600 – WATER SYSTEM

600.00.00 – Scope

This section shall include but not be limited to all items of work necessary for and incidental to the planning, survey, design and construction of the City of Central Point water system or systems as may be administered by the City within dedicated City rights-of-ways or easements, or as may be dedicated to the City. This section shall also apply to private water systems insofar as they may affect the city water system through connection.

This work shall also include any appurtenances, such as pavement removal and replacement, trench excavation and backfill, providing and installing water pipe and fittings, connection to existing lines; providing and installing line valves and valve boxes, providing and installing fire hydrant assemblies, providing and installing end drain assemblies (blow-off valves), providing and installing air relief valves, providing and installing water service connections, installing necessary and incidental thrust blocking; and testing, flushing and chlorinating of the new system.

It shall be the responsibility of Applicants, Engineers or Contractors to visit the site of the proposed work and become fully acquainted with the conditions relating to the construction, so that they fully understand the facilities, restrictions, and difficulties involved in the construction work proposed under the Contract or development. They shall satisfy themselves as to the quantities involved, including materials, equipment, and labor.

610.00.00 – General

610.10.01 – References

American Water Works Association (AWWA) Standards, current or updated editions.

Oregon Administrative Rules (OAR) and Oregon Revised Statutes (ORS) current revisions as may apply to Public Water Systems and Cross Connection Control.

American Association of State Highway Transportation Officials, AASHTO, “Standard Methods of Test”

American Public Works Association (APWA), 2009. “Standard Specifications for Public Works Construction”.

American Concrete Institute (ACI)

Ductile Iron Pipe Research Association (DIPRA)

City of Central Point Municipal Code (CPMC) as may apply to Public Water Systems and Cross Connection Control.

Medford Water Commission (MWC)

City of Central Point Public Works Standards and Specifications as may apply to water systems, related construction and cross connection control.

Oregon Occupational Safety and Health Division (OR-OSHA) Rules and Regulations as they may apply to water systems, related construction and cross connection control.

State of Oregon, Manual of Uniform Traffic Control Devices (OMUTCD) current requirements, including, " Oregon Temporary Traffic Control Handbook for Operations of 3 Days or Less", latest edition.

610.10.02 – Tables

600-1 Restrained Joints
600-2 Service Connection Materials
600-3 Bolt Torque Loads
600-4 Pipe Deflection

620.00.00 – Design Standards

The purpose of these standards is to provide a consistent design policy under which the physical aspects of water system design, plan preparation and related construction can be brought to completion.

This section contains design standards and specifications to ensure the safe and efficient operation of the City water system including cross connection control and elimination. The requirements in this section are established as minimum standards to follow and apply to both new construction and reconstruction of all City water storage and delivery systems.

Designs shall consider the existing water system, master plans, neighborhood plans and approved tentative plans. The Applicant, engineer and contractor shall provide the necessary testing, exploration, survey and research to adequately design water system facilities, which will connect to and be a part of, or an extension of the City water system.

All requirements of the Oregon State Plumbing Specialty Code and the Oregon State Health Department, as they pertain to Public Water Systems, shall be strictly adhered to. All materials supplied shall meet the requirements of the One Hundred Eleventh Congress Senate Bill 3874 (S. 3874), the Reduction of Lead in Drinking Water Act. All materials shall be manufactured in the USA, unless otherwise approved by the PWD. All materials used for water system construction shall be of new manufacture. No rebuilt, reconditioned, or previously used materials shall be used.

Operation of valves in the City's water system by anyone other than City employees is strictly prohibited. Contractors shall not open or close valves, or take any action that may affect the operation of the existing water system, except as specifically required by the plans and specifications, and only with prior approval by the City.

620.10.00 – Minimum Design Requirements

620.10.01 – Location

Water lines shall normally be located 10' south or 10' west of centerline of streets. The longitudinal placement of water lines and valves within the intended vehicle wheel path shall be avoided.

Exceptions to these requirements may be made in order to avoid cutting and replacing pavement, to avoid conflicts with other existing underground facilities and to permit sanitary sewers to be installed on the low sides of streets. As nearly as practical, mains shall be installed in the same relative location on a particular street with the distance from the centerline of the street being varied as little as possible.

Mains shall not be installed in alleys and the installation of mains within easements across privately owned property is to be done only when absolutely necessary such as the avoidance of dead-end conditions. Such easements, when required, shall be a minimum of 15' in width except that the Public Works Department may require additional widths for major trunk lines and multiple utility easement locations. Easements where required, shall be located adjacent to property lines of a single property and shall not straddle property lines. Conditions of the easement shall include provisions that the property included in the easement shall not be used for any purpose which would interfere with the unrestricted use for water system purposes including the maintenance, repair, construction or re-construction of such. Under no circumstances will the City grant permission for the construction of any building or structure of any type excluding fences within the easement.

620.10.02 – Separation of Facilities

Separation of water mains, including service lines, and sanitary sewers shall be in accordance with current Oregon State Health Division Rules OAR 333-061-0050(9), figure 1, and/or as modified in these Standards except in all cases where running parallel with each other, there shall be a minimum 10' separation unless otherwise approved by the Public Works Department.

Excepting sanitary sewers as noted above, the minimum horizontal spacing between water mains and storm sewers, gas lines, electrical utilities, shall be 5' horizontally and 12" vertically as measured from the outside of the pipe or conduit. Separation between other public utilities such as Gas, TV or Telephone and similar utilities shall be as determined by the individual utility company or franchisee.

In all cases where utilities cross in close proximity to one another, a cement sand slurry shall be required for separation between any city lines and any utility. In some cases, depending on size and type of facility, concrete bridging piers or supports will be required to span the water facility. The vertical spacing at sewer crossings shall be designed and constructed in accordance with OAR 333-061-0050(9).

620.10.03 – Minimum Water Main and Pipe Sizing

The minimum size for distribution lateral water mains in residential areas shall be 8". The minimum size in multiple-dwelling, commercial and industrial areas shall be 12" except that in the sole discretion of the Public Works Department, 8" lateral lines may be allowed if flows meet domestic and fire protection needs in the area. Where fire demands or line losses might demand larger sized pipe, the Engineer will be required to submit hydraulic computations to support the use of 8" pipe, or to establish the size required.

In certain cases, such as cul-de-sacs, where water lines will not be extended, where not more than 10 dwelling units are to be served, and no fire hydrants are to be served by the line, a 6" diameter water line may be approved, at the discretion of the PWD.

Where no fire hydrants are served, and no more than 5 dwelling units are served, a 4" diameter water line may be approved, at the discretion of the PWD, where the line length will be less than 200'.

620.10.04 – Minimum Cover

Unless otherwise approved by the Public Works Department (PWD), the minimum and standard depth for water lines shall be 36" from top of AC (finish grade) to the top of the water line as measured at the bell portion of the pipe.

620.10.05 – Reinforced Flow

All water distribution systems, including lateral mains, shall be designed for reinforced flow (looped system) wherever possible. The installation of permanent dead end mains shall be avoided. Looping shall be defined as a minimum distance of 500' between mainline connections.

620.10.06 – Fire Hydrant Location and Spacing

Fire hydrants shall be located outside the curb return at street intersections or as nearly as possible. The centerline of the fire hydrant shall normally be set to the correct bury depth within the Right-of-Way, 12" behind the sidewalk but in no case shall any part of the hydrant be less than 2" behind the sidewalk. In the absence of sidewalk or curb, the centerline of the hydrant shall be set 12" inside the Right of Way. The minimum length of bury shall be 3-1/2' and the hydrant shall be adjusted so that the bottom of the flange is approximately 1" above the back of sidewalk or ground line. See Standard Detail Sheet W-3 Fire Hydrant for additional detail.

Fire Hydrant locations, spacing, and demand criteria will be determined by Fire District No. 3, and approved by the City. The minimum required spacing between fire hydrants shall be 300'. The maximum distance from a fire hydrant to the rear of a commercial building shall be 150'. The minimum flow shall be 1000 – GPM.

620.10.07 – Service Connections

Except as described in Section 630.55.00 below, minimum size piping for service connections shall be 1" diameter. Service connection pipe sizes and meter sizes for multiple dwelling units, commercial, and industrial services shall be established in conformance with "Fixtures Demands Curves", as set forth in the Oregon State Plumbing Specialty Code. Meters shall not be installed in driveways, sidewalks or other traffic areas unless circumstances make it unavoidable. In this instance, placement of meters shall be at the discretion of the PWD.

Service connection angle stops that require height adjustment (to fit meter into meter box) after final Public Works inspections, will be adjusted, by City forces, at developer/owner expense.

620.10.08 – Gate and Butterfly Valves

Valve sizes shall normally be sized the same as the mains in which they are to be installed unless otherwise approved.

Gate valves and / or butterfly valves shall normally be located at street intersection Tees or Crosses. There shall be a sufficient number of valves so located that not more than 3 valves must be operated to affect any one particular shut –down, and the spacing of valves shall be such that the length of any one shut-down in high value areas shall not exceed 800' nor 1,200' in other areas. As a minimum, tee intersections shall be valved in at least 2 branches and a cross intersection shall be valved in at least 3 branches to provide the most efficient method of isolating line when shutting down for repair or connection. The maximum spacing between valves shall be 800' in industrial and commercial areas and 1200' in residential areas.

Water lines located or stubbed out for planned future extension and is serving more than 4 dwelling units shall have a gate valve and cap installed to minimize shut down periods. Tees shall be flange x mechanical joint. The connection between the tee and the valve shall be a flange connection. The valve shall be a flange x mechanical joint valve. If a Foster adapter is used, then the rest of this paragraph does not apply.

Where the connection of the valve to the tee in the street is impossible or impractical, the valve shall be located at the extension of the right-of-way line. Such line shall be restrained if dead-ended. Valves shall be located in such a manner that each section of line may be isolated for repair or maintenance while leaving contiguous sections served by the reinforced (looped) system.

620.10.09 – Air and Vacuum Relief

To the extent possible, the water system shall be designed to avoid the need for air relief valves. Where water lines will be constructed in hilly areas, air and vacuum valves, pressure air valves, combination air valves, or universal air valves will be required and shall be located at the high points in the system. Blow-off assemblies will be required as directed by the Public Works Department at dead end lines or lines to be extended in the future.

620.10.10 – Fire Hydrant Retention

Fire hydrant assemblies shall be mechanically retained with "megalug" ®, Tyler Union TufGrip™, or approved equal retainers in accordance with Public Works Standards and Specification. Refer to Standard Detail W-3, Fire hydrant.

620.10.11 – Joint Retention

Dead-end water lines or waterlines to be extended shall be mechanically restrained with "Megalug" ®, Tyler Union TufGrip™, restrained glands or approved equal, in accordance with the following table:

Table 600-1

Pipe Diameter	Minimum Length of Pipe With Restrained Joints
4"	24'
6"	34'
8"	45'
10"	54'
12"	64'

620.10.12 – Sewer Crossings

Sewer crossings shall be designed and installed in accordance with current Oregon Health Division requirements defined in OAR 333-061-0050(9), unless modified by this section or as otherwise approved in writing by the Public Works Department.

In Situations where a water line or service line and a sanitary sewer lateral cross, the separation between the two shall be as follows:

a) Wherever possible, the bottom of the water line shall be 1-1/2' or more above the top of the sewer line and one full length of the water line shall be centered at the crossing.

b) Where the water line crosses over the sewer line but with a clearance of less than 1-1/2', the sewer line shall be exposed to the sewer line joints on both sides of the crossing to permit examination of the sewer pipe. If the sewer pipe is in

good condition, and there is no evidence of leakage from the sewer line, the 1-1/2' separation may be reduced to 8". The contractor must center one length of water line at the crossing. If the Public Works Department determines that the conditions are not favorable or finds evidence of leakage from the sewer line, the sewer line shall be replaced with a full length of PVC pressure pipe, AWWA Standard C900 or ductile iron Class 54 (AWWA-151) pipe.

c) Where water line crosses under the sewer line, the Contractor shall expose the sewer line for examination by the Public Works Department as indicated in (b) of this section. If conditions are favorable and there is no evidence of leakage from the sewer line, the sewer line may be left in place, but must be supported with a reinforced concrete beam for preventing of settlement when it spans the water line trench, and special precautions must be taken to assure that the backfill material over the waterline in the vicinity of the crossing is thoroughly tamped in order to prevent settlement which could result in the leakage of sewage. If the Public Works Department determines that conditions are not favorable or finds evidence of leakage from the sewer line, the provisions of (b) of this section shall apply.

d) In all cases where the existing sewer pipe consists of concrete, "Orangeburg" or other similar types of pipe material it shall be replaced with shall be replaced with a full length of PVC pressure pipe, AWWA Standard C900 or ductile iron Class 54 (AWWA-151) pipe centered at the crossing so that any joints will be at least 9' from the crossing or to the edge of the City right-of-way whichever is less.

Whenever a sanitary sewer is uncovered and the sewer pipe leaks or is broken, then ductile iron water pipe, Class 54, PVC pressure pipe, or sewer pipe conforming to AWWA Standard C900 must be used to replace the sewer pipe. One full length of the ductile iron pipe or PVC pipe shall be centered at the water pipeline crossing so that the joints of both pipes shall be at least 9' from the crossing centerline. Care must be taken to assure smooth inverts at the new sewer joints. All repairs including labor, pipe materials; backfill, pavement and other street materials shall be at Contractors expense.

620.10.13 – Creek and Waterway Crossings

The channel at the crossing of any horizontal angle shall be defined as the highest elevation of the stream bank or the 100-year flood elevation datum whichever is less.

Ductile iron pipe conforming to AWWA C151, thickness Class 54 shall be used for all creek or waterway crossings whether buried or exposed. At a minimum, all pipes through the crossing including a full length of pipe at either side of the channel shall be mechanically restrained using materials conforming to Section 630.11.04, Restrained Joint Pipe. All vertical or horizontal bends shall be thrust blocked and anchored as specified in Section 640.35.05, Thrust Blocking and as shown on Standard Detail(s) W-1 and W-2 of these Standards.

No valves, blow-off assemblies or similar facilities shall be located in any creek or waterway channel. However, the blow-off outlet or pipe may be directed to the channel where directed or otherwise shown on the plans.

620.10.14 – Valve Installation Depth

Where the water line depth and valve installation causes the operating nut to be greater than 30" below finish grade, a valve operating nut extension shall be supplied and installed. The top of the extension shall not be less than 12" nor more than 30" from finish grade. See standard drawings W-14 and W-18

620.10.15 – Corrosive Soil Requirements

The Engineer shall conduct initial soil tests within the planned area of water line system construction to determine the presence of soils or electrolytic compounds that have the ability or potential ability to corrode the water line system including mains, lateral lines, service lines, valves, couplings and other components which may be affected.

Soil sampling, analysis and remediation shall be conducted in accordance with the requirements set forth in ANSI/AWWA C105/A21.5-99, American National Standard for Polyethylene Encasement For Encasement of Ductile Iron Pipe Systems including applicable provisions of Appendix A, Notes on Procedures for Soil Survey Tests and Observations and their Interpretation to Determine Whether Polyethylene Encasement Should be Used. Also, soil resistivity measurements shall be performed in accordance with ASTM G57, Standard Test Method for Field Measurement of Soil Resistivity Using Wenner Four-Electrode Method.

620.20.00 – Quality Assurance

620.20.01 – Construction Staking

Construction staking for the water system shall normally be accomplished after clearing and grubbing has been completed and the street section has been excavated (cored out). Staking and hubs will be required that define the location, offset distances, pipe diameter, depth of cut and invert elevations of the water pipe and fittings.

620.20.02 – Inspections, General

In addition to periodic informal inspections the Public Works Department requires a minimum of formally requested inspections at the following phases in order to assure that the approved plan requirements and specifications are met:

1. Bedding, pipe jointing, alignment and grade.
2. Installation of pipe zone material.
3. Backfill operations including density testing of layers in the variable and upper backfill zones.

Inspections should be coordinated with the inspector and must be requested by the Contractor at least 24 hours in advance of the required inspection. Arrangements for inspections during weekends and holidays must be made at least 48 hours in advance.

Requests for Public Works inspection may also be made through the PWD secretary at (541) 664 -7602 ext.241.

Also see Section 650, Inspections, Testing and Disinfection for detailed requirements.

630.00.00 – Water System Materials

630.10.00 – Pipe Materials

All water system piping, with the exception of service laterals less than 3" in diameter and mainline over 12", shall be ductile iron Class 54 pipe, or as required by the PWD. All water system piping over 12" diameter, shall be a thickness or class approved by the PWD. All creek crossings shall have a standard minimum Class 54 wall thickness. All piping shall be as manufactured by United States Pipe & Foundry Company or by Pacific States Cast Iron Pipe Company or approved equal.

If C900 water system piping is installed, as directed by the City of Central Point PWD, it shall have tracer wire installed per 640.35.06 – Tracer Wire.

630.10.01 – Certifications

All piping and materials to be incorporated into a City project or to be dedicated to the City shall be legibly marked and / or stamped in accordance with AWWA standards. The Public Works Department may require additional documentation such as invoices or factory records to substantiate the quality, Country of origin or types of materials being installed.

630.11.01 – Mechanical Joint Pipe

Mechanical joint pipe shall be standard thickness cement-mortar lined conforming to the requirements of AWWA C104. Joints shall conform to AWWA C111 and shall be as manufactured by United States Pipe & Foundry Company of Pacific States Cast Iron Pipe Company or approved equal. Joint accessories shall be furnished with the pipe by the manufacturer. Bolts shall be low-alloy steel or ductile iron in accordance with AWWA C111.

630.11.02 – Push-On Joint Pipe

Push-on ductile iron pipe shall be standard thickness cement-mortar lined conforming to the requirements of AWWA C104. The rubber ring gasket shall be suitable for the specified pipe sizes and pressures and shall be furnished with the pipe. A non-toxic vegetable soap lubricant shall be supplied in sufficient quantities for installing the furnished pipe.

630.11.03 – Flanged Joint Pipe

Flanged joint ductile iron pipe shall be thickness Class 54 and conform to AWWA C151. The pipe shall be cement-mortar lined conforming to the requirements of AWWA C104. Bolts and installation shall be in accordance with Appendix A of AWWA C115. Gaskets shall be red rubber, 1/8" thickness, meeting the requirements of ANSI/AWWA, A21.11-00, Appendix A. Flanges shall be ductile iron unless otherwise noted on the approved detail specifications and plans.

630.11.04 – Restrained Joint Pipe

Restrained joint pipe shall conform to AWWA C 151 and be thickness Class 54 cement-mortar lined conforming to the requirements of AWWA C104. The pipe shall be furnished with spigot ends and push-on joint bells suitable for transmitting the thrust created by a dead end condition based on diameter and minimum pressure of 150 psi. Mechanical joint pipe shall be restrained by ductile iron MEGALUG ® restraint assemblies as manufactured by EBAA Iron, ROMAGRIP by ROMAC, or Tyler Union TufGrip™, or an approved equal. Restrained push-on joints shall be Perma-lock as manufactured by Pacific States Cast Iron Pipe Company or approved equal. The minimum number of setscrews by size of gland shall be as follows:

4" - 2	14" - 10
6" - 3	16" - 12
8" - 4	18" - 12
10" - 6	20" - 12
12" - 8	24" - 16

630.11.05 – Poly Pigs

"Poly Pigs" shall be constructed of flexible open cell polyurethane foam and be wrapped with polyurethane spiral bands. They shall be able to pass through reductions of up to 60% of cross sectional area of nominal pipe. They shall have the ability to negotiate short radius bends, ells, tees, crosses, wyes, gate valves, ball valves, multi-dimensional piping and reduced port valves. "Poly Pigs" shall be municipal series, coated type, 5-7 lbs per cubic foot density, and generally be for a light cleaning or gauging application. CCP may specify use of bare type 5-7 lbs per cubic foot density pig for use prior to the use of the coated pig.

630.12.00 – Corrosion Inhibiting Pipe Materials

Corrosion inhibiting materials for encasement of ductile iron pipe shall meet the requirements set forth in ANSI/AWWA C105/A21.5-99, American National Standard for Polyethylene Encasement For Encasement of Ductile Iron Pipe Systems.

630.20.00 – Valves

630.20.01 – Gate Valves and Tapping Valves (4" through 12")

Gate valves and tapping valves for use as line valves and as auxiliary valves for fire hydrant assemblies shall be cast-iron body, bronze-mounted, resilient-seated valves with a full rubber encapsulated wedge and floating stem nut. Interior coating shall be hot-applied fusion-bonded type epoxy conforming to the performance standards of AWWA C550.

Valves shall have non-rising stems with "0" – ring seals and 2" square operating nuts, and shall open when turned counter clockwise. All valves with mechanical joint connections shall be furnished with glands and gaskets, and ductile iron nuts and bolts, glands, and gaskets. All valves shall have the manufacturer's initials, pressure rating and year of manufacture cast in the body. All gate valves shall conform to AWWA C509. Gate valves manufactured by the Mueller Company, the Kennedy Valve Company, or an approved equal, will be accepted.

630.20.03 – Butterfly Valves (Valves larger than 12")

Butterfly Valves, with the exception of 12" tapping valves, shall conform to the above specification for large gate valves. All valves larger than 12" shall be butterfly valves.

Butterfly valves shall be short-bodied flanged or wafer type, or shall have mechanical joints. They shall be epoxy coated and of lined, rubber seated type conforming to AWWA C504, Class 150 B, and shall be iron body valves.

Butterfly valves shall be suitable for direct burial, and shall have direct burial, totally enclosed, fully gasketed, grease-packed integral manual operators, with 2" square operating nuts. The valves shall open counter clockwise, and the minimum number of turns from open to closed position shall be not less than 2 turns for each inch of valve size. Valves shall be designed to withstand submersion in water to a pressure of 10-psi.

Butterfly valves which are manufactured by the Kennedy Valve Company and Mueller Company, or approved equal, will be accepted. Flanges for gate valves and butterfly valves shall be drilled in accordance with ANSI – 125 lb. Standard. Mechanical joints shall conform to AWWA C111. The minimum number of turns from closed to open position shall be not less than 2 turns per inch of valve size.

630.20.04 – Valve Boxes

Valve boxes shall be the three piece sliding adjustable "Medford" type consisting of a top section, cover and extension. The top section shall be cast-iron, and shall be similar and equal to the type as manufactured by East Jordan Iron Works style 910. The top section shall be 15" in length and 6" inside diameter. The cover shall be labeled "Water", shall fit the valve box snugly and shall not rock on its seat. The valve box extension shall be 6" outside diameter PVC Schedule 80. The extension shall be within 8" of finished grade. 8mil plastic shall be wrapped around the joint between the valve can bottom and the well

casing. This is required so that slurry backfill does not infiltrate this joint and cement it together.

630.20.05 – Valve Operating Nut Extensions

Where required, valve operating nut extensions that meet the depth requirements shown on the plans or as required by the PWD shall be supplied by the valve manufacturing company. Where the valve manufacturing company cannot supply the extensions, they may be fabricated according to Standard Detail W-14.

630.25.00 – Ductile Iron Fittings

630.25.01 – Mechanical Joint Fittings

Mechanical joint cast or ductile iron fittings shall conform to AWWA C153. Cement-mortar lined is required on all fittings. Joints shall conform to AWWA C111. Joint accessories shall be furnished with fittings. T-bolts shall be of domestic origin, high strength, low-alloy Cor-Ten steel or ductile iron in accordance with ANSI/AWWA C111/A21.11-90. Unless otherwise noted, the pressure rating shall be 250 psi.

The weights of mechanical joint fittings shall be as designated in the standard tables included in AWWA C153. The weights of joint accessories shall not be included as a part of the weight of the fittings.

Fittings shall be as manufactured by Tyler, Trinity Valley, U.S. Pipe, Pacific States Pipe, American, Griffin, Union Foundry, or an approved equal.

630.25.02 – Push-On Joint Fittings

Push-on joint ductile iron fittings shall conform to AWWA C153. Joints shall conform to AWWA C111 for push-on rubber gasket joints and shall be “TYTON ®” as manufactured by United State Pipe & Foundry Company and others or approved equal.

No plain end fittings will be allowed in restrained joint conditions. Unless otherwise noted, the pressure rating shall be 250 psi. Joint gaskets, including gasket lubricant, shall be furnished with the fittings. Cement-mortar lining is required on all fittings. Fittings shall be as manufactured by Tyler, Trinity Valley, U.S. Pipe, Pacific States Pipe, American, Griffin, Union Foundry, or an approved equal.

630.25.03 – Flanged Fittings

Flanged cast or ductile iron fittings shall conform to AWWA C153. Flanges shall have bolt circles and bolt holes matching those of ANSI B16.1. Unless otherwise noted, the pressure rating shall be 250 psi.

Bolts for joining cast iron flanges shall be carbon steel of at least Grade 3 with American Standard Regular unfinished hexagon heads and the nuts shall be of steel with

American Standard Regular hexagon dimensions, all as specified in American Standard Wrench Head Bolts and Nuts (ANSI B18.2). Bolts and nuts shall be cadmium plated in sizes to and including 7/8" diameter.

All bolts and nuts shall be threaded in accordance with American Standard for Screw Threads (ANSI B1.1), Course Thread Series, Class 2A and 2B fit. Fittings must be cement-mortar lined in accordance with AWWA C104. Fittings shall be as manufactured by Tyler, Trinity Valley, U.S. Pipe, Pacific States Pipe, American, Griffin, Union Foundry, or an approved equal.

Gaskets shall be red rubber, 1/8" thickness, meeting the requirements of ANSI/AWWA, A21.11-00, Appendix A.

630.25.04 – Compact Ductile Iron Fittings

Mechanical joint ductile iron compact fittings shall conform to AWWA C153. Joints shall conform to AWWA C111. Joint accessories shall be furnished with the fittings. Bolts shall be of domestic origin, high strength, low-alloy steel or ductile iron in accordance with AWWA C111. The pressure rating shall be 350 psi. Fittings must be cement-mortar lined in accordance with AWWA C104. Fittings shall be as manufactured by Tyler, Trinity Valley, U.S. Pipe, Pacific States Pipe, American Griffin, Union Foundry, or an approved equal.

630.30.00 – Fire Hydrant Assemblies

Fire hydrant assemblies shall include the MJ Swivel Tee for dry connection and Tapping Sleeve with flange connection for wet taps. Use the MJ x MJ Gate Valve for dry connections and the FL x MJ Tapping Valve for wet taps. Included also in the assembly is the Valve Box, 6" ductile iron pipe, the fire hydrant, and all thrust blocking or "MEGALUG"® restraints, as detailed on Standard Detail Sheet W-3.

630.30.01 – Fire Hydrants

Fire hydrants shall be of the compression type conforming to AWWA C502, and shall have 5-1/4" valve opening with 6" mechanical joint end connection. The hydrant shall open when turned counter clockwise and shall have two 2-1/2" hose nozzles and one 4-1/2" pumper nozzle. The nozzles and operating nut shall be National Standard.

All hydrants shall have corrosion resistance protection on the interior of the hydrant shoe, coating shall conform to corrosion resistance protection on the interior to the hydrant shoe, and coating shall conform to AWWA C550.

The hydrants shall be painted a chrome yellow color, newly manufactured and un-weathered, and shall be equipped with a safety break flange located above the ground line. The depth of bury of the hydrants shall be such that when the hydrant is set at the grade indicated on the Plans that the ground line marked on the hydrant shall be at the sidewalk or ground surface. Only the following hydrants will be accepted:

Mueller – Super Centurion 250
Kennedy – Guardian K-81
Waterous – Pacer
East Jordan -- Watermaster

630.30.02 – Auxiliary Valve and Valve Box

Valve shall be as detailed, and as described in section 630.00.00, Fire Hydrant Assemblies above. Valve boxes shall conform to section 630.20.04, Valve Boxes above.

630.35.00 – End Drain Assembly (Blow-Off)

630.35.01 – Valve Boxes, Vaults and Cover

Valve boxes for End Drain Assemblies shall as described in section 630.20.04, Valve Boxes. Refer to Standard Details W-9A through W-10b

630.35.02 – Blow-Off Valve

Blow-off valves shall be a 2" gate valve with resilient seats, galvanized threaded fittings and a 2" square-operating nut. Permanent blowoff valves shall be furnished per Standard Drawing W-9B.

630.35.03 – Ductile Iron Pipe and Plug

The ductile iron pipe and fittings shall conform to sections 630.10.00, Pipe Materials and Section 630.25.00, Ductile Iron Fittings.

630.40.00 – Tapping Sleeves, Service Saddles, Couplings

630.40.01 – Service Saddles (1" - 2")

Use 202NS, or approved equal

630.40.02 – Tapping Sleeves (For 3" and larger)

Use SST Romac, or approved equal. All sleeves and saddles shall have test plug.

All connections to live City water systems up to 2" shall be made by the Public Works Department or a contractor that is authorized by the Public Works Department to make

the live connection. In such cases, a public works inspector shall be present during the live tap. Connections to existing water mains for new mains or services larger than 2" shall be wet-tapped by a pre-approved tapping contractor using proper equipment.

630.40.03 – Couplings

All couplings shall meet current AWWA Standards. All center and end rings shall be ductile or cast iron on 4" and larger pipe and meet acceptable ASTM Standards except where specifically stated otherwise. Gaskets shall be made of materials compounded for water service. Nuts and bolts shall be corrosion resistant, mastic coated, high strength, low-alloy steel with heavy hex nuts, meeting requirements of AWWA C111. Couplings shall be as manufactured by Romac or approved equal.

630.50.00 – Air Relief Valve Assemblies

630.50.01 – 1" (For Mains and Laterals up to 30" in diameter)

Air relief valves shall be A.R.I. air valve (D-040), as shown on standard detail sheet W-4, or approved equal. Armorcast P6000486 10x20x12 meter box and lid will be used for this application.

630.50.02 – 2" (Mains larger than 30")

Air relief valves shall be A.R.I. air valve (D-040), as shown on standard detail sheet W-4. Armorcast P6000486 10x20x12 meter box and lid will be used for this application.

630.55.00 – Service Connections

This section covers single box service connection materials for 1" through 3" residential and commercial / industrial service connections installed concurrent with new water system construction. Also refer to Standard Detail Sheets W-5, W-6, W-6A and W-7 and for additional parts and assembly.

All taps on existing water mains shall be completed with the water main in service, unless approved by City. No interruption of service will be allowed.

Where uninterrupted service is required to a public facility under constant use such as a motel, apartments, restaurant or hospital, the Applicant must install a lockable service bypass line. This minimizes delays of service during periods of repair or maintenance. Also, refer to Section 630.56.00, Backflow Prevention Assemblies.

630.55.01 – Service Line Parts and Accessories

Service connection parts and accessories, for ¾" thru 2" services, will be supplied by the City of Central Point water department as follows:

1) One, 1" corporation stop
   a) Or 2" tap assembly at main.
2) One saddle, if needed
3) One angle meter stop
4) One meter
5) Stiffeners
6) One meter box and lid
7) 1" service Municipex line for residential, or 2" Municipex for 1 -1/2" or 2" services
8) Tracer wire, and connectors, for the service line

Water meters will be installed by City of Central Point at the request of the builder. All parts will be signed for and picked up, by the contractor/developer representative, at the City of Central Point water department offices. Arrangements shall be made 48 hours in advance of proposed pick up. Pickup of **ALL** parts will be completed in one visit. Contractor will not be allowed to receive partial deliveries.

Table 600-2 Service Connection Materials

Meter Size (inch)	City Service Piping Size/Type	Corporation Stop (no pack joints allowed)	Angle Meter Valve (No Ball Valves) (no pack joints allowed)	Meter Box & Lids	Customer Meter Valve (with handles)
¾"	1" Municipex (requires tracer wire, see section 640.35.06) (see note 7,8)	300psi Ball corp, cc inlet, CTS comp outlet. Mueller- 300 B25008N Ford- FB 1000-4-Q McDonald- 74701BQ1 Use 202NS saddle if applicable	1"x¾" 300psi ball angle Mtr valve CTS comp X Mtr swivel Mueller- 300 B24258N Ford- BA43-342W-Q-NL McDonald- 74602BQ (1"x3/4"x3/4")	Armorcast Rotocast polyethylene 12X20 box or approved equal. Solid cover with touch pad hole. Doubles use B-24 fiberglass box and lid TRPL(Armorcast, Fiberlyte or approved equal)(3)	300psi Ball valves meter swivel X FIP Mueller- 300-B24351N Ford- B13-332W McDonald- 76101MW
1"	1" Municipex (requires tracer wire, see section 640.35.06) (see note 7,8)	300psi Ball corp, cc inlet, CTS comp outlet. Mueller- 300 B25008N Ford- FB 1000-4-Q McDonald- 74701BQ1 Use 202NS saddle if applicable	1"x1" 300psi ball angle Mtr valve CTS comp X Mtr swivel Mueller- 300 B24258N Ford- BA43-444W-Q-NL McDonald- 74642BQ1	Armorcast Rotocast polyethylene 12X20 box or approved equal. Solid cover with touch pad hole. Doubles use B-24 sized fiberglass box and TRPL lid (Armorcast, Fiberlyte or approved equal) (3)	300psi Ball valves meter swivel X FIP Mueller- 300-B24351N Ford- B13-332W McDonald- 76101MW
1-½"	2" Municipex (requires tracer wire, see section 640.35.06)	2" Mueller 2360 resilient wedge gate valve, or appr. equal, w/ Std. 2" sq. operating nut, 2" FIP X FIP Requires ROMAC 202NS double strap tapping saddle w/ 2" cls nipple.	1-½" 300psi Ball angle meter valves FIP X meter flange. Requires 2" to 1-½" male adapter and reducer. Mueller- 300-B-24286N Ford- BFA13-666W McDonald- 746048	Armorcast Rotocast polyethylene 17X30 box P6001534X18-1 or approved equal. Solid cover with touch pad hole. (3)	1-½" 300psi Ball valves meter flange X FIP. 1-½" Gasket Incl. all nuts and bolts. Mueller- 300-B24337N Ford- BF13-666W McDonald- 76101MW
2"	2" Municipex (requires tracer wire, see section 640.35.06)	2" Mueller 2360 resilient wedge gate valve, or appr. equal, w/ Std. 2" sq. operating nut, 2" FIP X FIP Requires ROMAC 202NS double strap tapping saddle w/ 2" cls nipple.	See Standard Drawing W-6A	Armorcast Rotocast polyethylene 17X30 box P6001534X18-1 or approved equal. Solid cover with touch pad hole. (3)	See Standard Drawing W-6A
3"	4" DI	4" Mueller 2300 resilient Gate Valve, or approved equal , flange X MJ. As specified in 630.20.01 above w/ 4" tapping sleeve. See also dwg W-15	4" Mueller 2300 resilient Gate Valve, or approved equal, MJ X MJ. As specified in 630.20.01 above w/4" tapping sleeve. See also dwg W-15.	Utility Vault minimum size 4.5' X 9'. See also dwg W-15	4" Mueller 2300 resilient Gate Valve, or approved equal, MJ X MJ. As specified in 630.20.01 above w/ 4" tapping sleeve. See also dwg W-15

NOTES:

1. Dual ¾" services shall be in a B24 sized polyethylene box(except in sidewalks) with lid drilled for touch read meter system. Service trees not allowed. 1meter per service line
2. Traffic rated lids will be required in driveway areas.
3. In areas where meter box will be set in sidewalk, concrete Christy B12, B24 or B36 boxes will be required, wrapped with 8mil plastic.
4. All materials supplied shall meet the requirements of the One Hundred Eleventh Congress Senate Bill 3874 (S. 3874), the Reduction of Lead in Drinking Water Act.
5. Dielectric unions will be placed behind customer meters by City of Central Point forces, when required.
6. Services that are bored will require a 2" schedule 40 sleeve for a 1" service, and a 4" schedule 40 sleeve for 2" services.
7. Substitutes for Municipex may be approved upon review by the City of Central Point Public Works Department.
8. Municipex requires use of stiffener/insert at all joints.
9. All ball valves and AMV's shall be full port.

630.56.00 – Backflow Prevention Assemblies

All backflow prevention assemblies and shutoff valves installed in connection with the City of Central Point water system shall be on the current Oregon Health Authority, Drinking Water Section, "Approved Backflow Prevention List". All installations shall be in accordance with CPMC 13.20, applicable OHD requirements, and current Oregon Plumbing Specialty Codes.

630.60.00 – Trench, Bedding, Pipe Zone and Backfill

630.60.01 – Excess Excavated Trench Materials

Unless otherwise established by test borings or test excavation that "rock" exists at the locations of water lines, service connections or hydrant, it shall be assumed that all excavation will be unclassified excavation, and the Contractor shall remove all materials encountered. Excess excavated materials shall be disposed of as set forth in Section 330, of these Standard Specifications.

630.60.02 – Bedding and Pipe Zone Materials

(a). Water System Mains – All material used for backfill in the bedding and pipe zone areas shall be ¾"-0 crushed rock base as described in Section 910.11.00, Trench Backfill and Bedding Aggregate, of these Standard Specifications.

Where incompetent or unstable trench bottoms are encountered, the Public Works Department may authorize over excavation and stabilization of the trench with 4" crushed rock as described in section 910.10.03, Sub-base Aggregate or Section 915.00.00, Sub-grade and Trench Reinforcement Rock(ballast) prior to the placement of bedding material.

(b). Service Lines – The bedding and pipe zone material around service lines up to 2" in diameter shall be clean or reject sand as described in Section 910.11.01 (c), Bedding for Water Service Lines and Utilities. Compaction of sand shall be accomplished by mechanical means using a vibraplate, jumping jack or similar device. Decomposed granite, pea gravel and red cinders, are not approved and shall not be used.

1" Services that are bored shall be sleeved in 2" schedule 40, 2" services that are bored shall be sleeved in 4" schedule 40.

630.60.03 – Trench Backfill Materials

(a). New Street construction – All water mains and service lines installed within the Rights of Way for newly constructed streets shall be back filled above the pipe zone to the top of sub-grade with ¾"-0 crushed base rock as described in Section 910.11.00, Trench Backfill and Bedding Aggregate, of these Standard Specifications.

(b). Existing Paved Streets and Shoulders – All water mains and service lines installed, repaired or modified within the street section including sidewalks or adjacent shoulders shall be back filled according to Standard Detail T-1. Extending 3' down from finished grade (upper zone), uncompressible 1 sack sand / cement slurry mixture as described in Section 945.00.00, Cement-Sand Slurry, shall be used. Variable zone may be ¾"-0 crushed rock or Cement-Sand Slurry as above. Paving materials shall meet the requirements of Section 925.00.00, Hot Mix Asphaltic Concrete Paving (HMAC). Also refer to Section 350.20.00, Street Cutting Including Curbs, Gutters and Sidewalks.

Trenches within the shoulder but not under any portion of the paved street section, Standard Detail T-2, shall be back filled with ¾"-0 crushed rock meeting the requirements of Section 910.11.00, Trench Backfill and Bedding Aggregate.

(c). Natural Ground – Water mains and service lines outside the street Rights of Way may be back filled above the pipe zone with materials described in Section 910.11.01 (g), Trench Backfill Outside of Street R/W.

640.00.00 – Construction Requirements and Workmanship

640.10.00 – Trench Excavation, General

It is the intent of these Standard Specifications that the progress of the work shall progress in a systematic and efficient manner so that as little inconvenience as possible will result to the public during the course of construction.

No work within a City right of way or easement shall commence until the Applicant has applied for and received a Public Works Department "Construction Permit" or unless during emergencies has been authorized by the PWD to conduct such work.
Prior to beginning work the Applicant or Contractor shall submit a Traffic Control Plan to the PWD. The Contractor shall notify the PWD, and Emergency Dispatch Center (Central Point Police Department) when directed by the PWD, of the address, periods of work, road closures and detours and other operations critical to public safety. Applicant shall obtain all utility locates in accordance with OAR 952-001-0010 through 952-001-0100. Call **1-800-332-2344, or dial 811.** Also refer to Section 140.30.00, Traffic Control.

Except by permission of the Public Works Department, at no time shall the trenching equipment be farther than 200' ahead of each pipe laying crew.

Backfill of the trench shall be accomplished so that no section of approved pipe shall be left open longer than 48 – hours unless otherwise authorized by the Public Works Department. Backfill and cleanup shall be completed as each section of pipe has been inspected, tested, and approved.

All trench excavation operations shall be conducted in a safe manner in accordance with OSHA requirements as administered by the State of Oregon (OROSHA).

The Contractor shall repair and re-grade all existing drainage ditches, natural drainage courses and all other drainage facilities, including culverts, damaged or removed during the construction.

The Contractor shall give prompt consideration for reopening street, roads and driveways to the public after the pipe has been installed. No traffic-way shall be closed while work is suspended over weekends or holidays and closures during workdays shall be as brief as practicable.

Provide and maintain any temporary measures needed to promote safe traffic movement over the trench with steel jump plates, cold patching, warning signs or lights, etc. All jump plates shall be secured in place with plate locks on leading edge exposed to traffic at speed and cold mix A.C or Hot Mix base along other edges. Cold mix shall be placed such a manner as to provide a smooth transition from the jump plate to the existing pavement grade.

No trench, on site or off-site, shall be left at any time in an unsafe condition. The permit holder is responsible for and is liable for hazards or damage resulting from the prosecution of the work.

The Contractor shall be required to provide the necessary personnel and signing to control traffic for the duration of the project in accordance with MUTCD and ODOT "Oregon Temporary Traffic Control Handbook for Operations of 3 Days or Less", latest edition.

Where private accesses are to be closed, the property owner(s) shall be notified by the Contractor at least 24-hours in advance of the closure. Access for fire and emergency equipment shall be maintained at all times. Also see Section 350.20.00, Street Cutting including Curbs, Gutters and Sidewalks.

640.20.01 – Pavement Removal and Replacement (Street Cuts)

Where new water lines cross existing pavements, the Contractor shall pre-saw the lines of the trench sides to the full depth of the pavement before attempting to remove the paving or curbs and gutters.

All work shall be done in accordance with Sections 350.20.00, Street Cutting including Curbs, Gutters and Sidewalks, and 350.20.02, Curb, Gutter and Sidewalk Cuts. Paving and concrete materials shall meet the requirements defined Section 930.00.00, Portland Cement Concrete and 925.00.00, Hot Mix Asphaltic Concrete Paving (HMAC).

Where the contractor discovers un-located existing water, sewer and utilities lines during his excavation, the Contractor shall promptly notify the Public Works Department and OUNC. In accordance with other applicable sections of these Standard Specifications the Contractor at his expense shall be required to support, repair or cause to be

repaired, and protect the pipe or utility. If the pipe or utility is not damaged, a mound of sand shall be placed immediately above the facility to a depth of 12" and marked with a heavy duty, highly visible highly visible metallic/ plastic locating tape laid across the full width of the trench before backfilling with the specified materials. The requirements for the metallic/plastic locating tape are described in Section 960.00.00, Miscellaneous Materials.

After backfill has been placed and compacted as required, contractor shall utilize a "T-Cut" method on the existing asphalt, in which the asphalt is cut again a minimum of 6" wider than the existing trench wall, on both sides, including any undermined areas. Exposed road bed will then be satisfactorily compacted, as determined by the Public Works Director, or their representative, prior to paving the trench.

640.25.01 – Alignment and Grade

Trenches shall be excavated to the lines and grades shown on the Plans and Profiles, as staked and as shown on the Standard Detail Sheet T-1 through T-6, Trench Section unless otherwise specified or shown on the approved plans. The minimum trench width for pipes less than 24" in diameter is the outside pipe diameter plus 18".

640.25.02 – Rock Excavation

Where "rock" is encountered, as described in Section 330.10.01(b), it shall be excavated to a depth at least 4" greater than the grade required by Sheet T-1 of the Uniform Standards.

The trench shall then be back filled to the proper trench grade with ¾"-0 crushed base rock conforming to Section 910.11.00, Trench Backfill and Bedding Aggregate of these Standard Specifications, and compacted to a minimum of 95% AASHTO T-99 (A). When using explosives for rock excavation, the Contractor shall follow all the rules and requirements of Sections 340.11.01, Use of Explosives and 340.11.02, Repair of Damage.

640.25.03 – Shoring, Sheeting and Bracing

The Contractor's "competent person" shall determine all requirements, including but not limited to, equipment, materials, shoring, sheeting, bracing, trench widths, trench slopes including any methodology or techniques thereof in order to comply with all applicable OR-OSHA provisions and requirements for trench excavation and related activities.

Trench support shall remain in place until the pipe has been placed, inspected, tested, and repaired if necessary; and until the backfill in the pipe zone has been placed and compacted as specified to a minimum of 6" above the top of the pipe.

640.25.04 – Excavated Materials

Where approved excavated materials may be used in the backfill above the pipe zone, for pipes outside the street section. The excavated materials shall be piled along the

trench side by the Contractor's "competent person" in accordance with OR-OSHA requirements in such a manner that will not endanger the work and or obstruct traffic ways, sidewalks, gutters, storm drains and driveways.

Fire hydrants under pressure, valve boxes, meter boxes, fire and police call boxes, and other utility controls shall not be obstructed, and shall remain accessible at all times. Gutters shall be left clear of all debris, silt, and gravel and not allowed to enter the storm drain sewer system. Natural watercourses shall not be obstructed. When excavated materials will not be used for trench backfill, they shall promptly be removed and disposed of as set forth in Section 330.10.02, Disposal of Excess Excavated Soils, and Section 800, Erosion and Sediment Control of these Standard Specifications. Special permits or conditions may be required by other agencies if working in or adjacent to a stream channel.

640.25.05 – De-Watering

The contractor shall provide and maintain ample means and devices with which to promptly remove and dispose of all water entering the trench excavation during the time that the trench is being prepared for the pipe laying, during pipe laying operations; for such additional time as may be required for the setting or hardening of thrust blocks; during the times that backfill is being placed, and at such other times as may be specified in Special Specifications. The Contractor shall dispose of the water in a suitable manner without damage, erosion or sedimentation to adjacent property as further described in Section 800, Erosion and Sediment Control.

640.30.00 – Trench Backfill

640.30.01 – Trench Bedding

¾"-0 crushed rock bedding material as specified in Section 910.11.00, Trench Backfill and Bedding Aggregate, shall be placed the full width of the trench and thoroughly tamped so as to uniformly support the pipe on a firm unyielding minimum 4" deep cushion along the full length or the pipe including the bell.

Bell holes shall be excavated as necessary to obtain the 4" cushion depth of bedding at each pipe joint. Bedding shall extend above the bottom of the pipe to approximately one – third of its outside diameter, and shall be thoroughly tamped – equally on both sides of the pipe so that the pipe is not displaced during tamping, and so that the pipe is fully supported at the specified line and invert grade.

In certain cases where the depth of trench exceeds 8' in depth, is safety hazard, and where heavy sub-surface water flow is present the Public Works Department may authorize the use of clean, washed 1" rock (pea gravel) bedding beneath the pipe.

640.30.02 – Pipe Zone Backfill

¾"-0 crushed rock pipe zone backfill as specified in Section 910.11.00, Trench Backfill and Bedding Aggregate, shall be carefully placed in lifts not exceeding 6"in depth on both sides of the pipe, and shall be thoroughly compacted, equally, on both sides of the pipe so that the pipe is not damaged, or displaced, either vertically or laterally from grade during tamping.

Upon approval of pipe alignment and tamping beneath the haunches, the pipe zone material shall continue for the full trench width to an elevation at least 6" above the top of the pipe. Pipe zone material installed above the pipe may be mechanically tamped provided an adequate cushion is maintained to prevent damage or contact with the pipe.

640.30.03 – Backfill above the Pipe Zone

Within the street Right of Way, above the pipe zone, backfill conforming to the requirements of Section 910.11.00, Trench Backfill and Bedding Aggregate and as illustrated by Standard Detail T-1, Trench Section, shall be placed and compacted in lifts not exceeding 8" in depth. The PWD may authorize the installation of increased lift thickness where high frequency vibrators mounted on large excavators are used. In all cases, the backfill shall be compacted to the following densities:

Upper zone - On new street sections from finish sub-grade elevation to the top of the variable zone or 6" above the top of pipe, whichever is less, the ¾"-0 crushed rock backfill above the pipe zone shall be compacted to a minimum of 95% of maximum density AASHTO T-99 (A). On existing streets the upper zone backfill section is measured as 36" from finished pavement to the top of the pipe zone since there usually is not a layer of sub-base material being placed.

Variable zone - From the top of the pipe zone to a level 36" below the top of sub-grade, the ¾"-0 crushed rock backfill above the pipe zone shall be compacted to a minimum of 90% of maximum density AASHTO T-99 (A).

Under all existing paved street sections a 1 sack cement-sand slurry mix as conforming to Section 945.00.00, Cement-Sand Slurry shall be used as backfill in the upper zone as shown on Standard Detail T-1.

Outside the Street Section – Unless otherwise directed backfill above the pipe zone shall be placed in lifts not exceeding 12" in depth and compacted to the following densities:

From the top of the pipe zone to finish grade, the backfill above the pipe zone shall be compacted to a minimum of 90% of maximum density. AASHTO T-99 (A) shall be used in accordance with the type of backfill material installed. The type of backfill material used may be approved select native material, ¾"-0 crushed rock or decomposed granite. Muck, vegetative material, or other incompetent materials shall not be installed.

640.30.04 – Concrete Cap

On all pipes where the total cover is less than 24" and where otherwise required on the plans, a concrete cap with materials conforming to Section 930.00.00, Portland Cement Concrete (PCC), shall be poured from 2" below the spring line of the pipe to a minimum of 6" above the top of the pipe, and to the full width of the pipe trench. A 6-mil plastic membrane shall be placed next to the pipe to prevent adhesion of the concrete.

640.30.05 – Backfill for Vaults, Blow-off and Pressure Relief Valve Applications

Back fill for these applications shall be accomplished in the same manner and to the same standards as backfill for pipe trenches.

640.30.06 – Backfill for Service Connections

Service connections shall be bedded and surrounded with a minimum of 6" above and 6" below the pipe, the full width of the trench with clean reject sand as described in Section 910.11.01(c), and mechanically compacted using a vibraplate, jumping jack or similar device, prior to back filling with ¾"-0 crushed rock as described in Section 910.11.00 and as shown on Sheet W-5 and W-7 of the Standard Details. Decomposed granite and pea gravel is not approved and shall not be used.

640.35.00 – Installation of Water Pipe and Fittings

640.35.01 – Distribution of Materials

Material shall be distributed on the job no faster than it can be used to good advantage. Pipe which cannot be physically lifted by workmen from the trucks hauling the pipe shall be unloaded by a forklift or other approved means.

All piping materials, valves, hydrants and other fitting shall be protected from contamination and weathering.

All piping materials including valves, couplings, tees and other fittings shall be clearly marked or tagged with the manufacturers name, part or model number, and ASTM/AWWA reference number.

640.35.02 – Preparation

All pipe delivered with visible damage to any portion of the pipe or bell, or having any grease or similar material lodged inside the pipe, will be rejected.

All pipe and fittings shall be first inspected by the Contractor or his authorized representative before being lowered into the prepared trench to insure that no cracked, broken, or defective pipe or fittings are being used in the work. The ends of the pipe shall be cleaned thoroughly with a brush and non-petroleum based cleaner, or other approved means, when necessary to remove blisters, grease, soil and other foreign

material. Extreme care shall be exercised to insure that the inside surfaces of the bell or coupling are smooth and free from any projections or deformity which would interfere with the assembly or water tightness of the joint.

Foreign matter and dirt shall be removed from the inside of pipe before it is lowered into the trench, and it shall be kept clean by approved means during and after laying

640.35.03 – Handling

Proper implementation, using clamps, tools, equipment and facilities shall be provided by the Contractor to conduct safe operation and proper protection of the work. All pipe and fittings shall be lowered into the trench in such a manner as to avoid any physical damage. Under no circumstances shall pipe or fittings be dropped or dumped into the trenches. All damaged fittings or pipe suspected of damage shall be clearly marked and/or tagged as "Rejected" and shall be removed from the job site.

640.35.04 – Line and Grade

Maximum deviation from true line or grade, as established by the Engineer, shall not exceed 0.10' for line or grade at any joint. Minimum cover shall be 3' unless otherwise approved by the PWD.

640.35.05 – Thrust Blocking

Concrete thrust blocks which meet the requirements of Section 930.00.00, Portland Cement Concrete (PCC), as shown on the plans and as illustrated on Standard Detail Sheet(s) W-1 and W-2 shall be poured against solid, undisturbed earth. No concrete shall be poured until all water has been removed from the excavation.

Suitable forms shall be constructed to obtain the minimum bearing areas, shapes and positions as shown on Standard Detail Sheet(s) W-1 and W-2, Thrust Blocks that will provide full bearing surfaces against solid undisturbed earth.

The thrust blocks shall be cured a minimum of 5 days before hydrostatic or air tests are conducted. Care shall be taken during excavation not to over excavate in the areas where thrust blocks are to be poured.

Upon curing for the specified time period, all forms shall be removed from the excavated trench prior to backfilling.

640.35.06 – Tracer Wire

Tracer wire shall be required on all service lines, 1" to 2", and all C900 main line installed. Tracer wire requirements will vary based on the type of installation, as follows;

1. Main water line is ductile iron, with PEX service lines: In this instance, tracer wire will be required on the PEX service line only. The tracer wire shall be 14 ga. Solid core UF Blue, direct bury compatible. No THHN allowed. Tracer wire shall be

stripped for one foot at the corporation stop and wrapped around the corporation stop securely, ensuring a positive ground. Tracer wire for service lines shall be continuous with no splices. The end of the tracer wire at the angle stop shall be securely wrapped around the angle stop, conveniently located and stripped for 1 inch to allow for location testing. The ends of the tracer wire shall be visually checked by the City prior to backfill.

2. Main line is C900: In this instance, tracer wire shall be Trace Safe®, or approved equal. Mainline C900 shall have Trace Safe® locating wire installed at the 3 O' clock position on the pipe. It shall be secured to the C900 every 8 to 10 feet with duct tape, and care shall be taken during backfill operations to ensure that it remains in place. All splices, including line splices, 'tee' splices and butt splices, shall be Trace Safe®, or compatible with the tracer wire approved for use, to ensure watertight seals. No wire nuts will be allowed. All tracer wire splices will be visually checked by the City prior to backfill.

Additionally, after installation, tracer wire will be tested for locatability. If any repairs are needed so that tracer wire will be sufficiently locatable, repairs will be done at contractor/developer expense.

640.40.00 – Polyethylene Encasement of Ductile Iron Pipe

Where required, polyethylene encasement of ductile iron pipe shall be conducted in accordance with requirements set forth in ANSI/AWWA C105/A21.5-99, American National Standard for Polyethylene Encasement For Encasement of Ductile Iron Pipe, with materials meeting the requirements set forth in 630.12.00, Corrosion Inhibiting Pipe Materials.

640.45.00 – Laying and Jointing of Pipe

The Contractor shall take the necessary precautions required to prevent ground water, excavated or other foreign material from getting into the pipe during the laying operation. At all times when laying operations are not in progress, at the close of the day's work, or whenever the workmen are absent from the job, the open end of the last laid section of pipe shall be closed and blocked by a watertight plug to prevent entry of foreign material or creep of the gasketed joints. All ground water and sloughed material shall be removed prior to extending the pipe.

Unless otherwise directed, pipe shall be laid with the bell end facing in the direction of placement. For lines on steep grades the bells shall face upgrade.

All newly laid waterlines shall use "poly pigs" as an internal pipeline cleaner. "Poly pigs" shall be installed at locations determined by the Public Works Department.

640.45.01 – Ductile Iron Push-on Joint Pipe and Restrained Joint Pipe

Ductile Iron Pipe with push on type or restrained joints, shall be laid and jointed in strict accordance with the manufacturer's recommendations, as approved by the Public Works Department and in accordance with the requirements of the approved plans and Detail Specifications. The Contractor shall provide all special tools and devices such as special jacks, chokers, clamps and similar items required for the installation. Lubricant for the pipe gaskets shall be specified or furnished by the pipe manufacturer and under no circumstances shall petroleum-based grease be used.

Prior to the joining of pipe, the bell and spigot shall be wiped clean and no dirt shall remain in the barrel. The rubber gasket and spigot end shall be properly lubricated with specified non-petroleum grease and installed to assure a watertight joint.

After the joint has been made, the pipe shall be aligned and checked for grade. The trench bottom shall form a continuous and uniform bearing and support for the pipe at every point between joints. Sufficient pressure shall be applied in making the joint to assure that the joint is "home" as defined in the standard installation instructions provided by the pipe manufacturer.

To assure proper pipe alignment and joint make-up, sufficient pipe zone material shall be placed to secure the pipe from movement before the next joint is installed. The contractor shall take all precautions necessary to prevent the "uplift" or floating of the line prior to the completion of the back filing operation.

640.45.02 – Mechanical Joint Pipe

Mechanical joint ductile iron pipe shall be installed in accordance with the manufacturer's recommendations. The ends of the pipe shall be cleaned of all dirt, mud and foreign matter by washing with water and scrubbing vigorously with a wire brush, after which the gland and gasket shall be slipped on the plain end. The end of the pipe shall then be guided carefully into the bell of the pipe previously laid. The spigot shall be centrally located in the bell, the gasket placed in position and the bolts inserted in the holes.

When tightening bolts, the gland should be brought toward the flange evenly, maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. This shall be done by partially tightening the bolts evenly in a star pattern. This cycle is to be repeated until all bolts are within the range of torque shown in Table 600-3, Bolt Torque Loads. If effective sealing is not attained at the maximum torque, the joint shall be disassembled and reassembled after thorough cleaning and inspection of the gasket.

Prior to placement of pipe zone material, the pipe and fittings shall be checked to assure proper grade, alignment and support as described in Section 640.35.04 above.

640.45.03 – Flanged Pipe and Fittings

Flanged pipe and fittings shall be jointed in accordance with procedures set forth in AWWA C115 (Appendix). Bolts shall be tightened in a star pattern taking care that all bolts are tightened evenly to the loads described in Table 600-3 and that there is no over-stressing of bolts or flanges.

Prior to placement of pipe zone material the pipe and fittings shall be checked to assure proper grade, alignment and support as described in Section 640.35.04 above. In no case shall alignment of pipe be forced through the tightening of bolts.

Table 600-3

Bolt Torque Loads

(From ANSI/AWWA C111/A21.11-00)

Pipe Diameter	**Bolt Size**		**Range of Torque**		**Length of Wrench ***	
Inch	Inch	(mm)	Lbs/Ft	N/m	Inch	(mm)
3	5/8	15.9	45-60	61-81	8	203
4-24	¾	19.1	75-90	102-122	10	254
30-36	1	25.4	100-120	136-163	14	356
42-48	11/4	31.8	120-150	163-203	16	406

* The torque loads may be applied with torque-measuring or torque-indicating wrenches, which may also be used to check the application of approximate torque loads applied by a worker trained to give an average pull on a definite length of regular socket wrench.

640.45.04 – Preventing Ground Water from Entering Pipe

At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a water-tight plug or other means approved by the Public Works Department. No ground water shall be permitted to enter the pipe during the laying of pipe. These provisions apply at all times of the day as well as overnight. If water is in the trench the seal shall remain in place until the trench is pumped completely dry.

640.45.05 – Cutting Pipe

The cutting of pipe for inserting valves, fittings or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe or lining and so as to leave a smooth end at right angles to the axis of the pipe.

Acceptable methods of cutting cast iron pipe are sawing with a band or powered hacksaw or with a portable, gasoline engine driven abrasive saw. Cast iron pipe may also be cut with a lathe or portable milling saw.

Acceptable methods of cutting ductile iron, cement mortar lined pipe are only those done by sawing or milling. Flame cutting of ductile iron pipe by means of oxy-acetylene torch shall not be allowed.

When mechanical joint or push-on joint pipe is cut in the field, it shall be cut as recommended by the pipe manufacturer, and the cut end shall be ground back or dressed as recommended by the pipe manufacturer and approved by the Public Works Department.

640.45.06 – Horizontal and Vertical Curves

All pipes shall be laid in a straight line and grade unless otherwise shown on the approved plans or authorized in writing by the PWD or the Engineer.
When pipe is to be laid in either horizontal or vertical curves, in accordance with the Plans, or to avoid an obstruction, see 640.45.07 – Deflection of Pipe.

640.45.07 – Deflection of Pipe

Joint deflections shall be no more than 80% of maximum allowable deflection per manufacturer's specifications. Minimize bends/fittings by utilizing deflections in joints whenever possible. All bends (11¼°, 22½°, 45°, or 90°) shall be noted on the plans.

640.50.00 – Installation of Valves, Hydrants and Service Connections

640.50.01 – Install Valves and Valve Boxes

Valves and Valve Boxes as described in Section 630, Water System Materials, shall be installed at the locations shown on the Plans. The valves shall be properly connected and supported in a vertical position with stems plumb. Valve boxes shall be installed at all valves unless otherwise specified.

The valve box shall be centered on the operating nut and the extension shall be trimmed to proper length so that the box slides over the extension for a minimum of 8" as measured from final grade. The cover shall match the finish grade of paving, and shall be fully supported by paving materials, refer to standard detail W-18. Wrap valve can and well casing joint in 8mil plastic as shown.

Deep valves, over 30" as measured from the operating nut to the rim of the valve box shall be fitted with an operating nut extension as manufactured by the valve manufacturer or approved equal. See Section 630.20.05.

640.50.02 – Install Fire Hydrant Assemblies

Fire hydrant assemblies as specified in Section 630, Water System Materials, including the line tees, auxiliary valves and valve boxes, piping, fire hydrants and thrust blocks shall be installed at the locations shown on the Plans, and shall be assembled, jointed and supported as shown on Standard Detail Sheet W-3 of the Public Works Standards

640.50.03 – Install Blow-Off Assemblies

Blow-off Assemblies, as specified in Section 630, Water System Materials including the ductile iron pipe section with M.J. tapped plugs, the valves and nipples, brass, galvanized PEX pipe and fittings, shall be installed at the locations shown on the Plans, and shall be jointed and assembled as detailed on Standard Detail W-9A Through W-10B, Mainline Blow-off Assembly(s) of these Standards.

640.50.04 – Install Air Relief Valves

Air relief valves conforming to Section 630, Water System Materials shall be 1" for pipes under 30" in diameter and 2" for pipes greater than 30" in diameter and unless otherwise specified shall include the service saddle, corporation stop, valves and nipples, the air valves, the pipe and fittings, the vents, the vaults, and the covers, as shown on Standard Detail Sheets W-4, Air Relief Valves. Air relief valves shall be installed at the locations shown on the Plans.

The air relief valves shall be assembled, jointed and installed in accordance with the detail on Sheets W-4 of the Public Works Standards, with the vault plumb, and the cover flush with the finish grade.

In certain field applications and for air valves required in the street section, the Public Works Department may specify additional requirements to assure the protection and efficient operation of air valve installations. Designs will be approved by the PWD on a case-by-case basis prior to installation.

640.50.05 – Installation of Service Connections

Water service connection materials, including the trench excavation and backfill, the service saddles, corporation stops, Municipex piping, curb stops, and the meter boxes with lids shall conform to Section 630, Water System Materials and as shown in Table 600-2. The connection shall be installed at the locations shown on the Plans, and in accordance with the details shown on Sheet W-7 of the Uniform Standards. The Engineer will set the required hubs and marking stakes.

640.50.06 – Cathodic Protection

In certain soils cathodic protection may be required to prevent corrosion of pipe and fittings. Cathodic protection shall be installed using the materials and methods as follows and on Standard Detail Sheet W-8.

Soil resistivity will determine the amount of cathodic protection required for waterline construction. Resistivity is in the units ohm-cm.

1. Soil resistivity greater than 3,000 ohms-cm, ductile iron main waterline can be laid bare, with municipex services.
2. Soil resistivity less than 3,000 ohms-cm, ductile iron main waterline shall be poly wrapped, services will be municipex, and extra cathodic protection may be required including sacrificial anodes. These requirements will be based upon design engineer recommendations and review by City Engineer.

640.50.07 – Installation of Valve Operating Nut Extensions

Where the installation of a valve shall cause the operating nut to be greater than 30" from finish grade a Valve Operating Nut, meeting the requirements set forth in Section 630.20.05 shall be installed as shown on Standard Detail W-14 and W-18, Water Valve Extension.

650.00.00 – Inspection, Testing and Disinfection

Inspection shall be required following each phase of pipe laying / jointing, bedding and backfill.

650.10.01 – Pipe and Bedding

Upon installation of the pipe and bedding materials as required in Section 640.30.00, Trench Backfill and Section 910.11.00, Trench Backfill and Bedding Aggregate, and prior to covering the Contractor shall request and receive an inspection by the Public Works Department. The purpose of this inspection is to assure proper pipe support, alignment, grade and tamping of the material under and around the pipe.

650.10.02 – Backfill

Backfill of water line trenches above the pipe zone section shall include testing for compaction density of each layer to be installed in accordance with AASHTO T-99 (A) and the requirements of Sections 640.30.00, Trench Backfill. The Public Works Department may require pot holing and testing of selected trench sections below the surface if any compacted layer exceeds 8" of thickness. The Contractor shall request an inspection prior to placing successive lifts of backfill material.

It shall be the responsibility of the Contractor to arrange for testing of material in the presence of the inspector with a testing laboratory approved by the Public Works Department and certified to conduct the required test. Test results shall be painted on

the street or sub-grade surface material at the point of testing as well as recorded by the testing agency or institution. The soils testing company shall issue certified copies of all test results to the Public Works Department.

650.20.00 – Hydrostatic Testing, Flushing and Disinfection

650.20.01 – Pressure and Leakage Testing

Pressure and leakage tests shall be performed on all newly laid pipe or any valved section of it, or both, unless otherwise specified. The Engineer or his designee will conduct the tests in the presence of the Public Works Department inspector. The City will supply necessary gauges to perform the test. The Contractor shall install the necessary test tees or taps and valves at the ends of all pipe runs to be tested. The Contractor shall furnish all necessary assistance for conducting the test and shall furnish the test pump, pipe connection, hoses, valves and suitable graduated containers for measurement of the water used for testing.

The test shall be conducted after the trench has been back-filled sufficiently to prevent movement of the pipe during testing and flushing. The joints at all valves, tees or couplings to the extent possible other joints shall be left exposed for inspection of visible leakage.

Where any section of pipe is provided with concrete thrust blocking, the pressure test shall not be made until at least five days have elapsed after the concrete thrust blocking is installed. If high-early cement is used for the concrete thrust blocking, the time may be reduced to two days instead of the five previously specified. Temporary shoring or thrusting may be employed to allow for pressure testing, or during emergency repairs, to allow the return to service of a repaired water line. Temporary shoring and thrusting shall be employed against native ground or other fixed in place objects such that no movement can occur. All temporary shoring and thrusting, which can be removed without adversely affecting the integrity of the permanent thrust block, shall be removed before backfill occurs.

The pressure test shall be conducted in the following manner: After the pipe and trench have been back-filled or partially back-filled as herein before specified, the pipe shall be filled with water. The test pressure of the newly installed pipe shall be 1-½ times the normal static water line pressure as measured at the test point, but not less than 150 pounds per square inch. Unless stated otherwise in the detail specifications or authorized by the Public Works Department the duration of each pressure test shall be 30 minutes.

(a) Expelling Air: Before applying the specified test pressure all air shall be expelled from the pipe or pipe system being tested.

(b) Procedure: Each valved section of pipe shall be slowly filled with water to replace any lost; and the specified test pressure, measured at the point of lowest

elevation, shall be applied by means of a pump connected to the pipe in a satisfactory manner.
The pump shall then be isolated, and the pressure shall be held in the line for the 30- minute test period noted above. If at the end of the 30-minute test period, a drop in pressure is noted, the pump shall be operated until the required test pressure is again attained. The pump suction tube shall be in a bucket; barrel or similar device so that the amount of water required restoring test pressure may be accurately measured.

(c) Leakage: Leakage shall be 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 until the leakage is less than the number of gallons per hour as determined by the following formula:

$$L = \frac{ND \quad (P)\ ½}{7400*}$$

L = allowable leakage in gallons per hour;
N = number of joints in the length of pipe tested;
D = nominal diameter of pipe in inches;
P = average test pressure during the leakage test in pounds per square inch

*Based on 18' pipe lengths. Use a Factor of 6433 if 21' pipe lengths are used.

(d) Correction of Excessive Leakage: Should any test of pipe in place disclose leakage greater than that allowed under (c) above, the Contractor shall, at his own expense, locate and repair the defective joints or pipe until the leakage is within the specified allowance.

(e) Visible Leaks: All visible leaks and known leaks revealed by the test shall be repaired regardless of the total amount of leakage shown by the test.

650.20.02 – Flushing

After the pipe has been completely laid and connected to the distribution system at one end, and after testing has been completed and accepted, a complete flushing through all hydrants, service lines, air relief valves, blow-off valves and dead ends shall be completed. The Contractor shall provide sufficient trench pumping capacity to pump out the water flushed from the open end.

650.20.03 – Disinfection

Disinfection of new lines by means chlorination shall be completed by the Contractor after flushing. The water shall be fed slowly into the new line with chlorine applied in regulated amounts to produce a dosage of 50 ppm. **At no time shall the chlorinated mixture be allowed to flow into the existing potable water distribution system.**

The treated water shall be retained in the pipe for at least 24 – hours and not more than 36 – hours. A free chlorine residual of not less than 10 ppm shall be produced in all parts of the line after the 24 – hour period has elapsed.

The chlorinating agent shall be a liquid, chlorine gas-water mixture, direct – fed chlorine gas, or a calcium hypochlorite and water mixture that will produce the dosage amounts noted above. Chlorine gas-water mixture shall be applied by means of a solution – feed chlorinating device. Chlorine gas shall be fed directly from a chlorine cylinder equipped with suitable device for regarding the rate of flow and providing for effective diffusion of gas within the pipe. Calcium hypochlorite shall be similar and equal to commercial products known as H.T.H., Perchloron or Chlor. A solution consisting of 5% powder to 95% water by weight should be prepared. The calcium hypochlorite and water mixture, first made into a paste and then thinned into slurry, shall be injected or pumped into the newly laid line under the conditions specified herein before.

The method of placing concentrated quantities of commercial disinfectant in the line as it is being laid is not a satisfactory method of disinfection and will not be allowed.

During the chlorination process, all valves and hydrants within the newly constructed system shall be operated to allow all newly installed pipe and fittings to be disinfected.

After chlorination; the water shall be flushed from the line at its extremities, including all service laterals, by the contractor, and will be tested after 24-hours by the Public Works Department for chlorine residual and any bacterial content.

During the flushing process, no chlorinated water shall be introduced or allowed to enter the sanitary sewer system. All chlorinated water with a residual content greater than 4 PPM shall be disposed of by dispersal to open ground having a minimum surface area of not less than 1 acre, and will not drain directly to a creek, storm sewer or irrigation facility. Alternatively, the chlorinated water may be de-chlorinated onsite, monitoring CL2 discharge by a city approved representative or hauled to a de-chlorinating facility or other suitable site for disposal.

Water samples shall be taken by the PWD and delivered to an approved laboratory and tested for bacterial and chemical components at the expense of the Contractor or Developer. Upon satisfactory testing the water shall be equal in chemical content to the permanent source of supply contain no harmful bacteria in accordance with Oregon Health Authority, Drinking Water Division standards. If the water fails to meet the test requirements, the pipe shall be re-disinfected and re-flushed by the Contractor as described above until the testing standards are met. Additional testing will be at Contractor/Developer expense.

Upon satisfactory testing and disinfection or re-disinfection, and approval, the Contractor or Developer shall be notified by the Public Works Department and under direction thereof shall open the newly installed system to the City water system.

650.20.04 – Installation of Poly Pigs

"Poly Pigs" shall be supplied and installed by the contractor during installation of the pipeline. Number, size and locations shall be as determined by the Public Works Engineer, or their representative. The "poly pigs" shall be moved through the pipeline system by the use of water pressure during flushing operations performed by City of Central Point personnel, but after service taps have been made. All "poly pigs" shall be removed from the pipeline by CCP prior to testing and disinfection.

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