SECTION 331416 - SITE WATER UTILITY DISTRIBUTION PIPING

This Section specifies pipe materials, fittings, valves, meters, and backflow preventers normally encountered with Site water distribution systems, including potable water line, fire water line, or combined potable water line and fire water line from 5 feet outside building to utility source.

See Drawing Coordination Checklist and Evaluations for information needed to coordinate this Specification Section with Plumbing and Fire Protection Drawings.

1. GENERAL
	* + 1. SUMMARY
				1. Section Includes:

Pipe and fittings for Site water line, including [**potable water line**] [**, fire water line**] [**, and**] [**combined potable water line and fire water line]**.

Tapping sleeves and valves.

Valves and boxes.

Post-Indicator Valve Assembly

Yard hydrants.

Reduced-pressure backflow preventers.

Double-check backflow preventers.

Pipe support systems.

Bedding and cover materials.

* + - * 1. Related Requirements:

List other Sections directly related to or affecting Work of this Section. Include Sections specifying information expected to be found in this Section as well as Sections required to describe complete system or assembly requirements.

Section 033000 - Cast-in-Place Concrete: Concrete for cradles and encasements.

Section 221100 - Facility Water Distribution: Product and execution requirements for domestic water piping at building.

Section 310001 - Earthwork Materials: Soils for backfill in trenches.

Section 310000 - Earthwork: Product and execution requirements for excavation and backfill; Execution requirements for trenching.

Section 316219 - Timber Piles: Pipe supports.

Section 330110.58 - Disinfection of Water Utility Piping Systems: Disinfection of water mains and appurtenances.

Section 330509.33 - Thrust Restraint for Utility Piping: Tied joint-restraint system to anchor and resist forces developed in underground closed pipeline systems.

Section 330563 - Concrete Vaults and Chambers: Cast-in-place, precast-concrete, or masonry structures for access to subsurface drainage piping or utilities.

Section 330577 - Fiberglass Metering Manholes: Fiberglass-reinforced plastic (FRP) valve vaults and meter boxes for valve and meter installations.

Section 330597 - Identification and Signage for Utilities: Pipe markers.

Section 331417 - Site Water Service Utility Laterals: Water main service connections.

Section 331419 - Valves and Hydrants for Water Utility Service: Fire hydrants, valves, and valve boxes for fire hydrant and water main installations.

Section 331900 - Water Utility Metering Equipment: Positive displacement meters as required by this Section.

* + - 1. REFERENCE STANDARDS

List reference standards included within text of this Section, with designations, numbers, and complete document titles.

LEED requires compliance with specific editions of referenced standards. Consider including publication dates for referenced standards in this Section to ensure the correct standard is used for LEED compliance.

* + - * 1. American Association of State Highway and Transportation Officials:

AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 10-lb Rammer and a 18-in. Drop.

* + - * 1. American Society of Mechanical Engineers:

ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.

ASME B16.18 - Cast Copper Alloy Solder-Joint Pressure Fittings.

ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.

* + - * 1. American Society of Sanitary Engineering:

ASSE 1012 - Performance Requirements for Backflow Preventers with an Intermediate Atmospheric Vent.

ASSE 1013 - Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Principle Fire Protection Backflow Preventers.

* + - * 1. ASTM International:

ASTM B88 - Standard Specification for Seamless Copper Water Tube.

ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3).

ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3).

ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

ASTM D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).

ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.

ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets.

ASTM D3035 - Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.

ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

* + - * 1. American Water Works Association:

AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.

AWWA C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems.

AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast.

AWWA C200 - Steel Water Pipe, 6 In. (150 mm) and Larger.

AWWA C203 - Coal-Tar Protective Coatings and Linings for Steel Water Pipe.

AWWA C205 - Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 In. and Larger - Shop Applied.

AWWA C206 - Field Welding of Steel Water Pipe.

AWWA C207 - Steel Pipe Flanges for Waterworks Service, Sizes 4 In. Through 144 In. .

AWWA C208 - Dimensions for Fabricated Steel Water Pipe Fittings.

AWWA C213 - Fusion-Bonded Epoxy Coatings and Linings for Steel Water Pipe and Fittings.

AWWA C300 - Reinforced Concrete Pressure Pipe, Steel-Cylinder Type.

AWWA C301 - Prestressed Concrete Pressure Pipe, Steel-Cylinder Type.

AWWA C500 - Metal-Seated Gate Valves for Water Supply Service.

AWWA C600 - Installation of Ductile-Iron Mains and Their Appurtenances.

AWWA C606 - Grooved and Shouldered Joints.

AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In., for Water Transmission and Distribution.

AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 In. Through 3 In. for Water Service.

AWWA C906 - Polyethylene (PE) Pressure Pipe and Fittings, 4 In. Through 63 In. , for Waterworks.

* + - * 1. American Welding Society:

AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.

* + - * 1. Manufacturers Standardization Society of the Valve and Fittings Industry:

MSS SP-60 - Connecting Flange Joints between Tapping Sleeves and Tapping Valves.

* + - * 1. NSF International:

NSF 61 - Drinking Water System Components - Health Effects.

NSF 372 - Drinking Water System Components - Lead Content.

* + - 1. SUBMITTALS

Only request submittals needed to verify compliance with Project requirements.

* + - * 1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Product Data: Submit manufacturer information regarding pipe materials, pipe fittings, valves, [**, and**] <**\_\_\_\_\_\_\_\_**>.
				5. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

Include separate paragraphs for additional certifications.

* + - * 1. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
				2. Qualifications Statements:

Coordinate following subparagraph with requirements specified in QUALIFICATIONS Article.

Submit qualifications for manufacturer and installer.

Remove paragraph below if not LEED project.

* + - 1. SUSTAINABLE DESIGN SUBMITTALS
				1. Section 018113 – LEED Documentation Requirements: Requirements for sustainable design submittals.
				2. Manufacturer's Certificate:

Certify that products meet or exceed specified sustainable design requirements.

Insert material certifications list below to suit products specified in this Section and Project sustainable design requirements. Specific certificate submittal and supporting data requirements are specified in Section 018113.

Materials Resources Certificates:

Certify source and origin for [**salvaged**] [**and**] [**reused**] products.

Certify recycled material content for recycled content products.

Certify source for regional materials and distance from Project Site.

* + - * 1. Product Cost Data:

Submit cost of products to verify compliance with Project sustainable design requirements.

Exclude cost of labor and equipment to install products.

Provide cost data for following products:

Edit list of material cost data below to suit products specified in this Section and Project sustainable design requirements. Specific cost data requirements are specified in Section 018113.

Salvaged, refurbished, and reused products.

Products with recycled material content.

Regional products.

<**\_\_\_\_\_\_\_\_**>.

* + - 1. CLOSEOUT SUBMITTALS
				1. Section 017716 - Contract Closeout: Requirements for submittals.
				2. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations.
				3. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
			2. QUALITY ASSURANCE

Use this Article to specify compliance with overall reference standards affecting all products and installation included in this Section.

* + - * 1. Valves: Mark valve body with manufacturer's name and pressure rating.
				2. Materials in Contact with Potable Water: Certified according to NSF 61 and NSF 372.
				3. Perform Work according to [**NYSDOH**] <**\_\_\_\_\_\_\_\_**> standards.
				4. Comply with AWWA M17 standard for fire hydrants.
				5. For UL Listed or FM Global-Approved Fire Hydrants, comply with NFPA 24.

Include following paragraph only when cost of acquiring specified standards is justified.

* + - * 1. Maintain <**\_\_\_\_\_\_\_\_**> [**copy**] [**copies**] of each standard affecting Work of this Section on Site.
			1. QUALIFICATIONS

Coordinate following paragraphs with requirements specified in SUBMITTALS Article.

* + - * 1. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum [**five**] <**\_\_\_\_\_\_\_\_**> years' [**documented**] experience.
				2. Installer: Company specializing in performing Work of this Section with minimum [**five**] <**\_\_\_\_\_\_\_\_**> years' [**documented**] experience in installation of Work of this Section.
				3. Installer Qualification Data: Persons engaged with the installation of water utility service main distribution piping and their appurtenances shall have a minimum of 5 years' experience while in the employ of a company or companies engaged in the installation of water service systems for domestic and fire service mains and their appurtenances.

Name of each person who will be performing the work.

Upon request, furnish names and addresses of the required number of similar project that each person has worked on which meets the qualifications requirements.

* + - 1. DELIVERY, STORAGE, AND HANDLING
				1. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
				2. Storage:

Store materials according to manufacturer instructions.

Block individual and stockpiled pipe lengths to prevent moving.

Do not place pipe or pipe materials on private property or in areas obstructing pedestrian or vehicle traffic.

Store PE and PVC materials out of sunlight.

* + - * 1. Protection:

Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.

Provide additional protection according to manufacturer instructions.

* + - 1. EXISTING CONDITIONS
				1. Field Measurements:

Verify field measurements prior to fabrication.

Indicate field measurements on Shop Drawings.

1. PRODUCTS
	* + 1. PIPING

Select one or more of following paragraphs based on Project requirements.

* + - * 1. Ductile Iron Pipe:

Comply with AWWA [**C151**] [**C104**].

Fittings:

Material: [**Ductile**] [**Gray**] iron.

Thickness: Standard.

Joints:

Comply with AWWA C111.

Provide rubber gasket with rods.

Design consultant to design pipe jackets based on soil conditions.

Jackets: [**AWWA C105 PE jacket**] [**Double-layer, half-lapped, 10-mil PE tape**] [**Double-layer, half-lapped, <\_\_\_\_\_\_\_\_>-mil PE tape**].

* + - * 1. Copper Tubing:

Comply with ASTM B88.

Type [**K**] [**L**], annealed.

Fittings: [**ASME B16.18, cast copper**] [**or**] [**ASME B16.22, wrought copper**].

Joints: [**Compression connection**] [**or**] [**AWS A5.8/A5.8M, BCuP silver braze**].

* + - * 1. PVC Pipe:

[**ASTM D1785, Schedule 40**] [**ASTM D1785, Schedule 80**] [**ASTM D2241**] [**SDR-<\_\_\_\_\_\_\_\_> for <\_\_\_\_\_\_\_\_>-psig rating**].

Fittings: PVC, ASTM D2466.

Joints:

Comply with ASTM D2855.

Type: Solvent weld.

* + - * 1. PVC Pipe:

Comply with AWWA C900, Class [**165**] [**235**].

Fittings:

Material: Cast iron.

Comply with AWWA C111.

Joints:

Comply with ASTM D3139.

Furnish compression gasket ring.

ASTM D3035 piping is available in 10 different wall thicknesses ranging from DR 32.5, thinnest, to DR 7, thickest, with pressure ratings from 160 psig to 840 psig. Coordinate wall thickness and pressure rating with intended service conditions.

* + - * 1. PE Pipe:

Pipe: Comply with [**AWWA C901**] [**AWWA C906**] [**ASTM D3035, DR <\_\_\_\_\_\_\_\_> for <\_\_\_\_\_\_\_\_>-psig pressure rating**].

Fittings:

Comply with AWWA C901.

Type: [**Molded**] [**or**] [**fabricated**].

Joints: [**Compression**] [**Butt fusion**].

* + - 1. TAPPING SLEEVES AND VALVES
				1. Tapping Sleeves:

[Manufacturers](http://www.specagent.com/LookUp/?ulid=9273&mf=04&src=wd):

Kennedy Valve Company, (607) 734-2211, 1021 E. Water St., Elmira, NY 14901.

Mueller Co., (800) 876-0036, 1401 Mueller Ave., Chattanooga, TN 37406.

Smith-Blair Inc., (870) 774-3561, 30 Globe Ave., Texarkana, TX 75505.

Approved equivalent.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

* + - * 1. Description:

Material: [**Stainless Steel**].

Type: Dual compression.

Outlet Flange Dimensions and Drilling: Comply with ASME B16.1, Class [**125**] <**\_\_\_\_\_\_\_\_**>, and MSS SP-60.

* + - * 1. Tapping Valves:

[Manufacturers](http://www.specagent.com/LookUp/?ulid=9272&mf=04&src=wd):

Kennedy Valve Company, (607) 734-2211, 1021 E. Water St., Elmira, NY 14901.

Mueller Co., (800) 876-0036, 1401 Mueller Ave., Chattanooga, TN 37406.

Smith-Blair Inc., (870) 774-3561, 30 Globe Ave., Texarkana, TX 75505.

Approved equivalent.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

* + - * 1. Description:

Comply with AWWA C500.

Type: Double disc with non-rising stem.

Inlet Flanges: Comply with ASME B16.1, Class [**125**] <**\_\_\_\_\_\_\_\_**>, and MSS SP-60.

Mechanical Joint Outlets: Comply with AWWA C111.

Mark manufacturer's name and pressure rating on valve body.

* + - * 1. Corporation Valves: Comply with AWWA C800. Include saddle and valve compatible with tapping machine [and manifold].

Service Saddle: Copper alloy with seal and AWWA C800, threaded outlet for corporation valve.

Corporation Valve: Bronze body and ground-key plug, with AWWA C800, threaded inlet and outlet matching service piping material.

Manifold: Copper fitting with two to four inlets as required, with ends matching corporation valves and outlet matching service piping material.

* + - 1. VALVES AND HYDRANTS
				1. Valves, Valve Boxes, and Fire Hydrants: As specified in Section 331419 - Valves and Hydrants for Water Utility Service.
				2. Yard Hydrants:

[Manufacturers](http://www.specagent.com/LookUp/?ulid=9271&mf=04&src=wd):

Woodford Manufacturing, (719) 574-0600, 2121 Waynoka Rd. Colorado Springs CO 80915.

Jay R. Smith Mfg. Co., (334) 277-8520, 2781 Gunter Park Dr. East, Montgomery, AL 36109-1405.

Approved equivalent.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

Description:

Automatic-draining, non-freezing yard hydrant for hose connection.

Inlet:

Size: 1 inch NPT.

Fitting: Female.

Nozzle:

Size: 3/4 inch.

Material: Brass.

Fitting: Male.

[**Type: Removable.**]

Casing:

Description: Galvanized-steel pipe.

Size: 1-1/4 inch.

Drain Hole: Tapped, 1/8 inch NPT.

Operating Rod:

Description: Galvanized-steel pipe.

Size: 3/8 inch.

Working Pressure: 125 psig

* + - 1. REDUCED-PRESSURE BACKFLOW PREVENTER ASSEMBLIES INCLUDING VALVES
				1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=8015&mf=04&src=wd):

FEBCO, A Watts Brand, (978) 689-6066, 815 Chestnut Street, North Andover, MA 01845-6098.

FLOMATIC Valves, (800) 833-2040, 15 Pruyn’s Island Drive, Glens Falls, New York 12801

MATCO-NORCA, (800) 688 – 2583, 1944 Route 22, PO Box 27, Brewster, New York 10509

NIBCO Inc., (800) 234-0227, 1516 Middlebury Street, P.O. Box 1167, Elkhart, IN 46515.

Zurn Inc., (855) 663-9876, 511 West Freshwater Way, Milwaukee, WI 53204.

Approved equivalent.

* + - * 1. Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards. Backflow Preventer Test Kits

Description: Factory calibrated, with gages, fittings, hoses, and carrying case with test procedure instructions.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

Other types of backflow preventers are available. Specific requirements, particularly regarding use of reduced-pressure backflow-type meters, depend on local utility and code requirements.

* + - * 1. Description:

Comply with ASSE 1013.

Materials:

Body: Bronze.

Internal Parts: Bronze.

Springs: Stainless steel.

Lead free.

Check Valves:

Quantity: Two.

Description: Independently operating, spring loaded.

Type: Diaphragm type, differential pressure relief, located between check valves.

Provide third check valve opening under back pressure in case of diaphragm failure.

Vent Outlet: Non-threaded.

Furnish two gate valves, one strainer, and four test cocks.

* + - * 1. Double Check Valve Assemblies:

Comply with ASSE 1012.

Description: Two independently operating check valves, with intermediate atmospheric vent.

Materials:

Body: Bronze.

Internal Parts: Corrosion resistant.

Springs: Stainless steel.

* + - * 1. Reduced Pressure Detector, Fire Protection Backflow Preventer Assemblies:

Comply with ASSE 1013.

Description: Two independently operating check valves, with an intermediate relief valve.

Materials:

Body: Bronze.

Internal Parts: Corrosion resistant.

Springs: Stainless steel.

Four test cocks.

* + - * 1. Backflow Preventer Test Kits

Description: Factory calibrated, with gages, fittings, hoses and carrying case with test procedure instruction.

Concrete encasement and/or cradles are not typical. Designer of Record should verify these are applicable to the project. Remove paragraph below if it does not apply.

* + - 1. CONCRETE ENCASEMENT AND CRADLES
				1. Concrete:

As specified in Section 033000 - Cast-in-Place Concrete.

[**Type: Reinforced, air entrained.**]

Compressive Strength: [**4,000**] <**\_\_\_\_\_\_\_\_**> psi at [**28**] <**\_\_\_\_\_\_\_\_**> days.

Finish: Rough troweled.

* + - * 1. Concrete Reinforcement: As specified in Section 032000 - Concrete Reinforcing.
			1. SUSTAINABILITY CHARACTERISTICS

Insert sustainable design characteristics in this Article to suit content of this Section and Project sustainable design requirements specified in Section 018113. Remove paragraph if not LEED project.

* + - * 1. Material and Resource Characteristics:

Recycled Content Materials: Furnish materials with maximum available recycled content [**including:**] [**.**]

Insert list of materials specified in this Section required to have recycled content.

<**\_\_\_\_\_\_\_\_**>.

Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project Site [**including:**] [**.**]

Insert list of materials specified in this Section required to be regional materials.

<**\_\_\_\_\_\_\_\_**>.

* + - 1. ACCESSORIES
				1. Thrust Restraints: As specified in Section 330509.33 - Thrust Restraint for Utility Piping.
				2. Air-Release Valves:

As located on Drawings.

As specified in Section 400578.11 - Air Release Valves for Water Service.

* + - * 1. Pipe Markers: As specified in Section 330597 - Identification and Signage for Utilities.
				2. Vaults: As specified in Section 330563 - Concrete Vaults and Chambers.
				3. Metering Equipment: As specified in Section 331900 - Water Utility Metering Equipment.
				4. Meter Boxes: As specified in Section [**330577 - Fiberglass Metering Manholes**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.
				5. Steel Rods, Bolt, Lugs, and Brackets:

Comply with ASTM [**A36**] [**or**] [**A307**].

Grade A carbon steel.

* + - 1. PROTECTIVE ENCLOSURES
				1. Freeze Protection Enclosures:

Description: Insulated enclosure designed to protect aboveground water piping, equipment, or specialties from freezing and damage, with a heat source to maintain minimum internal temperature of [**40 deg F**]when external temperatures reach as low as [**minus 34 deg F**]

Standard: ASSE 1060

Class I: For equipment or devices other than pressure or atmospheric vacuum breakers

Class I-V: For pressure or atmospheric vacuum breaker devices. Include drain in housing.

Housing: Reinforced [**aluminum**] [**fiberglass**] <**\_\_\_\_\_**> construction.

Size: Of dimensions indicated, but not less than those required for access and service of protected unit.

Drain opening for units with drain connection.

Access doors with locking devices.

Insulation inside housing.

Anchoring devices for attaching housing to concrete base.

Electric heating cable or heater with self-limiting temperature control.

1. EXECUTION
	* + 1. EXAMINATION
				1. Verify that building service connections and municipal utility water main sizes, locations, and elevations are as indicated on Drawings.
			2. PREPARATION
				1. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, and remove burrs.
				2. Remove scale and dirt on inside and outside before assembly.
				3. Prepare pipe connections to equipment with flanges or unions.
				4. Protect and support existing distribution piping and appurtenances as Work progresses.
			3. INSTALLATION
				1. Bedding:

Excavate pipe trench as specified in Section [**310000 - Earthwork**].

Edit following subparagraph to suit pipe diameter, types of pipe bends, and soil-bearing conditions.

Placement:

Place bedding material as specified in Section [**310000 - Earthwork**], [**as indicated on Drawings**].

Backfill around sides and to top of pipe as specified in Section 310000 - Earthwork.

Place fill materials as specified in Section 310000 - Earthwork.

* + - * 1. Pipe and Fittings:

Maintain separation of water main from [**sewer**] <**\_\_\_\_\_\_\_\_**> [**piping**] <**\_\_\_\_\_\_\_\_**> according to NYSDOH requirements and [**as indicated on the Drawings**].

Group piping with other Site piping work whenever practical.

Install pipe to elevations indicated on Drawings.

Install ductile-iron piping and fittings according to AWWA C600.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

Route pipe in straight line.

Install access fittings to permit disinfection of water system performed under Section [**330110.58 - Disinfection of Water Utility Piping Systems**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_**>.

Thrust Restraints:

Provide thrust restraint [**as indicated on the Drawings**].

Establish elevations of buried piping with not less than [**5**] <**\_\_\_\_\_\_\_\_**> feet of cover.

Pipe Markers: As specified in Section 330597 - Identification and Signage for Utilities.

* + - * 1. Disinfection: As specified in Section 330110.58 - Disinfection of Water Utility Piping Systems.
			1. TOLERANCES
				1. Install pipe within tolerance of [**5/8**] <**\_\_\_\_\_\_\_\_**> inch.
			2. FIELD QUALITY CONTROL
				1. Testing:

Pressure test piping system according to AWWA C600 <**\_\_\_\_\_\_\_\_**>.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

Pressure test piping system as indicated on pipe schedule.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

Pressure test piping system according to AWWA C600 and following:

Test Pressure: Not less than 200 psig or 50 psi in excess of maximum static pressure, whichever is greater.

Conduct hydrostatic test for a minimum of [**two**] <**\_\_\_\_\_\_\_\_**> hours.

Slowly fill section to be tested with water; expel air from piping at high points.

Install corporation cocks at high points.

Close air vents and corporation cocks after air is expelled.

Raise pressure to specified test pressure.

Observe joints, fittings, and valves under test.

Remove and renew cracked pipes, joints, fittings, and valves showing visible leakage, and retest.

Correct visible deficiencies and continue testing at same test pressure for additional two hours to determine leakage rate.

Maintain pressure within plus or minus 5 psi of test pressure.

Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of test.

Compute maximum allowable leakage using following formula:

L = SD x sqrt(P)/C.

L = testing allowance, gph.

S = length of pipe tested, feet.

D = nominal diameter of pipe, inches.

P = average test pressure during hydrostatic test, psig.

C = 148,000.

If pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.

Leakage:

If test of pipe indicates leakage greater than allowed, locate source of leakage, make corrections, and retest until leakage is within allowable limits.

Correct visible leaks regardless of quantity of leakage.

Perform pressure test on piping according to [**NYSDOH**]<**\_\_\_\_\_\_\_\_**> standards.

Provide all testing results to the Director’s Representative.

END OF SECTION 331416