

CHAPTER 5

WATER

STANDARD CONSTRUCTION SPECIFICATIONS

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STANDARD CONSTRUCTION SPECIFICATIONS

5 - WATER

501 - Water Pipe and Fittings

501.01.00 Description

501.01.01 General

This Section covers the work necessary for furnishing and installing water pipe and fittings normally used for water distribution systems.

501.01.02 Certification

Furnish certification where specifically required by the Engineer properly executed by the manufacturer, showing compliance with the required specifications, and requested in conformance with **Subsection 106.04 Certification of Commercial Products**.

Furnish to the City the current "Certificate of Compliance" issued by Underwriters' Laboratories, Inc., prior to installation of any ductile iron pipe, cast iron fittings, or ductile iron fittings. No ductile iron pipe, cast iron fittings, or ductile iron fittings will be accepted by the City without a valid "Certificate of Compliance."

501.01.03 Corrosion

Take protective measures as specified by the City against electrolysis and corrosion from contact between dissimilar metallic materials at all points of contact.

501.01.04 Opening Valves

Valves shall be opened and/or operated by City personnel only.

501.02.00 Materials

501.02.01 General

Furnish the size, strength and thickness classification, the type of joints, and type of materials as specified. Furnish catalog data for all materials and shop drawings for all fabricated items for approval prior to ordering or fabricating.

501.02.02 Reserved

501.02.03 Ductile Iron Pipe

Ductile iron pipe material shall conform to ASTM 536. Pipe shall be centrifugally cast, conforming to ANSI A 21.51 (AWWA C 151), and shall be cement mortar lined and seal coated, conforming to ANSI A 21.4 (AWWA C 104). Pipe shall have a current "Certificate of Compliance" issued by Underwriters' Laboratories, Inc., certifying that representative samples of pipe are in accordance with ANSI/NSF Standard 61: Drinking Water Systems Components - Health Effects. Pipe joint shall be mechanical, flanged or push-on type. Furnish gaskets and joint lubricant conforming to ANSI A 21.11 (AWWA C 111), suitable for designated pipe joint, size, and pressure rating.

Use ductile iron pipe conforming to AWWA C 151, pressure class 350 on all main line pipe 3 inch (76.20 mm) through 16 inch (406.40 mm).

501.02.04 Concrete Cylinder Pipe, If Approved By The City

Concrete cylinder pipe shall conform to AWWA C 300. Steel cylinder thickness reinforcing wire diameter and spacing and cement mortar lining and coating shall be as specified. Furnish flanged, welded, or Carnegie-type push-on joints as required.

501.02.05 Steel Pipe, If Approved By The City

Steel pipe shall be the diameter and wall thickness shown and shall be manufactured in accordance with AWWA C 200 unless otherwise specified. Where required, furnish steel pipe protected by coal-tar or fluorochemical coating and lining as specified by the Engineer. Steel pipe joints shall be Carnegie-type as specified or flanged or plain-end for use with mechanical couplings.

501.02.06 Galvanized Steel Pipe, If Specified By The City

Unless otherwise specified, all galvanized steel pipe shall be Schedule 40, manufactured in accordance with ASTM A 120 and AWWA C 800, zinc coated inside and outside by the hot-dip process conforming to ASTM B 6 and ASTM A 120.

501.02.07 Pipe Fittings and Specials

Use Ductile Iron, mechanical fittings conforming to AWWA C 153 for all lines up to 16 inch (406.40 mm) diameter (Ductile Iron, AWWA C 110 for larger lines). Fittings shall have a current "Certificate of Compliance" issued by Underwriters' Laboratories, Inc., certifying that representative samples of fittings are in

accordance with ANSI/NSF Standard 61: Drinking Water Systems Components - Health Effects.

Pipe fittings and specials used with cast and ductile iron pipe shall conform to ANSI A 21.10 (AWWA C 110). Class 250 cast (gray) iron fittings and Class 350 ductile iron fittings shall be cement mortar lined and seal coated (inside) as specified for pipe herein above. Other joints that may be specified are mechanical, flanged, and various locking types.

Manufacture fittings and specials for concrete cylinder pipe in accordance with AWWA C 300. Fittings may be furnished with plain ends for welding, flanged joints or push-on joints, as specified.

Unless otherwise stated, manufacture fittings for steel pipe in accordance with AWWA C 200 and AWWA C 208. Furnish fittings for steel pipe that have plain ends, push-on joints as specified, or flanged ends. Protect steel pipe fittings and accessories by applying coal-tar enamel as specified in AWWA C 203 or as otherwise specified.

501.02.08 Flanges and Gaskets

Flanged fittings may be used in some instances in which case they will be shown or noted on the plans.

Provide flanges and gaskets conforming to the requirements of AWWA C 207, Class D unless otherwise specified, rated at 150 to 175 psi (1.0325 MPa to 1.206625 MPa). Flange drilling shall conform to ASA B 16.5. Provide bolts and gaskets conforming to AWWA C 207.

501.02.09 Mechanical Couplings

Provide cast or ductile iron mechanical couplings where connecting pipes are made of cast or ductile iron. Provide steel mechanical couplings where connecting pipes are made of steel or concrete cylinder pipe. Couplings shall be capable of withstanding the designated internal hydrostatic test pressure without leakage or overstressing. Coupling diameter shall be compatible with the outside diameter of the pipe on which the coupling is installed. Steel couplings shall receive corrosion protection as specified in **Subsection 501.02.06**. Mechanical couplings shall have a minimum metal ring dimension as shown. Bolts shall be stainless steel or ductile iron compatible with the coupling used.

501.02.10 Restrained Joints

Achieve joint restraint through the use of flanges, welded joint, joint harnesses, or other means as shown. Field welding of steel joints shall conform to AWWA C 206. Where joint harnesses are used, they shall consist of steel tie bolts extending across the pipe joints with lugs shopwelded to the steel pipe barrel as shown. Joint harness assemblies shall conform to AWWA M 11, sized as required to withstand the hydrostatic test pressure on the pipe. Components of joint harness shall be hot-dip galvanized after fabrication.

501.02.11 Thrust Blocks and Anchor Blocks

Concrete for thrust blocking shall not be leaner than; one part cement, 2-1/2 parts sand, 5 parts stone, by volume, and shall have a 28 day compressive strength of not less than 2,500 psi (17.2375 MPa). (See Standard Plan W-33).

Use Portland Cement concrete conforming to ASTM C 94.

Use ASTM A-307 bolt stock or threaded tie rods, plates, Star Bolts or other approved metal harness hot-dip galvanized after fabrication or furnished with comparable corrosion protection.

On all pipe sizes and classes, set screw type retainers will not be allowed to avoid damage to the pipe and cement mortar lining.

Certain other proprietary restrained joint systems of different type, style, design and manufacture may be used in lieu of metal harnessing. Megalug and Romac Grip Ring fittings may be used instead of Star Bolts and similar "set screw" type fittings. Other alternate details proposed must be submitted to the Director for approval prior to use. (Standard Plan W-34).

501.02.12 Chlorination Tap

Furnish and install chlorination tap and ancillary piping for the City's use per Standard Plan W-40. Pipe may be polyethylene or seamless copper (type K) tubing.

Valves shall meet requirements of **Subsection 504.02.02 Service Water Pipe and Fittings** for 5/8-inch (15.875 mm) meter connection.

501.02.13 Asphaltic Concrete

Use asphaltic concrete, Class "B" or Class "C" mix conforming to current ODOT standards and to the Division's publication "Standard Specifications for Asphalt

Materials", available from the Engineer of Materials and Research, in Salem. The applicable publication is that which is current on the date the project is first advertised for bids.

501.02.14 Portland Cement Concrete

Use concrete, expansion joint filler, reinforcing steel and aggregates conforming to current ODOT standards.

Use Minor Structure Concrete (MSC) conforming to ODOT, Section 00440, 3300 psi (22.7535 MPa) at 28 days, 4-7% AEA, 5 inch (127.00 mm) slump, ½ inch (12.70 mm) max. size coarse aggregate for in kind pavement replacement of sidewalks, driveways, etc. (Concrete for thrust blocking is specified under **Subsection 501.02.11.**)

501.03.00 Construction

501.03.01 General

501.03.01A - Removal of Damaged Material

Remove material from the job site that in the judgment of the Engineer is damaged beyond repair. Payment will not be made for damaged materials, their removal, or for repairs to such materials.

501.03.01B - Traffic Control

Provide traffic control, including signing, cones, barricades, flaggers and lighting as necessary during construction in accordance with **Section 202** of these Standards.

501.03.01C - Clearing and Grubbing

Clear all areas of proposed construction to the limits shown or specified. Remove all rocks, stumps, trees, brush and similar surface features and dispose of in accordance with all applicable Federal, State and local laws and regulations.

Grub areas if necessary to remove sub-surface features to a depth equal to the depth of the proposed work. See **Section 203**.

501.03.01D - Pavement Removal and Replacement

Saw cut all AC or PCC pavement to the lines shown or as directed. Remove all resulting pavement from the work site and dispose of in accordance with all applicable Federal, State and local laws and regulations.

All AC or PCC paved surfaces shall be restored equal to original condition. After water line has passed pressure testing and chlorination, remove temporary AC cold patch and replace AC pavement to original thickness but not less than 2 ½ inches (63.50 mm). Replace PCC pavement to original thickness but not less than 4 inches (101.60 mm) and finish to match adjacent pavement.

501.03.02 Preparation of Trench, Backfill and Dewatering

Prepare the trench for pipe laying as specified in **Section 204** of these Specifications. Grade the bottom of the trench to the line and grade to which the pipe is to be laid, with proper allowance for pipe thickness and for pipe base when specified. The trench bottom shall form a continuous uniform bearing and support for the pipe between bell holes.

Excavation for the installation of the water mains and service lines shall be unclassified excavation.

Excavate to the depth required to provide uniform and continuous bearing and support for pipe between joints on solid, undisturbed soil, or compacted bedding material joints. Maintain a cover of 36 inches (914.40 mm) from top of the pipe to finished grade unless otherwise shown, noted, or directed.

Use Class D backfill in all areas subject to vehicular traffic such as streets, driveways, roads, etc. and elsewhere as shown or directed.

Compact Class C backfill by mechanical means to 90 percent of maximum density at optimum moisture content (AASHTO T 99). Class C backfill will not ordinarily be tested for compaction but the City reserves the right to conduct such testing whenever it appears the compacting effort is inadequate to achieve a firm, uniform stable backfill.

Compact Class D backfill by mechanical means to 95 percent of maximum density at optimum moisture content (AASHTO T 99).

Restore all temporary crossings of existing A.C. pavement as soon as possible and leave them passable (driveable) using A.C. Cold Patch at the end of each work day.

Provide and maintain ample means and devices at all times to remove and dispose of all water entering the trench excavation during the process of pipe laying. Do not dispose of trench water into sanitary sewers.

501.03.03 Pipe Laying

Distribute the pipe so that no hazard will be presented to occupants of the adjoining property, pedestrians, or vehicular traffic. Lift the pipe during unloading using two slings placed at quarter points of the pipe sections. Pipe may be lifted into the trench using one sling near the center of the pipe, provided the pipe is guided to prevent its uncontrolled swinging. The sling shall bear uniformly against the pipe. When not being handled support the pipe on timber cradles or on properly prepared ground, graded to eliminate all rock points and to provide uniform support along the full length. When being transported support the pipe at all times in a manner which will not permit distortion or damage to the lining or coating. Replace or repair any pipe damaged in handling to the satisfaction of the Engineer. Payment will not be made for damaged pipe or repairs to such damaged pipe.

Prior to lowering pipe in the trench the Engineer will check for damages to the pipe coating. Repair all damages or flaws to the coating before the pipe is placed in the trench. Materials used for repair shall be the same as the material being repaired. Thoroughly clean the ends of the pipe being joined by using a wire brush or other method to remove all foreign matter from the pipe joint.

Prevent foreign material from entering the pipe while it is being placed in the trench. Remove all foreign material from the inside of the pipe and joint before the next pipe is placed. If the pipe cannot be placed into the trench in place without getting earth into the pipe, the Engineer may require that wooden plugs or snugly fitted, tightly-woven canvas bags be placed over each end of the pipe before lowering it into the trench. In this event, leave the plugs or bags in place until the connection is to be made to the adjacent pipe. Keep debris, tools, rags, or other materials out of the pipes at all times. Follow pipe laying operations closely with joint coating operations as required and backfilling of trenches as specified in **Section 204.**

Lay pipe with its bell end facing the direction of laying. For lines on an appreciable slope, face bells up grade unless otherwise allowed by the Engineer. Whenever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, do not exceed the specified allowable amount of deflection or that recommended by the pipe manufacturer. Where pipelines are intended to be laid in a straight line, do not deviate from a straight line in excess of 1 inch (25.40 mm) for line and 1/4 inch (6.35 mm) for grade. In order to avoid utility conflicts the pipe

shall be deflected at the joint(s) within the allowable limits recommended by the manufacturer in order to avoid the conflict.

Maintain horizontal separation between a water line and a sewer line laid approximately parallel to one another of not less than 10 feet (3.0480 m). When water and sewer lines cross, the water line shall be higher than the sewer line and the clear vertical separation shall not be less than 18 inches (457.20 mm). If 18 inch (457.20 mm) clearance cannot be obtained, replace the sewer line with ductile iron pipe using a minimum of one 18 foot (5.4864 m) length of solid pipe centered over the crossing. Maintain 3 feet (0.9144 m) separation from all other utilities.

When pipe laying is not in progress, close the open end of the pipe with a water tight plug or by other approved means to prevent entry of trench water or other foreign materials into the pipe. This includes the noon hours as well as overnight. Do not lay pipe in water or when in the opinion of the Engineer, trench conditions are unsuitable.

501.03.03A - Live Taps

Where necessary to install main line live taps, the City of Keizer will provide the tapping sleeve and valve and contract separately for the tap to be installed. The Contractor shall excavate the existing main line to be tapped and provide any necessary shoring, barricades and/or traffic control during the tapping operation. After connecting the new main to the tapping valve and providing necessary permanent thrust restraint, the Contractor shall provide valve box and then backfill and compact the excavation in accordance with these specifications.

501.03.04 Jointing

501.03.04A - Push-on Joint Pipe and Fittings

Lay pipe with push-on type joints in strict accordance with manufacturer's recommendations. Provide all special tools and equipment required for the installation. Lubricate the bell and spigot end as required by the manufacturer with an approved pipe lubricant. Furnish the gaskets required for the joint being assembled. Install the gasket with uniform tension around the joint groove before placing the pipe in the trench. After assembly, check the gasket position with a feeler gauge to ensure proper seating.

501.03.04B - Field-welded Joints

Where pipe is to be joined in the field by welding, perform all welding operations in accordance with AWWA C 206 unless otherwise specified.

501.03.04C - Screw Joint Pipe

Ream, clean, and remove burrs and mill scale from piping before making up joint. Use joint compound acceptable for use with potable water. Cut all threads to the proper length and depth so that the pipe extends into the fitting the full depth of the fitting thread.

501.03.05 Joint Protection

501.03.05A - Concrete Cylinder Pipe

After joining the pipe as specified, clean the exposed metal at the exterior space and fill the annular space with a Portland Cement grout composed of one part cement to 1 ½ fine aggregate with sufficient water to form a mixture the consistency of thick cream. Wrap the joint with a strip of woven fabric and band around the pipe at each side of the joint. The fabric shall be of such a weave as to allow the escape of air and excess water, but prevent escape of mortar. Pour the joint full of grout through a space in the woven fabric slightly to one side of the top. Rod the grout with a beaded wire or chain as it is poured into the joint. Immediately after completing the exterior joint, place damp earth over and around the joint to prevent rapid drying. Styrofoam diapers with integral banding may be used subject to prior approval by the Engineer.

After the backfill has been placed at least to the top of the pipe, dampen the inside joint space with water or a neat cement slurry and fill by compacting into the joint a Portland Cement mortar composed of one part cement to not more than two parts fine aggregate with sufficient water to form a stiff mix. Finish the surface to a dense troweled surface free of projections or depressions.

501.03.05B - Steel Pipe

Before the pipe is joined, apply the coating specified to the interior of the pipe at the joint. Furnish and apply material in accordance with AWWA C 203. Apply the coating in accordance with manufacturer's instructions completely over the uncoated portion of the pipe and overlap the factory coating on the pipe barrel for at least 2 inches (50.80 mm). Use a diaper to retain hot coal-tar enamel as required.

501.03.06 Electrical Continuity and Bond Bars

The required materials and installation for this item shall be as specified in the special specifications contained in the contract documents.

501.03.07 Fitting Installation

Install fittings at the location shown or as directed. Handle, clean, and install the fitting as specified in the appropriate sections for laying pipe. Where a cut in the pipe is necessary for inserting valves, fittings, or closure pieces, cut the pipe mechanically without damaging it or its lining and leave a smooth end at right angles to the centerline of the pipe. Do not flame cut without approval of the Engineer. Dress and bevel the cut end of the pipe to remove sharp edges and projections which may damage the gasket. Repair all damaged lining and coating to the satisfaction of the Engineer.

501.03.08 Anchorage

On all pipelines, securely anchor all tees, plugs, blow-offs, caps, and bends as shown or as directed to prevent movement due to thrust. Achieve anchorage only by use of approved thrust blocking or approved joint restraint.

501.03.08A - Thrust Blocking

Provide thrust blocking, as shown in Standard Plan W-33 or as directed by the Engineer, using concrete as specified. Place the concrete blocking between undisturbed earth and the fitting to be anchored. The bearing surface shall be sized and located to adequately withstand the applied thrust force. Do not encase pipe joints or fitting joints with concrete. Protect bolts and nuts from concrete. Place blocking so that the pipe and fitting joints will be accessible for repairs and service.

501.03.08B - Welding

If welding is to be used as a means of joint restraint, perform welding in accordance with AWWA C 206. Obtain the Engineer's approval of all welding procedures prior to proceeding.

501.03.08C - Joint Harness

Install harness rods as shown. Do not overtighten or pull pipe out of alignment, or damage pipe or pipe coating.

501.03.09 Hydrostatic Tests

Furnish all necessary labor, material and equipment and make all taps in the pipe as necessary to conduct the tests. The City Engineer or the City of Keizer will monitor the tests. The City of Keizer will operate all valves that are under pressure.

Conduct the tests after the trench has been backfilled or partially backfilled with the joints left exposed for inspection. Where any section of pipe is provided with thrust blocking, do not pressure test until at least five (5) days have elapsed after the thrust blocking was installed. If high-early strength cement is used for the concrete blocking, the time may be reduced to two (2) days.

Furnish the following equipment and materials for the tests:

1. Two approved graduated containers.
2. Two pressure gauges 0 to 200 psi (0 to 1 379 000 Pa).
3. One hydraulic force pump as approved with suitable hose and suction pipe as required.

Pressure test all newly laid mains in accordance with AWWA C 600 and in accordance with the following test procedure:

Slowly fill the pipe with water to expel air and apply the test pressure of 150 psi (1 034 250 Pa).

Maintain the test pressure in the line for one hour by shutting off the valve from the pump.

After one hour operate the pump until 150 psi (1 034 250 Pa) is again attained.

The pump suction shall be in a barrel or similar device, metered so that the amount of water required to restore the test pressure may be measured accurately to the nearest 1 ounce (29.57 mL).

Allowable leakage is defined as the quantity of water necessary to restore the specified test pressure at the end of the test period. No pipe installation will be accepted if the leakage is greater than the number of gallons (liter) per 1,000 feet (304.80 m) as set forth in the "City of Keizer Water Main Pressure Test Report".

Project: _____ Date: _____

Witnessed By:

Size: _____ Length: _____ Allowed: _____ GPH _____

Size: _____ Length: _____ Allowed: _____ GPH _____

Size:	Length:	Allowed:	GPH
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Size: Length: Allowed: GPH

Ft.

Average

Normal Pipe Diameter - Inches

TEST RESULTS

www.elsevier.com/locate/jmb

psig

gph

gph

TEST FAILED

Start Time:

Abstract

psig

gph

gph

TEST FAILED

Correction of Leakage: Should any test of pipe laid disclose leakage greater than that allowed, locate and repair the defective joints or pipe. Retest until the leakage is within the specified allowance.

501.03.10 Flush, Test, and Disinfect

Sections of pipe to be disinfected shall first be flushed to remove any solids or contaminated material that may have become lodged in the pipe. If no hydrant is installed at the end of the main, then a tap shall be provided large enough to develop a velocity of at least 2.5 fps (0.0708 m³/s) in the main. One 2 ½ inch (63.05 mm) hydrant opening will, under normal pressure, provide this velocity in pipe sizes up to and including 12-inch (304.80 mm).

Thoroughly flush all newly completed mains by opening the initial valve(s) and hydrants or blowoffs, under supervision of the Keizer Water Department.

The initial valve or valves are to remain closed at all times until the new line is accepted except when the new line is being flushed. Close all valves at completion of flushing and before disinfecting the new line.

501.03.10A - Chlorination of Pipelines

Following flushing, the Contractor under City supervision will disinfect all newly completed mains in accordance with AWWA C-600 and the chlorination procedure outline below. Before being placed into service, all repaired portions of existing mains must also be chlorinated. Provide chlorination taps as directed.

Before being placed into service, all new fire mains, repaired portions or extensions must be chlorinated so that a chlorine residual of at least 10 parts per million remains in the water after 24 hours standing in the pipe. This residual may ordinarily be expected with an initial application of 25 parts per million although some conditions may require more. Ineffective preliminary flushing of the main may require a larger application of chlorine to produce the desired residual.

Disinfecting and chlorination procedure shall be as follows.

1. Notify the City 48 hours prior to desired time of disinfection.
2. Chlorination will be done during morning hours only. No chlorination will be done on Fridays.
3. Provide all hoses, pumps, clean containers and any other equipment necessary to inject a minimum of 25 ppm of chlorine into the section to be chlorinated. Chlorine injection will be monitored by City staff.

4. Provide sampling taps or other access points, as selected by City, at least 12-inches (304.80 mm) above grade.
5. City to operate all existing valves, hydrants, etc., during chlorination.
6. City will notify Willow Lake Wastewater Treatment Plant prior to flushing chlorine solution into sanitary sewer.
7. City will test water prior to flushing to determine that residual chlorine is at least 10 ppm.
8. Sections testing at less than 10 ppm shall be rechlorinated.
9. City will flush system and take bacteriological (MTF) samples and deliver them to laboratory for analysis.
10. City will notify Contractor of laboratory results when available.
11. Any section failing bacteriological test shall be rechlorinated, resampled and reanalyzed at Contractor's expense.

501.03.10B - Form of Applied Chlorine

Methods of applying chlorine to a main are listed below in order of preference:

1. Liquid chlorine gas-water mixture.
2. Direct chlorine feed (dry gas).
3. Calcium or sodium hypochlorite and water mixture.
4. Chlorinated lime and water mixture.

The practice of adding a small amount of chlorine powder or tablets at each joint as the main is being laid is not an acceptable method of chlorinating a pipeline. The procedure does not permit preliminary flushing nor does it provide uniform chlorine distribution.

501.03.10C - The Use of Liquid Chlorine (Gas)

A chlorine gas-water mixture shall be applied by means of a solution feed chlorinating device or dry gas may be fed directly through proper devices for regulating the rate of flow and providing effective diffusion of the gas into the water within the pipe being treated. Chlorinating devices for feeding solutions of chlorine gas or the gas itself must provide means for preventing the backflow of water into the chlorine cylinder. Feeding of dry gas is limited to main pressures of less than 10 psi (68 950 Pa).

501.03.10D - Chlorine-bearing Compounds

A mixture of water and chlorine-bearing compound of known chlorine content may be used. Acceptable compounds are calcium or sodium hypochlorite and

chlorinated lime. These compounds should be mixed with water to yield a 1 percent chlorine solution according to the following table.

Product	Amount of Compound	Quantity of Water (Gallons)
High-test calcium hypochlorite (65-70% Cl)	1 pound (0.4536 kg)	7.50 (28.3875L)
Chlorinated lime (32-35% Cl)	2 pounds (0.9072 kg)	7.50 (28.3875L)
Liquid laundry bleach (5.25% Cl)	1 gallon (3.785L)	4.25 (16.0863L)
Concentrated liquid bleach (15% Cl)	1 gallon (3.785L)	14.0 (52.990L)

Note: Calcium hypochlorite or bleaching powder should be made into a paste and then thinned to a 1 percent solution.

Chlorine Requirements for 100-ft Lengths of Various Sizes of Pipe			
		Amount Required to Give 25 ppm Chlorine	
Pipe Size inches	Volume of 100-ft Length gallons	100% Chlorine pounds	1% Chlorine Water Solution Gallons
4 (101.6 mm)	65.3 (247.16 L)	0.0135 (6.124 g)	1/6 (0.6308L)
6 (152.4 mm)	146.5 (554.50 L)	0.0305 (13.83 g)	3/8 (1.4194 L)
8 (203.2 mm)	261.0 (987.89 L)	0.054 (24.50 g)	2/3 (2.5233 L)
10 (254.0 mm)	408.0 (1 544.28 L)	0.085 (38.56 g)	1 (3.7850 L)
12 (304.8 mm)	588.7 (2 228.23 L)	0.120 (54.43 g)	1 ½ (5.6775 L)

501.03.10E - Point of Application

The preferable point of application of the chlorinating agent is at the beginning of the pipeline or any valved section and through a corporation stop in the top of the pipe. The water injector for delivery of the gas-water mixture into the pipe should be supplied from a tap on the pressure side of the gate valve controlling the flow into the pipeline extension. Chlorine-bearing compounds should be pumped or ejected into the pipe as a 1 percent solution under the same conditions as above.

Valves should be manipulated so that the strong chlorine solution in the new pipe will not flow back into the supply line. Check valves may be used if desired.

501.03.10F - Rate of Application

Water from the existing distribution system shall be controlled so as to flow slowly into the main to be chlorinated. The feed rate of the chlorine mixture shall be in such proportion to the rate of flow of water entering the pipe that at least 10 ppm residual may be obtained after 24 hours. (The initial application should be at least 25 ppm).

501.03.10G - Retention Period

Treated water shall be retained in the pipe line long enough to destroy all nonspore-forming bacteria. This period should be at least 24 hours and chlorine residual of at least 10 ppm throughout the line should be obtained at the end of the retention period.

Note: Shorter retention periods with increased chlorine concentrations may be used under certain circumstances. Prior approval must be obtained from the Oregon State Health Division when shorter retention periods are necessary.

501.03.10H - Chlorinating Valves and Hydrants

In the process of chlorinating pipelines, Water Department designated valves should be operated while the pipeline is filled with chlorinating agent.

501.03.10I - Final Flushing and Bacteriological Tests

Following a retention period of 24 hours, all treated water in the main shall be thoroughly flushed from the newly laid pipeline at its extremities until the replacement water is free of contamination. Water delivered from the new main must be verified by bacteriological samples collected from points along the new main. Samples should not be collected from unsterilized hoses or fire hydrants. Upon return of an acceptable bacteriological report, the Contractor, under the City's supervision, will remove the tap(s) and plug the water main prior to paving, unless otherwise shown or specified.

501.03.10J - Repetition of Procedure

Should the initial treatment fail to yield satisfactory bacteriological results, the original chlorination and flushing procedure must be repeated and additional samples collected.

501.03.10K - Repairing or Cutting into Existing Mains

Whenever an old line is opened by accident or design the excavation is always wet and frequently badly contaminated. Where the main has been partially or totally dewatered that section of main must be chlorinated and flushed the same as a new main. In the event that water service cannot be disrupted to provide the full 24 hour retention period, an application of 100 ppm of chlorine may be used with a retention period of one hour followed by flushing.

501.03.10L - Removal of Excess Materials

Remove and dispose of excess excavated materials, pavement, curb, and other construction debris in accordance with all applicable local, State and Federal regulations.

501.04.00 Measurement and Payment

For payment purposes, measurements will be made of the completed work, in place, as tested and accepted. No measurement or payment for materials on hand, but not yet incorporated in the work, will be made unless explicitly stated elsewhere in the Contract Documents.

The Schedule of Contract Prices is intended to cover all of the major construction items to complete the work. If any question arises as to whether or not an item of work is covered by a bid item, submit the question to the Engineer in accordance with the General Conditions of the Contract.

Any item not listed in the Schedule of Contract Prices shall be considered incidental to the construction and no separate or direct payment will be made therefore.

501.04.01 Trench Excavation and Backfill, Pavement Removal and Replacement, and Pipe

Trench excavation and backfill, Class C, will be paid per lineal foot (meter) measured along the mainline pipe centerline. No adjustment will be made for depth of excavation except that the Contractor may request a Change Order in any case where actual trench depth exceeds 6 vertical feet (1.8288 m).

Trench excavation and backfill, Class D, will be paid per lineal foot (meter) measured along the mainline pipe centerline. No adjustment will be made for depth of excavation except that the Contractor may request a Change Order in any case where actual trench depth exceeds 6 vertical feet (1.8288 m).

Pavement removal and replacement, shall be paid for per square yard (m²) measured along the mainline pipe centerline. No adjustment will be made for thickness or type of pavement unless otherwise indicated in the Schedule of Contract Prices.

Measurement and payment for pipe will be made on a linear foot (meter) basis for the various types and sizes of pipe listed in the proposal as actually installed. Pipe will be field measured along the centerline of the pipe in place within the limits shown with no deduction in length made for valves, fittings, and specials. Measurement will be made to the nearest 0.5 feet (0.1524 m). No payment will be made on any section or reach of pipe deemed unacceptable due to excessive leakage or other defects until such leakage and defects have been corrected. The cost of all utility potholing shall be borne by the Contractor and no additional payment will be made. There will be no separate payment for deflecting water pipe to avoid conflict with another utility, it being understood that the cost, therefore, is incidental and included in the contract unit prices for "Trench Excavation and Backfill".

501.04.02 Fittings and Specials

Unless otherwise shown in the proposal, fittings and specials shall be paid for at a per unit basis for the size, type and class of pipe fitting specified.

501.04.03 Chlorination Taps

All cost for furnishing, installing, and reexcavating (for removal of chlorination taps) per Standard Plan W-40 shall be paid for on a per each basis as shown in the proposal.

501.04.04 Mechanical Couplings

Unless otherwise shown in the proposal or specified, mechanical couplings will be considered incidental to and included in the unit price for pipe and fittings.

501.04.05 Joint Restraint

Unless otherwise shown in the proposal, joint restraint, including thrust blocking will be considered incidental to and included in the unit price bid for pipe or fittings.

501.04.06 Flushing, Testing and Disinfection

Payment for flushing, testing and disinfection shall be made on a lump sum basis. The Lump Sum bid shall include all labor, material, equipment and incidental costs necessary to complete the flushing and pressure testing and for assisting the City

of Keizer during disinfection of the completed water mains. If re-testing, re-flushing or additional chlorination and resampling are found necessary all such additional work shall be done at no cost to the City. The City shall monitor the disinfecting procedure.

502 - Valves and Related Equipment

502.01.00 Description

502.01.01 General

This Section covers furnishing and installing the valves listed herein. The type and location of other special valves not listed herein will be specified and shown in the plans and special specifications, when required.

502.01.02 Certification

Furnish certification properly executed by the manufacturer showing compliance with the required specifications and result of test performance.

502.02.00 Materials

502.02.01 Gate Valves

Use cast iron body resilient seat gate valves, mechanical joint ends, 2 inch through 10 inch (50.80 mm through 254.0 mm), with O-ring seals conforming to AWWA C 509. Gate valves, mechanical joint ends, shall open counter-clockwise with a 2 inch square (1 290.4 mm²) operating nut.

502.02.01A - Gate Valve Sealing Material

Sealing material for flanged joints will consist of 1/8 inch (3.175 mm) thick, full face, one piece, cloth inserted, rubber gaskets conforming to Section 2.3 of AWWA C 207. Bolts and nuts shall conform to Section 2.2 of AWWA C 207.

502.02.01B - Resilient-seated Gate Valves

Resilient-seated gate valves shall conform to AWWA C 509, be iron body, nonrising stem with O-ring seals and shall be manufactured to open when the stem is rotated in a counterclockwise direction. Provide 2 inch square (1 290.4 mm²) operating nut. All internal cast iron parts shall be coated with a corrosion resistant epoxy coating certified by the NSF for use with potable water. Valves shall have a full size unobstructed water way and they shall seal drip tight.

502.02.02 Butterfly Valves

Unless otherwise specified, cast iron body, rubber gasketed, butterfly valves, 12 inch (304.80 mm) and larger, shall conform in all respects to the physical and performance requirements of AWWA C 504, short body type having operators suitable for direct burial. Furnish Class 150 B valves, mechanical joint ends, unless otherwise indicated. Furnish valves having a 2 inch square (1 290.4 mm²) operating nut which shall rotate counterclockwise to open unless otherwise shown.

502.02.03 Special Valves

Provide special valves as specified elsewhere in the contract documents and as shown on the plans.

502.02.04 Combination Air and Vacuum Release Valves

Furnish and install combination air and vacuum release valves sized as shown. Valves shall have cast iron bodies and covers and stainless steel floats. Float guides, bushing, and lever pins shall be stainless steel or bronze. Valves shall be designed for operating service to 300 psi (2 068 500 Pa).

502.02.05 Valve Boxes

See Standard Plan W-20 for non traffic areas.

See Standard Plan W-21 for traffic areas.

502.02.06 Reserved

502.03.00 Construction

502.03.01 Valves

Set valves in the same manner as previously specified for installation of pipe. Clean the face of flanges thoroughly before assembling the flanged joint. Insert the gasket and tighten the nuts uniformly around the flange. Align pipe carefully on

both sides of the valve before final tightening of the flanges to avoid stressing the valve body. After installation, operate the valve from full open to full closed to make sure that the valve does not bind during operation. Correct any malfunction in the operation of the valve. Test valve joints with the adjacent pipeline. Repair any leaks as previously specified. Backfill around valves in the same manner as specified for pipe.

When connecting to existing valves have the existing valve closed, remove any blowoff or other interfering fittings and connect to existing pipe. Cut pipe for inserting valves, fittings, or closure pieces in a neat and workmanlike manner without damaging the pipe or fittings. Leave a smooth, square end. Dress cut ends of pipe to remove sharp edges or projections which may damage fittings, valves or gaskets.

Set gate or butterfly valves plumb, level and at the locations shown or as directed. Adjust for proper bury and support valves and join to adjacent pipe sections. Provide temporary or permanent thrust restraint as necessary.

502.03.02 Valve Boxes

Center the valve boxes and set plumb over the operating nut of the valve. Set valve boxes so they do not transmit shock or stress to the valve. Set the valve box covers flush with the surface of the finished pavement or to such other level as may be directed. Cut the extensions to the proper length as required for proper installation. Backfill shall be the same as specified for the adjacent pipe. Correct any misalignment of valve boxes without additional expense to the City. Set valve boxes in accordance with Standard Plans W-20 and W-21.

502.03.03 Valve Pads

Where required, set valve pads on undisturbed earth in the trench bottom. Construct valve pads with reinforcing steel to the dimension shown on the plans. Set the valve pads to the elevation as shown so that when the valve is installed, it will rest on proper grade in contact with the valve pad. Allow five days' cure time before placing the valve on the pad.

502.04.00 Measurement and Payment

502.04.01 Valves

Measurement and payment for each size and type of valve will be on the unit price basis as shown in the proposal, shall include the valve in place with valve pad and

valve box as required. Auxiliary gate valves at fire hydrants will be paid for under the bid item "Gate Valves".

502.04.02 Valve Boxes

Measurement and payment for valve boxes and lids will be included in the payment for valves installed as specified.

503 - Fire Hydrants

503.01.00 Description

503.01.01 General

This Section covers the work necessary for furnishing fire hydrants and installing fire hydrant assemblies in accordance with **Section 204 - Excavation, Embankment, Bedding, and Backfill** and with Standard Plan W-25. Pipe and fittings are specified in **Section 501** and valves in **Section 502**. Furnish catalog data and obtain approval of all hydrants before ordering.

503.01.02 Certification

Furnish certification properly executed by the manufacturer showing compliance with the required specifications and results of tests performed.

503.02.00 Materials

503.02.01 Hydrants

Use Mueller, Model No. 423, Super Centurion 200 dry barrel, compression type valve, traffic model hydrants conforming to AWWA C 502. Hydrants shall have an underground compression type shutoff valve and drain openings at the bottom of the hydrant, to prevent damage to the barrel during cold weather. All hydrants shall be equipped with two, 2½ inch (63.50 mm) N.S.T. bronze hose ports and one, 4½ inch (114.30 mm) N.S.T. bronze steamer port, all with cast iron caps. The operating nut on the hydrant shall be a 1½ inch (38.10 mm) pentagon, tapered, opening counter-clockwise. (Standard Plans W-24 and W-25).

The hydrant shall be capable of 150 psi (1 034 250 Pa) working pressure and 300 psi (2 068 500 Pa) test pressure. The hydrant operating stem lubrication shall be provided by an oil or grease reservoir which is sealed from the water chamber. Hydrant design shall be such that water will not be permitted to enter the operating thread cavity. The center of steamer port shall be between 18 inch and 24 inch

(457.20 mm and 609.60 mm) above grade. Extensions, if required, to set a hydrant to proper grade shall be furnished and installed by the Contractor. The steamer port shall point towards the public way.

All new hydrants not yet activated and other hydrants that are out-of-service shall be completely bagged or covered in a manner that readily identifies the hydrant as inoperable. These bags will be removed by the City when activating the mains.

503.02.02 Base Block

Use solid precast concrete pier block having nominal dimensions of 16 inch x 16 inch x 8 inch (404.40 mm x 404.40 mm x 203.20 mm).

503.02.03 Gravel for Drainage

Use three-quarter-inch (19.05 mm) crushed rock free of organic matter, sand, loam, clay, and other small particles that will tend to restrict water flow through the gravel.

503.02.04 Concrete for Anchor Blocking

Use a mix not leaner than 1 part cement, 2 1/2 parts sand, 5 parts coarse aggregate, and just enough water to make a workable mix. Twenty-eight-day compressive strength shall be a minimum of 2,500 psi (17 237 500 Pa). Engineer shall approve quality of materials prior to their use.

503.02.05 Reserved

503.02.06 Tie Rods, Ductile Iron Lugs, Valve Boxes, Gate Valves, and Pipe

Construct as shown on the standard details, bound herewith, or as specified in the specifications governing gate valves and cast iron pipe and fittings, or as directed by the Engineer.

503.02.07 Galvanized Pipe

Standard weight, galvanized steel, ASTM A 120, with galvanized malleable screwed fittings, Federal Specification WW-P-521.

503.03.00 Construction

503.03.01 General

Construction and installation of hydrants shall conform to provisions of appropriate sections of AWWA C 600, except where otherwise specified. Installation of the hydrant shall conform to the applicable provisions of **Section 501** of these Specifications and Standard Plans W-24 and W-25.

503.03.02 Location and Position

Locate as shown or directed so as to provide complete accessibility to pedestrians. Improperly located hydrants or blowoffs or unplumbed hydrants shall be disconnected and reset at the Contractor's expense.

503.03.03 Excavation

Do not excavate below required grade. Refill overexcavated areas with gravel and hand tamp to provide firm foundation.

503.03.04 Base Blocks

Place on firm, level subbase to assure uniform support.

503.03.05 Hydrants

Set fire hydrants plumb, level and at the locations shown or as directed. Adjust for proper bury and support the hydrant auxiliary valve and adjacent pipe sections. Provide temporary or permanent thrust restraint as necessary. Set hydrant, valve and valve box in accordance with Standard Plans W-24 or W-25, as applicable.

Place carefully to prevent the base blocking from breaking. After hydrant is in place and connected to the pipeline, place temporary blocks to maintain the hydrant in a plumb position during subsequent work.

503.03.06 Anchor Blocks

Bearing surfaces shall rest against undisturbed soil. Bearing area shall be sufficient to prevent movement of pipeline and shall be as specified or directed by the Engineer.

503.03.07 Backflow Device Installation on Fire Main Line

The preferred location of the backflow device, if the line is not over 50 feet (15.24 m) from the property line, will be within the building, in an accessible location. The developer will be required to install an ownership valve, in a location approved by the City, in the public right-of-way adjacent to the property line. This valve will mark the separation between public and private ownership of the water line after the line has been chlorinated, tested, and approved by the City. The valve shall be operated by City personnel only.

If installation within the building is not feasible, the backflow device will be installed at or near the public right-of-way line, on private property, in an appropriate vault.

No taps are permitted between the backflow device and the ownership valve despite the line being privately owned and maintained.

503.04.00 Measurement and Payment

503.04.01 Hydrant Assemblies and Hydrant Stub Assemblies

Payment will be made for each fire hydrant assembly, fire hydrant stub assembly, and fire hydrant relocation at the unit price bid. Auxiliary gate valves at fire hydrants will be paid for under the bid item "Gate Valves". The fire hydrant assembly shall include all work between the main line gate valve up to and including the fire hydrant. Where both close coupled fire hydrants and fire hydrants requiring extensions for proper positioning are specified, separate bid items may be included in the Schedule of Contract Prices. No adjustment will be made for non-standard bury, unless clearly indicated in the Schedule of Contract Prices. Payment for main line tee fitting is included in "Fittings", if specified in the proposal. The cost of furnishing and installing the drain gravel and pier block used in installation of the fire hydrant will be included or absorbed in the unit price of the hydrant. Cost to furnish and install extensions, if required, to set hydrant to proper grade shall be considered incidental to the unit price of the hydrant.

Payment shall include all costs of installation including the pipe spool, gate valve, valve box, elbows and/or fittings, and fire hydrant complete in place as shown on Standard Plans W-24 or W-25.

When the City supplies the fire hydrant, all other components listed above are to be included in the fire hydrant pay item.

No differentiation will be made for horizontal length of the installation.

503.04.02 Blowoff Assemblies

Payment will be made for each blowoff assembly at the unit price bid per each, for the size and type of Blowoff including pipe, gate valve, valve box and all appurtenant work. No differentiation will be made between blowoff installations beginning at the plugged end of ductile iron pipe and those beginning at a mainline gate valve. In the latter case, the mainline gate valve with its valve box will be paid for at the price bid as specified in **Subsection 502.04.00**. Payment for tapped plugs is included in this Section.

Payment for each assembly shall constitute full compensation for all work specified in this Section and shall include excavation and backfill for each assembly.

504 - Water Service Installation

504.01.00 Description

This Section covers the work necessary for a Developer to install water services complete in place.

504.01.01 Work Performed by the Developer

Installation by the Developer's water contractor at the time when the water mains are installed.

The service shall be complete including a lock-wing angle ball meter stop and meter box set to top of curb grade.

504.01.02 Work to be Performed by the City

The City will provide and install meters in the meter boxes. Minor leveling adjustments of meter boxes will be done by the City when installing meters in the boxes.

504.02.00 Materials

504.02.01 Bedding and Backfill

All backfilling under streets, parking lots and driveways will be, Class "D" backfill, 1 inch minus (25.40 mm minus) or 3/4 inch minus (19.05 mm minus) crushed aggregate material meeting the requirements of current ODOT standards.

Backfill for all other areas may consist of Class "C" backfill, native materials, providing that no large rocks or clods of soil larger than 6 inches (152.40 mm) maximum dimensions are included. No sharp objects or any other material is acceptable.

Provide imported base material under all pipe where, in the opinion of the Engineer, material satisfactory for fine grading and bedding the pipe is not available at the trench. Imported base material will be used principally where ground water or rock conditions make the use of a lesser quality base impractical.

504.02.02 Service Water Pipe and Fittings

Each individual water service connection shall be equipped with the appropriately sized pipe and brass stops as shown on Standard Plans W-12 and W-13.

All water service pipelines shall be seamless copper (type K) tubing conforming to AWWA C 800 for potable water transmission.

504.02.02A - Corporation Stops

Corporation stops shall be bronze, full way bore, with Mueller thread and outlets sized to adapt to copper tubing. Ford, McDonald or Mueller corporation stops conforming to ASTM B 62 are considered approved equals.

Other than direct taps, all asbestos cement, plastic and steel pipe shall be saddle tapped. All saddles will be epoxy coated and iron pipe thread made of ductile iron with stainless steel straps, nuts, and washers.

Direct corporation taps may be made on the following cast iron/ductile iron pipe sizes. All other sizes shall be saddle tapped.

Size and Pressure Class		3/4" (19.05 mm)	1" (24.4 mm)	1-1/2" (38.1 mm)	2" (50.8 mm)
4" (101.6 mm)	Class 350	Yes			
6" (152.4 mm)	Class 350	Yes	Yes		
8" (203.2 mm)	Class 350	Yes	Yes		
10" (254.0 mm)	Class 350	Yes	Yes		
12" (304.8 mm)	Class 350	Yes	Yes		
14" (355.6 mm)	Class 350	Yes	Yes	Yes	
16" (406.4 mm)	Class 350	Yes	Yes	Yes	Yes
18" (457.2 mm)	Class 350	Yes	Yes	Yes	Yes
20" (508.0mm)	Class 350	Yes	Yes	Yes	Yes

In new subdivisions, do not bore or push services under new streets. Install before the street is paved or place a conduit under the street before paving, and install services later. Boring may be approved on other projects, such as replacement work under existing streets.

504.02.02B - Meter Stops and Boxes

Meter stops shall be bronze, locking, angle ball meter stops with pack joint copper tubing connector and outlet adaptable to meter couplings. Ford, McDonald or Mueller meter stops conforming to ASTM B 62 are considered approved equals.

Standard service connection details for service sizes from 3/4 inch through 2 inch (19.05 mm through 50.80 mm) are shown on Standard Plans W-11, W-12, W-13 and W-14.

Use Brooks, concrete meter boxes, three piece construction with cast iron lid for standard residential services. See Standard Plans W-11, W-12, W-13 for Model Number. Use traffic style boxes in areas subject to wheel loads.

504.02.03 Valves and Special Valves

Use bronze, ball cock valves with a minimum rated working pressure of 200 psi (1 379 000 Pa) for 1 ½ inch (38.10 mm) and 2 inch (50.80 mm) services. All valves shall be hydrostatically tested to 300 psi (2 068 500 Pa) or air tested to 100 psi (689 500 Pa) under water. Ford, McDonald or Mueller ball cock valves are considered approved equals.

504.03.00 Construction

504.03.01 Excavation, Backfill and Bedding

Maintain cover of 24 inches (609.40 mm) at the property line, or on private property within the permanent water easement.

A greater depth may be required to avoid underground obstructions.

Maintain a minimum of 6 inches (152.40 mm) clearance between the pipe and obstructions, unless otherwise directed.

Use Class D backfill under streets, parking lots, driveways, and in other areas as directed. Use Class C backfill in all other areas.

Compaction will be by mechanical means. Compact to a minimum of 95 percent of maximum dry density according to ASTM D 698 in all streets, driveways, parking lots and existing sidewalks.

Compaction for backfill in all other areas will be not less than 90 percent, including depths over 3 feet (0.9144 m).

Grade the bottom of the trench to the line and grade to which the pipe is to be laid. The trench bottom shall form a continuous and uniform bearing and support for the pipe on solid undisturbed ground.

Provide and maintain ample means and devices at all times to remove and dispose of all water entering the trench excavation during the process of pipe laying. Trench water shall not be disposed of into sanitary sewers.

504.03.02 Pipe Laying

Provide and use proper implements, tools, and facilities satisfactory to the Engineer for the safe and convenient prosecution of work. Handle pipeline materials to prevent damage.

While cleaning pipe and fittings, wire brush if necessary and wipe clean, dry and free from oil, dirt, grease, and other foreign matter before the pipe is laid.

Do not allow foreign material to enter the pipe while it is being placed in the trench.

At times when pipe laying is not in progress, close the open ends of pipe by a watertight plug or other means approved by the Engineer and allow no trench water or animals to enter the pipe. These provisions shall apply during the noon hours as well as overnight. If water is in the trench, keep the seal in place until the trench is pumped dry. Do not lay pipe in water or when, in the opinion of the Engineer, trench conditions are unsuitable. Dry line will have watertight plugs to prevent water and dirt from entering the pipe.

Cut pipe for inserting valves, fittings, or closure pieces in a neat and workmanlike manner without damaging the pipe, fittings, or interior coatings, and leave a smooth end at right angles to the axis of the pipe. Dress cut ends of pipe to remove sharp edges or projections which may damage fittings or valves.

Leakage on any service line shall be corrected to the satisfaction of the Engineer.

All taps will be made at a position of 10 o'clock or 2 o'clock. The Engineer may approve a tap on top of the main when the meter is set above the main.

In general, service connections will extend to and include the lock-wing angle meter stop unless directed otherwise by the Engineer.

Replacement services shall terminate in a new lock wing angle ball meter stop located inside the existing meter box parallel to and 2 inches (50.80 mm) from the existing stop. Damage to existing facilities shall be repaired at Contractor's expense.

Two or more service lines may be installed in the same trench. Taps must be a minimum of 16 inch (406.40 mm) apart and 16 inch (406.40 mm) from any bell, joint or fitting. Two or more meters may not be served by a common service line. Water service connection details are shown on Standard Plans W-11, W-12 and W-13.

Service line reconnects shall conform to the same specifications as new service line installations to the maximum extent possible.

504.04.00 Acceptance and/or Payment

504.04.01 - 504.04.02 Reserved

504.04.03 Acceptance

At such time as all construction work is complete and all testing, disinfection, and inspections have been found satisfactory by the Engineer, the City will recommend that the water service installation be approved.

504.04.04 Payment

Payment for service line installation shall be for each number of services completed in place. Where both "short side" and "long side" services are specified, separate bid items may be included in the Schedule of Contract Prices. Service line work includes all items from the main line tap to the meter box or other point of connection. No adjustment will be made for non-standard depth or length, unless clearly indicated in the Schedule of Contract Prices.

Payment for service line reconnects shall be for the number of services completed in place. Where both "short side" and "long side" services are specified, separate bid items may be included in the Schedule of Contract Prices. Service reconnection work includes all items from the main line tap to the meter box or other point of connection or reconnection. No adjustment will be made for non-standard depth or length, unless clearly indicated in the Schedule of Contract Prices.

