SECTION 211100

FACILITY FIRE SUPPRESSION WATER SERVICE 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. Section includes:

1. Pipes, fittings, and specialties.

1.3 DEFINITIONS

A. Fire-Suppression Water-Service Piping: Underground water service piping for automatic and manual fire suppression applications including but not limited to fire suppression water services and remote fire department inlet / test header connections; from interior building flange connection to Division 33 water service utilities connection within 5 feet of the building foundation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For underground fire-suppression water service piping; integral to Division 21 “Water-Based Fire Suppression Systems” shop drawing submittal.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: Comply with Division 21 for water-based fire suppression systems.

B. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 24. Include "Contractor's Material and Test Certificate for Underground Piping".

C. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Record Drawings: Complete Shop Drawing re-submittal updated to reflect actual final system installation integral to Division 21 “Water-Based Fire Suppression Systems” record drawing submittal.

B. Operation and Maintenance Data: For underground fire service specialties to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with requirements of utility company supplying the water. Include tapping of water mains and backflow prevention.
2. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

B. Installer Qualifications: Comply with Division 21 Section “Water-Based Fire Suppression Systems”.

C. Certified Engineering Technician Qualifications: Comply with Division 21 Section “Water-Based Fire Suppression Systems”.

D. Delegated Design Professional Qualifications: Comply with Division 21 Section “Water-Based Fire Suppression Systems”.

E. Source Limitations: Obtain products for each product category from a single manufacturer.

F. Product Standards: Listed in the "Fire Protection Equipment Directory" published by UL or the "Approval Guide" published by FM Global.

1. Subject to compliance with requirements, indication of a UL product requirement within Part 2 shall be construed to be inclusive of a corresponding FM Global approved product, with or without UL listing.

G. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-suppression water-service piping.

H. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.8 COORDINATION

A. Definition, “Coordinate”: Where Sections of the Work interact, the Contractor responsible for this Section of the Work initiates verbal and/ or written communication with one or more different Contractors responsible for other interacting Sections of the Work for the purposes of establishing a coordinated approach of product selections and installation sequencing that satisfies the individual requirements of the interacting Sections of the Work as well as the requirements of the Work as a whole.

B. Coordinate construction operations with those of other Sections of the Work and other entities to ensure efficient and orderly installation of each part of the Work.

1. Coordinate interfaces to Division 33 utilities.

C. Coordinate operations and product selections of this Section with operations and product selections included in different Sections that depend on each other for proper installation, connection, and operation.

D. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

E. Coordinate installation of different components with other Sections of the Work to ensure maximum performance and accessibility for required maintenance, service, and repair.

F. Make adequate provisions to accommodate items scheduled for later installation.

1.9 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.

PART 2 - PRODUCTS

2.1 DUCTILE-IRON PIPE AND FITTINGS

A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot ends.

B. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern; AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. EBAA Iron, Inc.

b. Smith Blair, Inc.

c. Tyler Union, Division of McWane Corp.

2. Pressure Rating: 350 psig minimum.

C. Flanges: ASME B16.1, Class 125, cast iron.

2.2 SPECIAL PIPE FITTINGS

A. Ductile-Iron Deflection Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. EBAA Iron, Inc.

2. Description: Compound, ductile-iron coupling fitting with sleeve and two 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.

3. Pressure Rating: 350 psig minimum.

2.3 JOINING MATERIALS

A. Gaskets for Ferrous Piping: ASME B16.21, asbestos free.

2.4 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.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Comply with excavating, trenching, and backfilling requirements in Division 31.

3.2 PIPING INSTALLATION

A. Comply with NFPA 24 for fire-suppression water-service piping materials and installation.

B. Install ductile-iron, fire-suppression water-service piping according to AWWA C600 and AWWA M41.

1. Install encasement for piping according to ASTM A 674 or AWWA C105.

C. 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.

D. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Div. 21 “Common Work Results for Fire Suppression”.

3.3 JOINT CONSTRUCTION

A. Comply with Div. 21 “Common Work Results for Fire Suppression”.

B. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure rating same as or higher than systems pressure rating for aboveground applications unless otherwise indicated.

C. Do not use flanges or unions for underground piping.

3.4 ANCHORAGE INSTALLATION

A. Anchorage, General: Install water-distribution piping with restrained joints. 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.

B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches in fire-suppression water-service piping according to NFPA 24.

C. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.5 CONNECTIONS

A. Connect fire-suppression water-service piping to Division 33 utility connections with ductile iron deflection fittings.

B. Connect fire-suppression water-service piping to interior fire-suppression piping.

3.6 FIELD QUALITY CONTROL

A. Use test procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described below in accordance with NFPA 13 and NFPA 24.

B. Flushing: Flush service piping to achieve a minimum velocity of 10 ft/sec prior to connecting to backflow preventer in accordance with NFPA 24.

C. 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.

D. Hydrostatic Tests: Hydrostatically test piping and attached appurtenances subjected to system working pressure at 200 psig. System shall maintain pressure +/- 5 psig or 2 hours.

1. Where additional water is added to the system to maintain 200 psig, the amount of water shall be measured in accordance with the procedures outlines in NFPA 24.

E. Prepare test and inspection reports.

3.7 IDENTIFICATION

A. Install continuous underground warning tape during backfilling of trench for underground fire-suppression water-service piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in Division 31.

3.8 CLEANING

A. Clean and disinfect fire-suppression water-service piping as follows:

1. Purge new piping systems and parts of existing systems that have been altered, extended, or repaired before use.

2. Piping Not Connected to Potable Water Supplies: Use purging 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. Piping Connected to Potable Water Supplies: Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:

a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow it to stand for 24 hours; or drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow it to stand for three hours.

b. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.

c. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.

3.9 PIPING SCHEDULE

A. Underground fire-suppression water-service piping shall be the following:

1. Mechanical-joint, ductile-iron pipe; mechanical-joint, ductile- or gray-iron, standard-pattern or ductile-iron, compact-pattern fittings; glands, gaskets, and bolts; and gasketed joints.

END OF SECTION