

SECTION 22 11 13 - FACILITY WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes water-distribution piping and related components outside the building for water service and fire-service mains.
- B. All work performed under this Section shall be in complete conformance with the requirements of the Brunswick-Glynn County Joint Water and Sewer Commission, including, but not limited to,
 - 1. BGJWSC Standards for Water & Wastewater Construction, by BGJWSC Planning & Construction Division, 1703 Gloucester Street, Brunswick, Georgia, 31520, dated January 2024 or later as amended, including:
 - a. Section 1.0 Design Standards
 - b. Section 2.0 Typical Details
 - c. Section 3.0 Acceptable Products & Manufacturers
 - d. Section 4.0 Technical Specifications
- C. Utility-furnished products include water meters that shall be obtained from the Brunswick-Glynn County Joint Water and Sewer Commission (JWSC).

1.3 DEFINITIONS

- A. PE: Polyethylene plastic.
- B. PVC: Polyvinyl chloride plastic.
- C. JWSC: Brunswick-Glynn County Joint Water and Sewer Commission

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.
- B. Field quality-control test reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
 - 2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
 - 3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.
- B. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Comply with ASTM F645 for selection, design, and installation of thermoplastic water piping.

- E. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.
- F. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.
 - 1. Potable-water piping and components shall comply with NSF 14, NSF 61, and NSF 372. Include marking "NSF-pw" on piping.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:
 - 1. Ensure that valves are dry and internally protected against rust and corrosion.
 - 2. Protect valves against damage to threaded ends and flange faces.
 - 3. Set valves in best position for handling. Set valves closed to prevent rattling.
- B. During Storage: Use precautions for valves, including fire hydrants, according to the following:
 - 1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
 - 2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
- C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
- D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
- F. Protect flanges, fittings, and specialties from moisture and dirt.

- G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.9 PROJECT CONDITIONS

- A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:
 - 1. Notify Owner no fewer than 7 days in advance of proposed interruption of service.
 - 2. Do not proceed with interruption of water-distribution service without Owner's written permission.

1.10 COORDINATION

- A. Coordinate connection to public water main with utility company.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Application" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
- B. Potable-water piping and components shall comply with NSF 14, NSF 61, and NSF 372. Include marking "NSF-pw" on piping.
- C. Pipe materials and accessories shall be in accordance with the requirements of the local authority having jurisdiction.
- D. All joints shall be made in accordance with the manufacturer's printed instructions.

2.2 DUCTILE-IRON PIPE AND FITTINGS

- A. Ductile-Iron Pipe: ANSI A21.50 (AWWA C150) and ANSI A21.51 (AWWA C151), pressure class not less than 150 (domestic) and 200 (fire), with mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated. Each length shall be clearly

marked with the name of the manufacturer, pressure rating, thickness or pressure class, and nominal pipe diameter. All ductile iron pipe shall be externally coated with a bituminous coating per ANSI A21.51 (AWWA C151). In areas of corrosive soils as defined in AWWA C105, Appendix A, all bolts, nuts, studs, and other uncoated parts of joints for underground installations shall be coated with asphalt or coal tar prior to backfilling. The interior of all ductile iron pipe, fittings, and specials shall be cement lined with a seal coat. Lining shall comply with ANSI A21.4 (AWWA C104). In areas of severely aggressive soils, provide polyethylene encasement for all ductile iron piping systems in accordance with AWWA C105.

1. JWSC Approved: American Cast Iron Pipe Company, US Pipe & Foundry, Clow, McWane
- B. Mechanical-Joint, Ductile-Iron Fittings: ANSI A21.53 (AWWA C153), ductile-iron compact pattern.
1. All ductile iron fittings shall be externally coated with a bituminous coating per ANSI A21.51 (AWWA C151). In areas of corrosive soils as defined in AWWA C105, Appendix A, all bolts, nuts, studs, and other uncoated parts of joints for underground installations shall be coated with asphalt or coal tar prior to backfilling. The interior of all ductile iron fittings and specials shall be cement lined with a seal coat. Lining shall comply with ANSI A21.4 (AWWA C104). In areas of severely aggressive soils, provide polyethylene encasement for all ductile iron piping systems in accordance with AWWA C105.
 2. Fittings shall have cast on them the pressure rating, nominal diameter, manufacturer's name, foundry location, and type of fitting (degrees or fraction of a circle). Cast letters and figures shall be on the outside body of the fitting. Fittings shall have a minimum working pressure of 250 PSI.
 3. Glands, Gaskets, and Bolts: ANSI 21.11 (AWWA C111), ductile- or gray-iron glands, rubber gaskets, and steel bolts.
 4. JWSC Approved: American Cast Iron Pipe Company, US Pipe & Foundry, Clow, McWane
- C. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end unless grooved or flanged ends are indicated.
1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 2. Gaskets: ANSI A21.11 (AWWA C111), rubber.

- D. Flanges: Above grade jointing only. ANSI 21.10 (AWWA C110) and ANSI A21.15 (AWWA C115). Flanges per ASME 16.1, Class 125 (domestic), Class 250 (fire), cast iron. Gaskets shall be used on all flanges. Gaskets shall be rubber insert type with cloth inserts and a minimum thickness of one eighth (1/8) inches. The number and size of bolts shall be in accordance with the same ANSI standards as the flanges.

2.3 PE TUBING AND FITTINGS

- A. PE, Domestic water service, 2" and smaller
 - 1. All water services 2" in diameter and smaller shall be manufactured of PE 3408, high density polyethylene in accordance with ASTM C901, ASTM D1248, ASTM D2737, and ASMT D3350. Tubing shall have a minimum working pressure of 200 PSI and shall be copper tube size SDR-9 and shall be blue in color. Couplings shall be made of bronze with compression fittings on both ends suitable for connection to polyethylene tubing with inserts.
 - 2. Tubing shall be approved for use with potable water by the National Sanitation Foundation and shall be continuously marked at intervals of not less than four (4) feet with the nominal size, pressure rating, NSF seal, manufacturer's name, standard dimension ratio, and ASTM specification.
 - 3. JWSC Approved: Charter, ADS
- B. PE, Fire-Service Pipe: Not used.

2.4 PVC PIPE AND FITTINGS

- A. Pipe shall be virgin polyvinyl chloride (PVC) pipe for potable water and fire protection and shall have a bell type coupling with a thickened wall section integral with the pipe barrel in accordance with ASTM D3139. Provisions must be made for expansion and contraction at each joint with flexible ring gaskets made of rubber or other suitable material. Elastomeric seals shall meet ASTM F477.
- B. PVC, AWWA Pipe, domestic water and fire protection pipe, 4" to 12" diameter: AWWA C900 Pressure Class (PC) 235 DR-18, with mechanical joint bell end with gasket, and with spigot end. Pipe is to be manufactured to ductile iron pipe equivalent outside diameters. Pipe for water mains shall be blude in color with each length marked with name of the manufacturer, pressure rating, nominal pipe diameter, and the seal of the National Sanitation Foundation (NSF).
 - 1. Comply with UL 1285 for fire-service mains if indicated.

- C. Mechanical-Joint, Ductile-Iron Fittings: ANSI A21.53 (AWWA C153), ductile-iron compact pattern.
1. All ductile iron fittings shall be externally coated with a bituminous coating per ANSI A21.51 (AWWA C151). In areas of corrosive soils as defined in AWWA C105, Appendix A, all bolts, nuts, studs, and other uncoated parts of joints for underground installations shall be coated with asphalt or coal tar prior to backfilling. The interior of all ductile iron fittings and specials shall be cement lined with a seal coat. Lining shall comply with ANSI A21.4 (AWWA C104). In areas of severely aggressive soils, provide polyethylene encasement for all ductile iron piping systems in accordance with AWWA C105.
 2. Fittings shall have cast on them the pressure rating, nominal diameter, manufacturer's name, foundry location, and type of fitting (degrees or fraction of a circle). Cast letters and figures shall be on the outside body of the fitting. Fittings shall have a minimum working pressure of 250 PSI.
 3. Glands, Gaskets, and Bolts: ANSI 21.11 (AWWA C111), ductile- or gray-iron glands, rubber gaskets, and steel bolts.
 4. JWSC Approved: American Cast Iron Pipe Company, US Pipe & Foundry, Clow, McWane
- D. PVC, AWWA Pipe, domestic water pipe, 2" in diameter and smaller: ASTM D2241, Pressure Rating (PR) 200 SDR-21, with push-on type jointing. Glued or solvent weld joints shall not be used. Pipe for water mains shall be blue in color (preferred) with each length marked with name of the manufacturer, pressure rating, nominal pipe diameter and the seal of the National Sanitation Foundation (NSF). If blue is not available, white may be used.
1. Fittings: PVC 1120, SDR 21 fittings shall be injection molded, push-on bell type with elastomeric rubber seals in accordance with ASTM D3139. Seals shall conform to ASTM F477.
 2. JWSC Approved: JM Eagle Blue Brute, Diamond Plastics, North American Pipe, National Pipe and Plastics, Vulcan.

2.5 RESTRAINED JOINTS

- A. Ductile Iron Fittings: mechanical joint restraints shall be incorporated into the design of the follower gland. Restraint devices shall consist of multiple gripping wedges incorporated into the follower gland and meeting the requirements of ANSI A21.10 (AWWA C110). Gland body, wedges and wedge actuating components shall be ductile

iron in accordance with ASTM A536. The dimensions of the gland shall be such that it can be used with the standard mechanical joint bell and tee head bolts. Twist off nuts (same size as the tee head bolts) shall be used to ensure proper actuation of the restraining device. The mechanical joint restraint shall be designed to accommodate the full working pressure of the pipe with a minimum safety factor of 2.0.

- B. Joints on ductile iron piping may be restrained by utilizing a joint restrained gasket which includes a stainless steel locking segment vulcanized into the rubber gasket. The gasket shall be rated for operating pressures up to 250 PSI in accordance with ANSI A21.11 (AWWA C111).
- C. Where it is necessary to restrain PVC pipe bells adjacent to valves and fittings, a harness restraint device shall be used in lieu of thrust blocking. The restraint shall be manufactured of ductile iron in accordance with ASTM A536. A split ring shall be used behind the pipe bell with a serrated ring to grip the pipe. A sufficient number of steel tie rods/bolts shall be used to connect the bell ring and the gripping ring. The harness restraint device shall accommodate the full working pressure of the pipe with a minimum safety factor of 2.0.
- D. The use of concrete thrust blocks as a method of joint restraint shall be limited to situations such as ties to or work associated with existing systems where exposing several joints of pipe is not feasible due to existing ground conditions. In such cases other restraining devices may be required at the direction of the Engineer. Concrete thrust blocks may be used in combination with tie rods in accordance with the JWSC standard construction details. Where used, concrete shall be 2,500 PSI minimum.
- E. Where tie rods are used as a method of restraint at mechanical joint fittings and valves, offset eyebolts shall be used to connect tie rods to the fitting. Tie rods shall be steel, threaded as required and installed with a washer and nut (same material as the rod) on either side of the joint. The size and number of tie rods shall be in accordance with the following table:

Pipe Size	Number of Tie Rods	Tie Rod Size
4"	2	3/4"
6"	2	3/4"
8"	2	3/4"
10"	4	3/4"
12"	4	3/4"
14"	6	3/4"
16"	6	3/4"

2.6 SPECIAL PIPE FITTINGS

A. Ductile-Iron Deflection Fittings:

1. Description: Compound, ductile-iron coupling fitting with sleeve and 1 or 2 flexing sections for up to 15-degree deflection, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
 - a. Pressure Rating: 250 psig (1725 kPa) minimum.

2.7 JOINING MATERIALS

- A. Refer to Section 33 05 00 "Common Work Results for Utilities" for commonly used joining materials.
- B. Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

2.8 PIPING SPECIALTIES

- A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.
- B. Tubular-Sleeve Pipe Couplings:
 1. Description: Metal, bolted, sleeve-type, reducing or transition coupling, with center sleeve, gaskets, end rings, and bolt fasteners and with ends of same sizes as piping to be joined.
 - a. Standard: AWWA C219.
 - b. Center-Sleeve Material: Stainless steel or Ductile iron.
 - c. Gasket Material: Natural or synthetic rubber.
 - d. Pressure Rating: 200 psig (1380 kPa) minimum.
 - e. Metal Component Finish: Corrosion-resistant coating or material.
- C. Split-Sleeve Pipe Couplings:
 1. Description: Metal, bolted, split-sleeve-type, reducing or transition coupling with sealing pad and closure plates, O-ring gaskets, and bolt fasteners.

- a. Standard: AWWA C219.
- b. Sleeve Material: Stainless steel.
- c. Sleeve Dimensions: Of thickness and width required to provide pressure rating.
- d. Gasket Material: O-rings made of EPDM rubber, unless otherwise indicated.
- e. Pressure Rating: 200 psig (1380 kPa) minimum.
- f. Metal Component Finish: Corrosion-resistant coating or material.

D. Flexible Connectors:

1. Nonferrous-Metal Piping: Bronze hose covered with bronze wire braid; with copper-tube, pressure-type, solder-joint ends or bronze flanged ends brazed to hose.
2. Ferrous-Metal Piping: Stainless-steel hose covered with stainless-steel wire braid; with ASME B1.20.1, threaded steel pipe nipples or ASME B16.5, steel pipe flanges welded to hose.

E. Dielectric Fittings:

1. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
2. Dielectric Unions:
 - a. Description:
 - 1) Standard: ASSE 1079.
 - 2) Pressure Rating: Not less than associated pipe and fittings.
 - 3) End Connections: Solder-joint copper alloy and threaded ferrous.
3. Dielectric Flanges:
 - a. Description:
 - 1) Standard: ASSE 1079.
 - 2) Factory-fabricated, bolted, companion-flange assembly.

- 3) Pressure Rating: Not less than associated pipe and fittings.
 - 4) End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
4. Dielectric-Flange Insulating Kits:
- a. Description:
 - 1) Nonconducting materials for field assembly of companion flanges.
 - 2) Pressure Rating: Not less than associated pipe and fittings.
 - 3) Gasket: Neoprene or phenolic.
 - 4) Bolt Sleeves: Phenolic or polyethylene.
 - 5) Washers: Phenolic with steel backing washers.

2.9 CORROSION-PROTECTION PIPING ENCASEMENT

A. Encasement for Underground Metal Piping:

1. Standards: ASTM A674 or AWWA C105.
2. Form: Sheet or tube.
3. Material: LLDPE film of 0.008-inch (0.20-mm) minimum thickness, or high-density, crosslaminated PE film of 0.004-inch (0.10-mm) minimum thickness.
4. Color: Black.
5. JWSC Approved: Trumbull.

2.10 GATE VALVES

A. AWWA, Cast-Iron Gate Valves:

1. Nonrising-Stem, Resilient-Seated Gate Valves, 4" diameter and larger, underground installation:
 - a. Description: Resilient seat wedge type; epoxy coated iron-body and bonnet; bronze mounted with all exterior mounted bolts and nuts of 316 stainless

steel. When fully open, clear opening shall be equal to the nominal pipe diameter.

- 1) Standard: AWWA C509 or C515.
- 2) Minimum Pressure Rating: 250 psig .
- 3) End Connections: Mechanical joint.
- 4) Interior Coating: Complying with AWWA C550.
- 5) Operating Nut: 2" square.
- 6) Operation: All valves shall open by turning left (counter-clockwise).
- 7) JWSC Approved: Clow, Mueller

b. Valve Box: Provide adjustable valve box and cover.

2. Nonrising-Stem, Resilient-Seated Gate Valves, 2" to 3" diameter, underground installation:

a. Description: Resilient seat wedge type; epoxy coated iron-body and bonnet; bronze mounted with all exterior mounted bolts and nuts of 316 stainless steel. When fully open, clear opening shall be equal to the nominal pipe diameter.

- 1) Standard: AWWA C509, ASTM A126 Class B
- 2) Minimum Pressure Rating: 200 psig .
- 3) End Connections: Threaded joint.
- 4) Interior Coating: Complying with AWWA C550.
- 5) Operating Nut: 2" square.
- 6) Operation: All valves shall open by turning left (counter-clockwise).
- 7) JWSC Approved: Clow, Mueller

3. OS&Y, Rising-Stem, Resilient-Seated Gate Valves, flanged, above grade:

a. Description: Cast- or ductile-iron body and bonnet, with bronze or gray- or ductile-iron gate, resilient seats, and bronze stem.

- 1) Standard: AWWA C509.
- 2) Minimum Pressure Rating: 200 psig.
- 3) End Connections: Flanged.
- 4) Operation: All valves shall open by turning left (counter-clockwise).

B. UL/FMG, Cast-Iron Gate Valves:

1. UL/FMG, Nonrising-Stem Gate Valves:

- a. Description: Iron body and bonnet with flange for indicator post, bronze seating material, and inside screw.
 - 1) Standards: UL 262 and FMG approved.
 - 2) Minimum Pressure Rating: 175 psig (1207 kPa).
 - 3) End Connections: Flanged.

2.11 GATE VALVE ACCESSORIES AND SPECIALTIES

A. Tapping-Sleeve Assemblies:

1. Description: Sleeve and valve compatible with drilling machine.
 - a. Standard: MSS SP-60.
 - b. Tapping Sleeve: stainless-steel, two-piece bolted sleeve with flanged outlet for new branch connection. Include sleeve matching size and type of pipe material being tapped and with recessed flange for branch valve.
 - c. Valve: AWWA, cast-iron, nonrising-stem, resilient-seated gate valve with one raised face flange mating tapping-sleeve flange.
2. Tapping sleeves shall be used for live tap applications or where indicated or where directed by the JWSC. Tapping sleeves shall be stainless steel wrap around type conforming to ASTM A126 and shall accommodate the full working pressure of the system.
3. Tapping valves shall meet the requirements of paragraph 210.A of this section. Tapping valves shall be flanged on one end for connection to the tapping saddle and mechanical joint on the other end. MJ tapping saddles and valves shall be

used where the main to be tapped is not level so that the valve operator may be installed in a vertical position.

4. JWSC Approved: JCM, Smith Blair.
- B. Valve Boxes: Valve boxes shall be cast iron, heavy duty roadway, screw type adjustable to six (6) inches up and down from the nominal required cover over the pipe. Six (6) inch PVC C900 Pipe shall be used to extend valve boxes to grade. Cast iron castings shall be manufactured of clean, even grain, gray cast iron conforming to ASTM A48, Class 20B. Valve boxes shall have cast iron drop covers stamped with the word "WATER" or "FIRE" as appropriate. Install per JSWC details. All valve boxes located in unpaved areas shall have a concrete collar.
1. Operating Wrenches: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.
 2. JWSC Approved: Star, Segma.
- C. Indicator Posts: UL 789, FMG-approved, vertical-type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of burial of valve.

2.12 BACKFLOW PREVENTION DEVICES

- A. Double Check Valve (DCV) Assemblies
1. The backflow preventer shall feature modular check assemblies with center stem guiding. Each check module shall have a captured spring and be accessible through a bolted cover plate. Seats shall be replaceable without special tools. The device shall be completely factory assembled and include, in addition to the check modules, tight closing resilient seated shut off valves, test cocks and strainer.
 2. The assembly shall meet the requirements of USC Manual 8th Edition, ASSE No. 1015, AWWA C510, CSA B64.5, IAPMO PA31 and UL Classified File No. EX3185.
 3. JWSC Approved: Watts, Hersey, Febco.
- B. Reduced Pressure Zone (RPZ) Assemblies
1. The RPZ shall consist of an internal pressure differential relief valve located in a zone between two positive seating check modules with captured springs and silicone seat discs. Seats and seat discs shall be replaceable in both check modules and the relief valve. There shall be no threads or screws in the waterway

exposed to line fluids. Service of all internal components shall be through a single access cover secured with stainless steel bolts. The assembly shall also include two resilient seated isolation valves, four resilient seated test cocks and an air gap drain fitting.

2. The assembly shall meet the requirements of USC Manual 8th Edition, ASSE Std. 1013, AWWA C511, IAPMO File No. 1563 and CSA B64.4.
3. JWSC Approved: Watts, Hersey, Febco.

2.13 CORPORATION VALVES AND CURB VALVES

A. Manufacturers:

1. JWSC Approved:
 - a. Corporation Stops: Mueller, Ford
 - b. Double strapped Tapping Saddles: JCM

B. Service-Saddle Assemblies: Comply with AWWA C800. Include saddle and valve compatible with tapping machine.

1. Double strapped tapping saddles shall be epoxy coated ductile iron body type with NPT service outlet. The saddles shall have a self-energizing o-ring rubber gasket, two alloy steel straps, and a female iron pipe tap conforming to AWWA C800.

C. Corporation Stops: Corporation stops are required on all water services. Corporation stops shall be made of brass conforming to AWWA C800, ASTM B62 and/or ASTM B584 and shall accommodate the full working pressure of the system. The inlet connection shall be AWWA standard iron pipe (IPT) thread. The outlet connection shall be compression type for polyethylene tubing.

D. Curb Valves: Ball valve, AWWA C800. Curbs stops shall be made of brass conforming to AWWA C800, ASTM B62 and/or ASTM B584 and shall accommodate full working pressure of the system. Service line connections shall be compression type for polyethylene tubing.

E. Service Boxes for Curb Valves: Similar to AWWA M44 requirements for cast-iron valve boxes. Include cast-iron telescoping top section of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over curb valve and with a barrel approximately 3 inches (75 mm) in diameter.

1. Shutoff Rods: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and slotted end matching curb valve.

2.14 WATER METERS

- A. Water meters will be furnished by utility company.

2.15 WATER METER BOXES

- A. Water meter boxes shall comply with JWSC standards.
- B. Meter boxes for one and one-half (1½) inch to two (2) inch meters shall be rectangle in shape. Boxes shall be constructed of a light-weight plastic composite material with a minimum tensile strength of 3400 PSI. Dimensions shall be suitable for the meter installed. Meter box shall not be located in paved area. Cover lettering shall indicate "WATER".

2.16 PROTECTIVE ENCLOSURES

- A. Weather-Resistant Enclosures:

1. Description: Insulated enclosure designed to protect aboveground water piping, equipment, or specialties from weather and damage.
 - a. Housing: Reinforced-fiberglass construction.
 - 1) Size: Of dimensions required for access and service of protected unit.
 - 2) Drain opening for units with drain connection.
 - 3) Access doors with locking devices.
 - a) Anchoring devices for attaching housing to concrete base.

- B. Enclosure Bases:

1. Description: 6-inch- (150-mm-) minimum thickness precast concrete, of dimensions required to extend at least **6 inches (150 mm)** beyond edges of enclosure housings. Include openings for piping.

2.17 FIRE HYDRANTS

A. Dry-Barrel Fire Hydrants:

1. Description: Freestanding, with one **NPS 4-1/2 (DN 115)** and two **NPS 2-1/2 (DN 65)** outlets, **5-1/4-inch (133-mm)** main valve, drain valve, and **NPS 6 (DN 150)** mechanical-joint inlet. Include interior coating according to AWWA C550. Hydrant shall have cast-iron body, compression-type valve opening against pressure and closing with pressure. Hydrant shall be fully bronze mounted. All nuts and bolts shall be 304 stainless steel. All working parts shall be fully removable without disturbing the barrel. Operating threads shall be totally enclosed by a rubber o-ring stem seal and lubricated by a grease or oil reservoir.
 - a. Standard: AWWA C502.
 - b. Pressure Rating: 250 psig (1725 kPa).
 - c. Outlet Threads: NFPA 1963, with external hose thread used by local fire department. Include cast-iron caps with steel chains.
 - d. Operating and Cap Nuts: Pentagon, **1-1/2 inches (38 mm)** point to flat.
 - e. Direction of Opening: Open hydrant valve by turning operating nut to left or counterclockwise.
 - f. Exterior Finish: The entire outside surfaces of the fire hydrant barrel above grade shall be factory primed and then painted with Koppers GLAMORTEX 501 red enamel paint. The base shoe shall be painted with a minimum 4 mils thick epoxy and the lower barrel shall be asphaltic or epoxy coated.
 - g. Nozzle Caps: Securely chained to hydrant barrel, constructed of heavy-duty corrosion resistant material.
 - h. Type: non-freezing type design with a simple and positive automatic drain which will be fully closed whenever the main valve is opened.
 - i. Design: Hydrant shall be traffic type such that the barrel will break away from the standpipe at a point above grade to prevent damage to the barrel and stem.
 - j. Hydrant shall comply with the requirements of local authorities having jurisdiction, including Brunswick-Glynn County Joint Water and Sewer Commission (JWSC) and Glynn County Fire and Rescue (GCFR).

2.18 FLUSHING HYDRANTS

A. Post-Type Flushing Hydrants:

1. Description: Nonfreeze and drainable, of length required for shutoff valve installation below frost line.
 - a. Pressure Rating: 150 psig (1035 kPa) minimum.
 - b. Outlet: One, with horizontal discharge.
 - c. Hose Thread: NPS 2-1/2 (DN 65), with NFPA 1963 external hose thread for use by local fire department, and with cast-iron cap with brass chain.
 - d. Barrel: Cast-iron or steel pipe with breakaway feature.
 - e. Valve: Bronze body with bronze-ball or plunger closure, and automatic draining.
 - f. Security: Locking device for padlock.
 - g. Exterior Finish: Red alkyd-gloss enamel paint, unless otherwise indicated.
 - h. Inlet: NPS 2 (DN 50) minimum.
 - i. Operating Wrench: One for each unit.

B. Ground-Type Flushing Hydrants:

1. Description: Nonfreeze and drainable, of length required for shutoff valve installation below frost line.
 - a. Pressure Rating: 150 psig (1035 kPa) minimum.
 - b. Outlet: One, with angle discharge.
 - c. Hose Thread: NPS 2-1/2 (DN 65), with NFPA 1963 external hose thread for use by local fire department, and with cast-iron cap with brass chain.
 - d. Barrel: Cast-iron or steel pipe.
 - e. Valve: Bronze body with bronze-ball or plunger closure, and automatic draining.
 - f. Inlet: NPS 2 (DN 50) minimum.

- g. Hydrant Box: Cast iron with cover, for ground mounting.
- h. Operating Wrench: One for each unit.

2.19 FIRE DEPARTMENT CONNECTIONS

A. Fire Department Connections:

- 1. Not used.

2.20 DETECTION TAPE

- ### A. Detection tape: Solid aluminum foil encased in a protective plastic jacket; safety blue in color; no less than two and half (2-1/2) inches wide; and shall bear the printed identification "CAUTION: BURIED WATER LINE BELOW".

2.21 TRACER WIRE

- ### A. Water pipe tracer wire: AWG 12/1, single conductor solid copper with blue jacket, UL rated suitable for direct burial, temperature range -20° C to 60° C, 600 Volts RMS.

2.22 ALARM DEVICES

- ### A. Not used.

PART 3 - EXECUTION

3.1 EARTHWORK

- #### A. Refer to project drawings and appropriate specifications.

3.2 PIPING APPLICATIONS

- A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.
- B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.
- C. Do not use flanges or unions for underground piping.

- D. Flanges, unions, grooved-end-pipe couplings, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.
- E. Underground water-service piping NPS 3/4 to NPS 2 shall be any of the following:
 - 1. PE, ASTM pipe; insert fittings for PE pipe; and clamped joints.
 - 2. PVC, ASTM D2241, PR200; and push on joints.
- F. Underground water-service piping NPS 3 to NPS 10 shall be any of the following:
 - 1. Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.
 - 2. PVC, AWWA Class 200 pipe; mechanical-joint, ductile-iron fittings; and gasketed joints.
- G. Water Meter Box Water-Service Piping shall be same as underground water-service piping.
- H. Aboveground water-service piping NPS 3 to NPS 10 shall be the following:
 - 1. Ductile-iron, flanged-end pipe; ductile-iron, flanged-end appurtenances; and flanged joints.
- I. Underground Fire-Service-Main Piping NPS 4 to NPS 12 shall be any of the following:
 - 1. Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.
 - 2. PVC, AWWA Class 150 pipe listed for fire-protection service; PVC Class 150 fabricated or molded fittings; and gasketed joints.
 - 3. PVC, AWWA C900 Pressure Class 235 DR-18 pipe listed for fire-protection service; ductile-iron, mechanical-joint fittings; and mechanical joints.

3.3 VALVE APPLICATIONS

- A. General Application: Use mechanical-joint-end valves for **NPS 3** and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FMG, nonrising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for **NPS 2** and smaller installation.

- B. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
1. Underground Valves, water service, **NPS 3** and Larger: AWWA, cast-iron, nonrising-stem, **resilient**-seated gate valves with valve box.
 2. Underground Valves, fire protection service, **NPS 4 (DN 100)** and Larger, for Indicator Posts: UL/FMG, cast-iron, nonrising-stem gate valves with indicator post.
 3. Use the following for valves in vaults and aboveground:
 - a. Gate Valves, **NPS 2** and Smaller: Bronze, nonrising stem.
 - b. Gate Valves, **NPS 3** and Larger: AWWA, cast iron, OS&Y rising stem, resilient seated.
 - c. Check Valves: AWWA C508, swing type.
 4. Pressure-Reducing Valves: Use water-service piping in vaults and aboveground to control water pressure.
 5. Relief Valves: Use for water-service piping in vaults and aboveground.
 - a. Air-Release Valves: To release accumulated air.
 - b. Air/Vacuum Valves: To release or admit large volume of air during filling of piping.
 - c. Combination Air Valves: To release or admit air.
 6. Detector Check Valves: Use for water-service piping in vaults and aboveground to detect unauthorized use of water.

3.4 PIPING INSTALLATION

- A. Water-Main Connection: Arrange with utility company for tap of size and in location indicated in water main. Furnish and install tapping saddle and valve. Actual tap will be performed by JWSC. No tap shall be made within 5 feet or 5 pipe diameters, whichever is less, of a pipe joint.
- B. Fire-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.

- C. Make connections larger than NPS 2 with tapping machine according to the following:
1. Install tapping sleeve and tapping valve according to MSS SP-60.
 2. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
 3. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.
 4. Install gate valve onto tapping sleeve. Comply with MSS SP-60. Install valve with stem pointing up and with valve box.
- D. Make connections NPS 2 and smaller with drilling machine according to the following:
1. Install service-saddle assemblies and corporation valves in size, quantity, and arrangement required by utility company standards.
 2. Install service-saddle assemblies on water-service pipe to be tapped. Position outlets for corporation valves.
 3. Use drilling machine compatible with service-saddle assemblies and corporation valves. Drill hole in main. Remove drilling machine and connect water-service piping.
 4. Install corporation valves into service-saddle assemblies.
 5. Install manifold for multiple taps in water main.
 6. Install curb valve in water-service piping with head pointing up and with service box.
- E. Comply with NFPA 24 for fire-service-main piping materials and installation.
1. Install PE corrosion-protection encasement according to ASTM A674 or AWWA C105.
 2. Install copper tube and fittings according to CDA's "Copper Tube Handbook."
- F. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.
1. Install PE corrosion-protection encasement according to ASTM A674 or AWWA C105.
- G. Install PE pipe according to ASTM D2774 and ASTM F645.
- H. Install PVC, AWWA pipe according to ASTM F645 and AWWA M23.

- I. Bury piping with depth of cover over top at least 36 inches according to the following:
 - 1. Under Driveways, Roadways, or Pavements: With at least 42 inches cover over top.
- J. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.
 - 1. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.
- K. Sleeves: Not used.
- L. Mechanical sleeve seals: Not used.
- M. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

3.5 INSTALLATION OF HANGERS AND SUPPORTS

- A. Install the following pipe attachments:
 - 1. Provide pipe supports on above ground piping as required and in accordance with JWSC details.
 - 2. On PVC piping, install pads or cushions on bearing surfaces to prevent hanger from scratching pipe.
- B. Support horizontal piping within 12 inches of each fitting and coupling.
- C. Support vertical runs of piping to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.6 JOINT CONSTRUCTION

- A. Make pipe joints according to the following:
 - 1. Ductile-Iron Piping, Gasketed Joints for Water-Service Piping: AWWA C600 and AWWA M41.

2. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194.
3. PE Piping Insert-Fitting Joints: Use plastic insert fittings and fasteners according to fitting manufacturer's written instructions.
4. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

3.7 ANCHORAGE INSTALLATION

- A. Anchorage, General: Install water-distribution piping with restrained joints. Joint restraint shall be in accordance with the authorities having jurisdiction. Anchorages and restrained-joint types that may be used include the following:
 1. Concrete thrust blocks.
 2. Locking mechanical joints.
 3. Set-screw mechanical retainer glands.
 4. Bolted flanged joints.
 5. Pipe clamps and tie rods.
- B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
 1. Gasketed-Joint, Ductile-Iron, Water-Service Piping: According to AWWA C600.
 2. Gasketed-Joint, PVC Water-Service Piping: According to AWWA M23.
 3. Fire-Service-Main Piping: According to NFPA 24.
- C. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.8 VALVE INSTALLATION

- A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.
- B. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.

- C. UL/FMG, Gate Valves: Comply with NFPA 24. Install each underground valve and valves in vaults with stem pointing up and with vertical cast-iron indicator post.
- D. UL/FMG, Valves Other Than Gate Valves: Comply with NFPA 24.
- E. MSS Valves: Install as component of connected piping system.
- F. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.
- G. Pressure-Reducing Valves: Install in vault or aboveground between shutoff valves. Install full-size valved bypass.
- H. Relief Valves: Comply with AWWA C512. Install aboveground with shutoff valve on inlet.

3.9 DETECTOR-CHECK VALVE INSTALLATION

- A. Install in vault or aboveground.
- B. Install for proper direction of flow. Install bypass with water meter, gate valves on each side of meter, and check valve downstream from meter.
- C. Support detector check valves, meters, shutoff valves, and piping on brick or concrete piers.

3.10 WATER METER INSTALLATION

- A. Install water meters, piping, and specialties according to utility company's written instructions.

3.11 ROUGHING-IN FOR WATER METERS

- A. Rough-in piping and specialties for water meter installation according to utility company's written instructions.

3.12 VACUUM BREAKER ASSEMBLY INSTALLATION

- A. Install pressure vacuum breaker assemblies of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.

- B. Do not install pressure vacuum breaker assemblies in vault or other space subject to flooding.

3.13 BACKFLOW PREVENTER INSTALLATION

- A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.
- B. Do not install backflow preventers that have relief drain in vault or in other spaces subject to flooding.
- C. Do not install bypass piping around backflow preventers.
- D. Support **NPS 2-1/2 (DN 65)** and larger backflow preventers, valves, and piping near floor and on brick or concrete piers.

3.14 WATER METER BOX INSTALLATION

- A. Install water meter boxes in paved areas flush with surface.
- B. Install water meter boxes in grass or earth areas with top 1 inch above surface.

3.15 CONCRETE VAULT INSTALLATION

- A. Install precast concrete vaults according to ASTM C891.

3.16 PROTECTIVE ENCLOSURE INSTALLATION

- A. Install concrete base level and with top approximately 2 inches (50 mm) above grade.
- B. Install protective enclosure over valves and equipment.
- C. Anchor protective enclosure to concrete base.

3.17 FIRE HYDRANT INSTALLATION

- A. General: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints or thrust blocks, and support in upright position.
- B. AWWA Fire Hydrants: Comply with AWWA M17.

- C. UL/FMG Fire Hydrants: Comply with NFPA 24.

3.18 FLUSHING HYDRANT INSTALLATION

- A. Install post-type flushing hydrants with valve below frost line and provide for drainage. Support in upright position. Include separate gate valve or curb valve and restrained joints in supply piping.
- B. Install ground-type flushing hydrants with valve below frost line and provide for drainage. Install hydrant box flush with grade. Include separate gate valve or curb valve and restrained joints in supply piping.
- C. Install sampling stations with valve below frost line and provide for drainage. Attach weather-resistant housing and support in upright position. Include separate curb valve in supply piping.

3.19 FIRE DEPARTMENT CONNECTION INSTALLATION

- A. Not used.

3.20 ALARM DEVICE INSTALLATION

- A. Not used.

3.21 FIELD QUALITY CONTROL

- A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
- B. Hydrostatic Tests:
 - 1. Upon completion of backfilling operations and prior to disinfection, all completed water lines shall be subject to hydrostatic (pressure and leakage) testing in accordance with AWWA C600 or AWWA C605 as appropriate and as outlined below. Pressure and leakage testing shall be conducted simultaneously. The contractor shall test all new water lines in the presence of a JWSC Inspector.
 - 2. The test pressure shall be measured at the lowest point. All required blow offs shall be installed by the contractor prior to the hydrostatic test.

3. The contractor shall furnish clean water as well as temporary plugs, caps, bulkheads, test pump and all other necessary equipment and labor for the test. The section of water main to be tested shall be filled with water of approved quality and all air shall be expelled from the pipe. Water for testing may be obtained from any existing fire hydrant or special wet tap of an existing water line provided that the method of backflow prevention used is approved by the JWSC Inspector.
4. The JWSC will operate all valves and hydrants on the existing water distribution system. If blow offs or other outlets are not available at high points for releasing air, the contractor shall make the necessary taps at such points and shall plug such holes at the completion of the test. The Table below lists the approximate amount of water which must be added to the pipe to raise line pressure from 0 to 150 PSI when no air is present.

Pipe Size	Gallons per 100LF
6"	0.73
8"	1.31
10"	2.04
12"	2.94
16"	5.22

5. If the actual field test quantities (additional water amount) is over 4 times greater than the amounts listed in the table above, severe air entrapment is likely and additional efforts should be made to expel air from the pipe prior to testing.
6. All piping shall be pressure and leakage tested for a minimum of 2-hours duration at 150 PSI. All valved sections shall be hydrostatically tested to ensure sealing (leak allowance) of all line valves. During the 2-hour test period, no pipe will be accepted if pressure loss is greater than 5 PSI regardless of the leakage test results. The allowable testing leakage shall not exceed 11.65 GPD/Mile/inch of nominal diameter at a pressure of 150 PSI. If the initial test results are unsatisfactory, damaged or defective pipe, fittings and valves shall be repaired or replaced and the test repeated until satisfactory results are obtained.

C. Disinfection:

1. Upon satisfactory completion of the hydrostatic test, all new water lines and other pipe related installations which may have been contaminated by the work shall be disinfected in accordance with AWWA C651, the Rules for Safe Drinking Water as published by the Georgia Environmental Protection Division, and as

outlined below. The contractor shall disinfect all new water lines in the presence of a JWSC Inspector.

2. Prior to disinfection, water lines shall be thoroughly flushed to remove contaminated materials from the line. The contractor is referred to AWWA C651 for precautions during construction and procedures for flushing.
3. Disinfection shall be accomplished by introducing chlorine into the main to be disinfected. The disinfection procedure used may be any of the methods or procedures outlined in AWWA C651. A chlorine residual of at least 25 milligrams per liter (mg/l) shall be maintained for 24 hours in the water line to be disinfected. After the 24 hour holding or contact period, the heavily chlorinated water shall be flushed from the main until the chlorine residual within the main reaches the level of chlorine normally carried in the distribution system (1.0 mg/l). De-chlorination of the flushing water may be required if the highly chlorinated water is to be discharged directly to a surface water stream or storm drain system. If the water can be sheet-flowed over a large area or discharged to a holding pond, de-chlorination may be avoided.
4. After final flushing and before the new water main is connected to the distribution system, two consecutive sets of acceptable samples, taken at least 24-hours apart, shall be collected from the new main.
5. At least one set of samples shall be collected from every twelve-hundred (1200) linear feet of new water main, plus one set from the end of each line and at least one set from each branch. The JWSC Water Compliance Coordinator, in conjunction with the JWSC inspector, will determine the number and location of the required sampling points to meet the current standards. All required sampling taps shall be installed by the contractor, at his expense, prior to disinfection.
6. The collection of samples and bacteriological testing will be performed by the JWSC at the Contractor's expense unless noted otherwise on the construction plans. If the bacteriological tests are unsatisfactory, disinfection procedure shall be repeated until satisfactory results are obtained.

3.22 IDENTIFICATION

- A. Install continuous underground detectable warning tape during backfilling of trench for underground fire protection and water-distribution piping. Locate below finished grade, directly over piping.

- B. Contractor shall furnish and install locate wiring on all non-metallic water mains in accordance with the JWSC Standard Details. Locate wire shall be brought to grade outside a valve box or locating station box, as required, at four hundred and seventy-five (475) foot intervals (maximum). In addition, all water mains shall have detection tape installed two (2) feet above the pipe. Tracer wire and detection tape shall be as specified above.
- C. Installed locate wiring shall be tested by the contractor as part of the inspection process, using a qualified tester and suitable testing equipment. The contractor shall notify the JWSC Inspector at least 48 hours in advance of the locate wire field testing schedule.

3.23 CLEANING

- A. Clean and disinfect water-distribution piping as follows:
 - 1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
 - 2. Fire Protection Service: Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
 - 3. Water Service: Use purging and disinfecting procedure prescribed by authorities having jurisdiction.
- B. Prepare reports of purging and disinfecting activities.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Measurement of water mains for payment shall be the number of linear feet of pipe of each type and size in place, completed in accordance with the Plans and specifications and accepted by the Architect/Engineer measured along the centerline of pipe from end to end of pipe exclusive of the actual length occupied by valves. There shall be no separate measurement for fittings, concrete thrust blocks or for excavation, bedding or backfilling

- B. Measurement for payment for fire hydrant assemblies shall be the number of hydrants installed in place, complete with valves and boxes, completed in accordance with the Plans and Specifications and accepted by the Architect/Engineer. There shall be no separate measurement for excavation and backfilling
- C. Measurement for payment for valves shall be the number of valves of each type and size in place, complete with valve boxes and fittings, completed in accordance with the Plans and Specifications and accepted by the Architect/Engineer. There shall be no separate measurement for excavation and backfilling.

4.2 PAYMENT

- A. Piping: Payment will be made at the Contract unit price bid per linear foot for each type and size of pipe, which prices and payments shall be full compensation for furnishing all materials including excavating, backfilling up to the bottom of proposed stabilized subgrade in paved areas, backfilling up to proposed finish grade in unpaved areas, concrete thrust blocks, flanges, gaskets, hardware, flushing, sterilization, all labor, equipment, tools and incidentals necessary to complete the work under this Section.
- B. Hydrants and Valves: Payment will be made at the Contract unit price bid per each for each type and size of gate valve with box, tapping sleeve and valve assembly or fire hydrant assembly, which prices and payment shall be full compensation for furnishing all materials, excavating and backfilling up to the bottom of proposed stabilized subgrade in paved areas, backfilling up to proposed finish grade in unpaved areas, valve boxes, fittings, hardware, all labor, equipment, tools and incidentals necessary to complete the work under this Section.
- C. Single and Dual Water Service Assemblies: Payment will be made at the Contract unit price bid for each item completed in accordance with the Contract Documents that is installed by the Contractor and accepted by the Engineer. This price shall include all wire, screws, tape, tubing or PVC pipe, restoration, etc., necessary for the complete installation of the item to the satisfaction of the Engineer. This price includes all lateral tubing or PVC pipe, regardless of length. This price shall be full compensation for furnishing all materials, and for all labor, equipment, tools and incidentals necessary to complete the item. No separate payment will be made for excavation, haunching material, bedding, backfill or compaction.
- D. Payment will be made under:

Item No. 22 11 13-1 Water Main, 6" Dia., C-900, MJ Fittings – per Linear Foot

Item No. 22 11 13-2 Water Main, 8" Dia., C-900, MJ Fittings – per Linear Foot

- Item No. 22 11 13-3 Water Main, 8" Dia., HDPE, DR11 Including Fittings – per Linear Foot
- Item No. 22 11 13-4 Water Main, Service Stub 2" Dia., – per Each
- Item No. 22 11 13-5 Water Main, Reconnect Existing Service Line, Size as Required – per Each
- Item No. 22 11 13-6 Water Valve, 8" Gate Valve with Road Box – per Each
- Item No. 22 11 13-7 Water Main, Connection to Existing, 8"x8" Tapping Valve and Sleeve with Road Box – per Each
- Item No. 22 11 13-8 Water Valve, Flush Valve and Riser, 8" Dia. – per Each
- Item No. 22 11 13-9 Fire Hydrant Assembly, including Gave Valve and Box, Complete – per Each
- Item No. 22 11 13-10 Relocate Fire Hydrant Assembly, Complete – per Each
- Item No. 22 11 13-11 Remove Existing Water Main – per Linear Foot
- Item No. 22 11 13-12 Remove Meter and Box– per Each
- Item No. 22 11 13-13 Remove Gate Valve and Box

END OF SECTION 22 11 13