and all damage and injury thereto, arising out of or in consequence of any act or omission of the CONTRACTOR. All existing pipes, culverts, poles, wires, fences, mailboxes, bounds, etc., shall be supported in place or otherwise protected from injury, or shall be restored to at least as good condition as that in which they were found immediately prior to start of Work.

2.12 SAFETY AND ACCOMMODATION:

The CONTRACTOR shall provide at his own expense, suitable bridges over trenches where required for the accommodation and safety of the traveling public, and provide facilities for access to private driveways for vehicular use. **No open excavations shall be allowed to remain open during the overnight hours.** He shall erect suitable barriers around the excavation to prevent accidents to the public and shall place and maintain during the night sufficient lights on or near the Work. A space of twenty (20') feet must be left so that free access may be had at all times to fire hydrants and proper precautions shall be taken so that the entrances to fire hydrants and fire stations shall not be blocked or obstructed.

2.13 DISPOSAL OF SURPLUS AND UNSUITABLE EXCAVATED MATERIAL:

The CONTRACTOR shall dispose of all surplus and unsuitable materials (including stockpiles) at no cost to the CITY. All surplus excavated material and any material unsuitable for use shall be disposed of offsite, in areas provided by the CONTRACTOR. All disposal areas on properties located within the City of Torrington shall be approved, in writing, by the CITY, prior to use. The CONTRACTOR shall not dispose of surplus materials on wetland or other areas prohibited by the Corps of Engineers or the Connecticut Department of Energy and Environmental Protection.

PART 3 - COMPACTION REQUIREMENTS AND TESTING

3.01 Terms

The term "compacted to not less than a percent of maximum density" shall mean the minimum degree of compaction to be attained expressed as a percentage of the maximum density for the materials at optimum moisture content as determined by the current Tests for Moisture-Density Relationships of Soils, ASTM D1557, Method D. When the term "thoroughly compacted" is used in these specifications, it shall mean compaction to at least 95% of the maximum density of the soil at optimum moisture content when tested in accordance with the above method.

3.02 Testing

The following types of soil tests may be conducted by the CITY, tests shall be taken by qualified personnel approved by the ENGINEER and at locations, depths and on materials directed by the ENGINEER, and all costs in connection therewith shall be borne by the CITY. Tests which do not meet the specified requirements shall be repeated, at the same locations, after remedial actions are taken at the entire expense of the CONTRACTOR until satisfactory test results are obtained.

- A. Particle-Size Analysis of Soils and Backfill Material in accordance with ASTM D 422.
- B. Moisture-Density Relationship of soil in accordance with ASTM D1557, Method D.
- C. In-place Density-Tests of soil in accordance with ASTM D 1556.

PART 4 - BACKFILL

4.01 MATERIALS:

A. Suitable Material:

Suitable material for trench backfill shall be the material excavated during the course of construction, but excluding Unsuitable Material defined as follows: debris, pieces of pavement, frozen material, organic matter, topsoil, all wet or soft muck, peat, silt or clay, ledge excavation or any material which, as determined by the Engineer, will not provide sufficient support or maintain the completed construction in a stable condition. As previously stated broken rock from blasting shall not be used as backfill. No stone or rock over 2" shall be placed in the area between 4" below the pipe and 6" above the pipe. No stone with any side larger than 8" will be placed in the backfill. The trench to be excavated located within the Oak Avenue Street shall include the backfill materials as shown in the appropriate contract drawing typical detail.

- B. Imported bank or crushed gravel will be used for trench backfill below Oak Avenue pavement and sidewalk base courses. Bank or crushed gravel shall be clean, well graded from coarse to fine and shall meet grading "B" and the requirements for plasticity and resistance to abrasion indicated in Article M.02.02 of the STANDARD SPECIFICATIONS.
- C. Processed Aggregate base course shall meet the requirements of Section M.05.01 of the latest edition of the STANDARD SPECIFICATIONS.
- D. Bedding material shall be Crushed Stone to the requirements of M.01.01 of the STANDARD SPECIFICATIONS. Crushed stone shall be No. 6 in size and shall be clean, sound and free of silt or foreign materials as follows:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
1 inch	100
3/4 inch	90-100
1/2 inch	20-55
3/8 inch	0-15
No. 4	0-5

- E. Filter fabric shall be Amoco Non-Woven Construction Fabric No. 4553, or approved equal. Filter fabric shall be highly permeable and non-biodegradable, suitable for intended installation.

4.02 PROCEDURE.

- A. Backfilling around Structures: Excavated material approved by the Engineer shall be used for backfill around manholes and other structures. The backfill shall be thoroughly compacted in 8" lifts.

- B. Pipe Bedding: Pipe bedding material will be required below all pipe and all structures. Bedding material shall be placed to the full width of the trench the dimensions shown on the Drawing Details. Material under and around the pipe shall be carefully and thoroughly compacted.
- C. Placement of Backfill above Pipe Bedding
 - 1. Backfill above pipe to the bottom of the base material layer (or topsoil where applicable) shall be suitable material from excavation. This backfill material shall be placed, spread and leveled in layers not to exceed 8" in depth. All voids along the sides of the trench, behind sheeting, under bracing or other objects, shall be completely filled, using such fine materials, hand labor and materials as may be necessary. The entire area of each layer shall be compacted by means of mechanical rammers or vibrators or pneumatic tampers. Each layer shall be compacted and compacted before the next layer is placed. The Engineer shall also have the right to approve or disapprove the compaction equipment to be used and also the height of backfill to be compacted in one lift. All backfill materials shall be compacted to a minimum of 95% of the maximum dry density or as directed by the Engineer. Each layer of compacted granular fill shall be compacted at optimum moisture content. No subsequent layer shall be placed until the specified compaction is obtained for the previous layer. This backfill shall be carried up to the bottom of materials specified to be placed for surfacing requirements.
 - 2. At the Engineer's discretion, the Contractor may compact the backfill by means of a Ho-Pac. There must be at least 36" of material above the top of the pipe prior to beginning the Ho-Pac operation. Material the 36" limit shall be compacted by means of mechanical rammers or vibrators or pneumatic tampers. When a Ho-Pac is utilized, trench backfill shall be compacted in lifts not to exceed two (2') feet.
 - 3. In areas where the finished surface is to be loam, the CONTRACTOR shall complete the backfilling with the respective specified material to compacted depths as shown.
 - 4. In all roadway areas, the Contractor shall install gravel base course, processed aggregate base course and bituminous concrete pavement as shown on the Contract Drawing Details.

PART 5 - MEASUREMENT

5.01 TRENCH EXCAVATION - EARTH:

Trench Excavation - Earth and Backfill will not be measured for separate payment. Removal and storage of topsoil and suitable material, transporting materials, saw cutting and removing pavement, trench dewatering, trench backfill and compaction, as described in parts 2, 3, and 4 of this Section, and disposal of surplus and unsuitable material will not be measured for separate payment.

5.02 TRENCH EXCAVATION - ROCK:

- A. Trench excavation - rock will be measured as the actual number of cubic yards of rock removed within the following trench payment widths and depths. Trench pay limit shall be I.D. + 2 feet for pipe up to 16" in diameter and I.D. + 3 feet for pipes greater than 16" diameter as shown on the typical trench sections on the Contract Drawings. The depth will be measured from the existing surface of the rock to 12 inches below the pipe.
- B. Boulders over 1 cubic yard, which are required to be removed within the trench payment limits, shall be measured for payment as Trench Excavation - Rock. Boulders under 1 cubic yard shall be classified for payment under Trench Excavation - Earth and paid accordingly.
- C. No separate measurement will be made for bank or crushed gravel (or stone below bedding limits) used to replace excavated rock. The cost of Bank or Crushed Gravel used to replace excavated rock shall be included in the unit price for Trench Excavation- Rock.

5.03 TEST PIT EXCAVATION AND REFILL:

Test pit excavation and refill, as ordered by the Engineer, will be measured by the cubic yard removed.

5.04 TRENCH EXCAVATION - UNSUITABLE:

- A. Trench excavation - Unsuitable will be measured as the actual number of cubic yards of material removed below the bottom of bedding limits. The depth will be measured from the bottom of normal bedding limits to the depth as determined by the Engineer.
- B. No separate measurement will be made for bank or crushed gravel (or stone below bedding limits) used to replace unsuitable excavation. The cost of Bank or Crushed Gravel used to replace unsuitable excavation shall be included in the unit price for Trench Excavation - Unsuitable.

PART 6 - BASIS OF PAYMENT

- 6.01 Trench Excavation – Earth, will not be paid for separately. All costs in connection with this work will be included in the unit prices bid for various sizes and types of pipe and various structures.
- 6.02 Trench Excavation - Rock, will be paid for at the Contract Unit Price bid for “**Trench Excavation – Rock**” per cubic yard regardless of depth, and shall include all materials used to backfill the volume of the rock removed.
- 6.03 Trench Excavation of unsuitable material below the pipe bedding limits will be paid for at the Contract Unit Price bid for “**Trench Excavation - Unsuitable Material**” per cubic yard to a depth as determined by the Engineer, and shall include its disposal off site. No separate payment will be made for bank or crushed gravel (or stone below bedding limits) used to replace excavated unsuitable material. The cost of Bank or Crushed Gravel used to replace excavated unsuitable material shall be included in the unit price bid. 
- 6.04 Imported “Bank or Crushed Gravel” that shall be used for backfilling trenches below the road and sidewalk bases will not be paid for separately. Payment to be included in the contract unit price bid per linear foot for whichever size and type of pipe indicated and shall include all labor, materials, equipment, tools and all work incidental to complete the item as specified. Where rock or unsuitable material below the bedding limits is excavated, the price of for stone replacement material shall be included in the respective unit price bid for excavation of rock or unsuitable material. 
- 6.05 Material for backfilling trenches outside of road and sidewalk pavement areas shall be backfilled with suitable backfill material excavated from trench as approved by the Engineer and will not be measured for payment. Any imported “Bank or Crushed Gravel” will not be paid for separately.
- 6.06 Saw-cutting Pavement, Driveways and Sidewalks – Payment will not be paid for separately. All cost in connection with this work will be included in the unit price bid for various size and types of pipe and structures.
- 6.07 “**Test Pit Excavation and Refill**” in Street or Sidewalk Pavements – Payment will be paid for at the Contract Unit Price bid per each regardless of depth, and shall include all Imported Gravel or Crushed Gravel materials used to backfill the excavated volume.
- 6.08 ~~All costs in connection with the protection and support of utilities shall be included in the lump sum price bid for “Protection and Support of Existing Utilities”.~~ 
- 6.09 Payment for all of the above work shall include the cost of all labor, materials, equipment, transportation, tools, and all other work incidental or necessary to complete the work as specified.

END OF SECTION

TRENCHING, BACKFILLING, AND COMPACTING
02220-07
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SECTION 02500

STORM DRAINAGE

PART 1 - GENERAL

1.01 SCOPE OF THE WORK

- A. Storm drainage system includes, but is not limited to, construction of storm sewers, drainage structures, drainage appurtenances, riprap, ditching, excavating, backfilling, bituminous concrete pavement repair of street, curbing, and sidewalks, stockpiling materials, shoring, and dewatering of trenches for storm sewers as required for safe and workmanlike construction.
1. Under this heading shall be included the construction of all catch basins, junction boxes, manholes and drop inlets (and also the alteration, reconstruction or conversion of such existing structures) all 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.
 2. The Contractor is hereby notified that over the years of past repairs to the storm drainage system, there are locations where the pipe sizes of pipes immediately going into or out of the drainage structures had been reduced in diameter, and that **the Contractor shall replace the storm sewer pipe to match the original larger size of the storm main sewer.** This work may include adding adapters, collars, or other miscellaneous fittings as may be necessary. This is being done to eliminate the flow restrictions caused by the smaller pipe sizes. **Contractor is notified that all pipe connections measured from within three feet (3') of the inside wall of the catch basin which includes the length of the adapter/miscellaneous fittings, regardless of size are included in the cost of the drainage structure. All other pipe as indicated on the Contract Drawings that is to be replaced shall be paid at the Contract Unit Bid Prices for pipe.**
- B. Pipe bedding shall be in accordance with the details shown on the Drawings.

1.02 QUALITY ASSURANCE

- A. Storm drain pipe may be inspected at the manufacturing source and at the job site by the ENGINEER.
- B. Contractor shall notify the ENGINEER for inspection of pipe and drainage structure installation prior to backfilling trenches.

1.03 JOB CONDITIONS

- A. Construction of the forty-two (42") drainage system in the intersection of Church Street and Highland Avenue shall proceed as early in the construction schedule as possible. Maintain adequate drainage of the project area at all times. Prevent flooding of adjacent roads and private properties.
- B. Temporary Drainage: Wherever possible, new storm sewers and inlets to serve the various drainage areas shall be constructed and placed in service. Where this is not possible, temporary drainage facilities shall be provided as required. These may include temporary ditches or paved depressions, slope drains, temporary connections into completed storm sewers, or such other means as the circumstances may require.

PART 2 - MATERIALS

The materials to be used in the construction of storm drainage shall be those indicated on the plans or ordered by the Engineer and shall conform to Section M.08 of the STANDARD SPECIFICATIONS.

2.01 BEDDING & BACKFILL MATERIAL

Trench backfill material shall conform to the requirements of Section 02220, Trench, Backfilling and Compaction.

2.02 STORM DRAIN PIPE MATERIALS

- A. HDPE - High Density Polyethylene Pipe Smooth Bore (Type S) including all related fittings (ex. Adapters, collars, and wye's). HDPE shall conform to Section M.08 of the Standard Specifications.
- ~~B. Ductile Iron Pipe (DIP) Class 52 shall be centrifugally cast pipe conforming to ANSI Specification A21.50 and A21.51 latest revisions. Ductile iron pipe shall have push-on type joints conforming to ANSI A21.11, designed for assembly using a continuous molded ring gasket of solid cross section, positioned in an annular space in the pipe socket in a manner to be locked in place to form a positive seal. Ductile iron fittings and specials shall conform to ANSI Specification A21.10 latest revisions and shall be of the type suitable for jointing with the piping specified above. Ductile iron fittings shall be of the sizes, dimensions and types indicated as specified and as required for the proper fitting of the completed work. Ductile Iron Pipe is included if it is necessitated by cover requirements. This is a field situation.~~
- C. Fernco (flexible) couplings conforming to ASTM D 5926, C 1173, and CSA B602.
- D. Inserta Tee – three-piece lateral connection consisting of a PVC hub, rubber sleeve, and stainless steel band. Proper sized “Wet Diamond Bit” is to be obtained through vendor for coring into concrete pipe (see attached detail to this specification).
- E. Underdrain pipe and all related fittings (ex. - wye's, bends, couplers, caps, cleanout plug, frame and cover) shall be size of six inch (6”), and type of pipe is to be N-12 ST(soiltight) IB (integral bell) Dual Wall HDPE installed in stone per detail in Contract Drawings. The cleanout manhole frame and cover shall be Campbell Foundry #4153, or approved equal.
- F. Weep pipe into catch basin shall be size of four inch (4”), and type of pipe is to be SDR 35 perforated pipe and shall conform to ASTM D- 3034. End cap is to match the size and type SDR 35 pipe.

2.03 CASTINGS

- A. Catch Basin frames and grates shall conform to Type “C” or Type “C-L” (single or double grate) as shown on the Contract Drawings. Grate and frame shall be galvanized steel with surface suitable for tack weld. Galvanizing shall conform to Section M.06.03.

2.04 MANHOLES, STORM - PRECAST CONCRETE

- A. All pre-cast storm manholes shall conform to the requirements of Section 5.07 of the STANDARD SPECIFICATIONS.
- B. Frames and covers shall be as outlined on the Contract Drawings. Storm Manhole Frame is Campbell Foundry Pattern No. 1009. Storm Manhole is Campbell Foundry Pattern No. 12037312. The “Heavy Duty (Slotted) Manhole Frame and Grate” is to be Campbell Foundry Pattern No. 1184. Contractor is responsible to specifically state when ordering the storm manhole frame and cover, that the identification wording stamped on the cover is to be per City Detail 5.1 in the Contract Drawings.
- C. All drainage structures with thru drainage flow shall have shaped invert. End of line structures shall have slab only bottoms, with no sumps or shaped inverts.
- D. Manhole steps shall not be installed in riser structures.

STORM DRAINAGE
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2.05 APPURTENANCE MATERIAL

A. Brick:

1. Clay or Shale Brick: Comply with ASTM C32 for sewer brick and manhole brick, grade as selected. Brick dimensions shall be 4" x 8" x 2½" nominal and shall yield the wall thickness as shown on the plans.

2. Concrete Masonry Units: Comply with ASTM C139.

B. Mortar shall conform to Section M.11.04 of the STANDARD SPECIFICATIONS, and comply with ASTM C270, Type M, for the pipe joints and manhole and inlet brickwork.

C. Concrete for storm drainage construction shall be in accordance with Section M.03.01 of the STANDARD SPECIFICATIONS. Strength shall be 4,000 psi at age 28 days.

D. Reinforcement shall comply with ASTM A615.

G. Geotextile shall be of a type appearing on the Connecticut Department of Transportation's Approved Products List for Geotextiles, referred to in Subsection M.08.01-26 of the STANDARD SPECIFICATIONS.

H. "Prosoco Consolideck Saltguard WB Sealer" (or approved equal) for salt protection shall be applied on all exposed concrete surfaces, including the paved inverts. If a substitute product is proposed by the Contractor, then the contractor shall submit product information for City approval. The product shall be specifically manufactured for this type of application. The rate of application shall be as recommended by manufacturer. A curing period recommended by the manufacturer shall be followed prior to application of the "Saltguard".

2.06 CATCH BASINS, STORM - PRECAST CONCRETE

A. All pre-cast storm catch basins shall conform to the requirements of Section 5.07 of the CONN DOT STANDARD SPECIFICATIONS and typical details show in the Contract Drawings.

B. Structure bases, tops and Frames and covers shall be as outlined on the Contract Drawings. Contractor is responsible to specifically state when ordering the catch basin parts, that the correct bases and tops are matched together as shown in the Contract Drawings.

C. All drainage structures with thru drainage flow shall have shaped invert. End of line structures shall have slab only bottoms, with no sumps or shaped inverts.

PART 3 - CONSTRUCTION METHODS

3.01 GENERAL

A. All pipes will be laid in an open trench of dimensions as shown in Details on the Contract Drawings. No projecting pipe conditions will be allowed.

B. Lengths of storm drain pipe shown on the Drawings are approximate distances inside wall to inside wall of structures. Contractor shall install pipe based on actual field conditions. Slopes of pipe specified on the Drawings shall be verified by field measurement prior to trenching.

C. Particular care shall be exercised in establishing the relationship of storm drain pipe, drainage structure bases, and final drainage top conditions. Drainage structure tops are required to be located in specific position and orientation. Subsurface construction is to be located to allow drainage structure construction as detailed on the Drawings without modification. In case of misalignment of drainage structure tops and bases, Contractor will be required to correct the construction as directed by the Engineer.

STORM DRAINAGE
02500-03

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- D. Any new direct connections to storm pipe shall specifically be with "Inserta Tee" of the specific pipe size and type. Inserta Tee is a three-piece lateral connection consisting of a PVC hub, rubber sleeve, and stainless steel band. The tap into the pipe for the "Inserta Tee" is to be done with a proper sized "Wet Diamond Bit", to be obtained from the Inserta Tee supplier.
- E. Bulkhead pipes and structures as called out on the plans shall be blocked with an eight inch 8" thick wall of brick and masonry (see appurtenance material above).
- F. The existing 48" tile pipe in the intersection of Church Street and Highland Avenue connects to the existing box culvert by way of a tapered concrete transition section. The new forty-two inch (42") HDPE pipe in the intersection of Church Street and Highland Avenue shall be connected into or abut up to the remaining opening at the transition section by providing cast in place (c-i-p) concrete to seal all void openings around the new pipe. The new c-i-p concrete collar shall enclose the existing structure opening and the outside of the new 42" pipe by at least 2 feet in all directions. This collar shall be watertight and structurally sound. The connection to the existing storm manhole "STMH (2-2)" shall be made with brick and mortar to create a watertight seal that is structurally sound.

3.02 STRUCTURES

- A. These structures shall be constructed in accordance with the requirements contained herein for the character of work involved. Provisions pertaining to bar reinforcement shall apply except that shop drawings need not be submitted for approval, unless called for on the plans or directed by the Engineer. Welding shall be performed in accordance with the applicable sections of the AWS Structural Welding Code, D1.1.
- B. The surfaces of the tops of all concrete catch basins, junction boxes and drop inlets shall be given a coat of Prosoco Consolideck Saltguard WB Sealer (protective compound material) immediately upon completion of the concrete curing period at the rate of .04 gallons per square yard (0.2 liter per square meter). The material for this work shall conform to the requirements of Subarticle M.03.01-11
- C. All structure tops are to be dry set except as noted on plans. All other masonry units shall be laid in full mortar beds unless otherwise noted on the plans.
- D. Metal fittings for catch basins, junction boxes, manholes or drop inlets shall be set in full mortar beds or otherwise secured as shown on the plans.
- E. When constructing a new drainage structure within a run of existing pipe, the section of existing pipe disturbed by the construction shall be replaced with new pipe of identical type and size of the original main line, extending from the drainage structure to the nearest joint of the existing pipe.
- F. 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.
- G. If the frames, covers or tops are broken or so damaged as to be unfit for further use, they shall be replaced with new, sound material conforming to the above requirements for the material involved.
- H. Weep pipes of the size and type specified shall be installed as shown on the Contract Drawings, or as directed by the Engineer. The work consists of coring if necessary, if weep pipe is not incorporated into the masonry work around the storm pipe into and/or out of the catch basin.
- I. Where existing or proposed pipes are shallow or where precast structures are not possible to be installed in the opinion of the Engineer, then at the direction of the Engineer catch basins may be constructed of masonry and concrete block with a precast top frame and cover, precast flat top and precast base slab.

J. Project Specific Catch Basin Notes:

Proposed catch basins in this contract are specified in the contract drawings in two parts.

1. The first part is the base section,
 - i. This includes the entire structure from the base slab up to the top of the corbel and spacer level as shown in details 1, 5 & 6 on sheet 10 and details 4.1 and 4.2 on sheet 9.
 - ii. The notation used throughout this set of Contract Drawings denotes this section as the "base" section.
 - iii. Typical notation example is: **Type "C-L" catch basin base**
2. The second part is the precast top section,
 - i. The top section is to be known as the pre-cast concrete frame and imbedded metal grate as shown in detail 7 on sheet 10 and details 4.1 and 4.2 on sheet 9.
 - ii. This notation used throughout this set of Contract Drawings denotes this section as the "top" section.
 - iii. Typical notation example is: **Type "C-L" top**
3. The contractor shall be advised that some catch basin bases are paired with non-typical tops.
4. An example would be: Type "C" catch basin base with Type "C-L" top.
5. Pay items per catch basin shall include both the base and top sections as one unit.

3.03 BEDDING MATERIAL

Pipe and structure bedding shall be placed in accordance with Section 02220, Trenching, Backfilling and Compacting.

3.04 PIPE LAYING

- A. Pipe laying shall proceed upgrade where practicable. Pipe shall be laid true to line and grade with a straight and uniform invert. Pipe shall not be laid in a wet or muddy trench. Trenches shall be dewatered as required and the bottom shall be firm, smooth, and properly shaped as specified.
- B. Pipe size connections in and out of all drainage structures shall be re-connected with a correct pipe size that matches the size of the original main line pipe size.
- C. Based on actual field conditions, and at the direction of the Engineer, the Contractor is responsible to construct the connection of the forty-two (42") HDPE to the existing concrete box as is necessary, in the intersection of Church Street and Highland Avenue.
- D. The Contractor shall pay particular attention to invert elevations as indicated on the Contract Drawings. In some locations, the pipe is proposed to be lowered.
- E. Underdrain and all related fittings (ex. - wye's, bends, couplers, caps, cleanout plug, frame and cover) and cleanout assembly of the size and type specified shall be installed as shown on the Contract Drawings, or as directed by the Engineer. The work consists of coring, if necessary, if the underdrain pipe is not incorporated into the masonry work around the storm pipe into and/or out of the catch basin. The cleanout is a complete vertical assembly and begins at the wye consisting of all pipe, fittings, frame and cover to proposed finished grade as shown on the Contract Drawings

3.05 BACKFILLING

Backfilling above pipe bedding shall be as indicated on the Contract Drawings and in accordance with Section 02220, Trenching, Backfilling and Compacting

3.06 APPURTENANCES

- A. All drainage structures are to be constructed as shown on the Drawings.
 1. Contractor shall furnish and install drainage structures as shown in detail on the Drawings.



2. All drainage structures with thru drainage flow shall have shaped invert.
3. All mortar joints shall be filled full. Joints shall be struck flush inside and out.
4. Joints shall not be less than ¼ inch and not more than 2 inch in thickness. No spalls or bats shall be used except for shaping around irregular openings or when unavoidable at corners.
5. All pipe entering drainage structures shall be cut and ground smooth with the face of the wall. Breaking the pipe will not be acceptable.
6. All joints around pipe and structure walls at the face of the wall shall be packed full with mortar.
7. The bottom of drainage structures shall be clean of all debris and walls shall be wiped clean of mortar as work progresses.
8. Catch basin tops shall be cast-in-place to line and grade and shall slope continuous with gutter.
9. Masonry construction is required to be solid. All joints and spaces shall be filled full of mortar as units are laid. Structural masonry construction practice is required. Outside joints are to be filled full of mortar and struck flush. Walls are to be constructed to line and plumb.
10. **Masonry construction (particularly green mortar work) is to be protected from damage caused by backfilling and compaction operations.** Any damage caused during backfilling or compaction will be repaired at the Contractor's own expense.
11. Pipes or drainage structures shall not be broken by impact methods. Cutting of pipe with pipe saw or coring of a drainage structure is required.

3.07 CONCRETE CONSTRUCTION

Precast concrete shall conform to the requirements of M.08.02 of the STANDARD SPECIFICATIONS. Shop Drawings for structures shall be submitted to Engineer for approval prior to delivery.

3.08 CLEANUP

Pipes and structures shall be left clean and free from mud or debris of any kind. When looked through, each line between structures shall show a full circle of light. Otherwise, Contractor shall be required to remove and replace the defective portion of the work.

3.09 WORKMANSHIP

Any pipe which is not in true alignment and grade and properly placed as to the center line of the road or which shows any undue settlement after laying, or is damaged, shall be taken up and re-laid or replaced without extra compensation.

3.10 CONNECTIONS TO EXISTING STORM SEWERS AND STRUCTURES

- A. The CONTRACTOR shall make all connections to the existing facilities as indicated on the Drawings and as herein specified, or as directed.
- B. The CONTRACTOR shall furnish all pipe, fittings and appurtenances. The CONTRACTOR shall do all excavation and backfill as required.
- C. Existing pipelines damaged by the CONTRACTOR shall be replaced by him at his own expense in a manner approved by the ENGINEER.

3.11 INTERFERENCE

- A. The CONTRACTOR shall develop a program for the construction and placing in service of the new works subject to the approval of the ENGINEER. All works involving cutting into and connecting to the existing facilities shall be planned so as to interfere with operation of the existing facilities for the shortest possible time and when the demands on the system best permit such interference even to the extent of working outside of normal working hours to meet these requirements.
- B. The CONTRACTOR shall have all possible preparatory work done and shall provide all labor, tools, material supervision and equipment required to do the work in one continuous operation.
- C. The CONTRACTOR shall have no claim for additional compensation, by reason of delay or inconvenience, for adapting his operations to the needs of the public.

PART 4 – METHOD OF MEASUREMENT

- 1. Drainage work will be measured for payment as it appears in the Bid Proposal form and as defined in other Sections of these Specifications. Payment will include full compensation for all labor, materials, pipe and structure removal, pipe and structure cutting, pipe and structure removal and disposal, coring, equipment, gravel/granular fill, bedding material, masonry collars, excavation, backfilling and backfill material, stockpiling of materials, saw cutting and sidewalk and pavement removal and all other items necessary or incidental to the completion of the work under this section in accordance with these Specifications and the Drawings.
- 2. There will be no measurement or payment for work and materials involved with connecting new drainage structures into a run of existing pipe, regardless if the diameter is upsized, within three feet (3') measured from the inside wall of the structure including the length of the adapter/miscellaneous fittings. Any additional work associated with the setting connections of the structure and the pipe shall be incidental thereto.
- 3. New pipe installed from structure to structure, or structure to existing pipe as listed in the Contract Bid Form, and as called for on the Contract Drawings, will be measured from the beginning to the end of the installed pipe inside wall of manhole or catch basin to the inside wall of manhole, catch basin or inside face of existing pipe connection.
- 4. Catch Basins will be measured by the actual number of each installed, complete, of the types shown on the Contract Drawings for the type specified, complete in place, which shall include full compensation for all labor, materials, pipe and structure removal, pipe and structure cutting, pipe and structure removal and disposal, coring, equipment, gravel/granular fill, bedding material, masonry collars, excavation, backfilling and backfill material, stockpiling of materials, saw cutting and sidewalk and pavement removal and all other items necessary or incidental to the completion of the work under this section in accordance with these Specifications and the Drawings thereto, and all adjacent pavement restoration to the street, curb and sidewalk and restoration to all non-paved areas. 
- 5. Catch Basins and Manholes shall be constructed with a paved invert where there is thru flow or as indicated on the Contract Drawings or where directed by the ENGINEER. The ENGINEER may direct CONTRACTOR to construct paved invert within existing manholes. Paved inverts will be measured per each for new or existing single Type "C" or Type "C-L" catch basins. Double catch basins or existing manholes will be measured per each separately, regardless of the structure base dimensions. 
- 6. There will be no measurement or direct payment for the application of the "Prosoco Consolideck Saltguard WB Sealer" (protective compound material), but the cost of this work shall be considered as included in the general cost of the work.
- 7. Replacement of new manhole or catch basin tops, frames and covers will be measured per each complete, including sawcutting, excavation removal and disposal, setting, and pavement repair patch for catch basin top or manhole frame and cover of the size and type specified in the Contract Drawings.
- 8. "Inserta Tee" will be measured complete per each unit. This includes obtaining the proper sized "Wet Diamond Bit" from the Inserta Tee supplier, coring, PVC hub, rubber sleeve, and stainless steel band.

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9. ~~In addition to the price per structure, paved inverts shall be measured per each for the type of structure. Single or double catch basin shall be considered the same type. Existing manholes shall be measured separately.~~
 10. Underdrain pipe of the size and type specified will be measured per linear foot and measured from the beginning to the end of the installed pipe inside wall of manhole or catch basin to the inside wall of manhole, catch basin or inside face of existing pipe connection.
 11. Wye's for the underdrain pipe of the size and type specified will be measured per each, complete, as indicated on the Contract Drawings. Other work and material cost are covered under the cost of the underdrain.
 12. Cleanout's (vertical assembly from the wye to the cleanout plug, including the frame and cover) for the underdrain pipe of the size and type specified will be measured per each, complete, as indicated on the Contract Drawings. Other work and material cost are covered under the cost of the underdrain.
 13. Weep pipe into catch basin and end cap of the size and type specified will be measured per linear foot measured from the beginning to the end of the installed weep pipe. Other work and material cost are covered under the cost of the structure. Engineer shall direct the Contractor in the field as to the length of the weep pipe to be installed.

PART 5 – BASIS OF PAYMENT

5.05—Basis of Payment: These structures will be paid for as follows:

- A. Pipe will be paid for at the contract unit price per linear foot for the type specified, complete in place, which price shall include saw cutting and pavement removal; excavation; dewatering; trench support; disposal of trench excavation – earth; all materials including pipe bedding stone and fabric; backfilling including back fill materials; stockpiling of materials; compaction; grading; utility identification warning tape; replacement of curbs, sidewalks and driveways; temporary and permanent pavement per plan/City details; and all work necessary or incidental to the completion of the work under this section of the Specifications. Payment made shall be considered as full compensation for furnishing all labor, equipment, tools, material, services and installing pipe of the size and type shown on the plans regardless of depth, and as detailed and tabulated in the bid proposal complete in place, including all connections necessary to constitute a fully operational system approved by the ENGINEER.
 - B. ~~Manholes will be paid for at the contract unit price each for the type specified complete in place, which price shall include all materials, equipment, tools and labor incidental thereto. If so indicated on the Contract Drawings, manholes shall be constructed with paved inverts. Paved invert will be included in the price for manholes.~~
 - C. Precast Catch Basins will be paid for at the Contract unit price per each for **“Precast Catch Basin”** for the type specified, complete in place, which price shall include full compensation for all labor, materials, pipe and structure removal, pipe and structure cutting, pipe and structure removal and disposal, coring, equipment, gravel/granular fill, bedding material, masonry collars, excavation, backfilling and backfill material, stockpiling of materials, saw cutting and sidewalk and pavement removal and all other items necessary or incidental to the completion of the work under this section in accordance with these Specifications and the Drawings thereto, and all adjacent pavement restoration to the street, curb and sidewalk. Paved inverts will be paid separately for catch basins and manholes at the contract unit price per each for the type of structure per Bid Form items.
 - D. ~~Flared end sections shall be paid per each unit installed complete.~~
 - E. ~~Reset Units will be paid for at the contract unit price each for "Reset Manhole," "Reset Catch Basin," or "Reset Drop Inlet," 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, and all materials, equipment, tools and labor incidental thereto.~~
 - F. Drop Inlets will be paid for at the contract unit price each for "Drop Inlet," of the type specified, complete
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STORM DRAINAGE
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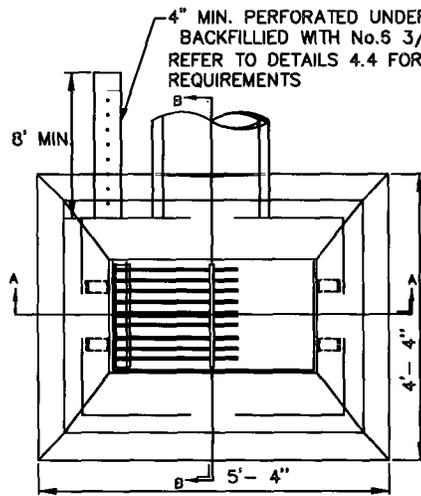
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~~in place, which price shall include all materials, equipment, tools and labor incidental thereto. Drop Inlets shall be constructed with a paved invert as indicated on the Contract Drawings. Paved invert will be included in the price for drop inlet per each of the type specified.~~

- G. Weep pipe into catch basin (including coring if necessary) and end cap of the size and type specified will be paid for at the unit price bid per linear foot, complete in place, and all work necessary or incidental to the completion of the work under this section of the Specifications. Payment made shall be considered as full compensation for furnishing all labor, equipment, tools, material, services and installing pipe of the size and type shown on the plans regardless of depth, and as detailed and tabulated in the bid proposal complete in place, including all connections necessary to constitute a fully operational system approved by the ENGINEER. Other work and material cost are covered under the cost of the structure.
- H. ~~The resetting of existing pipe including all additional backfill material, compaction, equipment, tools and labor incidental thereto will be paid for at the contract unit price per linear foot for "Reset Existing Pipe" for the type and size specified.~~
- I. ~~"Frames, Covers and Tops" when required in connection with reset units, will be paid for at the contract unit price each for such "Manhole Frame and Cover or (Type) Catch Basin Top", complete in place, including all incidental expense; or when no price exists, the furnishing and placing of such material will be paid for as extra work. When the catch basin top has a stone or granite curb in its design, this curb or inlet shall be included in the cost of the top.~~
- J. ~~Conversion of drainage structures will be paid for at the contract unit price each for "Convert Catch Basin to (Type) Catch Basin," "Convert Catch Basin to Manhole," or "Convert of Manhole to Catch Basin", complete in place, which price shall include excavation, cutting of pavement, removal and replacement of pavement, pervious material, backfill, all alterations to present catch basin, all materials including catch basin frame and grate of the type specified, or manhole frame and cover, all equipment, tools and labor incidental thereto~~
- K. Where indicated on the Contract Drawings, the removal of existing, manholes, catch basins, junction boxes, including all additional gravel backfill materials, compaction, equipment, tools, surface restoration and labor incidental thereto will be paid for at the contract unit price per each for **"Remove and Dispose of Catch Basin or Manhole"**. 
- L. Where existing catch basins are being replaced with new structures, there will be no measurement or payment for the removal of the existing structure regardless of its size, shape, material, depth or condition, including all additional gravel backfill materials, compaction, equipment, tools, surface restoration and labor incidental thereto. 
- M. There will be no measurement and payment for pipe removal and restoration including all additional gravel backfill materials, trench pavement and lawn repair, compaction, equipment, tools and labor incidental thereto.
- N. Bulkhead existing pipes and structures regardless of inside diameter, material, or use, including all additional gravel backfill materials, compaction, and equipment, tools and labor incidental thereto will be paid for at the contract unit price per each for **"Bulkhead existing pipe end"** regardless of diameter or type.
- O. New pipes connected to existing storm main pipes using "Inserta-Tee" fittings regardless of size and type specified, will be paid for per each unit for **"New Pipe Connections"**, complete in place, for which price shall include excavation, cutting of pavement, removal and replacement of pavement, pervious material, backfill, all materials including "Inserta Tee" (including PVC hub, rubber sleeve, & stainless steel band) of the size and type specified, all equipment, tools including purchase or rental of "Wet Diamond Bit", and labor incidental thereto. 
- P. Existing pipe connections, where new pipes (replacing existing pipes) are connected to existing storm sewer main pipes, shall be modified to accept the new pipe regardless of size and type specified (ex. replace 10" to 12" and reconnect into 30" pipe), will be paid for per each connection for **"Modify Existing Pipe Connection"**, complete in place, which price shall include excavation, cutting of pavement, removal and replacement of pavement, masonry collars, pervious material, backfill, all materials, all equipment and tools, and labor incidental thereto. 

- Q. Existing pipe to (catch basin or manhole) structure connections, where new pipes (replacing existing pipes) are connected to existing structures, shall be modified to accept the new pipe regardless of size and type specified (ex. replace 10" to 12" pipe and reconnect into existing catch basin), will be paid for per each connection for **"Modify Existing Structure - Pipe Opening"**, complete in place, which price shall include excavation, cutting of pavement, cutting of existing structure, removal and replacement of pavement, masonry cement, masonry brick, masonry collars, pervious material, backfill, all materials, all equipment and tools, and labor incidental thereto. 
- R. Fernco couplers used as an alternate connection to existing pipes will not be paid for separately, but such cost shall be included in the overall contract unit prices.
- S. Paved inverts shall be paid per each for the type of structure per Bid Form items. 
1. Paved inverts for new or existing Single Catch Basins (Type "C" or Type "C-L") will be paid for at the contract unit price per each for **"Paved Invert – Single Catch Basins"**.
 2. Paved inverts for Double Catch Basins or Manholes (regardless of the structure base dimensions) will be paid for at the contract unit price per each for **"Paved Invert – Double Catch Basin or Manhole"**.
- T. Underdrain pipe of the size and type specified will be paid for at the unit price bid per linear foot, complete in place, which price shall include saw cutting and pavement removal; excavation; dewatering; trench support; disposal of trench excavation – earth; all materials including pipe bedding stone and fabric; backfilling including back fill materials; stockpiling of materials; compaction; grading; utility identification warning tape; replacement of curbs, sidewalks and driveways; temporary and permanent pavement per plan/City details; and all work necessary or incidental to the completion of the work under this section of the Specifications. Payment made shall be considered as full compensation for furnishing all labor, equipment, tools, material, services and installing pipe of the size and type shown on the plans regardless of depth, and as detailed and tabulated in the bid proposal complete in place, including all connections necessary to constitute a fully operational system approved by the ENGINEER.
- U. Wye's for the underdrain pipe of the size and type specified will be paid for at the unit price bid per each, complete in place, as indicated on the Contract Drawings. Other work and material cost are covered under the cost of the underdrain.
- V. Cleanout's (vertical assembly from the wye to the cleanout plug, including the frame and cover) for the underdrain pipe of the size and type specified will be paid for at the unit price bid per each, complete in place, as indicated on the Contract Drawings. Other work and material cost are covered under the cost of the underdrain.

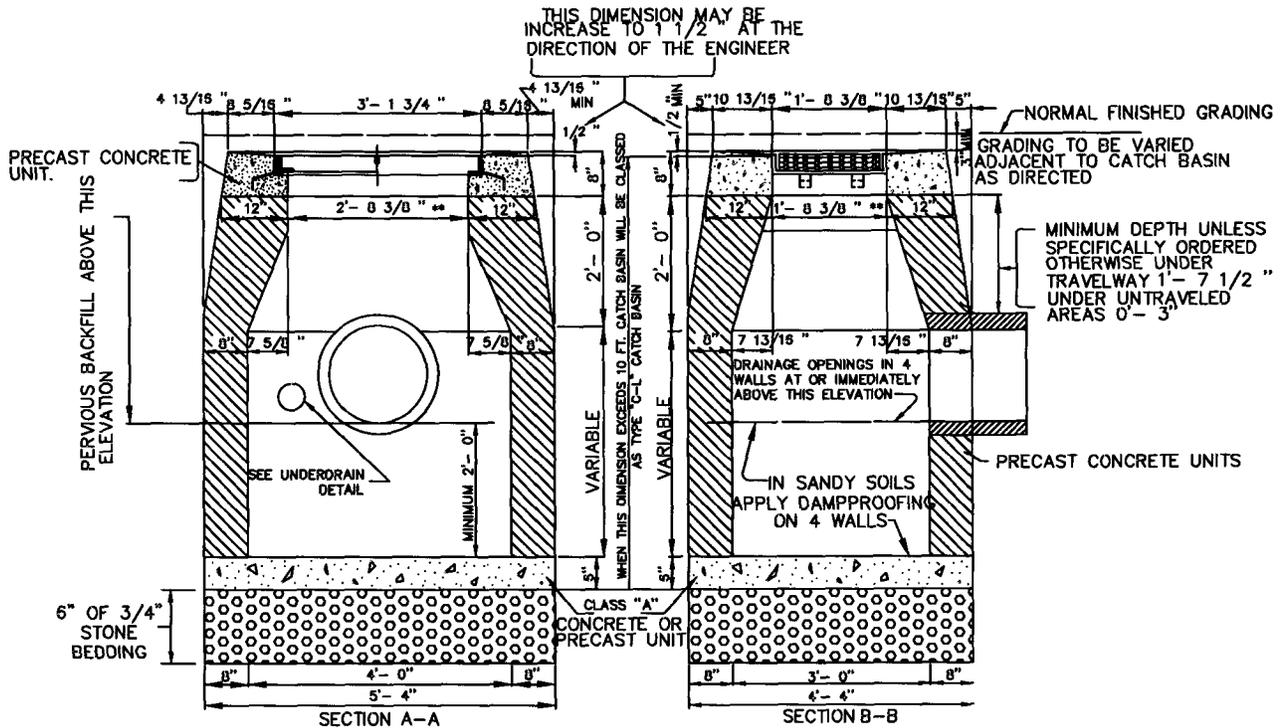
END OF SECTION



PLAN
TYPE "C-L" CATCH BASIN

NOTES

1. WALLS OF ALL CATCH BASIN OVER 10 FT DEEP TO BE INCREASED TO 12" THICKNESS. INSIDE DIMENSIONS TO REMAIN THE SAME.
2. PRECAST CONCRETE TOP SHALL BE APPROVED BY THE ENGINEER BEFORE INSTALLATION.
3. CATCH BASIN SUMPS SHALL BE OMITTED IF DIRECTED BY THE ENGINEER.
4. PROVIDE 4" PVC PERFORATED WEEP PIPE TO RELIEVE THE GROUNDWATER FROM THE PIPE BEDDING. PLACE AT ALL LOCATIONS WHERE PIPE ENTERS OR EXITS THE STRUCTURE.
5. ALL GRATES SHALL BE TYPE "A" GALVANIZED GRATES.
6. CB TOP BE SET ON MIN. OF 2" TO MAX. 4" OF MASONRY FOR ADJ.



SECTION A-A
SECTION B-B
TYPE "C-L" CATCH BASIN

4.2
009

TYPE "C-L" CATCH BASIN
DETAIL
NTS

REVISED FOR ADDENDUM#1 - DATE: 08/31/2016

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