

04/07/17

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SSD: 02/17/2000, 11/04/08, 04/02/10, 12/08/11, 05/06/14, 07/14/14, 12/15/14, 01/14/15, 10/14/15, 05/18/16, 03/29/17

Suggestions for customizing this Special Provision to fit your project needs:

- Read through first.
- Determine what applies to your project.
- If there is a section that does not apply to the project, leave the section in. It will be there in case something comes up during construction where it might be needed.
- Modify sections that are in conflict with Town requirements.
- If a section will adversely affect the Town requirements or is inappropriate, replace the wording for the section with the word **Blank**; then sections that follow will not need to be renumbered.
- At the end of the document is a key for the NHDOT standardized item numbers and descriptions. Please leave the key intact, as this will allow access to other items that may come up during construction. Use this key to prepare item numbers/descriptions for the purposes of the estimate of quantities and costs.
- If there is a special water item that is not in the list, contact the NHDOT Utility Coordinator to determine what the item number and description should be.
- If you need items for other work activities like common structure excavation-exploratory, pipe jacking, concrete pipe or others that are not part of this specification please contact the NHDOT Utility Coordinator for assistance. There are provisions already written for use and, as in the case of pipe jacking on NHDOT projects, we would like to keep them as separate special provisions.
- If your project must include proprietary items, please send the Department a justification letter explaining why you need those specific items. The Department will use that letter in the filling out of a Request for Approval of Public Interest Finding form (PIF).
- Please preserve the formatting of the document to maintain conformity with the NHDOT Standard Specifications.
- This Special Provision was written in dual units so that it could be used with either imperial or metric. Leave it that way, it won't hurt a thing.

This document should be set to 'track changes' while editing. Any changes you make will be highlighted, making reviewing much easier. If you have problems working with the edit tracking, contact the NHDOT Utility Coordinator for help.

PROJECT NAME
NUMBER

Date

SPECIAL PROVISION

SECTION 611 -- WATER INSTALLATION

Description

1.1 General Description of Work. The purpose of this work is to install [*Describe the work (Size, length, structures, location, etc.) in general terms—two or three sentences*]. The CONTRACTOR is responsible for furnishing, installing and removing temporary water systems and furnishing and installing the new water mains and appurtenances in accordance with the water main plans and as specified herein or as ordered by the ENGINEER.

1.1.1 The [*Town of . . .*] or its Designated Agent, hereinafter called OWNER, together with the ENGINEER, will inspect, accept and/or reject work related to the water facilities herein specified.

1.1.2 The CONTRACTOR shall furnish all materials, labor, tools and equipment, and perform all operations, testing, and incidentals necessary for a complete operating water facilities installation, as outlined herein and on the plans and setting up and maintaining a temporary water system to maintain water service at all times, except for authorized shutdowns approved by_____.

1.2 Sequence/Maintenance of Service. The CONTRACTOR is responsible for maintaining continuous water service to affected customers via a temporary water system, except when construction requires an interruption of water service. A service interruption may last no longer than six hours. The CONTRACTOR must obtain written approval from the OWNER prior to interruption of water service to affected water users. The OWNER requires that a written notice be sent to all water customers 48 hours in advance of the scheduled shutdown. The OWNER will provide written notification, but it is the CONTRACTOR's responsibility to establish and address needs, and shall coordinate with the ENGINEER and the OWNER.

1.3 Reference Drawings and Information. Neither the NHDOT nor the OWNER guarantees the accuracy or completeness of existing conditions shown on the NHDOT project construction plans for this water facilities work. Sufficient investigations shall be made by the CONTRACTOR so that the CONTRACTOR is knowledgeable of existing conditions prior to tendering a bid.

1.4 Submittals

1.4.1 Shop Drawings are required for each and every element of the water facilities installation work. _____ copies of shop and working drawings for water facilities shall be submitted to the _____ City/Municipality Water Division or its Designated Representative, together with the ENGINEER for approval in accordance with 105.02. Each shop drawing shall be

assigned a sequential number for purposes of easy identification, and shall retain its assigned number, with appropriate subscript, on required resubmissions.

1.4.2 Shop Drawings are generally defined as all fabrication and erection drawings, diagrams, brochures, schedules, bills of material, manufacturers data, spare parts lists, and other data prepared by the CONTRACTOR, his subcontractors, suppliers, or manufacturers which illustrate the manufacturer, fabrication, construction, and installation of the work, or a portion thereof.

1.4.3 Shop Drawings shall be submitted as a complete package by Special Provision section, unless otherwise reviewed and approved by the ENGINEER. It is the intent that all information, materials and samples associated with each specification section be included as a single submittal for the ENGINEER's review. Any deviation from this requirement, such as submitting miscellaneous metals grouped by structure, shall be requested in writing prior to any associated submittal.

1.4.4 The CONTRACTOR shall be responsible for the prompt and timely submittal of all shop and working drawings so that there shall be no delay to the work due to the absence of such drawings.

1.4.5 No material or equipment shall be purchased or fabricated specifically for the Contract until the required shop and working drawings have been submitted as hereinabove provided and reviewed for conformance to the Contract requirements. All such materials and equipment and the work involved in their installation or incorporation into the Work shall then be as shown in and represented by said drawings.

Materials

2.1 Earthwork Materials

2.1.1 Common Backfill. Common backfill shall be granular material, consisting of hard sand and gravel so graded that, of the material passing the No. 4 sieve, not more than 35 percent shall pass the No. 200 sieve. Common backfill shall be free of organic matter, trash, roots or other deleterious material and shall contain no stone measuring greater in any dimension than two-thirds of the loose lift thickness or 8 inches, whichever is smaller. Common backfill shall be capable of forming a firm, stable base when spread and compacted in accordance with this specification. In addition, common backfill shall be non-plastic (plasticity index zero, defined as liquid limit minus plastic limit). Common backfill may be obtained from either on-site excavations or off-site sources. Any materials excavated from the trench not conforming to this specification shall be properly disposed of as specified and replaced with approved material, as required, at no additional cost to the OWNER or NHDOT.

2.1.2 Sand Bedding and Blanket. Sand bedding and blanket material required for installation of the water mains, services, and appurtenances shall meet the following gradation requirements: 100% passing the ½ inch sieve and, of the material passing the #4 sieve, no more than 12% shall pass the #200 sieve.

2.1.3 Gravel Fill. Gravel fill shall consist of hard, durable gravel free from trash, organic matter, clay, surface coatings, and other deleterious materials. Gravel fill shall have a maximum

stone size of two-thirds of the loose lift thickness, or 6 inches, whichever is smaller. That portion passing the 4 inch (100 mm) sieve shall meet the following gradation requirements, as determined by ASTM C 136 and ASTM C 117:

<u>Sieve Size</u>	<u>Percent Passing</u>
6 inch	100
No. 4	25-70
No. 200 *	0-12

* Based on fraction passing the No. 4 sieve.

2.1.3.1 When approved by the OWNER, gravel fill used for pipe bedding shall have a maximum stone size of 1½ inches.

2.1.4 Crushed Gravel. Crushed gravel shall consist of hard durable sand and gravel, free from trash, organic matter, clay, surface coatings, and other deleterious materials. Crushed gravel material shall meet the following gradation requirements, as determined by ASTM C 136 and ASTM C 117:

<u>Sieve Size</u>	<u>Percent Passing</u>
3 inch	100
2 inch	95-100
1 inch	55-85
No. 4	27-52
No. 200 *	0-12

* Based on fraction passing the No. 4 (4.75 mm) sieve.

2.2 Water Mains and Appurtenances. All products and materials shall conform to the latest appropriate section of American Water Work Association (AWWA) and American National Standards Institute (ANSI) Standards and as otherwise specified hereinafter.

2.2.1 Ductile Iron Water Main Pipe

2.2.1.1 Push-On Type Ductile Iron Water Pipe for temporary and permanent systems shall be ductile iron complying with ANSI A21.51 and AWWA C151, Class 52. Pipe shall be double cement-lined 1/8 inch thick and seal coated inside and out in accordance with ANSI A21.4 and AWWA C104. Joints shall be rubber gasket, push-on type in accordance with ANSI A21.11 and AWWA C111. Use only lubricant that is specified by the pipe manufacturer.

2.2.1.2 Mechanical Joint (MJ) Ductile Iron Pipe for use on bridge crossings shall conform to ANSI A21.51/AWWA C151 Class 52. Mechanical joint fittings shall be ductile iron conforming to ANSI A21.10/AWWA C110. Pipe and fitting joint shall meet ANSI A21.11/AWWA C111 standards and shall include plain rubber gaskets. Pipe and fittings shall be double cement lined and seal coated inside and outside in accordance with ANSI A21.4/AWWA C104. All pipe and fittings shall be furnished with ductile iron retainer glands.

2.2.2 High Density Polyethylene Pipe

2.2.2.1

2.2.3 Brass Wedges. Two brass wedges shall be installed in all push-on type joints to provide electrical conductivity between pipe lengths.

2.2.4 Ductile Iron Fittings shall be mechanical joint type with a 350 psi pressure rating in accordance with ANSI A21.10 and AWWA C110. Fittings shall be double cement-lining $\frac{1}{8}$ inch thick and seal coated inside and out in accordance with ANSI A21.4 and AWWA C104. Fitting shall be Tyler or approved equal. See section 2.3 for thrust restraint.

2.2.5 Mechanical Joint Restraining Devices shall be used with all mechanical joints. Glands shall be manufactured of ductile iron conforming to ASTM A 536. The ring shall be grade 65-45-12 ductile iron in accordance with ASTM A 536. Mechanical joint restraining devices shall be "Grip-Ring" as manufactured by Romec, "Field Lok" gasket system manufactured by Tyler Union or approved equal.

2.2.6 Couplings shall be mechanical joint ductile iron solid sleeve type meeting the requirements stated above for ductile iron fittings.

2.2.7 Valves

2.2.7.1 Gate Valves shall be in accordance with AWWA C509. Gate valves shall be resilient-wedge type with a non-rising bronze stem, 2 inch AWWA operating nut and fusion bonded epoxy coated both inside and out. Gate valves shall have mechanical joints as specified above. The valves shall be American Flow Control - 2500, Mueller 2360, or approved equal. Valves shall open left.

2.2.7.2 Butterfly Valves shall be in accordance with AWWA C504. Butterfly valves shall be used for size 10 inch and above. The valves shall be Henry Pratt Co. 'Groundhog', Dresser 450BF, or Allis-Chambers 'Steamseal'.

2.2.7.3 Insertion Valves shall be manufactured of ductile iron and feature a resilient wedge valve and shall be in accordance with AWWA C-509-01. The gate valve shall feature resilient-wedge type gate with a non-rising bronze stem and a 2 inch AWWA operating nut. Valve shall open left. Valve shall be Advanced Valve Technologies "EZ Valve" or approved equal.

2.2.7.4 Valve Boxes shall be heavy pattern cast iron, two piece, slip type, 5 inch shaft, with extension pieces sufficient to allow proper cover. Valve boxes shall weigh at least 100 pounds with cover. The upper section of the box shall be top-flange type to prevent settlement. The lower section shall be belled type to enclose the operating nut of the valve. The cover shall be cast iron with the word "WATER" plainly cast thereon. Valve boxes shall be BUFFALO, TYLER, Mueller, Quality Water Products, or approved equal.

2.2.7.5. Tapping Sleeves shall be mechanical joint, split sleeve with outlet flange conforming to AWWA C-110 section 10-14 with drilling recessed for tapping valve. The sleeve shall be ductile iron construction and include a $\frac{3}{4}$ inch FIP threaded test plug in the body of the sleeve. Side rubber gaskets shall be rectangular in cross section and fit into grooved channels in the casting. These gaskets shall not require cutting or trimming to match the mechanical joint end gaskets. Tapping sleeves shall be furnished with standard accessories including, but not limited to: glands, gaskets, and Cor-Ten bolts and nuts or equivalent. All flange bolts shall be 316 stainless steel. Interior and exterior of sleeve shall be bituminous coated with a minimum of

4 mils dry thickness. Tapping sleeves shall be capable of accepting a full sized tapping cutter.

2.2.7.6 Tapping Gate Valves shall be resilient wedge style open left valves meeting the same specifications as gate valves under section 2.2.7.1 of these specifications except that one end of the valve shall be equipped with a flange conforming to AWWA C-110 section 10-14 for attachment to the tapping sleeve.

2.2.8 Hydrants and Appurtenances

2.2.8.1 Hydrants shall be in accordance with AWWA C502, and all addenda thereto. Hydrants shall be equipped with 5¼ inch main valves, as sized by seat ring internal opening, plugged drain holes, 6 inch pipe connection, one 4½ inch National Standard pumper connection and two 2½ inch hose connections. Each hydrant shall be equipped with a gate valve on the branch line as specified herein.

2.2.8.2 Hydrants shall open left.

2.2.8.3 For purposes of standardization, hydrants shall be American Darling B-84-B, Waterous, Metropolitan Hydrant, Mueller Super Centurion 250, or approved equal. Hydrants shall have been manufactured no earlier than one year prior to installation. Hydrants shall be thoroughly cleaned and given two shop coats of paint in accordance with AWWA Specification C502 before shipment. Paint color shall be the standard hydrant color of the _____.

2.2.8.4 If the paint coating on any hydrant is damaged during shipping or installation, the CONTRACTOR shall touch-up paint the hydrants in accordance with AWWA Specification C502.

2.2.9 Corporation Stops shall be ball valve type with a PTFE coated brass ball, CC (AWWA tapered) threads, double O-ring seal, blow-out proof stem design, and compression-type outlet connection with a grip joint. All corporation stops are to be constructed of NSF 61 Annex G "Lead Free" compliant brass. Corporation stops shall be Ford F series, Mueller 300 series, or approved equal.

2.2.10 Service Saddles will be required for corporation stops in accordance with paragraph 3.11 herein. Service saddles shall be double strap type with 360° contact on the main. The body shall be constructed of nylon-coated ductile iron and the straps shall be stainless steel. Service saddles shall be double bolt, Model "306", as manufactured by Romac Industries, Inc. or approved equal by Ford Meter Box Company, Cascade Waterworks Mfg. Company, or Mueller Company. Saddles shall meet all applicable parts of AWWA C800.

2.2.11 Service Pipe for house services and chlorine injection points shall be Type "K" copper tubing conforming to ASTM B 88. The name of trademark of the manufacturer and type shall be stamped at intervals along the pipe.

2.2.12 Curb Stops shall be ball valve type with a PTFE coated brass ball, CC (AWWA tapered) threads, double O-ring seal, blow-out proof stem design, and compression-type outlet connection with a grip joint. All curb stops are to be constructed of NSF 61 Annex G "Lead

Free” compliant brass. Curb stops shall be Ford Z series, Mueller 300 series, or approved equal, shall not have a draining port, and shall open right.

2.2.13 Curb Boxes shall be adjustable in lengths consistent with pipe depths. Curb boxes shall be ERIE style with a 1/2 inch x 24 inch stainless steel rod and plug type cover. Curb boxes shall be Ford, Mueller, or approved equal.

2.2.14 Service Pipe Couplings shall be made of brass. Both ends of the coupling shall be compression type with a grip joint. Couplings shall be manufactured by Ford, Hayes, Mueller, or approved equal.

2.2.15 Temporary Water Main and Fittings shall be ductile iron as specified in sections above.

2.2.16 Temporary Service Pipe and Fittings shall be as specified in sections above.

2.3 Concrete for thrust restraint shall be Class B in accordance with Section 520.

2.4 Insulation

2.4.1 Board Insulation shall be rigid extruded polystyrene 8 feet long, 2 feet wide, and 2 inches thick having an R value of 10 and conforming to ASTM C 578, Type VII, and shall be STYROFOAM HI-60 as manufactured by Dow Corning Chemical Co. or approved equal.

2.4.2 Round Insulation shall be a rigid pipe insulation supplied in half shells to completely cover the exterior of the pipe, joints and expansion joint with three inches of insulation to yield a minimum R-value of 15 (R=5 per inch of thickness). The compressive strength of the insulation shall be 24-PSI minimum in accordance with ASTM D 1621. The water absorption shall be 0.7% maximum in accordance with ASTM C 272. Service temperature range shall be -50°F to 150° F.

2.4.2.1 PVC Jacket. PVC jacket shall consist of a hard PVC wrapped cover completely surrounding the pipe and insulation, and have a nominal thickness of 1/4 inch. The jacket shall be factory wrapped around the insulated pipe and fittings, and sealed. Pipe shall be joined to have the middle of the pipe centered over the drain pipe.

2.5 Casing Pipe for highway crossing shall be steel and shall be in accordance with API STD.5L, Grade B, X-42, ASTM A 139.

2.5.1 Casing Pipe:

<u>Description</u>	<u>6” Carrier Pipe</u>
Nominal Casing Size	24"
Outside Diameter	24"
Wall Thickness (min)	0.375"
Weight per Foot (min)	94.62 #/ft
Yield Strength (min)	35,000 psi
Type of Joint	Butt Welded
Type of Coating	None

2.5.2 Tolerance. Out-of-round tolerance shall not exceed 0.50 inches.

2.5.3 Pipe Spacers shall be a two-piece 14-gauge T-304 stainless steel assembly with stainless steel bolts. Assembly shall be the restrained positioning type. The runners shall be a ultra-high molecular weight polymer with a maximum coefficient of friction of 0.12. The assembly shell liner shall be 0.090" ribbed PVC with 85-90 durometer.

2.5.4 Carrier Pipe shall be mechanical joint ductile iron per section 2.2.2.

2.5.5 Bulkhead Materials shall be one of the following (see plan for type):

2.5.5.1 Brick and Mortar. Brick for bulkheads shall be sound, uniformly burned and shall comply with ASTM C 32, Grade SA. Mortar shall consist of one part cement, one-quarter part lime, and two parts sand. Sand shall comply with ASTM C 144; lime shall comply with ASTM C 207, Type S; cement shall comply with ASTM C 150, Type II.

2.5.5.2 Rubber Seal. Rubber shall have one adhesive side for initial attachment to the pipe. Bonding agent shall be as recommended by the seal manufacturer. Three-quarter-inch stainless steel bands shall be used to secure the rubber seal to the casing and carrier pipes. Rubber seal shall be Model CCES as manufactured by Cascade Waterworks MFG or approved equal.

Construction Requirements

3.1 General. The CONTRACTOR shall furnish all water main pipe, fittings, services and related material and appurtenances, labor, tools and equipment, granular material, and concrete; and perform all operations and incidentals necessary for complete excavation, installation, backfill, and testing as outlined herein and on the plans; and maintain service at all times.

3.1.1 The CONTRACTOR shall be responsible for the layout of the work. The DEPARTMENT will provide control points as described in Section 105.08. The temporary and permanent water mains, service connections and appurtenances shall be built at the locations indicated on the Plans to facilitate reconstructing other facilities within this area of the project.

3.1.2 The CONTRACTOR shall be responsible to field locate all existing water services for the purpose of connecting them to the proposed mains. This may involve exploratory test pits of which payment will be made under Item 206.19 – Common Structure Excavation Exploratory.

3.1.3 Location of new water services for all lots throughout the project area as part of the new water line will be as determined by the OWNER.

3.1.4 Consequential damages resulting from the CONTRACTOR not locating the facilities as shown on the Plans are the responsibility of the CONTRACTOR.

3.1.5 The CONTRACTOR, at the completion of each part of the work, shall furnish the as-built locations of the water main and appurtenances referenced to NHDOT'S Construction Base Line and Benchmarks. The as-built locations shall be to an accuracy of plus or minus 0.10 feet in plan and elevation.

3.1.6 Any deviations from the locations shown on the Plans require the OWNER's and the ENGINEER's approval. Any discrepancies with locations shown on the plans shall be brought to the ENGINEER's attention and subsequently resolved between the OWNER, the ENGINEER and the CONTRACTOR.

3.2 Temporary Water System

3.2.1 The CONTRACTOR shall provide a forty-eight (48) hour written notice to all water users regarding any disruption in service related to the installation and removal of by-pass and temporary service piping.

3.2.2 The temporary main shall be installed as shown on the Drawings.

3.2.3 Services to be connected to the temporary main shall be identified by the CONTRACTOR.

3.2.4 New temporary services shall be connected to existing service piping and installed in accordance with these specifications. Materials shall be as specified herein and shall include piping, saddles, corporation stops, copper tubing and compression couplings.

3.2.5 The temporary system shall be pressure and leakage tested and properly disinfected in accordance with applicable AWWA specifications.

3.3 Trench Excavation

3.3.1 General. Excavation, dewatering, sheeting, and bracing shall be carried out in such a manner as to eliminate any possibility of undermining or disturbing the foundations of any existing structure, utilities or any work previously completed under this contract.

3.3.2 On paved surfaces that will not be resurfaced under this contract, the CONTRACTOR shall not use or operate tractors, bulldozers, or other power-operated equipment with treads or wheels which are so shaped to allow cutting or damage of such surfaces during excavation or other phases of the work.

3.3.3 All lawns, paved surfaces, roadways, and structures which have been damaged or disturbed by the CONTRACTOR's operations outside of the project work areas shall be restored to a condition at least equal to that in which they were found immediately prior to the beginning of operations or as specified on the plans.

3.3.4 The CONTRACTOR shall provide trench shoring and dewatering, if necessary, to provide a stable and dry trench at all times. The pipe trench must be dewatered to 1 foot 6 inches below the invert of the new water pipe. Trench width shall be 2 feet plus the diameter of the pipe. Cover on pipe shall be a minimum of 5 feet 6 inches. Trench depth shall extend to 6 inches below the invert of the pipe.

3.3.5 As the excavation approaches pipes, conduits, or other underground structures, digging by conventional trenching machine methods shall be discontinued. Only manual methods of excavating shall be employed around buried utilities.

3.3.6 Prior to doing any work outside the right-of-way line on private property for connection of water services, the CONTRACTOR shall advise the property owner of the work and/or disturbance of the person's property that shall be performed, and the restoration thereof.

3.3.7 The CONTRACTOR shall maintain utilities, utility services and sewer pipe encountered in the excavation, and repair or replace them to their owner's satisfaction and be responsible for consequential damages thereof.

3.3.8 The CONTRACTOR shall not be compensated for any additional work required in working in close proximity to a utility line, sewer or underground structure in the trench line above or below the water pipe, except for common structure excavation (if required).

3.3.9 Excavations shall be kept dry until the pipes and appurtenances to be built therein have been completed to such extent that they shall not be damaged.

3.3.9.1 Provide, operate and maintain any dewatering system required to lower and control groundwater levels and groundwater hydrostatic pressure during the construction of the Work as required by this Section and the Contract Documents. The CONTRACTOR shall assume full responsibility and expense for the adequacy of the dewatering system with no additional time for performance.

3.3.9.2 The dewatering system shall be capable of developing an excavated subgrade relieved of any hydrostatic pressure that could cause a decrease in the stability of the excavated subgrade and which shall provide the necessary groundwater control for the proper performance required for completion of the Work.

3.3.9.3 Properly dispose of subsurface water collected in a manner that conforms to all applicable local and state ordinances, statutes and laws. Obtain all permits required for operation of the dewatering system.

3.3.9.4 Maintain continual and complete effectiveness of the dewatering system operation to provide a firm, stable, excavated subgrade at all times as required for proper performance of the Work.

3.3.9.5 Provide dewatering necessary to maintain the groundwater table 18 inches (450 mm) below the base of the proposed structure and/or pipe at all times.

3.3.9.6 Erosion Control. Provide adequate protection from erosion from any of the dewatering operations utilized during the course of the construction. Any damage, disruption or interference to newly constructed work or existing properties, buildings, structures, utilities and/or other work resulting directly or indirectly from dewatering operations conducted under this Contract shall be remedied by the CONTRACTOR, at no cost to the OWNER or DEPARTMENT.

3.3.9.7 Treatment of Dewatering Operations Discharges. Provide such additional treatment devices as may be required to meet the provisions of the Contract. This may include the construction of sumps and/or settling basins, stone rip-rap, silt fences or other requirements. The treatment devices shall be later removed and/or filled in with acceptable backfill material, and restored to original conditions once they are no longer needed, at no additional cost to the OWNER or DEPARTMENT.

3.3.10 Over-Excavation. If, in the opinion of the ENGINEER together with the OWNER, the material at or below the depth of the trench is unsuitable for foundation, it shall be removed to such depths as directed by the OWNER and ENGINEER and shall be replaced with compacted Granular Backfill (Sand), conforming to 209.2.1.1, and placed as provided in 209.3.

3.3.11 If the bottom of the excavation is deeper than the depth shown on the plans, by error of the CONTRACTOR, the condition shall be corrected by refilling to the proper grade with compacted Granular Backfill (Sand), conforming to 209.2.1.1. All costs shall be borne by the CONTRACTOR.

3.3.12 Rock and Boulder Excavation shall be in accordance with Section 206.

3.3.13 Excess and Unsuitable Excavation. Excavation not used for backfill and unsuitable excavation shall be removed from the site and properly disposed of by the CONTRACTOR in accordance with local, State or Federal regulations.

3.4 Trench Backfill

3.4.1 General. After the pipe has been placed and has been inspected by the OWNER together with the ENGINEER, backfilling shall be performed without delay.

3.4.2 Bedding shall extend the full width of the trench from 6 inches below the pipe, to the springline (horizontal centerline) of the pipe. Compact the bedding material to 95% Modified Proctor in accordance with ASTM D 157 and ASTM D 2922 prior to the placement of the blanket material.

3.4.3 Blanket Material shall be placed from the springline of the pipe to a minimum of 12 inches above the pipe crown. The trench shall be backfilled by placing and compacting the blanket material in lifts of 6 inches or less to 95% Modified Proctor in accordance with ASTM D 157 and ASTM D 2922. The filling shall be carried up evenly on both sides of the pipe with care taken not to raise or otherwise disturb the pipe. Compact the blanket material with approved hand-operated devices.

3.4.4 Backfill shall be placed from 12 inches above the pipe crown to the underside of the pavement select material profile, or to the underside of loam and grassed areas, with common backfill described herein and as approved by the ENGINEER.

3.4.4.1 Backfill shall be placed and compacted in layers of 6 inches or less. Compact the backfill material to 95% Modified Proctor in accordance with ASTM D 157 and ASTM D 2922. Compaction shall be by hand-operated compactors, or other approved method.

3.4.4.2 Jetting and bucket compaction are not acceptable means of compaction.

3.4.4.3 Trench areas improperly backfilled or having excessive settlement, as determined by the ENGINEER, shall be reopened to the required grade, backfilled using proper techniques, and repaved as necessary. The CONTRACTOR shall receive no additional compensation for repair of trenches constructed under this Contract.

3.4.5 Trench Pavement Patch. All pavement patching of water main-related trenches shall be in accordance with Section 401.3. The water main trench pavement edges shall be saw-cut prior to permanent patching.

3.5 Pipe Installation

3.5.1 General.

3.5.1.1 Pipe and fittings shall be handled with care to ensure that the pipe and fittings are in sound, undamaged condition. Particular care shall be taken to prevent damage to pipe coating and lining (if any).

3.5.1.2 The CONTRACTOR shall furnish slings, straps and/or other approved devices to support the pipe when it is lifted. Pipe and fittings shall not be dropped from trucks onto the ground or into the trench. Transporting pipe and fittings from storage areas shall be restricted to operations which shall not cause damage to the pipe or lining (if any).

3.5.1.3 All pipe and fittings shall be examined before laying, and no pipe or fittings shall be installed which are found to be defective. Damaged pipe coatings and/or lining (if any) shall be repaired as approved or directed by the ENGINEER at no additional cost to the OWNER or NHDOT.

3.5.1.4 Any pipe showing a distinct crack with no evidence of incipient fracture beyond the limits of the visible crack, if approved, may have the cracked portion cut off by, and at the expense of, the CONTRACTOR before the pipe is laid so that the pipe used is sound. The cut shall be made in the sound portion of the barrel at least 12 inches from the visible limit of the crack.

3.5.1.5 If any defective pipe is discovered after it has been laid, the CONTRACTOR shall remove the defective pipe and replace it with sound pipe at no additional cost to the OWNER or DEPARTMENT.

3.5.1.6 Pipe and accessories shall be kept in a sound, undamaged condition. They shall, at all times, be handled with care and shall not be dropped, dumped or bumped against any other object. Damaged material shall be replaced at no cost to NHDOT or OWNER, at any time during the construction that the damage is identified or occurs.

3.5.1.7 Pipe shall be stored off the ground.

3.5.2 Buried Pipe Installation. Installation of all buried piping shall be in accordance with AWWA Standard for installation of ductile iron water mains and their appurtenances, AWWA C600.

3.5.2.1 Pipe and fittings shall be thoroughly cleaned before they are placed. All lumps, blisters, and excess coal tar coating shall be removed from the spigot and from the interior of the bell, and these surfaces shall be wire-brushed, wiped clean and dry, and be free from oil and grease before the pipe is laid.

3.5.2.2 The interior of pipe, fittings and valves shall be kept clean and free of foreign material or soils at all times during storage and installation, or the material will be subject to rejection by the OWNER and ENGINEER.

3.5.2.3 All pipes and appurtenances laid in open trench excavation shall be bedded and uniformly supported over their full-length on bedding of the types specified herein and shown on the drawings. All work shall be performed in a dry trench.

3.5.2.4 Pipe and fittings shall be laid accurately to the line and grades. Care shall be taken to provide a firm bearing for the pipe along its entire length. Pipes shall not be laid in water, nor shall water be allowed to flow through them.

3.5.2.5 At all times when pipe laying is not actually in progress, the open ends of pipe in the trench shall be closed by temporary water-tight plugs or by other approved means. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe has passed.

3.5.2.6 Wherever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, the amount of deflection allowed shall not exceed that required for making a satisfactory joint and shall be subject to the approval of the OWNER and ENGINEER.

3.5.2.7 For mechanical joints, the spigot shall be centrally located in the bell, and adequate anchorage shall be provided at abrupt changes in direction and at dead-ends. All surfaces in contact with the rubber gaskets shall be brushed thoroughly with a wire brush immediately prior to assembly. The clean surfaces shall then be brushed with manufacturer's recommended lubricant prior to slipping the gasket over the spigot and into the bell. Lubricant shall also be brushed over the gasket prior to installation for the purpose of removing loose dirt and lubricating the gasket as it is forced into its retaining space. The CONTRACTOR shall use wrenches as recommended by the manufacturer. When tightening bolts, it is essential that the gland be drawn toward the pipe flange evenly, maintaining approximately the same distance between the gland and the face of the flange at all points around the socket.

3.5.2.8 For push-on joints, all foreign matter in the gasket seat in the socket shall be removed and the gasket wiped clean and flexed before placing in its seat. A thin film of lubricant shall be applied to the inside surface of the gasket. The plain end of the next pipe, after wiping clean, shall be aligned and carefully entered into the socket until it just makes contact with the gasket. Joint assembly shall be completed by forcing the end of the pipe past the gasket until it makes contact with the bottom of the socket. Final joint assembly of pipe 8 inches and smaller shall be accomplished by pushing against the face of bell of the entering pipe with a crow-bar or other tool. For larger pipe, the assembly shall be made with a jack and suitable slings.

3.5.2.9 When pipe is cut in the field, the cut end shall be tapered back approximately $\frac{1}{8}$ inch at an angle of 30 degrees with the centerline of the pipe with a coarse file or grinder to remove any rough edges which might injure the gasket.

3.5.2.10 The CONTRACTOR shall furnish and install all supports necessary to hold the piping and appurtenances in a firm, substantial manner at the lines and grades indicated on the drawings or as directed by the OWNER and ENGINEER.

3.5.2.11 Bends, tees, and other fittings in pipe lines buried in the ground shall be backed up with thrust restraint Class B concrete, ½ cubic yard minimum, against undisturbed earth (bearing area as shown on the plans). If the soil does not provide firm support, then bridle rods, clamps, etc. shall be provided to brace the fittings properly. All accessories shall be seal-coated thoroughly and heavily with an approved material per AWWA C104 after assembly and shall be subsidiary to the ductile iron fitting unit price. Thrust blocks are to be poured in place unless otherwise approved by the ENGINEER.

3.5.2.12 Insulation shall be installed as shown on the plans or as directed by the ENGINEER.

3.5.2.12.1 Board insulation shall be installed as shown on the Plans over water mains having less than 5 foot 6 inches cover with all joints overlapped and extending 8 feet either side of the centerline of the new culvert. The total thickness of the insulation shall be 4 inches. The width of the installed insulation shall be 4 feet

3.6 Casing Installation

3.6.1 Casing pipe shall be installed by open cut with bedding and cover material as shown on the plans.

3.6.2 Casing pipe ends shall be beveled with a single V-groove for field welding. Pipe joints shall be butt welded and shall be a full penetration on the outside circumference of the pipe. The single V-groove butt weld shall conform to the latest AWS Welding Code. All joints of the casing pipe shall be butt welded by a welder certified by the State of New Hampshire for the specific application.

3.7 Carrier Pipe Installation. After casing pipe has been installed and cleaned of dirt and debris, pipe spacers shall be attached to carrier pipe as shown on the plans. As carrier pipe is jointed, it shall be pushed into position inside the casing pipe. After the carrier pipe has been tested for leakage, bulkheads shall be constructed at each end of the casing pipe.

3.7.1 On brick bulkheads, a "one brick" opening shall be left in the bulkhead at the top of the casing pipe at each end and covered with polyethylene to prevent entry of backfilling materials. The portion of the carrier pipe passing through the brick bulkhead shall be wrapped with three layers of fifteen pound asphalt-impregnated felt before the bulkhead is constructed.

3.7.2 On rubber sealed bulkheads, apply bonding agent to seal the two ends of the rubber seal. Three-quarter inch stainless steel bands shall secure the rubber seal to the casing and carrier pipes.

3.8 Valve Installation. Valves and boxes shall be set with the stem vertical and box vertically centered over the operating nut. Valves shall be set on a firm foundation and supported by tamping selected excavated material under and at the sides of the valve. The gate box shall be supported during backfilling and maintained in vertical alignment with the top flush with finish grade.

3.9 Hydrants. Hydrants shall be set at the locations shown and bedded on a firm foundation. Each hydrant shall be set in true vertical alignment and properly braced.

3.9.1 Hydrants shall be mechanically restrained by either GripRing or Megalug type joint restraint systems as well as a thrust block.

3.9.2 Height adjustments shall be made to the hydrants so that the bottom flange of the hydrant is 3 inches above finish grade. Height adjustments shall be made with extension as manufactured by the hydrant supplied. All hydrant extension shall be considered subsidiary to the hydrant bid item.

3.9.3 Wherever a hydrant is set in soil that is pervious, a drainage pit 2 feet in diameter and 1 foot deep shall be excavated below each hydrant and filled with coarse gravel or crushed stone mixed with coarse sand, under and around the elbow of the hydrant and to a level of 6 inches above the waste opening. Compaction shall be in accordance with 304.3.7.

3.9.4 Wherever a hydrant is set in clay or other impervious soil, a drainage pit 2 feet in diameter and 3 feet deep shall be excavated below each hydrant and filled with coarse gravel or crushed stone mixed with coarse sand, under and around the elbow of the hydrant and to a level of 6 inches above the waste opening. Drainage pits shall not be connected to a sewer. Compaction shall be in accordance with 304.3.7.

3.9.5 Hydrants shall be set on a concrete base or another material base approved by the ENGINEER and shall be well braced and anchored by depositing concrete behind the hydrants on undisturbed earth at the end of the trench, or by wedging granite block in place of concrete.

3.9.6 When hydrants are to be removed the existing isolation valve shall be removed and hydrant piping shall be cut and capped a maximum of 12 inches from the water main tee with a $\frac{1}{3}$ Cubic Yard concrete thrust block poured against the cap.

3.9.7 The water main may be shut off for a maximum of 4 hours beginning after 9:00 a.m. for the removal of hydrants or installation of the tap or tee. Coordinate the shut off with the utility.

3.9.8 No hydrant shall be backfilled until directed by the ENGINEER.

3.10 Protection of Water Supplies

3.10.1 There shall be no physical connection between a public or private potable water supply system and a sewer, or sewer appurtenance which would permit the passage of any sewage or polluted water into the potable supply. No water pipe shall pass through or come in contact with any part of a sewer manhole. Locate the new water main with at least 10 feet (3 m) of horizontal separation distance between it and the existing or proposed sewer main.

3.10.2 A deviation from the separation requirements of 3.10.1 above will be allowed where necessary to avoid conflict with subsurface structures, utility chambers and building foundations, provided that the sewer is constructed as follows:

3.10.2.1 Sewer pipe shall be Class 52 ductile iron.

3.10.2.2 Joints shall be pressure tested with zero leakage at 25 psi for gravity sewers, and at 1-1/2 times working pressure for force mains.

3.10.3 Whenever sewers must cross water mains, the sewer shall be constructed as follows:

3.10.3.1 Vertical separation of the sewer and water main shall be not less than 18 inches.

3.10.3.2 Sewer pipe joints shall be located at least nine feet horizontally from the water main.

3.10.3.3 Sewer pipe joints shall be pressure tested with zero leakage at 25 psi for gravity sewers, and at 1-1/2 working pressure for force mains.

3.11 Service Installation. Install corporation stops on the new water main. The tapping machine shall be rigidly fastened to the pipe halfway between the horizontal and vertical position. The length of travel of the tap should be established so that when the stop is inserted and tightened with a 14 inch wrench, not more than one to three threads shall be exposed on the outside. When a wet tapping machine is used, the corporation stop shall be inserted with the machine while it is in place. Stops shall be tightened only sufficiently enough to give watertightness, and care must be constantly exercised not to over-tighten them.

3.11.1 Service saddles will be required as indicated by the following chart:

<u>Pipe Size</u>	<u>Saddle Requirements for Class 52 D.I. Pipe</u>
6 inch	Taps > ¾ inch
8 inch	Taps > ¾ inch
10 inch	Taps > 1 inch

3.11.2 Install copper tubing, from the corporation stop to the curb stop, in a trench with a depth of at least 6 feet. Care shall be exercised in the placing and laying of copper tubing to be sure that the pipe does not have kinks. Place at least 6 inches of sand adjacent to and below the tubing and 12 inches above the tubing.

3.11.3 Install curb stops and curb boxes at the approximate property line, or as indicated on the plans, and connect with new copper tubing coming from the new main. Place concrete block or flat stone beneath curb stop. Install curb box vertically centered over the operating key, with the elevation of the top adjusted to conform to the finished grade. Prior to backfilling, the CONTRACTOR shall ensure corporation stops are in the open position and curb stops are fully shut. Adequately support the box during backfilling to maintain vertical alignment. Care must be taken to ensure that the curb box does not rest on the curb stop.

3.11.4 Make connections of new copper services to existing services as directed by the ENGINEER. Connection shall be made using suitable couplings.

3.12 Inspection. Each section of installed water main will be visually inspected by the OWNER and ENGINEER. The pipe shall be true to both line and grade, shall contain no broken pipe, shall show no leaks, and shall contain no debris or other deposits of which shall in any way reduce the full cross-sectional area of the pipe.

3.12.1 Any section of water pipe which does not comply with these inspection criteria, as determined by the OWNER and ENGINEER, shall be promptly corrected, replaced or repaired

by the CONTRACTOR at no cost to the OWNER or NHDOT. Such methods as are employed for the correction shall be approved by the OWNER.

3.13 Pressure and Leakage Testing. The CONTRACTOR shall furnish all necessary equipment and labor for, and perform, pressure testing and leakage tests on the water pipe in accordance with AWWA C600 Specifications.

3.13.1 The CONTRACTOR shall make any taps and furnish all necessary caps, plugs, etc., as required in conjunction with testing, and also furnish a test pump, gauges, and any other equipment required in conjunction with carrying out the hydrostatic tests. The CONTRACTOR shall at all times protect the new water mains and the existing water mains against the entrance of polluting material.

3.13.2 Testing Requirements:

1. Test duration: Two (2) hours, minimum.
2. Test pressure: One hundred and fifty percent (150%) of maximum operating pressure as determined by the ENGINEER, or 100 psi; whichever is higher.
3. Allowable pressure loss: Pressure shall not vary more than 5 psi for the duration of the pressure test.
4. Allowable leakage: Allowable leakage shall be determined by the following formula:

ENGLISH
$L = \frac{SD(P)^{0.5}}{133200}$
L = allowable leakage, in gallons per hour. S = length of pipe tested, in feet. D = nominal pipe diameter, in inches. P = average test pressure, in psi (gauge).

5. Acceptance of installation shall be determined on the basis of allowable leakage. If any test of pipe laid discloses leakage greater than that specified, the CONTRACTOR shall, at his own expense, locate and make repairs as necessary until the leakage is within the specified allowance.
6. All visible leaks are to be repaired regardless of the amount of leakage.
7. The leakage test shall be constructed concurrently with the pressure test.

3.14 Disinfection. Before being placed in service, all new and temporary water pipelines shall be chlorinated by the CONTRACTOR in accordance with the requirements of AWWA C651. The procedure shall be discussed with the OWNER and ENGINEER prior to proceeding with the work.

3.14.1 The location of the chlorination and sampling points will be determined by the OWNER and ENGINEER in the field. Taps for chlorination and sampling shall be uncovered and backfilled by the CONTRACTOR, as required. The general procedure for chlorination shall

be first to flush all dirty or discolored water from the lines, and then introduce chlorine in approved dosages through a tap at one end, while water is being withdrawn at the other end of the line. The chlorine solution shall remain in the pipeline for a minimum of 24 hours.

3.14.2 Following the chlorination period, all treated water shall be flushed from the lines at their extremities, and replaced with water from the distribution system. Bacteriological sampling and analysis of the replacement water shall then be made after the replacement water has occupied the chlorinated pipeline for a minimum of 16 hours. Bacteriological analysis shall be completed by a state-certified laboratory in full accordance with AWWA C651. The CONTRACTOR shall rechlorinate at no cost to the OWNER or DEPARTMENT if the test fails to achieve satisfactory results, as approved by the ENGINEER. The line shall not be placed in service until the requirements of the NHDES, Water Supply Engineering Bureau are met.

3.14.3 Special disinfection procedures, such as soaking or swabbing approved by the ENGINEER, shall be used in connections to existing mains and where the method outlined above is not practical.

3.15 Spare Parts. The CONTRACTOR will be required to have on-site, at all times, the following spare parts:

11 ¼ ° bends	2 for each size pipe
22 ½ ° bends	2 for each size pipe
45° bends	2 for each size pipe
Solid sleeve couplings	2 for each size pipe
SDR 35 PVC pipe	2 lengths of 6" and 8"
Dresser couplings	2 for each size pipe
Retainer glands	2 for each size pipe

Method of Measurement

4.1 Pipe of the kind, type and size specified (including temporary pipe and service pipe) will be measured by the linear foot to the nearest 0.1 foot of furnished, installed and operational water pipe. Measurements will be taken along the centerline of the pipe, end to end, with no deductions for any valves and fittings.

4.1.1 Common structure excavation required for the removal and disposal of unsuitable material below the typical trench section will be measured as provided in Section 206.

4.1.2 Rock structure excavation and common structure excavation exploratory will be measured as provided under Section 206.

4.1.3 Granular backfill (sand) to replace material excavated under 5.2.1 will be measured as provided in Section 209.

4.2 Supported pipe including support assemblies, pipe of the kind, type and size specified, shall be measured by the linear foot to the nearest 0.1 foot of furnished, installed, and operational water pipe. Measurements will be taken from the backwall of abutment A to the back wall of

abutment B along the centerline of the pipe, end to end, with no deductions for any valves and fittings.

4.3 Encased pipe, including encasement of the kind, type and size specified, will be measured by the linear foot to the nearest 0.1 foot.

4.4 Valves, fittings, chlorine injection taps, corporation stops, and curb stops will be measured by the each for the number of units furnished and installed.

4.4.1 Tapping sleeves and valves with box, including thrust block and appurtenances, will be measured by the each for the number of units furnished and installed.

4.4.2 Adjusting water gates and shutoffs set by others will be measured by the number of units adjusted.

4.5 Hydrants including valve, pipe fittings, extensions and any other incidental work, including excavation and backfill, will be measured by the number of units furnished and installed, adjusted/relocated, reset, or removed.

4.6 Board insulation will be measured by the square yard to the nearest 0.1 of a square yard of area covered for the thickness specified.

4.6.1 Round insulation or round insulation with jacketing will be measured by the linear foot to the nearest 0.1 linear foot for the thickness specified. Measurement will be from end to end along the top (or bottom) of the insulation.

4.7 Temporary water system will be measured by the unit of furnished, installed, operational, and removed temporary pipe.

4.8 The ENGINEER must be involved in and approve of the measurement of any pay item.

Basis of Payment

5.1 The accepted quantity of pipe of the kind and type specified (including temporary pipe and service pipe) will be paid for at the contract unit price per linear foot complete in place, with the following stipulations:

5.1.1 Common structure excavation required for the removal of unsuitable material below the typical trench section will be paid for as provided in 206.

5.1.2 All rock structure excavation, any common structure excavation exploratory and any common structure excavation below the depth specified in 206.4.1.1 shall be paid as provided in 206.

5.1.3 Granular backfill (sand), to replace material excavated under 5.1.1 only, will be paid as provided in 209.

5.2 The accepted quantity of supported pipe, including support assemblies shall be paid at the contract price per linear foot complete in place as shown on the plans and specified herein, and

shall include furnishing and installing pipe, insulation, hangers, insulation jacketing, rollers and fittings, expansion joints and all other work required for or incidental to the completion of this item.

5.3 The accepted quantity of encased pipe, including encasement, will be paid at the contract price per linear foot complete in place as shown on the plans and specified herein, and shall include furnishing and installing casing pipe, assembly of casing pipe, excavation, bedding, blanket, backfill, furnishing and installing carrier pipe, pipe spacers, bulkheads and appurtenances, and all other work required for or incidental to the completion of this item, except as noted below.

5.4 The accepted quantity of valves, fittings, chlorine injection taps, corporation stops, and curb stops will be paid for at the contract unit price of each of the kind, type, and size specified complete in place.

5.4.1 Tapping sleeves and valves with box, including thrust block and appurtenances, will be paid for at the contract unit price for each complete in place.

5.4.2 The accepted quantities of adjusting water gates and shutoffs set by others will be paid for at the contract unit price per each complete in place.

5.5 The accepted quantity of hydrants will be paid for at the contract unit price for each complete in place.

5.6 The accepted quantity of board insulation, including excavation and backfill, will be paid for at the Contract unit price per square yard, complete in place.

5.6.1 The accepted quantity of round insulation or round insulation with jacketing, including all appurtenances needed to install the insulation around the pipe, will be paid for at the Contract unit price per linear foot, complete in place.

5.7 Bituminous pavement incorporated into the final pavement structure, or remaining over a winter maintenance season, will be paid for under Item 403.12 – Hot Bituminous Pavement, Hand Method.

5.8 Any work not specifically having a pay item and necessary for a complete and operational water system, as herein specified and called for on the plans, shall be considered incidental and subsidiary to the pay item work specified herein. The work considered as subsidiary and not separately paid for shall include but not be limited to the following:

5.8.1 Pipe material handling and storage on site.

5.8.2 Excavation, bedding, blanket and backfill.

5.8.3 Sheeting, shoring, and dewatering of trenches (if applicable).

5.8.4 Maintaining existing water service.

5.8.5 Concrete thrust blocks, thrust restraining systems.

5.8.6 Removal and decommissioning of temporary water system.

5.8.7 Restoration of property including loam and seed, utilities, and water lines (if applicable).

5.8.8 Pressure testing, disinfection, flushing.

5.8.9 Restoration of and connections to existing water systems including couplings.

5.8.10 Plugging abandoned water pipe.

5.8.11 Temporary bituminous pavement for the temporary trench patch.

5.8.12 Saw cutting of existing pavement.

5.8.13 Record plans.

Key for Item Numbers and Descriptions:

A:

0 – Cement Lined Ductile Iron Pipe (DI) LF

BC: Class

(ie 22 = Cast Iron Class 22, 52 = Ductile Iron Class 52)

DE: Diameter

1 – Cement Lined Ductile Iron Mechanical Joint Pipe (DI-MJ) LF

2 – Polyvinyl Chloride (PVC) LF

BC: Class/SDR

DE: Dimensions

3 – Polyethylene (PE) LF

BC: Class/SDR/CTS

DE: Dimensions

4 – Encased/Supported

B: Trenching Method

1 – Direct Buried/Open-Cut LF

2 – Jacking LF

3 – Supported (w/Support Assemblies) LF

9 – Contractor's Option LF

C: Encasement Material

0 – Cement Lined Ductile Iron Pipe (DI)

1 – Cement Lined Ductile Iron Mechanical Joint Pipe (DI – MJ)

2 – PVC

3 – Polyethylene (PE)

9 – Insulation w/Jacketing

D: Carrying Pipe

0 – Cement Lined Ductile Iron Pipe (DI)

1 – Cement Lined Ductile Iron Mechanical Joint Pipe (DI – MJ)

2 – PVC

3 – Polyethylene (PE)

4 – High Density Polyethylene (HDPE)

E: Size (Inches)

1 – 6"

2 – 8"

3 – 10"

4 – 12”

5 – Service Pipe & Appurtenances

B: Type

0 – Copper Pipe	LF
1 – Corporation Stop	EA
2 – Curb Stop w/Box	EA
3 – Service Saddle	EA

C: Modifier

0 - Unspecified

1 – Relocate

DE: Diameter

07 – ¾”

10 – 1”

15 – 1.5”

20 – 2”

30 – 3”

6 – Blank

7 – Fittings, Valves, Couplings, Reducers

B: Type

0 – Fittings, Bends, Tees, Solid Sleeves, End Caps	EA
1 – Gate Valves w/Box	EA
2 – Butterfly Valves w/Box	EA
3 – Couplings	EA
4 – Reducers	EA
5 – Air Release Valve w/Vault	EA
6 – Blow-Off Valve	EA
7 – Chlorine Injection Tap	EA
8 – Meter w/Vault	EA

C: Modifier

0 - Unspecified

1 – w/ Tapping Sleeve

2 – Insertion Valve

9 – (Supplied By Others)

DE: Diameter

8 – Various

B: Type

1 – Hydrant	EA
2 – Dry Standpipe (Bridge)	U
3 – Dry Hydrant	U
4 – Hydrant Only	U

C: If B = 2, then dimensions

1 – Adjust/Relocate

2 – Reset

3 – Reserved

4 – Remove

5 – Reserved

9 – (Supplied By Others)

DE: Dimensions

9 – Various

B: Description

0 – Adjusting

C: Type

0 – Water Gates and Shutoffs

EA

DE: Modifier

01 – Set by Others

5 – Insulation

C: Type

1 – Board Insulation

SY

D: Thickness (inches)

2 – Round Insulation

LF

DE: Diameter (inches)

3 – Round Insulation w/Jacketing

LF

DE: Diameter (inches)

9 – Temporary Water

C: Type

1 - Main

LF

2 – System

U

3 – Service

LF

DE: Diameter

Pay items and units (ENGLISH):

611.02206	6" CEMENT LINED CAST IRON WATER PIPE, CL 22	LF
611.02210	10" CEMENT LINED CAST IRON WATER PIPE, CL 22	LF
611.02310	10" CEMENT LINED CAST IRON WATER PIPE, CL 23	LF
611.05206	6" CEMENT LINED DUCTILE IRON WATER PIPE, CL 52	LF
611.05212	12" CEMENT LINED DUCTILE IRON WATER PIPE, CL 52	LF
611.05308	8" CEMENT LINED DUCTILE IRON WATER PIPE, CL 53	LF
611.23508	8" PVC PIPE, SDR 35	LF
611.23512	12" PVC PIPE, SDR 35	LF
611.31108	8" HDPE PIPE, SDR 11	LF
611.31112	12" HDPE PIPE, SDR 11	LF
611.50007	3/4" COPPER SERVICE CONNECTION	LF
611.50010	1" COPPER SERVICE CONNECTION	LF
611.50107	RELOCATE 3/4" COPPER SERVICE CONNECTION	LF
611.51007	3/4" CORPORATION STOP	EA
611.51010	1" CORPORATION STOP	EA
611.52007	3/4" CURB STOP W/BOX	EA
611.52010	1" CURB STOP W/BOX	EA
611.70006	6" FITTING	EA
611.70908	8" FITTING (SUPPLIED BY OTHERS)	EA
611.71006	6" GATE VALVE W/BOX	EA
611.71012	12" GATE VALVE W/BOX	EA
611.71112	12" TAPPING SLEEVE AND VALVE WITH BOX	EA
611.71212	12" INSERTION VALVE	EA
611.72010	10" BUTTERFLY VALVE W/BOX	EA
611.77	CHLORINE INJECTION TAP	EA
611.81	HYDRANT	EA

611.811	ADJUST/RELOCATE HYDRANT	EA
611.832	RESET DRY HYDRANT SYSTEM	U
611.90001	ADJUSTING GATES AND SHUTOFFS SET BY OTHERS	EA
611.9514	4" WATER MAIN BOARD INSULATION	LF
611.99306	6" TEMPORARY WATER SERVICE	LF