SECTION 331100 – WATER UTILITY DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Water-distribution piping and specialties outside the building for the following

1. Water services
2. Fire-service mains
3. Combined water service and fire-service mains
4. Vault, valves and materials
5. Fire hydrants

B. Utility-furnished products include water meters that will be furnished to the site, ready for installation.

C. Related Sections

1. Section 310000 – Earthwork.
2. Section 315000 – Excavation Support and Protection
3. Section 312319 – Dewatering

1.3 REFERENCES

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

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

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

G. ANSI/AWWA C105 - Polyethylene Encasement for Ductile Iron Piping for Water and Other liquids.

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

I. ANSI/AWWA C150 - Thickness Design of Ductile Iron Pipe.

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

K. ANSI/AWWA C158 - Ductile Iron Compact Fittings, 3 inches Through 24 inches and 54 inches Through 64 inches for Water Services.

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

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

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

1.4 SUBMITTALS

A. Submit under provisions of Division 1.

B. Product Data: Provide data on pipe materials, pipefittings, valves and accessories.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.5 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Division 1.

B. Accurately record actual locations of piping mains, valves, connections, and invert elevations.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with utility company and municipal authority.

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

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Division 1.

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

PART 2 - PRODUCTS

2.1 PIPE

A. Ductile Iron Pipe: ANSI/AWWA C104:
1. Fittings: Ductile iron, Class 52, standard thickness.
2. Joints: ANSI/AWWA C111, rubber gasket with rods.
3. Polyethylene encasement: Eight mil thick polyethylene tube manufactured in accordance with ANSI/AWWA C105/A21.5. Polyethylene adhesive tape, 1 ½" wide to seal joints.
4. Requirements of Aqua Ohio, Inc. shall govern.

B. Copper Tubing: ASTM B88, Type-K; annealed.
1. Fittings: ANSI/ASME B16.18, cast copper or ANSI/ASME B16.22, wrought copper.
2. Joints: Compression connection or ANSI/AWS A5.8, BcuP silver braze.
3. Requirements of Aqua Ohio, Inc. shall govern.

2.2 GATE VALVES - 3" (75 mm) and Over

A. ANSI/AWWA C500, Iron body, bronze trim, non-rising stem with square nut, single wedge, flanged ends, control rod, post indicator, extension box and valve key. Requirements of Aqua Ohio, Inc. shall govern.

B. ANSI/AWWA C509, Iron body, bronze trim, non-rising stem with square nut, single wedge, resilient seat, flanged ends, control rod, post indicator, extension box and valve key. Requirements of Aqua Ohio, Inc. shall govern.

2.3 HYDRANT

A. Hydrant: Mueller Centurion A-423-539382 as required by the local fire department and Aqua Ohio, Inc.

B. Hydrant Extensions: Fabricate in multiples of 6" with rod and coupling to increase barrel length.

C. Hose and Steamer Connection: Match sizes with utility company or fire authority, two hose

nozzles, one pumper nozzle.

D. Finish: Primer and two coats of enamel to color required by utility company or fire authority.

E. Requirements of Aqua Ohio, Inc. shall govern.

2.4 BEDDING MATERIALS

A. Bedding: Fill, as specified in Section 310000, natural stone, washed, free of deleterious material graded to maximum size of 5/8" and minimum size 1/4".

2.5 ACCESSORIES

A. Concrete for Thrust Blocks: Concrete type specified in Section 033000.

B. Backflow Preventer: Reduced pressure type as required.

C. Meter: As required by Aqua Ohio, Inc.

D. Requirements of Aqua Ohio, Inc. shall govern.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions under provisions of Division 1.

B. Verify that municipal utility water main size, location and invert are as indicated.

3.2 PREPARATION

A. Ream pipe and remove burrs.

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

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

3.3 BEDDING

A. Excavate pipe trench in accordance with Section 310000 for work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated.

B. Place bedding material at trench bottom, level fill materials in one continuous layer not exceeding 8" compacted depth and compacted in accordance with Section 310000.

C. Backfill around sides and to top of pipe with fill tamped in place and compacted in accordance with

Section 310000.

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

3.4 INSTALLATION – PIPE

Install all pipe as indicated by plans and details and in accordance with Aqua Ohio, Inc.

A. Maintain separation of water main from storm and sanitary sewer piping in accordance with municipal code and E.P.A. requirements.

B. Install pipe to indicated elevation to within tolerance of 1/2".

C. Install piping and fittings to ANSI/AWWA C605.

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 performed under Section 331100.

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.

I. Establish elevations of buried piping to ensure not less than five (5') feet of cover.

J. Backfill trench in accordance with Section 310000.

3.5 INSTALLATION - VALVES AND HYDRANTS

Install all valves and hydrants in accordance with the plans and details and in accordance with Aqua Ohio, Inc.

A. Set valves on solid bearing.

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

C. Set hydrants plumb and locate pumper nozzle perpendicular to roadway.

D. Set hydrants to grade, with nozzles at least 20" above proposed finished grade.

E. Locate control valve 18" away from hydrant.

F. Provide a drainage pit per detail filled with minimum of 8 c.f. of #57 washed limestone. Encase elbow of hydrant in gravel to 150 mm above drain opening. Do not connect drain opening to sewer.

G. Paint hydrants in accordance with local fire authority requirements and Aqua Ohio, Inc.

3.6 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. After lines have been pressure tested, flush out each run of pipe thoroughly, to remove all foreign matter from the lines. Disinfect in accordance with AWWA C651 and as directed by the water utility.

B. The Contractor shall arrange with the water utility for any taps for disinfection by chlorination.

C. Provide copies of test results to Owner's Representative and the water utility

3.7 SERVICE CONNECTIONS

A. Provide water service to utility company requirements with vault, double check backflow preventer and valves as indicated on drawings.

3.8 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Division 1.

B. Compaction testing will be performed in accordance with ANSI/ASTM D698.

C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

END OF SECTION 33 11 00