

- Earth backfill, sheeting, and shoring.
- Concrete cradles, unless otherwise provided.

615.06. BASIS OF PAYMENT.

Accepted quantities of pipe conduit of the types and sizes specified, measured as provided above, will be paid for at the contract unit price as follows:

(A)	REINFORCED CONCRETE PIPE, ROUND	LINEAR FOOT (METER)
(B)	VITRIFIED CLAY PIPE	LINEAR FOOT (METER)
(C)	POLYVINYL CHLORIDE (PVC) PIPE	LINEAR FOOT (METER)
(D)	SANITARY SEWER SERVICE CONNECTION*	EACH
(E)	SANITARY SEWER SERVICE LINE**	LINEAR FOOT (METER)
(F)	TRENCH EXCAVATION	CUBIC YARD (CUBIC METER)
(G)	STANDARD BEDDING MATERIAL	CUBIC YARD (CUBIC METER)

Such payment shall be full compensation for furnishing all materials, equipment, labor, and incidentals to complete the work as specified.

* *Includes the cost of installing an in-line tee and bracing for riser pipe.*

** *Riser pipe will be measured for payment; cost includes all fittings and adaptors to connect service to the existing line.*

SECTION 616 WATER PIPE AND FITTINGS

616.01. DESCRIPTION.

This work shall consist of the construction of waterlines and service lines of the type shown on the Plans in accordance with these and other applicable Specifications and in reasonably close conformity with the lines and grades shown on the Plans or established by the Engineer.

These Specifications set forth the general requirement for this type of work and provide a basis of payment for the required work. Additional specifications will be found in the Oklahoma State Department of Health (OSDH) Regulations, Manufacturers' recommendations, AASHTO, ASTM, ANSI, AWWA and the Public Utility for whom the work is to be performed. The Special Provisions, Plans, Public Utility Specifications, Supplemental or Standard Specifications shall govern over the OSDH minimum regulations.

616.02. MATERIALS.

Materials shall be in accordance with Section 733.

- (a) **Pipe.** Pipe shall be of the kind specified on the Plans and shall be identified in the project specifications with appropriate AASHTO, ASTM, ANSI or AWWA specifications numbers for both quality control (dimensions, tolerances, etc.) and installation (bedding, backfill, etc.).

In no case shall pipe or fittings with a pressure rating of less than 200 psi (1.4MPa) be used. Whenever plastic pipe is used, it shall bear the seal of the National Sanitation Foundation (NSF), have a Standard Dimension Ratio (SDR) not exceeding 14, and shall have an outside

diameter (OD) equal to the OD of the equivalent size ductile iron pipe. The minimum thickness class of cast or ductile iron pipe shall be 4 inch (100 mm) through 8 inch (200 mm), Class 51; 10 inch (250 mm) and larger shall be Class 50. All ductile iron pipe shall be wrapped with a loose fitting, slip-on polyethylene film. The film shall cover all portions of the water line and shall be used on all cast or ductile iron fittings.

- (b) **Joints.** Packing and jointing materials used in the joints of pipe and fittings shall meet the standards of the AWWA and the public utility.
- (c) **Fittings.** Use cast or ductile fittings for water lines—with the exception of copper water lines, which shall use all copper fittings. Use bronze service clamps for standard water service connections. The couplings shall be provided with factory installed brass bushing which conform to ASTM B 62 and AWWA C 800 for standard corporation stop threads.

616.03. SUPPLEMENTAL DRAWINGS.

The drawings on which the Proposal and Contract are based shall be supplemented by installation drawings. When shown in the Proposal they will be furnished at the contract unit price. When not shown in the Proposal, the drawings will be furnished in accordance with Subsection 105.02. These installation drawings shall include but are not limited to the following:

Profiles having a horizontal scale of not more than 100 feet to the inch (12 meters to 10 mm) and a vertical scale of not more than 10 feet to the inch (1.2 meters to 10 mm) with both scales clearly indicated

Brand name and model number of all materials

Installation instructions, thrust block sizes and locations; location of all fittings, method of disinfection and methods and/or materials required to make connections to the existing lines.

All drawings are to be identified with the plans by station number and distances left or right.

The public utility for whom the work is to be performed may have its own Specifications which are more stringent than the minimum OSDH Regulations. All pipe installation drawings after approval by the Engineer will become a part of the Contract documents and will govern the installation of all materials indicated thereon insofar as they apply.

NOTE: The approval of the Engineer shall not relieve the Contractor of sole responsibility for correctness of details, dimensions, and quantities, and shall in no way waive or modify any requirements of the Specifications or Plans.

616.04. CONSTRUCTION METHODS.

- (a) **General.** The work to be constructed as specified under the pipe bid item shall also be understood to mean bends, tees, crosses, sleeves, outlet assemblies, plugs and other specified fittings.

In general, the depth of trench shall be such that it will provide a covering of at least 30 inches (760 mm) below the surface of the natural ground or established subgrade.

During construction, make adequate provisions for drainage of the trench. Suspend pipe-laying operations during rains or whenever the trench cannot be kept dewatered. Place a watertight plug shall be placed in the open end of the main when construction is stopped at the end of each day's work or for any other cause.

Locate—or have located before excavation of the water line trench is begun—all intersecting sewer lines, house sewer lines, and sewers within 10 feet (3 meters) of the proposed water line location; these locations will have been mapped. Take measures to prevent the discharge of waste into the trench.

NOTE: If any sewer is disturbed, it must be carefully restored immediately to a tight operating condition at the Contractor's expense.

Horizontal and vertical separation of sanitary sewers and water mains must be maintained as specified in the OSHD Regulations. Whenever possible, locate a water main at least three meters horizontally from any existing or proposed sanitary sewer line. When water mains cross sanitary sewers, lay them to provide a minimum of vertical distance of 24 inches (600 mm) between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer to prevent damage to the water main. Whenever possible, sewer pipe joints will be located at least 10 feet (3 m) from any water line. When it is impossible to obtain proper horizontal and vertical separation as stipulated above, construct the sewer equal to water pipe and test it to assure it is watertight prior to backfilling.

Block all bends, tees, crosses, outlet assemblies, valves and plugs with concrete except where the fittings have flanged, welded or harnessed joints. Place concrete blocking so that joints are accessible for repair.

- (b) **Excavation.** Excavate in accordance with Subsection 613.04 (b).
- (c) **Bedding.** Provide bedding in accordance with Subsection 613.04(c).
- (d) **Laying Pipe.** Lay pipe in accordance with Subsection 613.04(d).
- (e) **Joining Pipe Conduit.** Make joints in accordance with the Manufacturers' recommendations and requirements of the AWWA. Prior to making pipe joints, clean and dry all surfaces of the portion of the pipe to be jointed. Keep trenches waterfree during jointing and for a sufficient period thereafter to allow the joint to become fully set and completely resistant to water penetration.

NOTE: There shall be no realignment of the pipe after the joint is completed unless the pipe is removed and a completely new joint constructed.

- (f) **Connecting to Existing Lines.** Where it's indicated on the Plans or required by the Engineer, make connections to existing lines, furnishing the materials required. No additional compensation will be allowed for this; instead, include the cost for these connections in the price bid for other items of the work.
- (g) **Removal of Existing Lines.** In general, if there is no further use for existing lines, abandon them (instead of removing them). When it is necessary to remove existing line or lines to provide for new installation, no additional compensation will be paid for that removal; instead include the cost for that work in the total price bid for the new line.

- (h) **Setting Valves.** Locate valves where shown on the Plans or as directed by the Engineer. Set them with the valve stem up unless otherwise specified, and caulk the joints as specified for other joints in the pipeline. Take care to see that all parts are in first-class working condition and that the valve is entirely free from foreign material before it's placed.
- (i) **Setting Fire Hydrants.** Locate fire hydrants where shown on the Plans or designated by the Engineer. Before placing any hydrant, take care to see that all foreign matter is removed from within the body or barrel. Tighten the stuffing boxes, and open and close the hydrant valve to see that all parts are in a first class working condition.

NOTE: Hydrant leads shall be cast or ductile iron pipe. Block the back side of the hydrant opposite the pipe with concrete between the hydrant and the vertical face of the end of the trench to prevent the hydrant from blowing off the line. Place each hydrant on a slab of stone or concrete not less than 4 inches (100 mm) thick and 16 inches (400 mm) square. Around the drain of the hydrant, place not less than 7 cubic feet (0.20 cubic m) of broken stone, gravel, or brick bats so the hydrant will properly drain. Firmly tamp backfill around the hydrant to the surface of the ground and to a distance of 5 feet (1.5 m) in front of the hydrant.

- (j) **Dead Ends.** Close dead ends with the required cap or plug depending on whether the dead end is a spigot end or bell end. Caps and plugs shall meet the same requirements as other cast iron fittings. In addition to caulking caps or plugs, securely brace them by casting a concrete block against the cap or plug. On pipes up to 4 inches (100 mm in diameter) place a 2 inch (50 mm) blowoff.
- (k) **Backfilling. Backfill in accordance with Subsection 613.04 (f).**
- (l) **Field Testing.** Inform the Engineer in writing 24 hours in advance of any testing. Test the installed pipe for pressure and leakage in accordance with AWWA Standard C 600. Working pressure of the pipe should not exceed 2/3 of the rated pressure of the pipe. Leakage shall not exceed 10 gallons per inch of diameter of pipe per mile (93 liters per 100 mm of diameter of pipe per kilometer) per 24 hours at 150 psi (1034 kPa) testing pressure.

Disinfect all new, cleaned, or repaired water mains in accordance with Rules and Regulations Governing Operation of Public Water Supply Systems. Water with 50 to 100 parts per million of chlorine shall be allowed to stand 24 hours and develop a residual of at least 10 parts per million of chlorine. Drain the spent solution in an acceptable manner and replace it with potable water prior to use of the line. As an alternate, either of the methods listed in the latest AWWA Specifications may be used. Obtain safe bacteriological samples on two consecutive days before that portion of the line is used.

Include all of the before-mentioned testing in the price bid for other items of work.

- (m) **Inspection.** The public utility for whom the work is to be performed will assign a utilities representative to the project for the purpose of coordinating compliance with Specifications during construction. The utilities representative will be directly responsible to the ODOT Engineer. All negotiations, decisions, instructions, interpretations of applicable Specifications, and other matters influencing the work shall be directed to the ODOT Engineer.

616.05. METHOD OF MEASUREMENT.

Water pipe will be measured for payment by the linear foot (meter), including such fittings as crosses, tees, sleeves, outlet assemblies, plugs, and other specified fittings, complete in place and accepted. Each separate size of pipe shall constitute a separate item for payment, and will be measured along the center line of the completed line, with no deductions made for the space occupied by fittings, valves, etc.

Valves will be measured for payment by each valve installed. Valves of different sizes shall constitute separate pay items. The price bid for these items shall include all the costs of work required to install them, such as tapping, tapping sleeves, valve boxes, meter boxes, etc.

Fire hydrants will be measured for payment by each such fire hydrant set, complete in place and approved, including drainage stone, blocking, and fire hydrant extensions.

Excavations, bedding material, blocking, testing, and fittings will not be measured for payment as a separate item, but the cost of same will be included in the contract unit price for water pipe.

When stipulated in the contract, *supplemental drawings* will be measured for payment on a lump sum basis.

616.06. BASIS OF PAYMENT.

Accepted quantities of water pipe and appurtenances of the types and sizes specified and supplemental drawings, measured as provided above, will be paid for as the contract unit price as follows:

(A)	DUCTILE IRON PIPE (LINED).....	LINEAR FOOT (METER)
(B)	POLYVINYL CHLORIDE (PVC) PIPE	LINEAR FOOT (METER)
(C)	COPPER WATER SERVICE PIPE	LINEAR FOOT (METER)
(D)	VALVES	EACH
(E)	CORPORATION STOP INSTALLATION*	EACH
(F)	METER INSTALLATION**	EACH
(G)	FIRE HYDRANTS	EACH
(H)	SUPPLEMENTAL DRAWINGS	LUMP SUM

Such payment shall be full compensation for furnishing all materials, equipment, labor, and incidentals to complete the work as specified.

* Corporation stop includes tapping, service clamp, and coupling for a complete installation; all materials will be as specified by the public utility.

** *Meter installation includes meter can, meter setter with ground key angle stop, crushed stone, and fittings for a complete installation; all materials will be as specified by the public utility.*