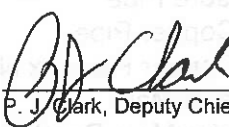


To: MODIFIED BY EB 01-025 EFFECTIVE 5/4/01 & EI 02-005 EFFECTIVE 7/11/02 SUPERSEDED BY <i>EB 02-024</i> EFFECTIVE 7/11/02		New York State Department of Transportation ENGINEERING INSTRUCTION	EI 00-038
Title: STANDARD SPECIFICATIONS - WATER SUPPLY UTILITIES			
Distribution: ☒ Manufacturers (18) ☒ Surveyors (33) ☒ Main Office (30) ☒ Consultants (34) ☒ Local Govt. (31) ☒ Contractors (39) ☒ Regions/Agencies (32) ☐ ()		Approved:  P. J. Clark, Deputy Chief Engineer, Design 12/29/00 Date	

ADMINISTRATIVE INFORMATION

This Engineering Instruction (EI) may be implemented immediately as a project's schedule permits, but shall be implemented for PS&E's submitted for the letting of July 5, 2001. This EI does not supersede any previous issuances.

PURPOSE

This EI issues changes and additions to the Standard Specifications of January 2, 1995. Minor revisions are made to Sections 203 and 206, and new Section 663 - Water Supply Utilities, Subsection 715-13 and Section 722-Water Supply are issued. New sections 659 - Telecommunications Utilities, 661 - Electric Utilities, 662 - Gas, Oil and Steam Utilities and 664 - Sanitary Utilities are also issued. The latter new sections do not provide any detailed specifications, but provide a structure to identify and organize special specifications. Section 660 - Utilities remains unchanged because numerous current special specifications reference this section. Section 663 is supported by standard sheets M663-1 through M663-7, issued by EB 00-072.

DISAPPROVED PAY ITEMS

04203.07	M	Sand Backfill
08203.070101	M	Sand Backfill (Type 1B)
08203.0701	M	Sand Backfill (Screenings)
08203.0702	M	Cushion Sand Backfill
05203.09	M	Select Granular Fill (PVC Water Line)
11615.6010	M	1.5 NPS Water Tap
11615.6015	M	2 NPS Water Tap
11615.6016	M	4 NPS Water Tap
11615.6040	M	Curb Gate Valve, 2 NPS
11615.6050	M	Wet Connection - 2 NPS
11615.6061	M	Steel Water Pipe, 1.5 NPS
11615.6062	M	Steel Water Pipe, 2 NPS
11615.6080	M	Precast Water Meter Structure
11615.6091	M	Gate Valve, 2 NPS
11615.609130	M	Gate Valve, 3 NPS
11615.609140	M	Gate Valve, 4 NPS
11615.6092	M	PVC Water Pipe, 1 NPS
11615.609250	M	PVC Water Pipe, 1.25 NPS
11615.609275	M	PVC Water Pipe, 0.75 NPS
11615.6093	M	PVC Water Pipe, 1.5 NPS
11615.6094	M	PVC Water Pipe, 2 NPS
11615.6096	M	PVC Water Pipe, 3 NPS
11615.6098	M	PVC Water Pipe, 4 NPS
11615.90	M	Precast Water Meter Structure
11615.99nn	M	Water Spray Control/Regulating Valve, Blow Off, Globe Valve

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11660.01	M	Furnish Building Water Service
11660.011101	M	Furnish Building Water Service
03660.0130xx	M	DI Water Pipe, xx NPS, Polyethylene Encased
01660.035n	M	PE Pressure Pipe
07660.03xx	M	Type K Copper Pipe
08660.03xx	M	Type K Copper Pipe, xx NPS
11660.04xx	M	Steel Water Main
11660.04xx10	M	Steel Water Main Bends and Reducers
11660.044890	M	Remove 48 NPS Steel Water Main and Appurtenances
11660.047290	M	Remove 72 NPS Steel Water Main and Appurtenances
25660.0502	M	Harnessed Joints on Existing 16 NPS Water Main
05660.0530	M	Prestressed Concrete Cylinder Pipe, 750mm
05660.0536	M	Prestressed Concrete Cylinder Pipe, 900mm
05660.0542	M	Prestressed Concrete Cylinder Pipe, 1050mm
05660.0548	M	Prestressed Concrete Cylinder Pipe, 1200mm
02660.06XX	M	DI Water Pipe, xx NPS
04660.06XX	M	DI Water Pipe, xx NPS
07660.06XX	M	DI Water Pipe, xx NPS
08660.06XX	M	DI Cement Lined Water Pipe, xx NPS
10660.06XX	M	DI Water Pipe, xx NPS
08660.061290	M	Remove Existing 12 NPS Temporary Water Main
08660.061299	M	F&I 12 NPS Temporary Water Main
10660.0650	M	DI Water Pipe Specials
10660.06nn	M	DI Water Pipe (CL54) (nn = xx NPS +50)
10660.066605	M	Restrained Joint DI Water Pipe, 16 NPS
10660.067405	M	Restrained Joint DI Water Pipe, 24 NPS
10660.067505	M	Restrained Joint DI Water Pipe Specials
08660.07XX	M	Water Gate Valves and Valve Boxes
08660.07XX01	M	Inserting Valves xx NPS and Valve Boxes
02660.0820	M	DI Water Line Specials
04660.0901xx	M	Service Valve and Valve Box
05660.09xx	M	Butterfly Valves xx NPS and Valve Boxes
10660.09xx	M	Butterfly Valves xx NPS and Valve Boxes
03660.10	M	Altering Water Valve Boxes
04660.10	M	Adjust Existing Valve Boxes
02660.1001	M	Altering Elevations of Existing Valve Boxes
05660.1001	M	Adjust Elevation of Water Main Valve Box
07660.1001	M	Change Elevation Gate Valve Boxes
01660.1002	M	Adjust Water Valve Box and Valve Boxes
02660.1002	M	Altering Elevations of Existing Curb Valve Boxes
07660.1002	M	Relocate Gate Valves and Valve Boxes
08660.1002	M	Adjust Water Valve Boxes for Resurfacing Work
07660.1003	M	Relocate House Service Shutoff Valves and Valve Boxes
10660.10xx	M	Gate Valve and Valve Box, xx NPS
01660.1005	M	Reestablish Service Connection, Water
07660.1005	M	Gate Valve and Box
07660.1005xx	M	Gate Valve and Valve Box, xx NPS

10660.1006	M	F&I Gate Valve & Valve Box, 6 NPS
10660.1008	M	F&I Gate Valve & Valve Box, 8 NPS
10660.1010	M	F&I Gate Valve & Valve Box, 10 NPS
10660.1012	M	F&I Gate Valve & Valve Box, 12 NPS
08660.1010	M	Altering Elevation of Water Valve Boxes
10660.1024	M	Install Gate Valve and Valve Box, 4 NPS
10660.1026	M	Install Gate Valve and Valve Box, 6 NPS
10660.1028	M	Install Gate Valve and Valve Box, 8 NPS
10660.1030	M	Install Gate Valve and Valve Box, 10 NPS
10660.1032	M	Install Gate Valve and Valve Box, 12 NPS
10660.1036	M	Install Gate Valve and Valve Box, 16 NPS
10660.1050	M	Adjust Water Valve Castings (All Sizes)
10660.1055	M	Adjust Water Valve Castings (Adj Ring Opt)
01660.1097	M	Replace Existing Valve Boxes
04660.11zz	M	Reestablish Water Service, zz NPS
07660.1102	M	Change Elevation House Service Shut-Off Valve Boxes
03660.12	M	Reestablish Water Service Connection
04660.12	M	Reestablish Water Service Connection
09660.1201	M	Reestablish Water Service Connection
08660.1202	M	Water Service Connections
10660.1295	M	Reestablish Water Service Connection
10660.1299	M	Reestablish Water Service Connection
15660.13	M	Relocate Hydrant
08660.1301	M	Relocate Hydrant
08660.1302	M	Relocate Hydrant Assy Complete
08660.1303	M	F & I Hydrant
08660.130301	M	Adjust Hydrant Elevation
08660.1304	M	F & I Hydrant (Furnished By Others)
10660.1310	M	Replace Hydrant
01660.1320	M	Remove and Store Hydrant
02660.1323	M	Remove Hydrant
01660.1401	M	F & I Yard Hydrant
02660.1401	M	F & I Hydrant
07660.1402	M	Hydrant
04660.1405	M	F & I Hydrant
10660.1410	M	Replace Hydrant
10660.1411	M	Replace Hydrant
08660.1480	M	Reset Standpipe
10660.1496	M	Replace Hydrant (Republic Airport)
03660.16	M	Cut Off Discontinued Service Laterals
02660.1601	M	Shut off Water Service at Main
04660.16zz	M	Water Service Pipe, zz NPS
08660.16xx	M	Line Stop and Tapping Fitting, xx NPS
10660.17xx	M	Tapping Valve and Valve Box, xx NPS X xx NPS
02660.1725	M	Tapping Valve and Valve Box, 12 NPS X 12 NPS
02660.18xx	M	Disconnect and Cap Existing Water Main, xx NPS
04660.18	M	Cut and Plug Existing Water Main
08660.18xyy	M	Tapping Sleeve, Valve and Box, xx NPS X yy NPS

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07660.1911	M	F & I 100mm Insulation for Water Main
01660.20	M	Replace Existing Curb Box
05660.20	M	Relocate Curb Stops and Boxes
08660.20	M	Relocate Curb Box, Complete
08660.2001	M	Alter Elevation of Curb Boxes
07660.20zz	M	Curb Stop and Curb Box, zz NPS
05660.25	M	Prefab Insulated Steel Water Main (Structures)
05660.25xx	M	Prefab Insulated Steel Water Main (Structures) xx NPS
07660.2508	M	Steel Water Main (Structures), 8 NPS
07660.2510	M	Steel Water Main (Structures), 10 NPS
11660.281101	M	Baker Coupling for Steel Water Main
07660.29zz	M	Corporation Stop, zz NPS
04660.30	M	Pipe Crossing
08660.3512	M	F&I 12 NPS Bridge Mounted Water Main
08660.3516	M	F&I 16 NPS Bridge Mounted Water Main
08660.351624	M	F&I 16 NPS Bridge Mounted Water Main in 24 NPS Casing
04660.41	M	Water Pipe Specials
03660.42	M	F&I Meter Pit Complete, (Class A)
10660.42	M	Relocate Water Meter and Meter Pit (All Sizes)
10660.4210	M	Relocate Water Meter and Construct Vault
05660.43	M	Water Meter Pit
10660.4303	M	Relocate Water Meter in New Meter Pit, Type A
10660.4304	M	Relocate Water Meter in New Meter Pit, Type B
04660.71	M	Temporary Water Main Bypass
11660.72	M	Steel Water Main 72 NPS
05660.77	M	Polyethylene Tube Encasement for Ductile Iron Pipe
05660.79xx	M	PVC Water Pipe, xx NPS (4-12)
05660.79xx	M	PVC Water Transmission Pipe, xx NPS (14-36)
07660.8070	M	Water Main Specials
11660.8072	M	72 NPS Steel Water Main Bends and Reducers
08660.81	M	Water Main Fittings
10660.81	M	Water Main Specials
04662.10xx	M	xx NPS DI, Insulated, Bridge Supported Water Main
08662.3512	M	Temp & Perm, 12 NPS Bridge Supported Water Mains
11663.010101	M	Ductile Cast Iron Water Pipe (BWS) 6 NPS
11663.010201	M	Ductile Cast Iron Water Pipe (BWS) 8 NPS
11663.010301	M	Ductile Cast Iron Water Pipe (BWS) 12 NPS
11663.010303	M	Ductile Cast Iron Water Pipe (BWS) 12 NPS
11663.010401	M	Ductile Cast Iron Water Pipe (BWS) 16 NPS
11663.010501	M	Ductile Cast Iron Water Pipe (BWS) 20 NPS
11663.010502	M	Ductile Cast Iron Water Pipe (BWS) 20 NPS
11663.010601	M	Ductile Cast Iron Water Pipe (BWS) 24 NPS
11663.010701	M	Ductile Cast Iron Water Pipe (BWS) 4 NPS
11663.010502	M	Ductile Cast Iron Water Pipe (BWS) 20 NPS
11663.0502	M	Water Pipe Specials (BWS)
11663.0611	M	Wall Sleeve Assy for 12 NPS Water Main
11663.0620	M	Boltless Ball Joint Flex-Lock Assembly for 20 NPS Water Main
11663.0712	M	12NPS Steel Water Main with Flanged Joints

11663.0716	M	Remove Existing 406mm High Pressure Water Main (BWS)
11663.0812	M	High Deflection Fittings
11663.1101	M	Cap Water Main, All Sizes (BWS)
11663.2011	M	Hydrant Fenders
11663.200201	M	Install Hydrant Assembly
11663.2101	M	Relocate Hydrant Assembly
11663.220101	M	Remove Hydrant Assembly
11663.28xx	M	Install Cast Iron Valves and Valve Boxes (BWS) xx NPS
11663.282002	M	20 NPS Gate Valve & Box (BWS)
11663.2913	M	12 NPS Gate Valve
11663.29xx	M	Ductile Cast Iron Water Valve & Valve Boxes (BWS) xx NPS
11663.2920	M	Ductile Cast Iron Water Valve & Valve Box (BWS) 20 NPS
11663.2921	M	20 NPS Gate Valve (BWS)
11663.3101	M	Reset Valve Boxes, All Sizes (BWS)
11663.320101	M	Remove Valve Boxes, All Sizes (BWS)
11663.40	M	Water Service Connection
11663.5008	M	NPS 8 Steel Water Pipe
11663.5012	M	NPS 12 Steel Water Pipe
11663.5016	M	NPS 16 Steel Water Pipe
11663.5020	M	NPS 20 Steel Water Pipe
11663.6010	M	Aluminum Jacket for Insulated Water Main
11663.6011	M	Wall Sleeve Assy for 12 NPS Water Main
11663.6012	M	50mm Thermal Insulation for Water Main
11663.86	M	Temporary Connection for Water Main Installation

CONTACT

Address questions regarding this issuance to Brian DeWald of the Construction Division at (518)-457-9688.

Make the following **changes** to Addendum No. 2 (Adopted November 4, 1999) to the Standard Specifications of January 2, 1995,:

Page II-5, Line 12, insert the following after "(Spiral Rib Pipe)":
"or plastic pipe"

Page II-5, add the following at the end of Line 17:
"When used as backfill for plastic pipe, 100% of the material shall also pass the 19 mm sieve."

Page II-6, insert the following after line 29:

I. Sand Backfill (Screenings). Materials furnished under these items shall be suitable and conform to the following requirements:

1. Gradation. The material shall have the following gradation:

Sieve Size	Percent Passing by Weight	Sieve Size	Percent Passing by Weight
12.5 mm	100	6.3 mm	90 to 100
75 μ m	0 to 1.0		

2. Soundness. The materials shall be substantially free of shale and soft, poor durability particles.

3. pH. Where the State elects to test for this requirement, a material with pH of less than 5 or more than 10 shall be rejected."

J. Sand Backfill (Type 1B). Materials furnished under these items shall be suitable and conform to the following requirements:

1. Gradation. The material shall have the following gradation:

Sieve Size	Percent Passing by Weight	Sieve Size	Percent Passing by Weight
6.3 mm	100	3.35 mm	90 to 100
180 μ m	0 to 15	75 μ m	0 to 1.0

2. Soundness. The materials shall be substantially free of shale and soft, poor durability particles.

3. pH. Where the State elects to test for this requirement, a material with pH of less than 5 or more than 10 shall be rejected.

K. Sand Backfill (Type 1A). Materials furnished under these items shall be suitable and conform to the following requirements:

1. Gradation. The material shall have the following gradation:

Sieve Size	Percent Passing by Weight	Sieve Size	Percent Passing by Weight
12.5 mm	100	6.3 mm	90 to 100
3.35 mm	0 to 15	75 μ m	0 to 1.0

2. Soundness. The materials shall be substantially free of shale and soft, poor durability particles.

3. pH. Where the State elects to test for this requirement, a material with pH of less than 5 or more than 10 shall be rejected."

Page II-20, delete line 20, and substitute the following:

"203-4.08 Select Granular Fill, Select Structural Fill, Sand Backfill (Screenings), Sand Backfill (Type 1B) and Sand Backfill (Type 1A). Quantities for this work shall be computed...."

Page II-21, insert the following after line 28:

"Sand Backfill (Screenings)
Sand Backfill (Type 1B)
Sand Backfill (Type 1A)"

Page II-22, insert the following after line 36:

"203.22	M	Sand Backfill (Screenings)	Cubic Meter
203.23	M	Sand Backfill (Type 1B)	Cubic Meter
203.24	M	Sand Backfill (Type 1A)	Cubic Meter"

Page II-23, insert the following after line 9:

"206-1.05 Test Pits. The work specified under this item shall include the excavation and backfill of test pits at locations shown in the contract documents, or as directed by the Engineer. Excavation and backfill methods, limits and equipment used shall be approved by the Engineer. This work will not relieve the contractor of the responsibility to locate underground facilities as required under 16 NYCRR 753."

Page II-23, insert the following after line 38:

"206-3.04 Test Pits. The Contractor shall excavate and backfill test pits in order to determine existing underground utility type, size and/or condition where new utility connections to existing facilities are proposed. The Contractor shall excavate and backfill test pits in a manner approved by the Engineer that prevents damage to wrappings, coatings or other protective coverings, such as by hand digging, vacuum excavation or similar non-destructive locating equipment. The limits of the excavation shall be those sufficient to determine existing utility type, size and/or condition."

Page II-24, insert the following after line 39:

"206-4.05 Test Pits. The quantity to be measured for payment will be the number of test holes excavated and backfilled in accordance with the contract documents."

Page II-25, add the following after line 22:

"206-5.05 Test Pits. The unit price bid for this work shall include the cost of furnishing all labor, materials and equipment necessary to excavate and backfill the test pit and replace any pavement, shoulder and sidewalk courses, subcourses, curbs, drives, lawns and other top surfaces required to complete the work."

Page II-25, add the following after line 28:

"206.05 M	Test Pit Excavation	Each"
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Make the following changes to the Standard Specifications of 1995:

Page 6-165, delete "SECTIONS 657 THRU 659 (VACANT)" and replace it with the following:

"SECTIONS 657 AND 658 (VACANT)"

SECTION 659 - TELECOMMUNICATION UTILITIES

659-1 DESCRIPTION. The work in this section shall include special construction required for telecommunications service utilities, including telephone, cellular telephone and cable television that are publicly, privately or cooperatively owned. The extent of work and construction specifications will be covered by special provisions in the contract documents.

659-2 MATERIALS. Materials shall meet the requirements specified by the respective utility company.

659-3 CONSTRUCTION DETAILS

659-3.01 General. The installation and testing procedures shall conform to the requirements specified by the utility company.

659-3.02 Schedule of Work. Work shall be scheduled for minimum interruption of service and must meet the approval of the utility company and the Engineer. A specified advance notice period must be given to the utility company and Engineer prior to interruption of services for construction.

659-3.03 Excavation. The requirements specified in Section 206, Trench, Culvert and Structure Excavation, shall apply.

659-3.04 Backfill. The requirements specified in §203-3.15, Fill and Backfill at Structures, Culverts, Pipes and Conduits and Direct Burial Cables, shall apply.

659-4 METHOD OF MEASUREMENT. As specified in the special specifications.

659-5 BASIS OF PAYMENT. As specified in the special specifications.

Page 6-165, delete "SECTIONS 661 THRU 664 (VACANT)" and replace it with the following:

SECTION 661 - ELECTRIC UTILITIES

661-1 DESCRIPTION. The work in this section shall include special construction required for electric service utilities that are publicly, privately or cooperatively owned. The extent of work and construction specifications will be covered by special provisions in the contract documents.

661-2 MATERIALS. Materials shall meet the requirements specified by the respective electric utility company.

661-3 CONSTRUCTION DETAILS

661-3.01 General. The installation and testing procedures shall conform to the requirements specified by the electric utility company.

661-3.02 Schedule of Work. Work shall be scheduled for minimum interruption of service and must meet the approval of the utility company and the Engineer. A specified advance notice period must be given to the utility company and Engineer prior to interruption of services for construction.

661-3.03 Excavation. The requirements specified in Section 206, Trench, Culvert and Structure Excavation, shall

apply.

661-3.04 Backfill. The requirements specified in §203-3.15, Fill and Backfill at Structures, Culverts, Pipes and Conduits and Direct Burial Cables, shall apply.

661-4 METHOD OF MEASUREMENT. As specified in the special specifications.

661-5 BASIS OF PAYMENT. As specified in the special specifications.

SECTION 662 - GAS, OIL & STEAM UTILITIES

662-1 DESCRIPTION. The work in this section shall include special construction required for gas, oil and steam service utilities that are publicly, privately or cooperatively owned. The extent of work and construction specifications will be covered by special provisions in the contract documents.

662-2 MATERIALS. Materials shall meet the requirements specified by the respective utility company.

662-3 CONSTRUCTION DETAILS

662-3.01 General. The installation and testing procedures shall conform to the requirements specified by the utility company.

662-3.02 Schedule of Work. Work shall be scheduled for minimum interruption of service and must meet the approval of the utility company and the Engineer. A specified, advance notice period must be given to the utility company and Engineer prior to interruption of services for construction.

662-3.03 Excavation. The requirements specified in Section 206, Trench, Culvert and Structure Excavation, shall apply.

662-3.04 Backfill. The requirements specified in §203-3.15, Fill and Backfill at Structures, Culverts, Pipes and Conduits and Direct Burial Cables, shall apply.

662-4 METHOD OF MEASUREMENT. As specified in the special specifications.

662-5 BASIS OF PAYMENT. As specified in the special specifications.

SECTION 663 - WATER SUPPLY UTILITIES

663-1 DESCRIPTION. This work shall consist of the construction or reconstruction of water supply utilities in accordance with these specifications, the contract documents and the standard sheets.

663-2 MATERIALS

663-2.01 General Materials requirements are specified in the following subsections:

Portland Cement Concrete	501
Reinforced Concrete Pipe Classes II, III, IV, V	706-02
Prefabricated Adjustment Rings, Frames and Utility Valve Risers for Drainage Units, Manholes and Utilities	715-13
High Strength Bolts, Nuts and Washers	715-14
Pins and Rollers	715-15
Stainless Steel Connecting Products	715-16
Ductile Iron Water Pipe, Fittings and Encasement	722-01
Steel Water Pipe and Fittings	722-02

Concrete Water Pipe	722-03
Water Valves and Hydrants	722-04
Plastic Water Pipe and Fittings	722-05
Water Service Pipe, Service Valves and Fittings	722-06
Wedge Type Mechanical Restraint Glands	722-07
Insulation for Water Mains	722-08
Steel Pipe	ASTM A53

Materials for water systems shall meet the appropriate American Water Works Association (AWWA) standards and American National Standards Institute (ANSI) specifications, except as modified by these specifications. Asbestos cement pipe or lead tipped gaskets shall not be used. The materials provided shall meet the requirements specified in the "Owner Requirements for Water Mains and Appurtenances".

663-2.02 Concrete. All concrete for thrust blocks and cradles for water mains shall meet the requirements of Class A Concrete in Section 501, Portland Cement Concrete General, except that the requirements for inspection facilities, automated batching controls and recordation will not apply. Class A concrete for thrust blocks and cradles, or other concrete that comes into contact with ductile iron or cast iron materials for water mains, including pipe, fittings, hydrants, valves and valve boxes shall not contain fly ash. The batching, mixing and curing methods and the inspection facilities shall meet the approval of the Department, or its representative. The Contractor may submit, for approval by Director, Materials Bureau, a mix at least equivalent to the specified Class A Concrete.

663-3 CONSTRUCTION DETAILS

663-3.01 General. All work shall be done in accordance with applicable AWWA standards, the plans and specifications, and shall be completed to the satisfaction of the Engineer. Owner requirements will be specified in the contract documents under the special notes "Owner Requirements for Water Mains and Appurtenances". The Contractor shall make all necessary arrangements, obtain all local permits, and pay all charges as required to satisfy the requirements and regulations of the system Owner. Any required health agency permits will be obtained by the system Owner. The local fire department shall be notified by the Contractor a minimum of forty-eight (48) hours prior to interruption of service to any existing hydrant and within twenty-four (24) hours after a hydrant is placed into service. The Contractor shall notify the Owner, in writing, of any hydrant installed with the drain hole plugged.

The locations of the existing mains as shown on the contract plans are often approximate, as indicated by the underground utility quality level designation. Where new water main connections, not including service connections of 2 NPS and smaller, to existing facilities are proposed, existing utility type, size and/or condition shall be determined by excavating test pits prior to the start of installation. The Contractor shall submit details for connecting existing pipe(s) to the proposed main(s) and drawings or catalog cuts of water pipes and appurtenances comprising the work to the Engineer, with sufficient time to allow for local approval, prior to ordering materials. The Contractor shall prepare and submit schedules of the proposed sequence of work for approval by the Engineer in accordance with §108-01. At any time pipe laying is not in progress, the open ends of the working pipe shall be kept plugged and watertight with plugs, stoppers or other means acceptable to the Engineer.

The Engineer shall be notified immediately of the discovery of any suspected asbestos-containing water supply utilities not identified in the contract documents. Any asbestos-containing water supply utility not identified in the contract documents and encountered during the work shall not be disturbed. No cutting, grinding or any disturbance of asbestos-containing utility shall be performed under the items in this section.

663-3.02 Removals. Removal of existing water main shall include the removal of all appurtenances and fittings within the trench excavation width for that size pipe as shown on the standard sheets, except that an existing concrete thrust block need not be removed unless its presence will interfere with proposed work. Existing items requiring removal and disposal shall become the property of the Contractor and shall be removed from the work site to the satisfaction of

the Engineer. Existing items requiring removal and storage shall be removed and stored by the Contractor for pick up by the Owner. The Contractor shall exercise care in removing items to be stored to prevent damage. Unusable or unwanted material shall be disposed of by the Contractor. Removal of an existing water service connection shall include the removal of the service pipe from the main to the highway boundary or other location(s) shown in the contract documents and the removal of the curb stop and curb box. Unless otherwise noted in the Owner requirements, corporation stops shall be removed and the hole plugged with a solid brass or iron plug.

Disturbance of asbestos-containing water supply utility requires use of a New York State Department of Labor (NYSDOL) licensed contractor using NYSDOL certified asbestos handlers. Removal of asbestos-containing water supply utility encountered during excavation or exploration shall not be performed under the removal items contained in this section.

663-3.03 Shutdowns. A shutdown of any portion of a water system to make connections to existing mains shall be made with the consent of the system Owner. Approvals for shutting off a water service shall be obtained from the Engineer. The Contractor shall give a minimum of forty-eight (48) hours notice to each customer prior to interruption of service, unless the system Owner requires a longer notification period. Such notice may be provided by posting a written notice at the entrance to the building from the street. When a residential service is to be interrupted for more than eight (8) hours, the Contractor shall, when directed by the Engineer, provide a temporary water service. When a commercial service is to be interrupted for more than 60 minutes during the establishment's normal business hours, the Contractor shall, when directed by the Engineer, provide a temporary water service. A temporary water service shall be required only when specified in the plans, or when directed by the Engineer, and will then be paid for under the Temporary Water Service item.

663-3.04 Excavation and Backfill. The Contractor shall meet the requirements specified in Section 206, Trench, Culvert and Structure Excavation, except as modified by the contract documents. The payment width of trench excavation shall be as shown on the standard sheet for this section. Bell holes shall be excavated no larger than required to allow joint assembly and to allow the pipe to lay flat in the trench. Trenches for pipe sizes from 3 NPS to 24 NPS shall provide a minimum of 150mm clearance to rocks or boulders and trenches for pipe sizes from 30 NPS to 64 NPS shall provide a minimum of 225mm clearance to rocks or boulders. Longitudinal excavation and backfill limits shall be 1.0 m beyond the connection or termination point with an existing main, and 0.6 m beyond the barrel of a hydrant.

The Contractor shall meet the requirements of §203-3.15, Fill and Backfill at Structures, Culverts, Pipes, Conduits, and Direct Burial Cables. Materials containing fly ash or slag, including Controlled Low Strength Material that contains flyash, shall not be used as backfill or allowed to come into contact with ductile iron or cast iron materials for water mains, including pipe, fittings, hydrants, valves and valve boxes. Bedding and embedment material used for backfill around plastic pipe shall have a maximum particle size of 19mm.

663-3.05 Thrust Restraint. Thrust forces produced in water mains at changes in direction or size shall be restrained in order to keep the main intact. Thrust restraint may be provided by restrained joints, retainer glands, thrust blocks or tie rods, as required by the Owner. The minimum required thrust block areas and volumes shown on the standard sheet are for a standard water system test pressure, soil bearing capacity and soil unit weight. These values shall be adjusted for higher water system test pressure requirements or different soil conditions in the field. The Contractor shall be responsible for providing the proper size and type of thrust restraint, based on the standard sheets, the Owner requirements and the contract plans. Thrust restraint for sizes larger than 24 NPS will be designed on a case by case basis, and will be shown in the contract documents.

663-3.06 Pipe.

A. General. Pipe shall be laid in close conformity to line and grade having a full, firm and even bearing at each joint and along the entire length of pipe. Pressurized pipe need not be laid with the bells upstream. Only gaskets certified by the Manufacturer for use with the type of pipe or fitting installed shall be used. Existing gray iron pipe

shall be cut with an abrasive pipe saw, rotary wheel cutter, guillotine pipe saw, milling wheel saw or a hydraulic squeeze cutter. The Contractor shall repair, realign or replace pipe that is damaged or disturbed through any cause occurring prior to acceptance of the contract. Pipe which is defective from any cause, including damage caused by handling and determined by the Engineer to not be repairable, will be unacceptable for installation and shall be replaced as directed by the Engineer at no cost to the State.

B. Ductile Iron Cement Lined Water Pipe. Ductile iron water mains shall be installed in accordance with AWWA Standard C600. Unless otherwise noted in the Owners requirements, ductile iron pipe up to 12 NPS shall be pressure class 350 or thicker, and the cement lining shall be 1.6 mm thick. Unless otherwise noted in the Owners requirements, ductile iron pipe from 14 NPS to 24 NPS shall be pressure class 250 or thicker, and the cement lining shall be 2.4 mm thick. Unless otherwise noted in the Owners requirements, ductile iron pipe from 30 NPS to 64 NPS shall be pressure class 250 or thicker and the cement lining shall be 3.2 mm thick. Ductile iron pipe joints shall be installed with deflections not exceeding that listed in the table on the standard sheet. Ductile iron pipe selected for cutting shall be field gauged in order to ensure that after smoothing and beveling (if required), the cut end will provide a sound joint. Ductile iron pipe shall be cut with an abrasive pipe saw, rotary wheel cutter, guillotine pipe saw or milling wheel saw. Ductile iron pipe shall be cut with an oxyacetylene torch only when recommended by the Manufacturer and approved by the Engineer. Cut ends and rough edges shall be ground smooth. Cut ends shall be beveled if using push-on joints. The Contractor shall ensure that the cement mortar lining of ductile iron pipe is not damaged during cutting operations.

C. Steel Water Pipe. Steel water pipe shall be installed in accordance with the contract documents and the Owner requirements. Steel pipe may be cut with an abrasive pipe saw, rotary wheel cutter, guillotine pipe saw or milling wheel saw. Steel pipe shall be welded in accordance with AWWA Standards and with the provisions of the "NYS Steel Construction Manual". Fittings for steel pipe shall be shop fabricated in accordance with AWWA Standard C208. Linings and coatings shall be installed in accordance with the appropriate AWWA Standard for the specified material.

D. Concrete Water Pipe. Concrete water pipe shall be installed in accordance with the contract documents and the Owner requirements.

E. Plastic Water Pipe. Plastic water mains shall be installed in accordance with AWWA Standard C605. Unless otherwise noted in the Owners requirements, plastic water pipe shall be pressure class 150. Plastic water pipe may be cut with a hand saw, circular saw or similar equipment. After cutting plastic water pipe, ends shall be smoothed or beveled similar to factory ends to provide sound joint connections. Plastic water pipe shall be re-marked with an insertion line to allow proper joint make-up. Unless otherwise noted in the Owners requirements, plastic water pipe shall be installed with a coated tracing wire above the pipe to facilitate location. A portion of the wire shall be stripped and firmly connected to valves, hydrants, corporation stop and curb stops to provide electrical connectivity.

F. Bridge Mounted Water Pipe. Water pipe shall be installed on a bridge in accordance with the contract plans. This shall include, but is not limited to, expansion devices, rollers, chairs, connectors, insulation, insulation covering and sleeves.

G. Handling and Assembly of Pipe. Pipe and fittings shall be inspected prior to placement. The inside of pipe, fittings and existing water mains shall be kept free of dirt and foreign material. If dirt or potentially contaminated water has entered the inside of a water main, the main shall be cleaned and disinfected prior to placement to facilitate the disinfection process on the completed installation. Pipe and fittings shall be lowered into place, and shall not be rolled, dropped or allowed to fall into a trench or pit.

663-3.07 Polyethylene Encasement and Insulation

A. Polyethylene Encasement. When called for in the contract documents, ductile-iron pipe shall be polyethylene encased in accordance with the methods outlined in AWWA Standard C105.

B. Insulation for Buried Water Pipe. When called for in the contract documents, insulation shall be installed in accordance with the contract plans and the Manufacturer's recommendations. Insulation for underground installation shall use appropriate material or be covered with an appropriate waterproof jacket or insulator, as specified in the Owner requirements.

663-3.08 Valves & Valve Boxes.

A. General. Valves shall have an asphaltic or epoxy coating as required under AWWA Standard C509 or C515. Valves shall open in the direction specified in the Owner requirements. Valves shall be lowered into place, and shall not be rolled, dropped or allowed to fall into a trench or pit. Valves shall not be lifted or moved by the valve stem.

B. Valve Installation. Valves shall be installed where shown on the contract plan during the progress of the pipe laying. Valves shall be laid with full, firm and even bearing. Bearing shall be provided by concrete blocks, or a minimum of 150mm of well-compacted granular fill or crushed stone, as required in the Owner requirements or as shown on the plans.

C. Handling of Removed or Relocated Valves. All valves shown on the plans to be removed or relocated shall be carefully detached, cleaned and stored in locations acceptable to the Engineer within the job site. The Contractor shall take special precautions to prevent damage to the valve during disconnection, movement and reinstallation.

D. Valve Relocation. Valves shall be removed from the existing location, checked, all foreign material removed from the interior and placed in operating condition before reinstallation. Exterior rust and corrosion shall be removed and the valve exterior recoated with an asphaltic coating prior to installation.

E. Valve Boxes. Unless otherwise noted in the Owner requirements, valve boxes shall be slide type adjustable, set plumb over the center of the valve and to the proper grade. Any valve box which has moved sufficiently from the original position so as to prevent the application of the valve key shall be reset by the Contractor at no additional cost to the State. New valve box covers shall be cast with the word "WATER" on the top as a means of identification.

663-3.09 Hydrants.

A. General. Each hydrant shall include bonnet, upper barrel, lower barrel and shoe with all internal operating parts. Hydrants shall be dry-barrel, traffic type, incorporating a frangible connection on the hydrant barrel or at the groundline joint and on the operating rod. The outside of the hydrant upper barrel shall be painted with a minimum of one coat of primer and one finish coat of industrial enamel in the color noted in the Owner requirements or to match existing hydrants if not noted. Unless otherwise noted in the Owner requirements, all hydrants shall have a 5 NPS main valve and be equipped with a 4½ NST steamer nozzle and two 2½ NST hose nozzles. Non-operational hydrants shall be bagged or covered, in a manner acceptable to the Engineer, until they are tested and placed in service.

B. Hydrant Installation. Hydrants shall be installed during the laying of pipe. Hydrants shall be restrained, typically from the main to the hydrant shoe, using one of the methods outlined under §663-3.05 "Thrust Restraint". Hydrants shall be set plumb at the proposed locations. The groundline marked on the hydrant, or identified by the manufacturer using an offset from a point on the hydrant, shall be within 25 mm above or below finished grade. The hydrant shall be installed so that no portion of the lower barrel, (that portion remaining if the hydrant top is broken off) extends more than 100 mm above grade. The measurement will be taken over a 1.5 m horizontal span

when a change in grade occurs within 1.5 m of the hydrant. Hydrant drainage material meeting the specifications of §703-02, Table 703-4, Size Designation 1 or 2, shall be placed around the hydrant at the drip location (0.2 m³ minimum) to drain the barrel, except as noted on the standard sheets or the contract plans. Hydrant barrels shall be rotated so that the steamer nozzle is facing the roadway, unless otherwise noted in the contract documents.

C. Handling of Removed or Relocated Hydrants. All hydrants shown on the plans to be removed or relocated shall be carefully detached, cleaned and stored in locations designated by the Engineer within the job site. The Contractor shall take special precautions to prevent damage to the hydrant assembly during disconnection, movement and reinstallation.

D. Hydrant Relocation. Hydrants shall be removed from the existing location, checked, all foreign material removed from the interior of the barrel and placed in operating condition before reinstallation. Exterior rust and corrosion shall be removed and the hydrant repainted the color specified by the Owner prior to reinstallation. When the hydrant is ready for service, the hydrant shall be opened and closed to verify that all parts are in working condition. The barrel interior shall be inspected for proper drainage after reinstallation is completed.

663-3.10 Hydrant Fenders. Fenders shall be installed where shown on the contract plans, in accordance with the standard sheets.

663-3.11 Dry Hydrants. Dry hydrants shall be furnished and installed in accordance with the contract documents.

663-3.12 Tapping Sleeve, Valve & Valve Boxes and Line Stop & Tapping Fittings. Fittings shall be installed in accordance with the Manufacturers recommendations. All valves shall be installed in accordance with the requirements of §663-3.08.

663-3.13 Bolted, Sleeve Type Couplings. All couplings shall meet the requirements of AWWA Standard C219.

663-3.14 Iron Water Main Fittings. All fittings shall be compact ductile iron (AWWA C153) unless specifically required otherwise in the Owner requirements. When approved by the Owner, the Contractor may provide a comparable full body fitting (AWWA C110) when not specifically required.

663-3.15 Wedge Type Mechanical Restraint Glands. Glands shall be installed in accordance with the Manufacturer's recommendations, using break away wedge bolts. If a gland needs to be moved or adjusted, the Contractor shall reinstall the wedges using a torque indicating wrench to within the torque range recommended by the Manufacturer.

663-3.16 High Deflection Restrained Joint Fittings. All fittings shall be compact ductile iron (AWWA C153) unless specifically required otherwise in the Owner requirements.

663-3.17 Water Service Connections. A water service connection shall include the installation of everything, except water service pipe, required to provide a connection from a main to a customer at the highway boundary, including corporation stop, curb stop, curb box, tapping sleeve or saddle, if required, and all necessary fittings.

Taps should be a minimum of 600mm from a pipe end. Multiple taps should be a minimum of 450mm apart, measured along the axis of the main. If taps are made at the 2 or 10 o'clock positions, the Contractor shall ensure that the high point in the water service pipe meets the minimum cover requirement. Taps greater than 2 NPS shall be made using a tapping sleeve and valve. For ductile iron pipe, unless otherwise noted in the Owner requirements, maximum allowable direct tap sizes shall be as shown in Table 663-1. For plastic pipe, unless otherwise noted in the Owner requirements, taps up to NPS 1 may be direct tapped into a main, and taps from 1-1/4 NPS to 2 NPS shall be tapped using a tapping saddle.

Table 663-1
MAXIMUM ALLOWABLE DIRECT TAP SIZE FOR DUCTILE IRON PIPE (NPS)

Pipe Size (NPS)	Pressure Class		
	250	300	350
4	--	--	3/4
6	--	--	1
8	--	--	1
10	--	--	1
12	--	--	1-1/4
14	1-1/4	1-1/2	1-1/2
16	1-1/2	2	2
18	2	2	2
20	2	2	2
24	2	2	2

Note: All thickness class sizes of ductile iron pipe may be direct tapped.

Unless otherwise noted in the Owner requirements, water service pipe shall be Type K copper. Unless otherwise noted in the Owner requirements, polyethylene water service pipe shall be installed with a coated tracing wire to facilitate location. A portion of the wire shall be stripped and firmly connected to the corporation stop and the curb stop to provide electrical connectivity.

The Contractor will have the option to install water service pipe using boring, drilling or other trenchless method. Trenchless installation shall be performed in a manner acceptable to the Engineer. Water service pipe installed using a trenchless method shall be installed in a single length free of couplings or other fittings over that length.

663-3.18 Water Meter Pits, Type A. All pits shall be furnished in accordance with details in the contract documents and the Owner requirements. Type A pits are concrete or masonry structures capable of holding water meters and valves, and allow personnel entry for service and repair. Unless otherwise noted in the Owner requirements, meters to be installed in water meter pits will be supplied by the Owner at no cost to the Contractor or to the State.

663-3.19 Water Meter Pits, Type B. All pits shall be furnished and installed in accordance with the standard sheets and the Owner requirements. Unless otherwise noted in the Owner requirements, meters to be installed in water meter pits will be supplied by the Owner at no cost to the Contractor or to the State.

663-3.20 Temporary Water Service for Water Main Installation. The Contractor shall, when called for in the contract documents or directed by the Engineer, provide temporary water service to customers during interruptions caused by water main work. The service may be provided by temporary piping or other method approved by the Engineer.

663-3.21 Adjust Valve Box Elevation. Prior to the placement of the top course and after the placement of the binder course, when required, the Contractor shall install adjustment rings or frames for valve boxes. The Contractor shall be responsible for ensuring that the adjustment rings or frames are compatible with the existing valve boxes. The adjustment ring or frame shall be placed so the valve box cover will not protrude above the finished surface of the pavement, and is no more than 5 mm below finished grade. The Contractor shall have the option of resetting the existing valve box to the required grade.

To ensure a firm and secure fit with the adjustment ring or frame, the seat of the existing valve box shall be free of all foreign material at the time of installation. The entire assembly shall be set on the seat of the existing valve box and secured. The valve box cover shall then be set upon the seat of the adjustment ring or frame. All rings or frames shall be protected from displacement caused by traffic maintained on the roadway or equipment used in the paving operation.

663-3.22 Disconnect and Cap Existing Water Main. Existing water main shall be disconnected and capped in accordance with the contract documents.

663-3.23 Hydrostatic Testing. Hydrostatic pressure and leakage tests shall be performed in accordance with AWWA C600. Prior to formal testing, the mains shall be thoroughly flushed. Hydrostatic pressure and leakage tests shall be made on installations (water mains, valves, fittings, etc.) having diameters larger than 2 NPS. The testing shall include any filling points, sampling points or other appurtenances required to conduct the tests. The total leakage per day shall not exceed the amounts allowable under AWWA C600. Unless otherwise noted in the Owner requirements, the system shall be subjected to the pressure/leakage test with water under a hydrostatic pressure of 1035 kPa for two (2) hours.

663-3.24 Disinfection. Upon completion of all water supply related construction, all mains, valves, hydrants and other appurtenances built under this contract shall be flushed, disinfected and tested for bacteriological quality in accordance with AWWA C651. Tablets shall not be used for chlorination of solvent welded plastic or screwed-joint steel pipe due to danger of fire or explosion from the reaction of joint compounds with calcium hypochlorite.

663-4 METHOD OF MEASUREMENT

663-4.01 Water Pipe. The quantity to be measured for payment will be in meters to the nearest 0.1 m as defined in § 101-32. The measurement for pipe will not include the length of fittings installed.

663-4.02 Water Service Pipe. The quantity to be measured for payment will be in meters to the nearest whole meter as defined in § 101-32. The measurement for pipe will not include the length of fittings installed.

663-4.03 Steel Pipe Bends and Fittings. Steel pipe bends and fittings will be measured in meters of equivalent lengths of steel pipe, to the nearest 0.1 m. The length of bends will be the length of the circular arc using the angle of the bend and the radius of bend used to make the desired connection. The length of special fittings for steel pipe will be the length along the centerline from an intersecting centerline, as in a tee or wye. The lengths may be measured for different diameters on a tee or wye having legs of unequal diameter. Refer to AWWA Standard C208, Figure 1 and Table 1 for lengths.

663-4.04 Bridge Mounted Water Pipe. The quantity to be measured for payment will be in meters to the nearest 0.1 m from a point 1.5 m behind the back surface of each structure abutment or backwall, or to points indicated in the contract documents for installations that do not pass through an abutment or backwall.

663-4.05 Valve & Valve Boxes. The quantity to be measured for payment will be the number of units of each size furnished and incorporated into the work in accordance with the contract documents.

663-4.06 Hydrants. The quantity to be measured for payment will be the number of units furnished and incorporated into the work in accordance with the contract documents.

663-4.07 Hydrant Fenders. The quantity to be measured for payment will be the number of fenders furnished and incorporated into the work in accordance with the contract documents.

663-4.08 Dry Hydrants The quantity to be measured for payment will be the number of dry hydrants, including all necessary pipe and fittings furnished and incorporated into the work in accordance with the contract documents.

663-4.09 Tapping Sleeve, Valve & Valve Boxes; Line Stop and Tapping Fittings; and Bolted, Sleeve Type Couplings. The quantity to be measured for payment will be the number of units of each size furnished and

incorporated into the work in accordance with the contract documents.

663-4.10 Iron Water Main Fittings. The quantity to be measured for payment will be the bare weight of fittings installed, as listed in AWWA Standard C110 or C153, as applicable. Total contract quantity will be measured to the nearest whole kilogram. No measurement will be made for the weight of gaskets, other appurtenant hardware, retainer glands provided solely for thrust restraint or thrust restraints rods. The quantity measured for payment for fittings not listed in the AWWA Standards will be based upon Manufacturer certifications.

663-4.11 Wedge Type Mechanical Restraint Glands and High Deflection Restrained Joint Fittings. The quantity to be measured for payment will be the number of units furnished and incorporated into the work in accordance with the contract documents.

663-4.12 Polyethylene Encasement for Water Mains and Insulation for Water Mains. The quantity to be measured for payment will be the number of meters along the pipe axis measured to the nearest whole meter furnished and incorporated into the work in accordance with the contract documents.

663-4.13 Water Service Connections and Curb Stop & Curb Box. The quantity to be measured for payment will be the number of complete units furnished and incorporated into the work in accordance with the contract documents.

663-4.14 Water Meter Pits, Type A and Water Meter Pits, Type B. The quantity to be measured for payment will be the number of complete units furnished and incorporated into the work in accordance with the contract documents.

663-4.15 Temporary Water Service for Water Main Installation. Payment for Temporary Water Service for Water Main Installation will be made on a lump sum basis.

663-4.16 Relocate Existing Water Valve & Valve Box, Relocate Existing Hydrant Assembly and Relocate Existing Curb Stop & Curb Box. The quantity to be measured for payment will be the number of units of each relocated in accordance with the contract documents.

663-4.17 Adjust Existing Valve Box Elevation, Adjust Existing Hydrant Elevation and Adjust Existing Curb Box Elevation. The quantity to be measured for payment will be the number of units of each adjusted in accordance with the contract documents.

663-4.18 Disconnect and Cap Existing Water Main. The quantity to be measured for payment will be the number of mains disconnected and capped in accordance with the contract documents.

663-4.19 Remove and Dispose of Existing Water Main. The quantity to be measured for payment will be in meters along the pipe axis measured to the nearest whole meter in accordance with the contract documents.

663-4.20 Remove and Dispose of Existing Water Valve & Valve Box and Remove and Dispose of Existing Hydrant. The quantity to be measured for payment will be the number of units removed and disposed of in accordance with the contract documents.

663-4.21 Remove and Dispose of Existing Water Service Connection. The quantity to be measured for payment will be the number of units removed and disposed of in accordance with the contract documents.

663-4.22 Remove and Store Existing Water Valve & Valve Box and Remove and Store Existing Hydrant. The quantity to be measured for payment will be the number of units removed and stored in accordance with the contract documents.

663-5 BASIS OF PAYMENT

663-5.01 General. The unit price bid shall include the cost of all materials, labor and equipment necessary to complete the work, except that test pits, excavation and backfill will be paid for separately. Unless otherwise noted in the contract documents, payment for thrust restraint shall be included in the price bid for pipe and appurtenances. No additional payment will be made for permits, cutting existing mains, thrust restraint, disinfection or testing. Progress payments for installed or relocated items will be made at the unit bid price for 80 percent of the quantity installed, when the installation is completed and backfilled to a minimum of 600mm over the top of the pipe plus additional cover required to protect the installation from vehicular and construction traffic. The remaining 20 percent will be paid for when required testing and disinfection of the system has been satisfactorily completed.

663-5.02 Steel Pipe Bends and Fittings. The payment for steel pipe bends and fittings will be made under the steel water pipe item for equivalent lengths of steel pipe. The payment item for a reducer will be based on the larger diameter.

663-5.03 Bridge Mounted Water Pipe. The unit price bid shall include the cost of all labor, materials and equipment necessary to complete the work, including, but not limited to, expansion devices, rollers, chairs, connectors, insulation, insulation covering and sleeves, except that structural utility support members will be paid for under a structural steel item.

663-5.04 Water Service Pipe. The unit price bid for plastic pipe and polyethylene water service pipe will include the installation of tracing wire, if required. If the Contractor opts to install water service pipe using a trenchless method, excavation and backfill will be paid for as if the standard installation method had been used. No additional payment will be made for surface restoration not required due to use of trenchless installation.

663-5.05 Hydrants. The unit price bid for each hydrant shall include a length or lengths of anchor pipe, installed at any point between the main and the hydrant up to 2.0 m long at no additional cost to the State. Hydrant drainage material will be included in the payment for each hydrant at no additional cost to the State.

663-5.06 Hydrant Fenders. The unit price bid shall include the cost of all labor, materials and equipment necessary to complete the work. The work shall include excavation for the fenders, installation and backfill. The excavation for the concrete collars and slabs and the concrete required will be paid for separately.

663-5.07 Bolted, Sleeve Type Couplings. If a bolted coupling is used to join two different diameters of pipe, the payment item will be based on the larger size.

663-5.08 Iron Water Main Fittings. Payment for a full body (AWWA C110) fitting provided but not required will be the weight of a similar compact (AWWA C153) fitting. The payment item for a fitting with different size connections will be based on the largest NPS size on that fitting (i.e. a 12 NPS x 4 NPS Tee will be in the 10 NPS - 16 NPS range).

663-5.09 Water Service Connections. Payment for a water service connection will include the cost of all labor, materials and equipment necessary to complete the installation of everything required to provide a connection from a main to a customer at the highway boundary, including corporation stop, curb stop, curb box, tapping sleeve or saddle, if required, and all necessary fittings, except the service pipe, which will be paid for separately.

663-5.10 Water Meter Pits. The unit price bid shall include the cost of all labor, materials, including meter pit lids, covers and steps, and equipment necessary to complete the work.

663-5.11 Relocate Existing Hydrant. The unit price bid for each hydrant relocation shall include a length of lateral pipe up to 2.0 m long, installed at any point between the main and the hydrant and hydrant drainage material at no additional cost to the State.

663-5.12 Adjust Existing Valve Box Elevation and Adjust Existing Curb Box Elevation. If the Contractor elects to reset the existing valve box, the costs of the work involved in the removal and replacement of existing disturbed pavement shall be included in the bid price for adjustment of the valve box.

663-5.13 Adjust Existing Hydrant Elevation. The unit price bid for each hydrant elevation adjustment shall include the cost of any barrel extensions required to complete the work at no additional cost to the State.

663-5.14 Disconnect and Cap Existing Water Main. Any fittings required to complete the work will be paid for separately.

Payment will be made under:

Item No.	Item	Pay Unit
663.01xx	M Ductile Iron Cement Lined Water Pipe	Meter
663.02xx	M Steel Water Pipe	Meter
663.03xx	M Concrete Water Pipe	Meter
663.04xx	M Plastic Water Pipe	Meter
663.05xx	M Bridge Mounted Water Pipe	Meter
663.06zz	M Copper Water Service Pipe	Meter
663.07zz	M Polyethylene Water Service Pipe	Meter
663.08zz	M Steel Water Service Pipe	Meter
663.10xx	M Resilient Wedge Valve & Valve Box	Each
663.11xx	M Butterfly Valve & Valve Box	Each
663.12xx	M Double Disk Gate Valve & Valve Box	Each
663.13nn	M Hydrant	Each
663.14	M Hydrant Fender	Each
663.15nn	M Dry Hydrant	Each
663.16xxyy	M Tapping Sleeve, Valve & Valve Box Assembly	Each
663.17xx	M Line Stop Fitting	Each
663.18xx	M Bolted, Sleeve Type Coupling	Each
663.2001	M Iron Water Main Fittings (3 NPS - 8 NPS)	Kilogram
663.2002	M Iron Water Main Fittings (10 NPS - 16 NPS)	Kilogram
663.2003	M Iron Water Main Fittings (18 NPS and larger)	Kilogram
663.21xx	M Wedge Type Mechanical Restraint Glands (xx NPS)	Each
663.22xx	M High Deflection Restrained Joint Fitting (xx NPS)	Each
663.23xx	M Polyethylene Encasement for Water Pipe	Meter
663.24xxgg	M Insulation for Buried Water Pipe (xx NPS with gg Thick Insulation)	Meter
663.25zz	M Water Service Connection	Each
663.26zz	M Curb Stop & Curb Box	Each
663.27nn	M Water Meter Pit, Type A	Each
663.28nn	M Water Meter Pit, Type B	Each
663.29nn	M Temporary Water Service for Water Main Installation	Lump Sum
663.30	M Relocate Existing Water Valve & Valve Box	Each
663.31	M Relocate Existing Hydrant	Each
663.32	M Relocate Existing Curb Stop & Curb Box	Each
663.33	M Adjust Existing Valve Box Elevation	Each
663.34	M Adjust Existing Hydrant Elevation	Each
663.35	M Adjust Existing Curb Box Elevation	Each
663.40	M Disconnect and Cap Existing Water Main	Each
663.41xx	M Remove and Dispose of Existing Water Main	Meter
663.42	M Remove and Dispose of Existing Water Valve & Valve Box	Each
663.43	M Remove and Dispose of Existing Hydrant	Each
663.44	M Remove and Dispose of Existing Water Service Connection	Each