SECTION 02510

WATER DISTRIBUTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe and fittings for site water lines including domestic water lines and fire water lines.

B. Valves, Fire hydrants, and Domestic water hydrants.

1.02 RELATED REQUIREMENTS

A. Section 02315 - Excavation: Excavating of trenches.

B. Section 02316 - Fill and Backfill: Bedding and backfilling.

C. Section 02317 - Trenching for Site Utilities: Excavating, bedding, and backfilling.

D. Section 02515 - Disinfection of Water Distribution System: Disinfection of site service utility water piping.

E. Section 03300 - Cast-in-Place Concrete: Concrete for thrust restraints.

F. Section 09900 - Paints and Coatings.

1.03 REFERENCES

A. City of Orange Water Services Standard Plans.

B. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers (ANSI B16.18).

C. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; The American Society of Mechanical Engineers.

D. ASTM B 88 - Standard Specification for Seamless Copper Water Tube.

E. ASTM D 1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

F. ASTM D 2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).

G. ASTM D 2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.

H. ASTM D 2855 - Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.

I. ASTM D 3035 - Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.

J. ASTM D 3139 - Standard Specification for Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.

K. AWS A5.8/A5.8M - Specification for Filler Metals for Brazing and Braze Welding; American Welding Society.

L. AWWA C104/A21.4 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water; American Water Works Association (ANSI/AWWA C104/A21.4).

M. AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems; American Water Works Association (ANSI/AWWA C105/A21.5).

N. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings; American Water Works Association (ANSI/AWWA C111/A21.11).

O. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast, for Water; American Water Works Association (ANSI/AWWA C151/A21.51).

P. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service; American Water Works Association.

Q. AWWA C502 - Dry Barrel Fire Hydrants; American Water Works Association (ANSI/AWWA C502/C502a).

R. AWWA C504 - Rubber Seated Butterfly Valves; American Water Works Association.

S. AWWA C508 - Swing-Check Valves for Waterworks Service, 2 In. (50 mm) Through 24 In. (600 mm) NPS; American Water Works Association (ANSI/AWWA C508).

T. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service; American Water Works Association (ANSI/AWWA C509).

U. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances; American Water Works Association (ANSI/AWWA C600).

V. AWWA C606 - Grooved and Shouldered Joints; American Water Works Association.

W. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Distribution; American Water Works Association (ANSI/AWWA C900/C900a).

X. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 In. (13 mm) Through 3 In. (76 mm), for Water Service; American Water Works Association.

Y. UL 246 - Hydrants for Fire-Protection Service; Underwriters Laboratories Inc..

1.04 SUBMITTALS

A. See Section 01350 - Submittals, for submittal procedures.

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

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

D. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with City of Orange Water Services requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

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

PART 2 PRODUCTS

2.01 WATER PIPE

A. PVC Pipe: ASTM D 1785, Schedule 40.
   1. Fittings: ASTM D 2466, PVC.
   2. Joints: ASTM D 2855, solvent weld.

B. Trace Wire: Magnetic detectable conductor, clear plastic covering, imprinted with "Water Service " in large letters.

2.02 VALVES

A. Valves: Manufacturer's and type per City of Orange Water Services for offsite facilities and County of Orange Architectural and Engineering Guide for onsite facilities.

2.03 HYDRANTS

A. Hydrants: Type as required by City of Orange Water Services.

B. Finish: In color required by City of Orange Water Services.

2.04 BEDDING AND COVER MATERIALS

A. Bedding: As specified in City of Orange Water Services Standard Plans.

B. Cover: As specified in City of Orange Water Services Standard Plans and County of Orange Architectural and Engineering Guide.

2.05 ACCESSORIES

A. Concrete for Thrust Restraints: Concrete type specified in City of Orange Water Services Standard Plans.

B. Backflow Preventer: Per City of Orange Water Services.

C. Meter: Per city of Orange Water Services.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that building service connection and municipal utility water main size, location, and invert are as indicated.

3.02 PREPARATION

A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, 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 TRENCHING

A. See Section 02317 for additional requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Form and place concrete for pipe thrust restraints at each change of pipe direction. Place concrete to permit full access to pipe and pipe accessories.

D. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.04 INSTALLATION - PIPE

A. Refer to City of Orange Water Services.

B. Maintain separation of water main from piping in accordance with health code.

C. Group piping with other site piping work whenever practical.

D. Establish elevations of buried piping to ensure not less than 3.5 ft of cover.

E. Route pipe in straight line.

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

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

H. Install trace wire 6 inches above top of pipe; coordinate with Section 02317.

3.05 INSTALLATION - VALVES AND HYDRANTS

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; locate pumper nozzle perpendicular to and facing roadway.

D. Paint hydrants in accordance with City of Orange Water Services.

3.06 SERVICE CONNECTIONS

A. Provide water service to utility company requirements with reduced pressure backflow preventer and water meter with by-pass valves and sand strainer.

B. Provide sleeve in retaining wall for service main. Support with reinforced concrete bridge. Calk enlarged sleeve watertight.

C. Anchor service main to interior surface of foundation wall.

D. Provide 18 gage galvanized sheet metal sleeve surrounding service main to 6 inches above floor and 6 feet minimum below grade. Size for 2 inches minimum of glass fiber insulation stuffing.

3.07 FIELD QUALITY CONTROL

A. Perform field inspection in accordance with Section 01410.

B. Pressure test water piping per City of Orange Water Services.

C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to County of Orange/OC Public Works.

END OF SECTION

SECTION 02515

DISINFECTION OF WATER DISTRIBUTION SYSTEM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Disinfection of site domestic water lines and site fire water lines specified in Section 02510.

B. Disinfection of building domestic water piping specified in Section 15400.

C. Testing and reporting results.

1.02 RELATED REQUIREMENTS

A. Section 02510 - Water Distribution.

1.03 REFERENCE STANDARDS

A. City of Orange Water Services.

B. AWWA B300 - Hypochlorites; American Water Works Association (ANSI/AWWA B300).

C. AWWA B301 - Liquid Chlorine; American Water Works Association (ANSI/AWWA B301).

D. AWWA B302 - Ammonium Sulfate; American Water Works Association (ANSI/AWWA B302).

E. AWWA B303 - Sodium Chlorite; American Water Works Association.

F. AWWA C651 - Disinfecting Water Mains; American Water Works Association (ANSI/AWWA C651).

1.04 SUBMITTALS

A. See Section 01350 - Administrative Requirements, for submittal procedures.

B. Test Reports: Indicate results comparative to specified requirements.

C. Certificate: Certify that cleanliness of water distribution system meets or exceeds specified requirements.

D. Disinfection report:
   1. Type and form of disinfectant used.
   2. Date and time of disinfectant injection start and time of completion.
   3. Test locations.
   4. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
   5. Date and time of flushing start and completion.
   6. Disinfectant residual after flushing in ppm for each outlet tested.

E. Bacteriological report:
   1. Date issued, project name, and testing laboratory name, address, and telephone number.
   2. Time and date of water sample collection.
   3. Name of person collecting samples.
   4. Test locations.
   5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
   6. Coliform bacteria test results for each outlet tested.
   7. Certification that water conforms, or fails to conform, to bacterial standards of City of Orange Water Services.

1.05 QUALITY ASSURANCE

A. Water Treatment Firm: Company specializing in disinfecting potable water systems specified in this Section with minimum three years documented experience.

B. Testing Firm: Company specializing in testing potable water systems, certified by governing authorities of City of Orange Water Services.

C. Submit bacteriologist's signature and authority associated with testing.

PART 2 PRODUCTS

2.01 DISINFECTION CHEMICALS

A. Chemicals: AWWA B300, Hypochlorite, AWWA B301, Liquid Chlorine, AWWA B302, Ammonium Sulfate, and AWWA B303, Sodium Chlorite.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that piping system has been cleaned, inspected, and pressure tested.

B. Schedule disinfecting activity to coordinate with start-up, testing, adjusting and balancing, demonstration procedures, including related systems.

3.02 DISINFECTION

A. Use method prescribed by the applicable state or local codes, or health authority or water purveyor having jurisdiction.

B. Provide and attach equipment required to perform the work.

C. Inject treatment disinfectant into piping system.

D. Maintain disinfectant in system for 24 hours.

E. Flush, circulate, and clean until required cleanliness is achieved; use municipal domestic water.

F. Replace permanent system devices removed for disinfection.

G. Pressure test system to 225 psi. Repair leaks and re-test.

3.03 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 01410.

END OF SECTION

SECTION 02535

SANITARY SEWER PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sanitary sewerage drainage piping, fittings, and accessories.

B. Connection of building sanitary drainage system to municipal sewers.

1.02 RELATED REQUIREMENTS

A. Section 02315 - Excavation: Excavating of trenches.

B. Section 02316 - Fill and Backfill: Bedding and backfilling.

C. Section 02317 - Trenching for Site Utilities: Excavating, bedding, and backfilling.

1.03 DEFINITIONS

A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.04 REFERENCE STANDARDS

A. County of Orange Public Works Department Standards and Specifications.

B. ASTM A 74 - Standard Specification for Cast Iron Soil Pipe and Fittings.

C. ASTM A 746 - Standard Specification for Ductile Iron Gravity Sewer Pipe.

D. ASTM C 12 - Standard Practice for Installing Vitrified Clay Pipe Lines.

E. ASTM C 14 - Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe.

F. ASTM C 14M - Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe [Metric].

G. ASTM C 76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.

H. ASTM C 76M - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe (Metric).

I. ASTM C 425 - Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings.

J. ASTM C 443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.

K. ASTM C 443M - Standard Specification for Joints for Circular Concrete Culvert and Sewer Pipe, Using Rubber Gaskets (Metric).

L. ASTM C 564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

M. ASTM C 700 - Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated.

N. ASTM D 1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

O. ASTM D 2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.

P. ASTM D 2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

Q. ASTM D 2751 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings.

R. ASTM D 3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

S. AWWA C111/A21.11 - American National Standard for Rubber Gasket Joints For Cast Iron and Ductile Iron Pressure Pipe and Fittings. (ANSI/AWWA C111/A21.11)

1.05 SUBMITTALS

A. See Section 01350 - Submittals, for submittal procedures.

B. Product Data: Provide data indicating pipe, pipe accessories.

C. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

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

E. Project Record Documents:
   1. Record location of pipe runs, connections, and invert elevations.
   2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.06 REGULATORY REQUIREMENTS

A. Conform to County of Orange Public Works Department Specifications code for installation of the Work of this section.

PART 2 PRODUCTS

2.01 SEWER PIPE MATERIALS

A. Plastic Pipe: SDR 35, (ABS) material; diameter as specified on the plan, bell and spigot style solvent sealed joint end.

B. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

2.02 BEDDING AND COVER MATERIALS

A. Pipe Bedding Material: As specified in Section 02317.

B. Pipe Cover Material: As specified in Section 02317.

PART 3 EXECUTION

3.01 TRENCHING

A. See Section 02317 for additional requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.02 INSTALLATION - PIPE

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.

B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
   1. Plastic Pipe: Also comply with ASTM D 2321.

3.03 INSTALLATION - CLEANOUTS

A. Form bottom of excavation clean and smooth to correct elevation.

B. Form and place cast-in-place concrete base pad, with provision for sanitary sewer pipe end sections.

C. Establish elevations and pipe inverts for inlets and outlets as indicated.

D. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.04 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 01410.

B. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to County of Orange/OC Public Works.

3.05 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION