Section 4 Index

Water

CITY OF BENTON CITY

SECTION 4

STANDARD SPECIFICATIONS FOR:

WATER

4-1 WATER PIPE

4-1.01 GENERAL

The work covered in this section shall include the furnishing, installation, and testing of the water piping, valves, tees, fittings, and other appurtenances and incidental work required to construct the water facility as shown on the plans and in accordance with SWSS Section 7-09 through 7-15, as herein modified.

4-1.02 APPROVED PIPE AND FITTINGS

The water pipe shall be one of the types as indicated below unless a specific type and class of pipe is otherwise called out in the contract special provisions.

A. DUCTILE IRON PIPE shall be Class 50. Ductile iron pipe shall conform to all requirements of ANSI A21.51 (AWWA C151). Pipe shall be cement-mortar lined and seal coated, conforming to ANSI A21.4 (AWWA C104). Pipe joints shall be push-on joint or as specifically specified or shown on the plans. Gaskets suitable for the designated pipe joint, pipe size, and pressures shall be furnished with the pipe and conform to ANSI A21.11 (AWWA C111).

B. POLYVINYL CHLORIDE (PVC) PIPE shall be Class 150, DR18. Pipe shall be push-on joint or coupled joint conforming to ASTM D1784 Class 12454-A or 12454-B. Pipe shall meet all the material, performance, and test requirements of AWWA C900.

C. PIPE FITTINGS shall be Class 250, unless specified otherwise. Fitting joints shall be compatible with adjacent pipe.

All fittings shown on the plans adjacent to a valve shall be flange connected to the valve.

1. Fittings for Ductile Iron and PVC Pipe

Fittings shall be Class 250, cement-mortar lined cast or ductile iron and shall conform to ANSI A21.1 (AWWA C110), ASTM 377 and ASTM 536. Mortar

lining for fittings shall be the same thickness specified for cast and/or ductile iron pipe and shall conform to ANSI 21.4 (AWWA C104). Rubber gasket joints shall conform to ANSI A21.11 (AWWA C111).

D. NUTS AND BOLTS shall be of sizes, material and quantities recommended in ANSI 21.11 (AWWA C111) and AWWA C207. Nuts and bolts shall be ductile iron or alloy steel A303, Grade B. Nuts and bolts for flanges shall conform to ANSI B16.1.

E. JOINT LUBRICANT shall be furnished with the pipe, in the amount and type recommended by the pipe manufacturer. The lubricant shall be a water-soluble, nontoxic, vegetable soap compound conforming to United States Pharmacopoeia No. P39.

4-1.03 INSTALLATION

Pipe shall be installed in accordance with the manufacturer's specifications for the type of pipe used. The Contractor shall construct the pipeline in accordance with Standard Drawings Section 4 and the requirements of SWSS Section 7-09 as herein modified.

Prior to beginning excavation and where directed by the Engineer, storm drainage catch basins shall be protected per Section 2-27 of these specifications.

4-1.04 TRENCH EXCAVATION AND BACKFILL

Trench excavation for water line construction shall be in accordance with SWSS Section 7-09.3(7) except as herein modified. Trench excavation shall provide for a minimum of 42 inches of cover

material over the top of the finished pipe grade. Trench backfill material shall be compacted by means approved by the Engineer, per the requirements of City Standard 1-13, as required to preclude future settlement and to achieve a minimum of 95 percent maximum density when tested in accordance with SWSS Section 7-09.3(11). In addition, the contractor is directed to Section 1-13 of these specifications.

Delete SWSS Section 7-09.3(7) B. Trench excavation shall be unclassified unless rock excavation is listed as a separate pay item.

As a minimum, all trenches which parallel the street centerline shall be water settled and compacted with a hoe-mounted or double drum vibratory mechanical compactor. Hand operated jumping jacks or shoe-type mechanical tampers will not be approved.

Pavement restoration shall be completed per the requirements of City Standard Drawing 2-6 and Section 2-29 of these standards.

The Contractor is advised that all existing water main lines have thrust blocks typically located as shown on Standard Drawing 4-6. These thrust blocks have been found to be constructed of rocks, blocks, concrete or other materials. The Contractor shall take such precautions, shoring, etc. as required to protect and not disturb the existing thrust blocks.

4-1.05 PIPE LOCATOR RIBBON

The Contractor shall, after backfilling and compacting the trench to within 12 inches of the top of the finished ground grade, install a continuous two-inch (2") minimum width blue plastic coated aluminum pipe locator ribbon over the top of the pipeline, which shall be clearly marked "CAUTION BURIED WATER LINE" continuously along the length of the ribbon.

4-1.06 TRACER WIRE

The Contractor shall install a tracer wire, in addition to the location ribbon, over all non-metallic water mains. the Tracer wire shall be 14 gauge copper wire with blue coded UF insulation. The tracer wire shall be installed as shown on the City of Benton City Standard Drawing 4-9. Bare wire contact points shall be provided at valve boxes, air release and blow off installations.

4-1.07 DISINFECTION AND FLUSHING

The Contractor shall flush water lines scheduled for testing per the provisions of Section 4-13 of these specifications. The disinfection of new water lines, including all connections and appurtenances, shall be in accordance with SWSS Section 7-09.3(24) as herein modified. Water health test points shall be provided at typical intervals of 500 to a maximum of 800 feet, or as approved by the Engineer. The Contractor will be required to notify the inspector up to 48 hours prior to the need for health testing. The Contractor shall then obtain health samples according to the procedure outlined in Section 4-22 of these specifications. Samples may be taken at fire hydrants and temporary blow-offs when available. When test points within the specified interval are not available, a saddle and corp stop shall be supplied and installed by the Contractor. Where applicable, the corporation stop shall be installed at the nearest service location.

Following acceptance of the health test, the water line shall be thoroughly flushed. City crews will operate all valves during the flushing procedure per the provisions of Section 4-13 of these specifications. The Contractor may operate valves which are installed by the Contractor and control the supply to the water mains being installed by the Contractor, for the purpose of filling installed water lines, pressurizing to line pressure prior to pressure tests and for final flushing prior to obtaining health samples. Prior to operating any valve, including valves installed by the Contractor, the City Engineering Department inspector must be on site and approval of the inspector must be obtained for the Contractor's proposed operation. The above specified valves, and herein specified procedures, constitutes the only approved operation of main line valves by personnel other than the City Water Department personnel. Non conformance with the provisions of this standard

specification and identified policy shall be treated as "tampering" and enforcement will be in conformance with the provisions of City Ordinance: (BCMC 13A.08.010)

The Contractor shall provide temporary or permanent blow off access points where fire hydrants are not available. During flushing, the Contractor shall provide piping, ditches, ponds or other measures as required to control or discharge flushed water in a safe manner. The Contractor shall be fully responsible for damage resulting from flushing water.

4-1.08 PRESSURE TESTING

4-1.08.01 WATER MAIN LINES

With the exception of building fire system lines, the pressure testing of new water lines, including all connections and appurtenances, shall be in accordance with SWSS Section 7-09.3(23) as herein modified. The hydrostatic test pressure for all types of pipe shall be 150 PSI for a length of one hour. The Contractor shall provide and install saddles and corporation stops as required to provide test points.

When the contractor is required to connect to an existing water main stub, or extend an existing water main, the city does not warrant that the existing valve or pipe will meet pressure test requirements. The contractor shall have the option of installing a valve at the point of connection or the contractor may attempt to pressure test, utilizing the existing installations at his sole risk and expense. Where water services are presently connected to the existing water main, the contractor shall install a mainline valve at the point of connection.

4-1.08.02 BUILDING FIRE LINE TEST PROCEDURES

The City Inspector must be present during the following:

1. PRESSURE TEST - Test for 2 hours at 200 P.S.I.
   If a loss, refer to allowable leakage description on contractor's Material and Test Certificate for underground piping form as required by the latest edition of the NFPA Standard.

2. FLUSH - After the underground fire line passes the pressure test the flushing of the pipe from the main to the flange can be scheduled.

   All debris that is in the underground pipe must be flushed clear (1-1/2 Minutes Min.), a burlap bag will be required to collect debris from the pipe.

3. FLOW TEST - When all debris has been flushed and the pipe is flowing clear, flow test must be taken to assure the pipe is flowing the minimum gallons per minute.

   4" Pipe - - 390 G.P.M.
   6" Pipe - - 880 G.P.M.
   8" Pipe - - 1560 G.P.M.

   Flow from the flange must be directed in a safe manner as not to flood the surrounding area. The contractor will conduct the flow test with a city representative present. The Contractor shall supply a pedo gauge and measure the flow.

   If the flushing can be completed without reducing the pipe size and the P.I. valve opened completely, then gauging the flow for gallons per minute will not be required.

4. HEALTH SAMPLE - The Contractor shall obtain a health sample per the requirements of City Standard Specifications, Section 4-22.

5. SOFT SEAT CHECK VALVE - If a soft seat check valve is required, contact the City's Cross Connection Specialist to inspect the valve prior to installation.

4-1.09 TRENCH SAFETY SYSTEMS

All trench excavations shall have adequate safety systems for the trench excavation that meet the requirements of the Washington Industrial Safety and Health Act, Chapter 49.17 RCW. The

Contractor shall be fully responsible for providing the necessary back sloping, cribbing, trench boxes, etc., as required to meet the specified safety requirements for the trench. When city crews will be making the main line tap, as provided by Section 4-8.02(C), the contractor shall provide all trench safety measures, prior to city personnel entering the trench.

4-1.10 MEASUREMENT AND PAYMENT

Measurement and payment will be made per the provisions of SWSS 7.09.4 and 7-09.5 and as modified by these specifications. The unit contract price for each size of "Water Line", per linear foot, when measured continuously along the pipe centerline, including the distances through structures, valves, and fittings, shall be full compensation for furnishing all labor, equipment, and materials, to trench, dewater, compact and backfill, lay and joint the pipe, make connections to existing stub lines, specified or required salvage, test, disinfect, flush, provide and install corporation stop test points, and all other incidentals required to perform the work in accordance with the plans and specifications or as directed by the Engineer. Where temporary 2-inch blow off assemblies are required for installation and testing, measurement and payment will be made per section 4-6.03 of these specifications.

"Trench Safety Systems", per linear foot, shall be measured along the main line trench length through valves and vaults. The unit contract price, per linear foot, shall be full compensation for furnishing all labor, equipment, materials and all other incidentals necessary to meet the requirements of the Washington Industrial Safety and Health Act, Chapter 49.17 RCW. All costs for trench safety systems for water service trenches shall be incidental to the water system main line measurement and payment.

4-2 ROCK EXCAVATION

4-2.01 GENERAL

When provided for in the bid proposal, a separate measurement and payment will be made for rock excavation. Rock excavation shall include solid rock formations requiring systematic drilling and blasting with explosives and any boulders or broken rock larger than one-half cubic yard in volume. Hardpan or cemented gravel, even though it may be advantageous to use explosives in its removal, shall not be classified as solid rock excavation. The bottom of the trench shall be brought up to grade by backfilling with selected backfill material and be compacted to the satisfaction of the Engineer.

The Contractor shall notify the Engineer at least 24 hours prior to any blasting. All blasting shall be done in accordance with local, county, and state regulations governing this class of work. Any damage to persons or property resulting from blasting operations shall be the sole responsibility of the Contractor and his surety.

4-2.02 MEASUREMENT

The measurement for "Rock Excavation" shall be made as follows:

A. LENGTH

Length will be the entire horizontal distance where rock is encountered, measured on a linear foot basis along centerline of trench.

All water line structures; i.e., valve pits, transmission line blow-offs, pressure reducing stations, etc., will be excluded and will be measured separately. Measurement will commence at the first location where rock is encountered and continue to the point where rock terminates.

B. WIDTH

The trench width for payment of rock excavation shall be as follows:

Size of Pipe	Pay Width of Trench
4" - 15"	2.5 feet
18" - 36"	Outside pipe diameter plus 12"

42" & larger	Outside pipe diameter plus 24"

C. DEPTH
Measurement for depth will be the vertical distance from six inches (6") below the pipe invert to the top of the solid rock strata. Depth will be measured at intervals of 25 feet along centerline of trench, beginning at the first location that solid rock is encountered, and the average depth between measuring points will be the depth used for computing depth of rock.

D. ROCK EXCAVATION FOR STRUCTURES
Rock excavation quantities for water line structures; i.e., valve pits, transmission line blow-offs, pressure reducing stations, etc., shall be computed on a cubic yard basis from the actual profile depth as noted above, multiplied by the area within a line parallel to and one foot (1') outside of the actual dimensions of the structure base.

4-2.03 PAYMENT

The unit contract price for "Rock Excavation," per cubic yard, shall be paid in addition to the payment for "Water Line Pipe," per linear foot. Payment for rock excavation shall be full compensation for all work necessary to excavate and dispose of the rock material. No payment will be made for rock excavated below required grade or outside the widths mentioned above.

4-3 WATER SERVICES

4-3.01 GENERAL

Where shown on the plans or indicated in the proposal, the Contractor shall provide the materials, trench excavation, necessary bedding, and backfill for the water service line from the main to the property line and the Contractor shall install the water service per Standard Drawings 4-26 through 4-31, including the required service taps to existing water main lines. Where existing water mains with existing services are replaced, the Contractor shall relocate the water meter and reconnect the private service as construction requires for new developments. Water services will not be located on the same property lines as the other utilities.

When a property is developed that has an existing water service(s), or mainline stubbed and the development will not utilize the existing service or stub, the developer's contractor shall expose the water main and remove the abandoned corporation stop and install a plug, or remove the abandoned valve and install a blind flange.

The Contractor shall provide extra width trench at the mainline as required to install the saddle a minimum two feet from all hubs, bells or joints.

The construction plans typically do not show the existing improvements behind the curb and walk. The Contractor shall make himself aware of the general conditions and any special conditions that may exist. All fence, lawn, irrigation systems, rock and gravel areas and all miscellaneous landscaping, shall be restored in accordance with industry standards and shall be of equal or better quality than the existing improvements. The Contractor shall take necessary measures to limit the impact to the existing improvements as much as possible, including tunneling or missiling under major tree roots, curbs, walks, fences, and similar obstructions.

Trench compaction and rock excavation shall be completed in accordance with Section 4-1.04 and 4-2 of these specifications. Pipe bedding material shall meet the requirements of Section 4-4.02 and 4-4.03 of these specifications.

Following installation of new concrete curb and gutter which crosses over a newly installed water service line, the Contractor shall mark the face of the concrete curb with a "W" in accordance with the requirements of Section 2-10.01 of these specifications.

4-3.02 INSTALLATION

When the new waterlines have been approved for service, the Contractor shall install water services per the City Standard Drawings No's. 4-26 through 4-31. Where new services are being installed to

existing homes, the Contractor shall reinstall the existing meter box and meter and complete connections to the existing homes as required to restore the water service as specified. The existing meter box and meter shall be removed undamaged by the Contractor. Where an existing meter box is substandard or damaged due to no fault of the Contractor, the Contractor shall supply and install a new meter box at the contract unit price. On City contracts, the meter box grade will be staked by the City, prior to installation; however, each box will require adjustment to the final slope, yard or wall grade after completion of the street work. Meter boxes shall be installed per Standard drawing 4-31. Boxes which require adjustment to grade shall be excavated, removed and reset to grade. Adjustments between box sections shall not be made with bricks, boards, cement grout or other measures. Properly installed manufacturer supplied extension rings may be utilized when extra deep installations require and when approved by the Engineer.

When replaced, the replacement shall include a complete box assembling, including lid. All connections to existing homeowners' galvanized pipe shall be made by a threaded connection.

Where existing customer water services are galvanized, the Contractor shall thread the service and install a dielectric union between the copper and galvanized connection. Where the existing service to the home is found to be deteriorated, the owner shall be notified in writing by the Contractor of the condition of the existing service and the limits of responsibilities as noted herein. The water service pipe shall be left exposed until the owner is shown the condition of the pipe. The Contractor shall then carefully bed and backfill the connection. The Contractor shall be fully responsible for all leaks in the existing owner service within five feet of his work connection for a period of one year and within 20 feet for a period of five days. Other leaks shall be the responsibility of the homeowner.

1-1/2-inch, 3-inch and other odd size water service taps will not be allowed. 1-1/2 inch services shall be served from the mainline by a 2-inch corporation stop and a 2-inch service line. Three-inch services shall be served from the mainline by a 4-inch flanged tee or flanged tapping saddle, a 4-inch flanged gate valve and 4-inch service line.

Polyethylene tubing shall be cut with square ends, beveled with beveling tool, and cleaned. Insert stainless steel insert without scarring or damaging tubing or insert. Hot water may be used for making tubing flexible. Tubing shall not be exposed to direct radiant heat or a flame. Make connection up tightly.

Copper and polyethylene service pipe shall be laid without kinking or buckling on short radius bends. Tubing shall be laid as a continuous piece from service saddle or corporation stop to the A.M.S. Splices shall not be allowed unless approved by the Engineer. Tubing that shows signs of damage, out of round, or laid with kinks or buckling shall be rejected.

Taps into the water main to provide for 3/4, 1, and 2 inch water services shall be made as herein specified.

1. Prior to the water main being installed in the trench, the main may be tapped using a hole saw. After the tap is completed, all debris left from making the tap must be cleaned from the pipe.
2. When tapping a new, or an existing PVC water main, the main shall be filled and brought to operating pressure, prior to tapping. A live tapping machine must be used (example: 3/4" and 1" taps, Mueller E-5 machine. 2", Mueller D-5 machine).
3. When tapping C-900 (plastic pipe) the boring tool must be a shell cutter designed specifically for tapping plastic pipe. The coupon must be retained in the shell cutter eliminating the possibility of it being left inside the water main.
4. All other main types (AC, Steel, Ductile iron, etc.) may be tapped using a drill bit made for the type of pipe being tapped.

4-3.03 MATERIALS

In addition to the materials listed, the Contractor shall provide and install miscellaneous fittings and connections as required to provide a complete replacement water service. Only listed materials are approved. All materials shall meet the approval of the City Water Dept. representative. The Contractor shall replace all corporation stops, ball angle meter valves, angle meter couplings etc. with new replacement parts. Only the meter and meter box shall be reused. All removed corporation stops, angle meter valves and copper fittings shall be delivered to the Water Department representative and shall remain the property of the City.

4-3.04 PIPE

The following pipe materials are approved for water services:

3/4 inch and 1 inch - U.S. Made Type K Soft Copper.

2 inch: Polyethylene tubing (PE) Phillips driscopipe 5100 ultra-high molecular weight, 200 psi, with copper tubing outside diameter, or approved equal. For service requirements over 1 inch, the next acceptable size is 2 inch. For service requirements over 2-inch, the next acceptable size is 4-inch. Provide reducers and fittings as required. See tapping requirements in Section 10-3.02.

4 inch and larger: Per Section 4-1.02

4-3.05 SADDLES - Ford FS202, Smith Blair 317 or Romac 202S stainless steel double strap, 3/4" & 1" have CC thread. 2" have iron pipe thread.

4-3.06 CORPORATION STOPS - CC thread, Quick Joint, 360 degree ball valve.

Ford Model:	FB1000Q - 3/4"
	FB1000Q - 1"
	FB1100 - Q: 2" male iron pipe x Quick Joint
Mueller:	3/4" and 1": Mueller 300 #110 compression connection #B25008
	2": H-15023 I.P. Thread x compression connection

4-3.07 BALL ANGLE METER VALVE - Quick Joint, 360 degree rotation with lock wings.

Ford:	BA 43-332 WRG, Full 3/4"
	BA 43-444 WRG, Full 1"
	BF A43-777W for 1-1/2" or 2" flanged meter
Mueller:	300 Ball angle meter valve
	B24258 3/4" & 1" 110 compression
	B-24276-3 for 2" meter

4-3.08 ANGLE METER COUPLINGS - Quick Joint

Ford:	L34-23Q 3/4" Meter to copper
	L34-44Q 1" Meter to copper

4-3.09 COPPER TO COPPER - Quick Joint

Ford:	C44-33Q 3/4"
	C44-44Q 1"
	For 2": Ford Brass Quick Joint with stainless steel liner
Mueller:	10 Compression Connection
	H15403 3/4" & 1"
	For 2": Mueller Brass "110 Compression Connection" with stainless steel liner

4-3.10 BRASS SERVICE TEES - 3/4" x 3/4" x 1" Quick Joint

Ford:	T444-334Q

Mueller: H15381 W/110 Conductive
Compression Connectors

4-3.11 BRASS SERVICE Y's - 3/4" x 3/4" x 1" Quick Joint
Ford: Y44-243Q
Mueller: H15343 110 Compression Connection

4-3.12 DIELECTRIC PIPE FITTINGS/UNIONS
250 psi rated Watts dielectric unions Anst B1634

Series 3003 Female iron pipe thread to female brass pipe or approved equal.

4-3.13 METER BOX
For 3/4 inch and 1 inch meters
Mid States Plastics, Inc. BCF style meter box
Series Part Number MSBCF-1324-12, or Raven Products RMB 13 x 24-12 with Poly Lid approved equal.
For 1-1/2" and 2" Meters
Raven Meter Boxes (RMB) – 17" x 30" x 18" – tops and bottoms are the same
Polyethylene RMB 17" x 30" x 12" – top and bottoms are the same
RMB 17" x 30" – R-Lid – Polyethylene (non-traffic areas)
C.I. 17" x 30" –R-Lid – Cast Iron Traffic Lid (Traffic areas)

4-3.14 MEASUREMENT AND PAYMENT
When provided for in the bid proposal, measurement and payment will be made for:

Reconnect existing water service – per each
1-inch street service assembly – per each
2-inch street service assembly – per each
¾-inch house service assembly – per each
1-inch house service assembly – per each
2-inch house service assembly – per each
Under house connection – per each
¾-inch water service line – per linear foot
1-inch water service line – per linear foot
2-inch water service line - -per linear foot
Connect to existing meter – per each
New meter box – per each
Site restoration – per each
Landscape restoration – lump sum
Missiling or tunneling – per linear foot

4-3.14.01 RECONNECT EXISTING WATER SERVICE
Where the existing water service is copper and is in good condition, the Contractor shall make the connection to the existing copper pipe and complete the connection to the new water main. The measurement and payment for "Reconnect existing water service" per each shall be full compensation for all costs for labor, equipment and materials as required to make the reconnection, including but not limited to, yard restoration, trench excavation, bedding, backfill, corporation saddle, corporation stop, copper pipe and fittings. A separate measurement and payment will be made for pavement restoration.

4-3.14.02 STREET SERVICE ASSEMBLY

The street service assembly shall include the service saddle, corporation stop, angle meter stop, electronic marker at stub locations and all adapters necessary for the installation of the new service line from the new water main in the street, to the meter location.

Payment for, "1-inch Street Service Assembly" or "2-inch Street Service Assembly", per each, shall be full compensation for all labor, equipment, materials and all incidentals required for the street service assembly as specified. A separate measurement and payment will be made for the service pipe, pavement restoration and removal and replacement of concrete sidewalk where applicable and as provided in the bid proposal.

4-3.14.03 HOUSE SERVICE ASSEMBLY

The House Service Assemblies shall include the dielectric union (UP-approved) for the new ¾-inch or 1-inch copper service connection to the existing house service, or 2-inch connection as applicable, the meter tail piece per City Standard Drawing 4-31, all pipe couplings, adapters or reducers necessary for the installation of the new service line from the meter to the house service connection, cap and abandonment of the existing service line where applicable, removal of the existing meter and reinstallation in the angle meter stop, at the new location, including vertical adjustment if required, except that if it is determined by the City Water Dept. representative, that the existing meter should be replaced, the Contractor shall remove the old meter and install the new city supplied meter when a meter box is to be relocated. Work shall also include removal and salvage of the existing meter box, or crushing of the top section of the existing substandard or damaged meter box to a minimum six inches below finished grade, backfill the old meter box and prepare the vicinity for site restoration. All salvaged meter box materials and replaced meters, shall be delivered to the city shops located at 1010 E. Chemical Drive for city salvage. Broken and unusable components shall be disposed of at a Contractor provided waste site.

At each location, the contractor shall reinstall the salvaged city standard meter box, or supply and install a complete new meter box assembly per City Standard Specification 4-3.14 and Standard Drawing 4-30 or 4-31 as applicable.

Measurement and Payment for, "3/4-inch House Service Assembly", "1-inch House Service Assembly", and 2-inch House Service Assembly", per each, shall be full compensation for all labor, equipment and materials as required for the House Service Assembly as specified. When a new meter box assembly is required, a separate measurement and payment will be made for "New Meter Box", per each, and shall be full compensation for all labor, equipment and materials as required to supply and install a new meter box assembly at each meter location. A separate measurement and payment will be made for the service line pipe per linear foot.

4-3.14.04 UNDER HOUSE CONNECTION

When the property water service is scheduled for replacement, the contractor may at his option and when approved by the homeowner, replumb the water service under the house rather than routing around the home. Code requires that all work performed in or under the house must be completed by a licensed plumber. The contractor shall obtain applicable plumbing permits from the Building Department and all work under the house will be inspected by the City Building Department.

Measurement and payment, per each, for "Under House Connection" shall be full compensation for all labor, equipment, materials and all incidentals required to obtain all applicable plumbing permits, excavate under the house foundation, and furnish and install all pipe and fittings as required to re-route the plumbing in accordance with all applicable codes. A separate measurement and payment will be made per each for "3/4-inch House Service Assembly".

When an under house connection is made, measurement for "3/4-inch Water Service Line" shall only be made from the AMS to the outside of the house foundation.

4-3.14.05 SERVICE LINE

Service pipe shall be supplied and installed per City of Benton City Standard Specification Section 4-3. The ¾-inch and 1-inch service line shall be "Type K" copper piping U.S. made. Two-inch service pipe shall be polyethylene tubing (PE) Philips Driscopipe 5100 ultra-high molecular weight, 200 psi with copper tubing outside diameter or approved equal. Fittings shall be per City of Benton City Standard Specifications Section 4-3.

Measurement and payment for "3/4-inch Water Service Line", "1-inch Water Service Line" and "2-inch Water Service Line", per linear foot, shall be full compensation for all labor, equipment, materials and all incidentals required to provide a complete service line installation, including trench excavation, bedding, backfill, compression couplings and all miscellaneous items necessary to complete the installation as shown on the plans and as directed by the Engineer. Measurement shall be the actual linear foot of water service pipe of each size used at each location.

4-3.14.06 CONNECT TO EXISTING METER

Where a new service is provided to an existing meter location, measurement and payment shall be made for " ___ inch street service assembly" per each and " ___ inch water service line" per linear foot and when applicable, "new meter box", per each. The assembly shall be installed per Standard Drawing 4-30 or 4-31, with the tailpiece set at a depth of 36-inches. After the water main is placed into service, the existing AMS shall be removed, and a new AMS shall be connected to the existing water meter. The bid item for "connect to existing meter" per each, shall be full compensation for all labor, equipment and materials as required to complete the connection to the existing water meter as specified.

4-3.14.07 NEW METER BOX

Where the existing meter box is damaged during removal, at no fault of the contractor, as determined by the Engineer, and where the existing meter box is substandard, the contractor shall install a complete new replacement meter box top and bottom section and lid.

Measurement and payment for "New Meter Box", per each shall be full compensation for all costs for labor, equipment and materials as required to supply and install a complete replacement meter box assembly.

4-3.14.08 SITE RESTORATION/LANDSCAPE RESTORATION

Measurement and payment will be made for the bid items as provided in the bid proposal. Measurement and payment for "Landscape Restoration" per lump sum, shall include all costs for labor, equipment and materials for all disturbed site restoration, unless a separate bid item is provided for "Site Restoration" per each site.

When included in the bid proposal, measurement and payment for "Site Restoration", per each site, shall include all labor, equipment and materials necessary for the restoration of all disturbed site improvements, not covered by other bid items, at the per each site price shown in the bid proposal for "Site Restoration". Each site is defined as each property address, where a new service is installed. Separate measurements and payment will be made for concrete and asphalt pavement removal and replacement and missiling when provided for in the bid proposal.

4-3.14.09 MISSILING OR TUNNELING

Measurement and payment for "Missiling or Tunneling", per linear foot, shall be full compensation for all labor, equipment and materials as required to bore under existing improvements such as asphalt or concrete pavements, walls, tree root areas, sensitive landscaping, and similar obstructions. The missiling bid item shall be in addition to the other

bid items contained in the bid proposal. For instance, 20 foot of 1-inch service missiled under a concrete slab, would be paid for as 20 LF of "1-inch Water Service", plus 20 LF for "Missiling or Tunneling". Where fences, curbs and similar narrow objects are crossed under, the minimum pay length at each location will be 5 LF, except where the contract contains a site field notes special provision, then measurement will be made as provided in the contract special provisions.

4-4 PIPE BEDDING

4-4.01 GENERAL

It is the intent of this contract to use select native material from the site for backfill around the water main pipe. When unsuitable native material exists or is encountered during trench excavation, imported bedding material may be required by the Engineer, depending on the type of pipe being installed and the type of materials encountered. Where directed by the Engineer, the Contractor shall furnish and place imported pipe bedding.

4-4.02 NATIVE BEDDING MATERIALS

Select native material used for bedding flexible and rigid pipe shall be free of wood waste, organic material and other extraneous or objectionable material and shall have a maximum dimension of one-inch (1") for all pipe materials. The trench typical section shall be per City Standard Drawing 4-7.

4-4.03 IMPORTED BEDDING MATERIALS

Imported pipe bedding for both rigid and flexible pipe shall be imported material in accordance with Section 4-4.02 above and the City of Benton City Standard Drawing 4-7. Imported bedding material will be subject to approval of the engineer.

4-4.04 COMPACTION

The bedding material shall be placed and compacted in lifts not to exceed six inches (6"). The pipe bedding shall be compacted to not less than 95 percent of maximum density. Compaction shall be done in such a manner as to preclude future settlement.

4-4.05 MEASUREMENT

Measurement for payment shall be by the linear foot for imported bedding material incorporated in the project.

4-4.06 PAYMENT

The unit contract price for "Imported Pipe Bedding," per linear foot, shall be full compensation for furnishing all labor, materials, tools, equipment, and incidentals necessary to supply, haul and place the imported bedding material in accordance with the plans and specifications or as directed by the Engineer.

Select native materials, which do not require truck haul and which are acceptable as bedding and utilized as bedding, shall be considered as incidental to the pipe installation and no additional payment will be made for its use as imported pipe bedding.

4-5 FIRE HYDRANT ASSEMBLIES

4-5.01 GENERAL

Installation of fire hydrants shall conform to the requirements of City of Benton City Standard Drawing 4-4, 4-4A and SWSS Section 7-14 as herein modified. Hydrants in all areas of the city shall be three (3) port fire hydrants, as described in Section 4-5.02 of these specifications.

4-5.02 MATERIALS

Fire hydrants shall be one of the following types: Clow Medallion, M&H Model 929, Mueller Centurion, Waterous Pacer WB-6, or Kennedy Traffic Model K-81. The fire hydrant model that is selected by the Contractor for installation will be used exclusively within the project limits unless

otherwise directed by the Engineer. The 6-inch and 12-inch flange vertical adjustment shall be manufactured specifically for the hydrant used. When not protected by a curb, hydrants shall be protected by guard posts per Standard Drawing 4-4, Sheet 2.

Fire hydrants shall be painted OSHA Safety Yellow above ground line. Hydrant paint shall be Quickset Enamel No. 3472 Hydrant Yellow as manufactured by Farwest Paint Manufacturing Company, 4522 South 133nd, Tukwila, WA 98168, or equal. The main valve opening shall be five and one-quarter inches (5-1/4") with two 2-1/2 inch hose nozzles with four (4) NST per inch and one 4-1/2 inch Steamer Port with four (4) NST per inch. The hydrant waste orifice at the base of the hydrant shall be bronze and connected to the hydrant by means of a bronze on bronze fitting to prevent rust and normal soil corrosion from plugging or interfering with its operation. Hydrants shall be of standard manufacture and of a pattern approved by the Owner. The name or mark of the manufacture, size of the valve opening, and year made shall be plainly cast in raised letters and so placed on the hydrant barrel as to be visible after the hydrant has been installed. Hydrants shall be a standard 4'-0" bury or deeper where conditions or conflicts require.

The hydrant shall be fitted with a permanent hydrant adapter, designed with metal sealing surfaces for permanent mounting. The adapter shall be a 5-inch Storz x 4-1/2-inch NH, equipped with cap and connector cable. The permanent hydrant adapter shall be Harrington, Inc., HPHA 50-45 NH or approved equal

The 6-inch and 12-inch vertical adjustment assemblies shall be complete, including the flanged riser, stem and all required components to provide a complete adjustment kit.

All associated valves, valve boxes, fittings and thrust blocks installed under the "Fire Hydrant Assembly" shall be in conformance with Section 4-8 of these specifications.

4-5.03 INSTALLATION

Fire hydrants shall be installed according to SWSS Section 7-14 as herein modified, and the City of Benton City Standard Drawing 4-4. Fire hydrants shall be located as shown on the plans. Where conflicts or conditions require deeper than standard bury, the Contractor shall provide an extra deep hydrant or add an adjustment to the standard hydrant. The following requirements shall prevail for the installation of the fire hydrant:

A. The hydrant shall be set at a standard height per Standard Drawing 4-4.
B. Hydrants are to be free of vegetation and barriers for a three-foot (3') radius circle measured from the operating nut.
C. Fire hydrants are to be hooded until operable and accepted.
D. Valves on mains to hydrants shall be bolted directly to the tee serving the hydrant.
E. Valves servicing fire hydrants on any fire line shall be installed as per City of Benton City Standard Drawing 4-4.
F. Guard post shall be installed as per Drawing 4-4 Sheet 2.
G. Salvage shall be completed per Section 1-35 of these specifications.
H. A standard bury hydrant shall be 4'-0". Where design or conditions at the time of installation requires a hydrant with a bury greater than 4'-0", the Contractor shall install a hydrant with a deeper bury when directed by the Engineer.

4-5.04 MEASUREMENT

Measurement for fire hydrant assembly shall be per each assembly. An assembly shall include: the hydrant with Storz Adapter, main line tee with flanged coupling adapters (when required), blocking for tee and hydrant, six-inch (6") gate valve and valve box, six-inch (6") connecting pipe, shackles, tie rods, pier blocks, coarse gravel, painting, and any other items that are required for the complete installation of the hydrant assembly as specified.

A separate measurement and payment will be made for “Fire Hydrant Guard Post” per each.

Where a hydrant is installed with a bury greater than 4'-0" as required per Section 4-5.03 H above, a separate measurement and payment will be made for ”Extra Depth Hydrant” per vertical foot, for the depth greater than 4’0”.

A separate measurement and payment will be made for add-on hydrant vertical adjustment assemblies, per each, only when design or grade revisions require that a hydrant, which was initially installed per Standard Specification Section 4-5.03 H is adjusted with the installation of an add-on vertical adjustment assembly.

A separate measurement will be made for “Storz Adapter” per each, only when an existing hydrant is retrofitted with a Storz Adapter. Payment shall include contractor removal and disposal of the existing nozzle chain and cap.

4-5.05 PAYMENT

The unit contract price for "Extra Depth Hydrant", per vertical foot", "6-inch or 12-inch Hydrant Vertical Adjustment Assembly," per each, "Fire Hydrant Guard Post", per each, "Fire Hydrant Assembly," per each, and Storz Adapter” per each shall be full compensation for all necessary labor, materials, tools, and equipment as required to complete the specified installation.

4-6 BLOW-OFF ASSEMBLY

4-6.01 GENERAL

This specification covers the construction and installation of a two-inch (2") blow-off assembly to allow for the controlled flushing of water from the water distribution system.

4-6.02 MATERIALS AND CONSTRUCTION

With the exception of temporary installations, all materials used shall be new and assembled in accordance to the requirements of the City of Benton City Standard Drawings 4-1, 4-2, and the following requirements:

A. Pipe shall be Polyethylene Tubing (PE) Phillips driscopipe 5100 ultra-high molecular weight, 200 psi, or equal.
B. Fittings shall be as called for on Standard Drawing 4-1.
C. Gate valve shall be flanged with a non-rising two-inch square operating nut, counter-clockwise opening, similar or equal to the M & H Style 67-02.
D. Valve boxes shall be as specified in Section 4-8.02E of the City of Benton City Standard Specifications.
E. Tapping saddle shall be a double strap saddle similar and equal to the Rockwell Model 313.

4-6.03 MEASUREMENT AND PAYMENT

The unit contract price for "Two-Inch Blow-Off Assembly", or "Temporary Two-Inch Blow-Off Assembly", per each, shall be full compensation for furnishing all labor, materials, equipment, trenching and backfill, valves, fittings, thrust blocks, adjusting the valve boxes to finished grade, all other incidentals required to install the complete blow-off assembly in place, including tapping into the water main and removal of the temporary installations.

4-7 AIR AND VACUUM RELEASE ASSEMBLY

4-7.01 GENERAL

This specification covers the construction and installation of an air and vacuum release assembly to allow for the automatic venting of air into and out of a water line during times when the line is being emptied or filled with water.

4-7.02 MATERIALS AND CONSTRUCTION

All materials used shall be new and assembled in accordance to the requirements of the City of Benton City Standard Drawing 4-8, and the following requirements:

A. Pipe shall be galvanized steel, Schedule 40, threaded by couple ends, and shall meet the requirements of ASTM designation A120.

B. Street elbows shall be standard dimension, galvanized, malleable iron, manufactured in accordance with the requirements of ASTM 197, and capable of withstanding a working pressure of 150 PSI.

C. Tapping saddle shall be a stainless steel, double strap saddle similar and equal to the Smith Blair 317.

D. Gate valve shall be flanged with non-rising two-inch (2") square operating nut, counter-clockwise opening similar and equal to the M & H Style 67-02.

E. Pipe coupling device shall be similar and equal to the Dresser Style 38.

F. Air and vacuum valve shall have a cast iron body, cover and baffle with a stainless steel float and Buna N seat. All internal parts such as float guides, bushings, and baffle retaining screws shall be either stainless steel or bronze. The valve shall be similar and equal to APCO No. 144, and shall be capable of handling operating pressures of 150 PSI.

G. Manhole ring and cover shall be in accordance with the requirements of the City of Benton City Standard Drawing 3-3 with the cover marked "Water."

H. Precast manhole section shall be in accordance with the requirements of SWSS Section 9-12.4.

I. Top slab shall be reinforced concrete in accordance with the requirements of Standard Drawing 4-8, designed for loading as specified by AASHTO for HS20 trucks.

4-7.03 MEASUREMENT AND PAYMENT

The unit contract price for "Air and Vacuum Release Assembly", per each, shall be full compensation for furnishing all labor, materials, equipment, trenching and backfill, valves, fittings, valve chamber, adjusting the valve chamber ring and cover to finished grade, and all other incidentals required to install the complete air and vacuum assembly in place, including tapping into the water main.

4-8 VALVES, VALVE BOXES AND FITTINGS

4-8.01 GENERAL

This specification covers all valves, valve boxes, and water line fittings (tees, elbows, crosses, blocks, etc.) necessary as indicated on the plan. All valves shall be bolted to tees and fittings unless otherwise specified.

4-8.02 MATERIALS

A. BUTTERFLY VALVES

Valves twelve inches (12") and larger, shall be butterfly valves.

All butterfly valves shall be Mueller Lineseal III, Class 150B, or "Pratt Groundhog", as distributed by Mueller Company, or the Mueller stamped “casting” utilizing the Pratt Groundhog valve design, or approved equal and conform to the AWWA Standard for "Rubber Seated Butterfly Valves", (AWWA C504) and at a minimum shall meet the following requirements:

1. Valves shall be Class 150-B and shall open counter-clockwise with a standard two-inch (2") square non-rising operator nut.

2. Flanged valves shall be furnished with flanges faced and drilled to 150 pound American Standard dimensions and, unless otherwise specified or shown on the drawings, may be either short-bodied or long-bodied.

3. Shaft seals shall be designed for use with standard split V type packing.
4. Valve discs shall be manufactured from material listed in 7.2 of the above referenced AWWA Standard.

Prior to the installation of all rubber-seated valves, the Contractor shall lubricate the seat with Molykote Valve Seal, Catalog No. 98750-56, as manufactured by Dow-Corning, or approved equal.

B. RESILIENT SEATED GATE VALVES

All 4-inch, 6-inch, 8-inch and 10-inch valves shall be resilient seated gate valves.

The resilient seated gate valves shall conform to the requirements of AWWA C515. The valve shall open counter-clockwise with a two-inch (2") square non-rising operator nut. The ductile iron gate valve wedge or gate member shall be fully encapsulated in synthetic rubber. All seating surfaces within the valve body shall be inclined to the vertical, the valve stem shall be sealed by a minimum of two (2) O-rings and all stem seals shall be replaceable with the valve wide open and subjected to full rated pressure.

The valve body and bonnet shall be epoxy coated inside and out.

The waterway shall be smooth and shall have no depressions or cavities in the gate seating area.

Resilient seated gate valves shall meet the above specifications and shall be Clow R/W, Waterous Series 500, Kennedy Ken-Seal, Mueller, Dresser M & H Style 3067, unless otherwise specified in the contract Special Provisions.

C. TAPPING

The Contractor shall be required to install and pressure test the resilient seated gate valves and tapping sleeves when making 4-inch to 10-inch live taps on mains. The resilient seated gate valves shall be in accordance with the requirements of Section 4-8.02B of these specifications and shall be installed in accordance with the City of Benton City Standard Drawing 4-5 and Sections 4-12, 13, and 14 of these specifications.

Following pressure testing of the sleeve and valve by the contractor, the City of Benton City Water Department will complete the tap. The City will allow the Contractor to make taps only under the Water Department's supervision. Notify the City Inspector to schedule the Water Department crews. Up to three work days notice may be required, prior to the scheduled tap date. The contractor will be required to provide safety measures per the requirements of Section 4-1.09, prior to city personnel entering the trench.

D. VALVE BOXES

Cast iron sliding type adjustable valve boxes with covers shall be provided for all buried valves. Valve boxes shall consist of top and bottom section with slide type extensions and large bottom base where specified. Drop type cover shall be marked "WATER." In unpaved areas, valve boxes shall be provided with a six-inch (6") thick concrete collar, 30 inches square at the ground surface. Valve boxes and covers shall be "Tyler No. 6855" series. The cover shall have a skirt length of 1-1/2 inches minimum, a total lid depth of 3-1/2 inches minimum, and a lid weight of minimum 13 pounds. Valve boxes shall be installed as shown on City of Benton City Standard Drawing 3-4.

E. FITTINGS

Fittings for ductile iron and PVC pipe shall be cast or ductile iron. Cast iron fittings shall conform to the quality and wall thickness specified in the American Standard for "Gray Iron and Ductile Iron Fittings, 3-inch through 48-inch for Water and Other Liquid" (AWWA C110), for "Fluid-Tite" joints specified in Section 1. All cast iron fittings, twelve inches (12") in diameter or larger, shall

be lined with cement mortar in accordance with the requirements of the American Standard for "Cement Mortar Lining for Cast Iron and Ductile Iron Pipe and Fittings for Water" (AWWA C104).

Ductile iron fittings shall be compact or standard bell and spigot, mechanical joint, or flanged as required on the plans. Standard fittings shall be in accordance with AWWA C110,"Gray Iron and Ductile Iron Fittings, 3-inch through 48-inch for Water and Other Liquids." Ductile iron compact fittings may be used in sizes through 12-inches. The fittings shall conform to all requirements of AWWA Standard C153 for ductile iron compact fittings 3-inch through 12-inch. The bell and spigot joints shall be rubber gasket sealed joints in accordance with AWWA C111. Ductile iron fittings, twelve inches (12") inside diameter or greater, shall be mortar lined in accordance with AWWA C104.

Cut-in tees and live tap tapping sleeves shall be in accordance with the requirements of the City of Benton City Standard Drawing 4-5 unless otherwise directed by the Engineer.

All fittings and valves shall be restrained by a thrust block, or restrained joints, in conformance with Sections F and G.

F. THRUST BLOCKING

Concrete blocking shall be installed in accordance with City of Benton City Standard Drawing, 4-6 Sheet 1 and shall bear against solid undisturbed earth at the sides and bottom of the trench excavation and shall be shaped so as not to obstruct access to the joints of pipe or fitting. An 8-mil polyethylene sheet, or two layers of 4 mil, shall be placed between the fitting and the thrust block prior to loading or pressurizing a water main. The concrete thrust blocking shall be allowed to cure as required to eliminate deformation of the block or blowoff of the fitting.

Unless the contract special provisions, or drawings designate the type of fitting restraint, the contractor may at his option, utilize restraint joints when the conditions of Section 4-8.02 G and Standard Drawing 4-6, Sheet 2 are met.

Unless the restrained joint requirements are met, including restrained joints within the lengths specified in Standard Drawing 4-6, Sheet 2, a thrust block shall be used. Thrust blocks are required if AC pipe exists anywhere within the required restrained joint limits and at all locations where connections are made to AC pipe. Due to the intermix of the various types of pipe throughout the City when a fitting, tee or tap is installed on an existing water main, a thrust block is required at the fitting, tee, or tap connection to the existing main. Thrust blocks are required for all installations where the pipe run length does not allow for the designated restraint length. Special notice and review should be made when restrained joints are considered for use on fire hydrant run installations. Hydrant pipe runs shorter than the designated “dead end valve” restraint length, required by Standard Drawing 4-6, Sheet 2, require a thrust block at the Fire hydrant and at the connection tee.

G. RESTRAINED JOINTS

Unless otherwise required by the contract special provision, or standard drawings and as restricted by these provisions, when the conditions of this section and Standard Drawing 4-6, Sheet 2 are met, the contractor may utilize restrained joints in lieu of thrust blocks on the water system fittings, valves and fire hydrants. The conditions and restrictions of Section 4-8.02 F shall apply. When connecting a tee, or fitting to an existing AC water main, or if AC pipe exists anywhere within the required restrained joint limits, standard thrust blocks are required. When a fitting, tee, or tap is installed on an existing water main, a thrust block is required at the tee, fitting, or tap. Hydrant connection pipe lengths shorter than the designated “dead end valve” restraint length that is required by Standard Drawing 4-6, Sheet 2, will require a thrust block at the tee and at the hydrant for the installation.

Approved methods of restrained pipe joints and fittings shall be:

a. For C-900 PVC pipe, Series 2000 Megalug restraints, or equal and for slip joint pipe, series 1500 Bell restraint Harness, or equal. Restraints shall be specifically designed and approved for use on C-900 PVC pipe and shall be installed in full conformance with the manufacturers requirements.

b. For Ductile iron pipe, Series 1100 Megalug restraints, or equal, on mechanical joint connections, or Series 1500 restraint harness for DIP, through 12 inch, or series 1700 restraint harness for DIP, or equals, on push joint pipe. Restraints shall be specifically designed for use on DIP and shall be installed in full conformance with the manufacturer's requirements.

Unless specifically provided for in the contract bid proposal, all costs for the use of restrained joints, including restraints required to restrain all slip and mechanical pipe joints within the restrained pipe limits, shall be incorporated into the unit contract price for the pipe and fittings, as provided for in the bid proposal and a separate measurement and payment will not be made for the mechanical restraints.

4-8.03 INSTALLATION

Installation of valves, boxes, and fittings shall be in accordance with City Standard Drawings 4–5 through 4–9 and SWSS Section 7-09 except as herein modified.

A. All valves are to be bolted directly to the tees or crosses as indicated in the plan. The flanges on valves and tee (or crosses) shall be plain faced. Flanges shall be faced and drilled to 150 pound American Standard dimensions.

B. All other connections between pipe and fittings, or pipe and valve shall be flexible coupling, "Ring-Tite," "Fluid-Tite," or approved equal, except as noted on City of Benton City Standard Drawing 4-5 for installation of a cut-in tee where flanged coupling adapters shall be used to connect the tee to the existing main. The provisions of Section 4-8.02 F and G will apply.

C. Valve extensions are required per City Standard Drawing 4-9, when the depth to the valve nut exceeds five (5) feet.

4-8.04 MEASUREMENT

Valves and associated valve boxes, including their adjustment to finished grade, shall be considered as one item and shall be measured per each according to size of valve. All fittings shall be measured per each according to size and type. All valves, thrust blocks and fittings which are included in the unit items for "Fire Hydrant Assembly," "Blow-off Assembly," etc., shall be measured and paid as incidental to those unit items and no additional payment will be made for them. Valve extensions, when required, will be measured per each.

4-8.05 PAYMENT

The unit contract price for each size of "Valve", per each, and each type and size of "Fitting" or "Valve Extension", per each, shall be full compensation for furnishing all necessary labor, equipment, materials, concrete thrust blocks, or restrained joints and all other incidentals required to install all valves and fittings in place in accordance with the plans and specifications or as directed by the Engineer.

When constructed in conjunction with a paving project, a separate measurement and payment will be made for adjusting to grade, after completion of paving, as per Section 4-10.

4-9 TRANSMISSION LINE BLOW-OFF ASSEMBLY

4-9.01 GENERAL

This specification covers the construction and installation of a transmission line blow-off assembly to allow for the manual release of sediments from a water transmission line.

4-9.02 MATERIALS AND CONSTRUCTION

All materials used shall be new and assembled in accordance with the requirements of the City of Benton City Standard Drawing 4-3.

A. The exact location of the assembly shall be field located as necessary to assure that the assembly is placed at the low point of the water line being installed.

B. Pipe shall be ductile iron as specified in Section 4-1.02.

C. Valves, valve boxes, and fittings shall be in accordance with Section 4-8.

4-9.03 MEASUREMENT AND PAYMENT

The unit contract price for "Transmission Line Blow-Off Assembly", per each, shall be full compensation for furnishing all labor, materials, equipment, trenching and backfill, valves, fittings, and all other incidentals required to install the transmission line blow-off assembly complete and in place, including the flanged outlet tee connection to the transmission line and adjusting the cast iron casing to the finished grade in accordance with the plans and specifications, or as directed by the Engineer.

4-10 ADJUST EXISTING AND NEW CASTING TO GRADE

4-10.01 GENERAL

When constructed in conjunction with a street construction project or pavement overlay, existing and new water valve boxes, air release and blow-off assembly castings, which are required to be adjusted to finished grade, shall be adjusted in accordance with the requirements of Section 2-18 of the City of Benton City Standard Specifications for Roadway and Standard Drawing 3-4 to which the Contractor's attention is hereby directed.

On water line projects which do not include new street construction or pavement overlays, the existing and new valve boxes and utility boxes within the pavement restoration limits shall be adjusted prior to pavement restoration. Where the new water valve boxes fall outside of the pavement restoration limits and in unpaved areas, the box shall be adjusted to conform to the adjoining grade and set in a 30" x 30" x 8"-thick concrete collar.

4-10.02 MEASUREMENT AND PAYMENT

When constructed in conjunction with a street construction of pavement or overlay project, measurement and payment shall be made in accordance with the requirements of Section 2-18 of the City of Benton City Standard Specifications.

On installations which do not include new street construction or pavement overlays, a separate measurement and payment will not be made for the specified water valve box and utility adjustments, unless the Contractor is directed to replace an existing substandard valve box. All costs for the specified adjustments shall be considered incidental to the water line installation pay items provided in the bid proposal. When the Contractor is directed to replace an existing substandard valve box, measurement and payment will be made as specified in Section 2-19.03 of these specifications.

4-11 SALVAGE

4-11.01 GENERAL

All existing tees, valves and miscellaneous fittings removed during construction and all abandoned valve boxes and fire hydrants, shall be removed by the Contractor and delivered to the city shops located at 1010 E. Chemical Drive, for City salvage. Prior to removal from the trench, all AC pipe shall be removed from the salvaged component and left in the trench.

4-11.02 MEASUREMENT AND PAYMENT

Salvage of existing water line appurtenances shall be considered incidental to the unit contract price for "Water Line" and no additional compensation shall be allowed.

4-12 SCHEDULED WATER LINE SHUT DOWN

4-12.01 GENERAL

The Contractor shall give the City a minimum three (3) work days notice of required water line shut down. Additional notice may be required for shut downs which will put a large number of residents out of service and in some commercial areas. Water line shut downs shall be scheduled for morning hours, except for special circumstances which must be preapproved by the Utility Supervisor and except for emergencies. The City Inspector shall verify that all required fittings necessary for connection are secured and on the job site prior to scheduling shut downs. The Contractor shall be billed for canceled shut downs, unless circumstances beyond the Contractor's control (as determined by the Engineer), have caused the Contractor to cancel the shutdown.

4-13 VALVE OPEN/CLOSE POLICY

4-13.01 GENERAL

Once a water main has been placed into service, only the City of Benton City Water Department shall open/close the water line valves, except that the Contractor may open/close a valve that controls a water main stub, which will be extended by the Contractor, provided that no water services are connected to the stub.

4-13.02 VALVE OPEN CLOSE PROCEDURE

The Contractor shall operate valves in strict conformance with this policy. A no-tolerance position will be taken if any valve is operated without an inspector on site and prior to specific approval and direction by the City Inspector. Nonconformance with this provision shall be considered as tampering and subject to enforcement in accordance with City ordinance (BCMC 13A.08.010).

4-13.02.01 FILLING NEW WATER MAIN

1. The City inspector must be on site prior to beginning of line filling. The Contractor's proposed procedure must be reviewed and approved by the inspector, prior to operation of any valves.
2. The Contractor shall check all valves on the new system, to verify that they are open, including in line valves, fire hydrant valves, etc.
3. Open fire hydrant or blow off at the opposite end of the new main to be loaded and have personnel stand by at the air release location.
4. The Contractor shall then open the supply valve no more than three (3) turns and monitor while the line is filled. The line must be loaded slow to prevent flushing of chlorine to one end, to allow release of air and to prevent high velocities in the City main.
5. The Contractor shall close the main line feeder valve as soon as water begins to come out of the blowoff or fire hydrant.
6. The Contractor shall then cap the blow off or fire hydrant and let the system sit for a <u>minimum</u> of 24 hours.

4-13.02.02 PRESSURIZING MAIN PRIOR TO PRESSURE TEST

At the Contractor's option, the new main may be brought to City line pressure, prior to beginning pressure testing as required by Section 4-1.08.

1. The procedure specified for Section 4-13.02.01 shall be strictly followed, except that the blow off or fire hydrant shall be opened only enough to allow the release of air and the main line valve shall be opened approximately one turn and closed as soon as water quits flowing.

4-13.02.03 FLUSHING OF NEW MAINS

After acceptance of the pressure test(s), and after a minimum 24-hour waiting period, all new water mains shall be flushed until clear of the sanitized chlorine, water per the requirements of Section 4-1.07 of these specifications.

1. The City inspector must be on site prior to beginning of flushing of new mains. The Contractor's proposed procedure must be reviewed and approved by the inspector, prior to operation of any valves.
2. The Contractor shall provide all discharge hoses, holding ponds, channel to his ditches for compaction, or other methods as required to control flushed water. The Contractor shall be fully responsible for any damages resulting from failure to control water during the flushing operation.
3. The Contractor shall open a fire hydrant or blow off at the end of the line to be flushed and then slowly open the control valve to provide a full 2 inch stream. The line shall be flushed until no odor of chlorine is present. The Contractor shall then test the chlorine level to assure that the chlorine residual is not more than the adjoining City water system.
4. When satisfied that the line is flushed, the main line valve shall be slowly closed and then the fire hydrant or blow off valve shall be slowly closed.
5. The contractor shall take health samples per the procedure specified in Section 4-22 of these specifications.

Sample location points shall be provided by the contractor at the specified 500 to 800 foot interval.

4-14 TIE-INS TO EXISTING WATER LINES

4-14.01 GENERAL

Tie-in to the existing water lines and the installation of the required fittings and water line shall be under the direct supervision of the Water Department and the Engineer. Extreme care shall be taken by the Contractor to keep the existing water lines and new fittings and water line clean and free from contaminates. The inside surfaces of the valve, pipe and fittings shall be thoroughly swabbed with, or filled with, a 75-parts per million chlorine solution 24 hours prior to the installation of all fittings. The fittings and water line shall be kept in a clean environment and delivered to the site within a protective covering. If a shutdown has been scheduled and the Contractor has not chlorinated and bagged valves and fittings 24 hours prior to the shut down, the Inspector will notify the City Water Department and City crews will chlorinate and bag the fittings and valves and bill the Contractor. The fittings and water line shall be swabbed again with the 75-parts per million chlorine solution just prior to their installation.

4-14.02 MEASUREMENT AND PAYMENT

All necessary labor, tools, dewatering, chlorine swabbing and incidentals as required to cut into existing water mains or remove existing fittings and valves as called for on the plans, shall be considered incidental to the unit contract price for water line, per linear foot, or fittings as allowed in the bid proposal.

4-15 COUPLINGS AND FLANGE COUPLING ADAPTERS

4-15.01 GENERAL

Couplings and flange coupling adapters shall be manufactured from cast iron and rated at a minimum 150 PSI. The minimum middle ring length shall be five (5) inches.

Bolts shall be galvanized steel or cast-iron protected.

4-16 DIG AND VERIFY

4-16.01 GENERAL

At the connection with existing water lines where shown and directed on the plans and as otherwise directed by the Engineer, the Contractor shall expose and verify the exact pipe location, type, size and fittings required prior to ordering the fittings. The Contractor is advised that all existing water

mains have thrust blocks typically located as shown on Standard Drawing 4-6. These thrust blocks have been found to be constructed of rocks, blocks, concrete or other materials. The Contractor shall stay an adequate distance away from all thrust blocks and shall take such precautions as required to not disturb the existing block(s). After digging and verifying, the Contractor shall backfill, compact and temporarily cold patch the surfacing where applicable. Work and materials shall be in accordance with Section 2 and Section 7 of the City of Benton City Standard Specifications.

4-17 ADDITIONAL/ALTERNATE FITTINGS

4-17.01 GENERAL

Where a standard or specified fitting cannot be obtained or is not readily available, and the Contractor is required to add an MJ adapter or reducer to the fitting, the MJ adapter or reducer shall be separately paid for under the bid items for "Flange Coupling Adapter" or " __x __ reducer" per each. The reducer or adapter shall be flange connected to the tee or fitting as applicable.

Bends where noted on the plan sheet are indicated to the degree of bend that appears to fit best. The Contractor shall have the same diameter bends of various degrees available for installation. If actual field conditions dictate that a degree of bend other than the one noted should be installed, the Contractor shall install the required fitting. Measurement and payment for "**-inch Bend", per each, shall be full compensation for the actual degree of bend installed as specified.

If fittings specified for an installation are not readily available, and involve revisions other than the addition of an MJ adapter, the Contractor may, when approved by the Engineer, install alternate fittings that complete the installation in the same manner. Alternate fittings, if used, will be measured and paid for by the unit bid price for the fittings that were specified for the installation.

All flanged fittings shall be cast with the fitting. Bolt on or threaded type flanges are not acceptable.

4-17.02 TEMPORARY AND MECHANICAL FITTING RESTRAINT

At all connections to active city main water lines and in other situations where the engineer determines that pressure must be returned to a mechanical joint or slip joint fitting, prior to a 24 hour cure time on a thrust block, the contractor may, at his option, install pipe and fitting restraints in accordance with Section 4-8.02 G and Standard Drawing 4-6, Sheet 2.

A thrust block shall be used in addition to the restrained joints for all fittings, directly connected to an existing water main.

4-18 PRESSURE CAPS

4-18.01 GENERAL

Where specified on the construction plans or where directed by the Engineer as required by construction, the Contractor shall pressure cap, thrust block or restrain the end of the existing or new water line. All work and materials shall be in accordance with Section 4 of the City of Benton City Standard Specifications and Drawings.

4-18.02 MEASUREMENT AND PAYMENT

The unit contract price for "1-Inch to 4-Inch Pressure Cap", or "6-Inch to 8-Inch Pressure Cap", or "10-Inch to 16-Inch Pressure Cap", per each, shall be full compensation for all labor, equipment, materials and incidentals necessary to complete the pressure cap in accordance with the plans and specifications or as directed by the Engineer.

4-19 SIDE SEWER LOCATION AND REPAIR

4-19.01 GENERAL

Although every effort has been made to show potential conflict with sewer services, the exact depth and location of sewer services are not known. The Contractor shall make every effort to prevent

damage to sewer services. The services in the City of Benton City are owned and maintained by the property owner and they will not be located by the City by a standard call for utility locates.

Prior to excavating in the vicinity of homes connected to existing sewer systems on all projects under contract to the City, the Contractor shall locate the sewer service. Location shall be made by inserting a locatable cable or signal transmitting cable into the sewer service either at a clean out or point of entry in the home. The Contractor is fully responsible for contacting the owner and making arrangements as necessary to complete the service locate. After the service is located, the Contractor shall reference the location as required to allow relocation of the service during all phased excavation work. On all private contracts the Contractor may locate each sewer service at his option; however, damaged services shall be repaired by the Contractor in all cases, at no additional cost to the City.

When sewer services are inadvertently broken or damaged, the Contractor shall repair the side sewer by installing a section of Schedule 40 ABS sewer pipe. The repair section of pipe shall be placed a minimum of one foot into the trench walls to provide a solid foundation for the crossing of the new trench. The pipe ends shall be connected using repair clamps. Repair clamps shall be a flexible coupling with stainless steel clamps and shall be Fernco flexible couplings or equal. The area under the side service connection shall be bedded with compacted 5/8-inch minus top course rock. When directed by the Engineer or where rocky soils, unstable soils, or other conditions exist, where it may be difficult to detect a damaged side service, water shall be run from the home toilet or other source, to insure that all of the side services are undamaged, prior to beginning backfill operations.

4-19.02 MEASUREMENT AND PAYMENT

When provided for in the bid proposal, a separate measurement and payment will be made for "side sewer locates" per each at the unit price as provided in the bid proposal. If the Contractor determines that actual unit cost for locates is greater than that provided, all additional costs for labor, equipment and materials as required to complete the locates, which exceeds the allowable unit price shall be incorporated into other bid items as provided in the bid proposal. If a separate bid item is not provided, the Contractor shall incorporate all costs for the required side sewer locates into the bid items provided.

If the Contractor damages sewer services during construction, no additional compensation will be made for damages resulting from the service damage or for the cost of labor, equipment and materials as required to complete the sewer service repair as specified.

4-20 ABANDONED CONDUITS

All pipes, conduits and other openings determined to be abandoned, which are cut or opened during the water line installation, shall be capped or concrete plugged prior to backfilling of the trench. Measurement and payment for required pipe cuts, labor, equipment, work and materials required to complete the specified plug shall be incidental to the pipe installation pay items.

4-21 ABANDONED FIRE HYDRANT REMOVAL

All fire hydrants connected to water mains scheduled for abandonment shall be removed by the Contractor and delivered to the City storage yard for City salvage. Fire hydrants shall be removed intact, including the shoe and all AC pipe shall be removed and left in the trench. When a fire hydrant is abandoned and the water main will remain in service, the valve shall be removed at the main line and a blind flange installed. Unless provided for in the special provisions, a separate measurement and payment will not be made for fire hydrant removal and all costs for removal and delivery shall be incidental to other bid items provided for in the bid proposal.

4-22 BACTERIA SAMPLING PROCEDURE POLICY

(Note: Effective on all contracts and permits issued after July 1, 1995) The following is the policy for bacterial sampling of new water mains by contractors. Samples shall be taken by the contractor at 500 to 800 foot intervals. One sample will be required for lines less than 500 feet and will be taken at the end of the new line. A city inspector is required to be on site prior to the contractor operating any valves and to witness the test.

1. Prior to sampling the following shall be completed in the order they appear.
   A. New water main loaded
   B. Water main shall sit with appropriate chlorine solution for a period of not less than 24 hours.
   C. Pressure test completed.
   D. New water main flushed until chlorine level is equal to the existing water main feeding new line.
2. Run water for a short period. Reduce flow to a small stream.
3. Test chlorine level with a DPD test kit and record residual on bacteria sample report form. Test kits must be capable of measuring chlorine residuals in minimum 0.1 increments from 0 to 2.0.
4. Turn off water flow and sterilize area where sample is being taken with heat or disinfectant spray similar or equal to BacDown Detergent Disinfectant.
5. Turn on water for one minute, slowly reducing water flow as time progresses.
6. Remove the sample container's top very carefully.
   A. Do not touch underside of cap with fingers or wave cap in the air.
   B. Do not rinse bottle out and refill, it contains thiosulphate (a dechlorination agent) that must be present.
   C. Do not overfill bottle (the bottle neck is sufficient).
   D. Put cap back on bottle very carefully to avoid any possible contamination.
   E. Label the sample with the project name & location sample was taken.
   F. The cap shall be sealed by the City Inspector immediately after sample is taken.
7. Turn off the sample water flow.
8. Shut off main valve feeding new water main. The new main shall be left off until bacteria sample results have been reported by the Health Department to Utility Supervisor or Water Dept. Crewleader.
9. The Contractor should deliver the sample to the Health Department at 506 McKenzie Street, Richland, WA 99352.
10. Complete filling out paper work for sample. The following information will be needed.
    A. Type of system: Public
    B. System ID# 05800B
    C. Circle Group "A"
    D. Name of system: City of Benton City
    E. Record specific location:
    F. Telephone Number: (509) 588-3322
    G. System owner/Manager: Public Works Director
    H. Send report to: City of Benton City, P.O. Box 70, Benton City, WA 99320
    I. Type of sample: Mark "New construction"
    J. Check box "Chlorinated" and record residual

4-23 HYDRANT METER – WATER SUPPLY

4-23.01 GENERAL

The City of Benton City makes available the use of temporary fire hydrant meters for the contractor's use of city water during construction activities. This standard specification contains the terms and conditions for obtaining a hydrant meter and using city water on permit projects.

Water for city construction contracts is not provided through this procedure. Water for city-administered construction contracts is obtained at no cost to the contractor, by contacting City Hall.

4.23.02 TEMPORARY FIRE HYDRANT METER AND WATER USE COSTS

On all permit contracts, the contractor or owner is required to place a deposit, pay a service charge and pay for all water usage according to the Benton City Fee Schedule.

4.23.03 USE REQUIREMENTS AND RESTRICTIONS

To obtain a fire hydrant meter – contact City Hall at 588-3322. You will need to provide a complete application, including: a deposit, the permit fee, contact person and phone number, location where the meter will be installed and refund information (address and phone number).

1. Fire hydrant meter readings - fire hydrant meters will be returned between 7;30am and 4pm hours, Monday through Friday (except holidays) at Benton City Hall, 708 9th Street within 3 months of issue date for a reading
2. When finished with the fire hydrant meter –Fire hydrant meters are to be returned immediately following the last day of use. The fire hydrant meter shall be returned to City Hall at 708 9th Street. All final charges for water usage and any meter damage* will be deducted from the deposit amount and the balance refunded to the customer. If charges exceed the amount deposited, the customer will be billed for the remaining balance.
3. Illegal water usage – Fire hydrant meter users caught taking water from fire hydrant, curb stops or other water valves without proper authorization or metering are subject to an administrative fine from the city of $500.00. Full payment shall be made before the city will provide authorized water service under any circumstances.
4. Responsibility of fire hydrant meter customer - Each customer shall protect the fire hydrant meter from damage due to freezing conditions, negligence or abuse. Any damage, other than from normal usage, shall be billed to the customer*. All meters are not transferable and shall be returned when use ends.
5. Installation and Location of Fire Hydrant Meter: - When issued a fire hydrant meter from the City of Benton City, the contractor shall be responsible for installing, locking and relocating the city issued fire hydrant meter and opening/closing the fire hydrant.

   DO NOT operate the fire hydrant with the top control nut, unless cold/freezing conditions apply (see No. 7). Use the hydrant gate valve to control the volume of water.
6. Cold/Freezing Weather Conditions - When the fire hydrant is open and the meter valve is closed, the fire hydrant base is constantly filled with water. In freezing weather, this could damage the fire hydrant and the meter. It is the responsibility of the contractor to close the fire hydrant and open the gate valve to drain the water from the meter when it is not being used. A fire hydrant wrench is the only acceptable tool to operate a fire hydrant.
7. Fire Hydrant/Meter Damage - The contractor will be responsible for any damage to the fire hydrant and/or meter due to circumstances beyond normal wear. A few examples are, but not limited to, breaking the fire hydrant stem by using too much torque, not using a fire hydrant wrench, damage to weep holes, cutting the lock on the meter, breaking any part of meter, etc.