SECTION 33 11 16

SITE WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified in this Section: Furnish materials and perform labor required to execute this work as indicated, as specified and as necessary to complete the Contract, including, but not limited to these major items:

1. Coordinate the work of this section with other trades including off-site construction.

2. Protect existing improvements designated to remain.

3. Staking and layout.

4. Water lines and appurtenances.

5. Trenching, backfilling and compaction.

6. Connections to existing facilities.

7. Disinfection and testing.

B. Related Work Specified Elsewhere:

1. Sanitary sewer, storm drain, gas, electrical and telephone lines.

2. Work within the public right-of-way.

3. Interior building systems: Refer to Division 15.

1.02 REFERENCE STANDARDS

A. General: Conform to the latest editions, unless otherwise indicated, of the following reference standards to the extent specified.

B. Ordinances, Codes and Regulations: All work shall be installed in accordance with all of the requirements of all legally constituted authorities having jurisdiction, including all local ordinances, codes and the Construction Safety Orders and General Industry Safety Orders of the State Division of Occupational Safety and Health (Cal/OSHA), CCR, Title 8.

C. American National Standards Institute, Inc. (ANSI):

1. B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.

2. B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

3. B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes.

D. American Public Works Association (APWA).

E. American Society for Testing and Materials (ASTM):

1. B88 - Specification for Seamless Copper Water Tube.

2. C94 - Specification for Ready-Mixed Concrete.

3. D3139 - Joints Pressure Pipes Using Flexible Elastomeric Seals.

4. F477 - Elastomeric Seals for Joining Plastic Pipes.

F. American Water Works Association (AWWA):

1. B300 - Hypochlorites.

2. B301 - Liquid Chlorine.

3. C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.

4. C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems.

5. C500 - Metal-seated Gate Valves for Water Supply Service.

6. C509 - Resilient-Seated Gate Valves for Water and Sewerage Systems.

7. C510 - Double Check Valve Backflow - Prevention Assembly.

8. C511 - Reduced - Pressure Principle Backflow - Prevention Assembly.

9. C605 - Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water

10. C651 - Disinfecting Water Mains.

11. C800 - Underground Service Line Valves and Fittings.

12. C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. Through 12 in., for Water Distribution.

G. National Fire Protection Association (NFPA):

1. NFPA 24 - Installation of Private Fire Service Mains.

H. Public Works Construction Specifications (indicated hereinafter as PWC Spec.): Standard Specifications for Public Works Construction, including all amendments thereto, except where noted otherwise in this section.

1.03 QUALITY ASSURANCE

A. General: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper performance of the work in this section.

B. Manufacturer's Qualifications: Firms regularly engaged in manufacture of water line products of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than five years.

C. Installer's Qualifications: A firm with at least two years of successful installation experience on projects with water line work similar to that required for the project.

1.04 SUBMITTALS

A. Comply with pertinent provisions of Division 1.

B. The Developer Design/Builder shall allow ample time for checking and processing and to allow the work to be accomplished in accordance with the accepted Schedule, and shall assume all responsibility for delays incurred due to rejected items. No installation of the material concerned shall be made until written approval has been obtained from the County's Representative. Approval of materials and equipment shall in no way obviate compliance with the plans and specifications.

C. Insofar as possible, all materials and equipment used in the installation of this work shall be of the same brand or manufacturer throughout for each class of material or equipment.

D. Record Drawings:

1. Comply with provisions of Division 1.

2. All buried piping and indicated future connections, exterior of any building shall be located both by depth and by accurate measurement from a permanently established landmark. All notations on record drawings of buried piping shall be made before any backfilling is started.

3. At completion of the work, these record drawings shall be signed by the Developer Design/Builder, dated and returned to the County's Representative.

1.05 DELIVERY, STORAGE AND HANDLING

A. Delivery and Storage: Inspect materials delivered to the site for damage. Store materials with minimum handling on site in enclosures or under protective coverings. Store rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.

B. Handling: Handle pipe, fittings and other accessories in such a manner as to ensure delivery to the trench in sound undamaged condition. Take special care not to injure fittings. Pipe shall be carried into position and not dragged. Do not under any circumstances drop or dump pipe, fittings, valves, or any other water line material into trenches. Do not leave rubber gaskets that are not to be installed immediately in the sunlight.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Buried Warning and Identification Tape: Shall be polyethylene plastic tape with metallic core manufactured specifically for warning and identification of buried utility lines. Tape shall be provided in rolls, 3 inches minimum width, APWA color coded for intended service with warning and identification imprinted in bold black letters continuously and repeated over the entire tape length. Warning and identification shall be "CAUTION BURIED WATER LINE BELOW" or similar wording. Code and letter coloring shall be permanent, unaffected by moisture and other substances contained in trench backfill material.

B. Pipe:

1. Water lines 4 inches in diameter and larger:

a. Polyvinyl Chloride (PVC) pipe conforming to AWWA C900, Pressure Class 305, (DR14), unless otherwise noted.

b. Joints: Push-on joints using elastomeric gaskets conforming to AWWA C900 and ASTM D3139.

2. Water lines 2 inches and less in diameter:

a. Copper tubing conforming to ASTM B88, Type K, seamless, annealed. Coiled tubing will not be allowed for copper tubing in sizes of 1½ and 2 inches in diameter.

b. Aqua Shield Corrosion Protection Sleeves, 100-mil thickness.

C. Fittings and Specials:

1. Copper tubing: Fittings for solder-type joints conforming to ANSI B16.18 or ANSI B16.22; fittings for compression-type joints conforming to ANSI B16.26, flared tube-type.

2. Polyvinyl Chloride (PVC) pipe: Conforming to AWWA C900, Pressure Class 305, (DR14), unless otherwise noted.

3. Repair fittings: Repair clamps, repair sleeves, joint clamps, and similar devices shall not be used to repair or join water lines. Pipe damaged during installation shall be removed and replaced.

D. Valves:

1. Valves 4 inches to 12 inches in size shall be resilient-seated gate valves conforming to AWWA C509. Valves shall be opened by turning counterclockwise. Valves on fire lines shall be post indicator type or outside screw and yoke type (OS & Y), hand-wheel operated, installed above grade. Valves installed on fire lines shall be listed by Underwriters Laboratories, approved by Factory Mutual Research Corporation and shall conform to NFPA 24. Valves on domestic lines or fire hydrant laterals shall have non-rising stems.

2. Indicator post for valves: Indicator post for valves shall conform to the requirements of NFPA 24. Operation shall be by wrench.

3. Backflow devices: Double check type and/or reduced pressure type, as indicated, conforming to AWWA C510 and C511, respectively. Backflow devices shall be installed a minimum of 12 inches above grade and not more than 48 inches above grade measured from the bottom of the assembly and with a minimum of 12 inches of side clearance on both sides of the assembly.

E. Valve Boxes: Each valve shall be provided with a cast iron extension type valve box of a size suitable for the valve on which it is to be used. The head shall be round and the lid shall have the word "WATER" cast on it. The boxes shall be of such a length as will be adapted, without full extension, to the depth of cover required over the pipe at the valve location. Valve boxes shall be coated with asphaltum or bituminous paint.

F. Underground Service Line Valves and Fittings: Service line valves and fittings shall conform to AWWA C800 with a 150 psi pressure rating.

G. Disinfection: Chlorinating materials shall conform to AWWA B300 or B301.

H. Concrete: Thrust block concrete shall conform to ASTM C94 with a minimum compressive strength of 2000 psi at 28 days.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Site and Drawings: Carefully examine the site and compare the drawings with existing conditions. By the act of submitting bids, the Developer Design/Builder shall be deemed to have made such examination and to have accepted such conditions, and to have made allowance therefore in preparing his figure.

B. Verification of Existing Elevations: Verify all join elevations prior to laying pipe.

C. Verification of Dimensions: Before proceeding with any work, the Developer Design/Builder shall carefully check and verify all dimensions, sizes, etc., and shall assume full responsibility for the fitting-in of his equipment into the structure. Where apparatus and equipment have been taken from typical equipment of the class indicated, the Developer Design/Builder shall carefully check the drawings to see that the equipment he contemplates installing will fit into the spaces provided.

3.02 INSTALLATION

A. Adjacent Facilities:

1. Building or Structures: 2 feet.

2. Parallel to Sewer Line:

a. Water line 5 inches or less in diameter shall not be installed in a common trench with the building sewer house connection unless the bottom of the water line is at least 12 inches above the top of the sewer house connection or where the water line is installed on a solid shelf excavated on one side of the common trench with a minimum clear horizontal distance of 12 inches from the sewer house connection.

b. Water mains larger than 5 inches in diameter shall be separated from the Project site sanitary sewer, receiving more than one building sanitary drain or acid pipeline, in accordance with the requirement of the State of California, Human and Welfare Agency, Department of Health Services.

3. Crossing Sewer Line:

a. Install water main a minimum of 12 inches clear, above or below a sanitary sewer.

b. A water main greater than 5 inches in diameter, crossing under a Project site sanitary sewer line, shall be installed with all their joints located at least 10 feet away from each side of the sanitary sewer line.

c. A water main greater than 5 inches in diameter, crossing over a Project site sanitary sewer line, shall be installed with all their joints located at least 4 feet away from each side of the sanitary sewer line.

d. Install all water mains no closer than 10 feet horizontally clear from the edge of sewage leach fields, seepage pits, and septic tanks.

4. Water lines shall not be laid in the same trench with sewer lines, gas lines, fuel lines, or electrical wiring.

5. Copper tubing shall not be installed in the same trench with ferrous piping materials. Where copper tubing crosses any ferrous piping material, a minimum vertical separation of 12 inches shall be maintained between pipes.

B. Plastic Line Markers: During back-filling of water line systems, install a continuous underground-type plastic line marker, located on the center-line of the buried line at six to eight inches below finished grade.

C. Building Service Lines:

1. Install lines to a point of connection within approximately 5 feet outside of buildings to which such service is to be connected and make connections thereto.

2. If building services have not been installed, provide temporary plugs or caps and mark location of the service in approved manner.

3. Service lines 2 inches in diameter and smaller shall be connected to the main by a service clamp and corporation stop.

D. Special Requirements for the Installation of Copper Tubing:

1. Trench excavation: Conforming to PWC Spec. Subsection 306-1.1.

2. Pipe laying: Conforming to the applicable sections of PWC Spec. Subsection 306-1.2, bedding as indicated. Cover over pipe shall be 36-inches minimum, unless otherwise indicated.

3. Backfill and densification: Conforming to the applicable sections of PWC Spec. Subsection 306-1.3.

4. Cutting of tubing: Cutting of tubing shall be done in a neat and workmanlike manner as recommended by the manufacturer. Tubing shall be cut square and all burs shall be removed.

5. Provide Aqua-Shield Protective Sleeve in accordance with the manufacturer's recommendations.

E. Special Requirements for the Installation of Polyvinyl Chloride (PVC) pipe:

1. General: Conforming to AWWA C605 except as otherwise indicated or specified. Pipe bedding as indicated with a minimum cover of 36 inches.

2. Pipe Anchorage:

a. Thrust blocks: Thrust blocking shall be in accordance with the requirements of AWWA C605 for thrust restraint, except that size of thrust blocks shall be as indicated.

b. Bearing area: Thrust block sizes have been designed based on the allowable soil bearing value indicated on the drawings. The Geotechnical Engineer shall certify that the insitu soils meet or exceed the design value.

c. Restrained joints: Pipe clamps, tie rods and restrained joints shall be only used in those locations indicated and shall conform to AWWA C605 and NFPA 24. Exterior surfaces shall be painted with a bituminous coating 1 mil thick in accordance with AWWA C151 or AWWA C110.

F. Installation of Valves and Fittings: Installation of valves and fittings shall conform to the applicable requirements of AWWA C600 in the locations indicated. Make and assemble joints as previously specified for making and assembling the same type joints between pipe and fittings. Valves shall be encased with polyethylene sheet conforming to AWWA C105.

G. Abandonment of Existing Water Pipe and Structures: Existing water lines so indicated shall be sealed and abandoned in place only after the new water lines have been tested, accepted and placed in service. Remove and dispose of existing valve boxes, service boxes and interfering portions of pipe.

H. Work in Public Right-of-Way: Conforming to the requirements of the City of Los Angeles.

3.03 HYDROSTATIC TESTING

A. Thrust Blocks: Hydrostatic tests shall not be made until at least five days after installation of concrete thrust blocks.

B. Testing Procedure: Flush and test ductile iron pipes in accordance with AWWA C600 for hydrostatic testing. The amount of leakage shall not exceed the amounts given in AWWA C600. Disposal of test water shall be in accordance with RWQCB requirements. Test water to be disposed shall contain no detectable chlorine residual.

3.04 DISINFECTION

A. Flush and disinfect water lines in accordance with AWWA C651 and the local agencies having jurisdiction.

B. Chlorine application for disinfection shall be by either the continuous feed method or tablet method. The resulting disinfectant solution shall have an available chlorine content of 50 parts per million (50 ppm) by weight and not less than twenty-five parts per million (25 ppm) after 24 hours.

3.05 CLEANING

A. Cleanliness of Site: During progress of work, keep premises reasonable free of debris and waste materials.

B. Removal of Debris: Upon completion and before final acceptance of work, remove all debris, rubbish, left-over materials, waste test water, tools and equipment from site in accordance with regulatory requirements and in an environmentally responsible manner.

END OF SECTION