SECTION 02713 - WATER SYSTEM

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Pipe and fittings for site water line including domestic water line and ductile iron pipe water line.

B. Valves, fire hydrants if required, and domestic water hydrants.

1.02 RELATED DOCUMENTS/SECTIONS

A. Contract documents and drawings, construction details as shown on the plans, geotechnical engineering report. Refer to appropriate related sections as applicable.

1.03 REFERENCE STANDARDS

A. AASHTO T180 - Moisture-Density Relations of Soils Using a 10-lb (4.54 kg) Rammer and an 18-in. (457 mm) Drop.

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

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

D. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.

E. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.

F. ANSI/ASTM D2466 - Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.

G. ANSI/AWS A5.8 - Brazing Filler Metal.

H. ANSI/AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.

I. ANSI/AWWA C105 - Polyethylene Encasement for Ductile Iron Piping for Water and other liquids.

J. ANSI/AWWA C111- Rubber-Gasket Joints for Ductile Iron and Grey-Iron Pressure Pipe and Fittings.

K. ANSI/AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.

L. ANSI/AWWA C500 - Gate Valves, 3 through 48 in NPS, for Water and Sewage Systems.

M. ANSI/AWWA C502 - Dry Barrel Fire Hydrants.

N. ANSI/AWWA C504 - Rubber Seated Butterfly Valves.

O. ANSI/AWWA C508 - Swing-Check Valves for Waterworks Service, 2 in through 24 in NPS.

P. ANSI/AWWA C509 - Resilient Seated Gate Valves 3 in through 12 in NPS, for Water and Sewage Systems.

Q. ANSI/AWWA C600 - Installation of Ductile-Iron Water Mains and Appurtenances.

R. ANSI/AWWA C606 - Grooved and Shouldered Type Joints.

S. ANSI/AWWA C900 - Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 inch through 12 inch, for Water.

T. ASTM B88 - Seamless Copper Water Tube.

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

V. ASTM D2241 - Poly (Vinyl Chloride) (PVC) Plastic Pipe(SDR-PR).

W. ASTM D2855 - Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.

X. ASTM D2922 - Test Methods for Density of Soil and Soil- Aggregate in Place by Nuclear Methods (Shallow Depth).

Y. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

Z. ASTM D3139 - Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.

AA. ASTM D3035 - Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter.

BB. AWWA C901 - Polyethylene (PE) Pressure Pipe, Tubing, and Fittings, ☐ inch through 3 inch, for Water.

CC. UL 246 - Hydrants for Fire - Protection Service.

DD. Local Authority Water and Sewer Department standards and

specifications.

1.04 SUBMITTALS

A. Provide data indicating pipe, pipe accessories, and manufacturer's warranties.

B. Manufacturer's Installation Instructions: Indicate special procedures required to install products specified.

C. Manufacturer's Certificate: Certify that products meet or exceed specifications and/or referenced standards.

1.05 PROJECT RECORD DOCUMENTS

A. Submit complete, detailed as built drawings to Owner, Developer, and Architect upon completion of the work showing vertical and horizontal location. As built drawings shall be based on field run survey(s) and be sealed and signed by a registered surveyor in the State where the project is located. Provide three sets of original hard copies and one digital file in AutoCad or other acceptable digital format. Contractor is responsible for approval and verification of acceptable digital format. **As-built drawings will be required at a minimum 45 days prior to substantial completion.**

B. Accurately record actual locations of pipe runs, taps, connections, valves, tees, mechanical joints, connections, pipes, manholes, structures, sub-surface drain fields, septic tanks, lift stations, service taps or stubouts, type and size of material, and top and invert elevations of all structures.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities or other structures. All such uncharted utilities or structures shall be shown on as built drawings.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with local utility company providing water service standards and specifications. Contractor shall coordinate with utility concerning inspection, testing and applicable specifications. The minimum requirements of the referenced standards herein shall be maintained in the event of conflicts with the local utility requirements.

B. Valves: Manufacturer's name and pressure rating marked on valve body.

C. Follow manufacturer's installation requirements and recommendations.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site in a timely manner to facilitate the construction schedule. Protect materials and equipment from damage due to construction, weather, or other means.

B. Deliver and store valves in shipping containers with labeling in place.

PART 2 - PRODUCTS

2.01 WATER PIPE

A. Ductile Iron Pipe: Shall conform to Local Authority standards and specifications.

B. PVC Pipe: Shall conform to local authority standards and specifications.

2.02 GATE VALVES - Up to 3 Inches (75 mm):

A. Shall conform to local authority standards and specifications.

2.03 GATE VALVES - 3 Inches (75 mm) and Over

A. Shall conform to local authority standards and specifications.

2.04 BALL VALVES - Up to 2 Inches (50 mm)

A. Shall conform to local authority standards and specifications.

2.05 SWING CHECK VALVES - From 2 inches to 24 inches (50 mm to 600 mm)

A. Shall conform to local authority standards and specifications.

2.06 BUTTERFLY VALVES - From 2 inches to 24 inches (50 mm to 600 mm)

A. Shall conform to local authority standards and specifications.

2.07 BEDDING MATERIALS

A. Bedding: Fill materials must be approved by soils engineer prior to placement and compaction. Cut trenches sufficiently wide to enable installation and inspection. The minimum bedding for all pipes is Class B as shown on the plans unless specified otherwise.

2.08 ACCESSORIES

A. Concrete for Thrust Blocks: Shall conform to local authority standards and specifications.

B. Backflow Preventer: Shall conform to local authority standards and specifications.

C. Meter: Shall conform to local authority standards and specifications.

D. Manhole and Cover: Shall conform to local authority standards and specifications.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify existing conditions, all existing utilities, and coordinate service taps with Local authority standards and specifications.

B. Verify that building service connection, vault, meter, and municipal utility water main size, location and invert are as indicated on the drawings.

3.02 PREPARATION

A. Ream pipe and tube ends and remove burrs.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare pipe connections to equipment with flanges or unions.

3.03 BEDDING

A. Excavate pipe trench in accordance with Section 02200 (2.07) and Section 02700 (3.03) for work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated.

B. Place bedding material at trench bottom, level materials in continuous layers not exceeding 6 inches compacted depth. Minimum compaction for pipe trenches is 95% of standard proctor or as directed by the soils engineer.

C. Maintain optimum moisture content of bedding material to attain required compaction density.

3.04 INSTALLATION - PIPE

A. Maintain separation of water main from other underground utilities,

pipes, or obstructions of one foot minimum.

B. Install pipe to indicated elevation to within tolerance of 5/8 inches. Maintain minimum depth of cover over top of pipe of 42 inches or as specified Local authority standards and specifications, whichever is greater.

C. Install ductile iron piping and fittings to ANSI/AWWA C600.

D. Route pipe in straight line.

E. Install pipe to allow for expansion and contraction without stressing pipe or joints.

F. Install access fittings to permit disinfection of water system.

G. Slope water pipe and position drain at low points.

H. Form and place concrete for thrust blocks at each elbow or change of direction of pipe main and as specified by Local authority standards and specifications.

I. Establish elevations of buried piping to ensure not less than 42 inches of cover.

J. Install trace wire continuous over top of pipe.

K. Backfill trench in accordance with Section 02200 (2.06).

L. All materials and construction shall conform, at a minimum, to the manufacturer's standards and specifications.

3.05 INSTALLATION - VALVES

A. Set valves on solid bearing.

B. Center and plumb valve box over valve. Set box cover flush with finished grade.

3.06 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Flush and disinfect system in accordance with standards and specifications of local authority standards and specifications and/or with referenced standards herein constituting minimum requirements.

3.07 SERVICE CONNECTIONS

A. Provide water service tap per all utility authority requirements including but not limited to reduced pressure device(s), backflow prevention

devices, vaults, valves, post indicator valve, fire department connection(s), and water meter(s) with by-pass valves as required by Local authority standards and specifications.

3.08 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 02200 (1.06).

B. If tests indicate Work does not meet specified requirements, remove Work, replace and retest, until the work meets specified requirements.

C. Frequency of Tests: As directed by the soils engineer.

END OF SECTION 02713