

**SKAMANIA COUNTY PUD NO. 1**

**WATER SYSTEM**

**SERVICE POLICIES AND DESIGN STANDARDS**

**OCTOBER 2004**

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**SKAMANIA COUNTY PUD**  
**WATER SYSTEM**  
**SERVICE POLICIES AND DESIGN STANDARDS**

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**POLICY ON EXTENSIONS OF THE  
WATER SYSTEM AND SERVICE**

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**DEVELOPER EXTENSION AGREEMENTS**

- A. When extension of the existing water system is required for service, the developer shall submit a Request For Utility Service to the PUD. PUD shall complete the document and resubmit it to the developer for signature. The developer shall then sign the document and return the original to PUD. Once finally signed by PUD, the document will become the Extension Agreement.
- B. Upon completion of the design and approval by PUD, a pre-construction letter of requirements will be sent to the owner noting requirements to be completed prior to construction. Upon completion of the pre-construction requirements and 48-hours notice, a pre-construction meeting will be held with the PUD at which time construction inspection will be scheduled. No water main construction work shall commence prior to the pre-construction meeting. After completion of construction and submittal of required documents and fees, final acceptance will be given by the PUD at which time service will be available by application following payment of fees for water meters.
- C. The owner is required to provide a surety bond for the project for a period of one (1) year after acceptance.
- D. Easements for a mainline water system shall be a minimum of fifteen (15') feet wide. The easement shall be prepared by a surveyor or engineer licensed to practice in the State of Washington. The easement shall be reviewed and approved by PUD prior to acceptance.
- E. Developer Extension projects shall be deeded to PUD for maintenance and operation by letter after the system has been found to meet PUD standards.

**GENERAL DESIGN CONSIDERATIONS**

- A. In all residential and commercial developments water main extensions are required to assure orderly development of the water utility system. All proposed water main extensions must comply with PUD's requirements for development, water quality and pressure zones, and fire protection requirements of PUD.
- B. Design and construction of water mains, including but not limited to mainlines, valving, fire hydrants, fire sprinkler connections with backflow devices, domestic and irrigation services, pump stations, pressure reducing stations, telemetry and other appurtenances shall be in compliance with the Request for Utility Service Form, PUD ordinances, special requirements of the PUD, these standards, and the most recent version of the *Standard Specifications for Road, Bridge, and Municipal Construction (Standard Specifications)* as produced by the Washington State Department of Transportation.

- C. The applicant is responsible for designing the Developer Extension Water system(s). The system(s) must be designed by a licensed engineer and approved by PUD.
- D. Water mains shall be extended through and to the extremes of the property being developed for gridding or future development as determined by PUD.

### **SIZING AND PRESSURE REQUIREMENTS**

- A. In areas where gridding or fire flow is a requirement, 8-inch diameter pipe will normally be required. A 6-inch diameter pipe may be substituted if PUD has determined that an adequate fire flow can be provided. Nothing shall preclude PUD from requiring the installation of a larger sized main if PUD determines a larger size is needed to meet fire protection requirements or for future service. The developer shall be required to pay the cost of all oversizing. Reimbursement for oversizing will be in accordance with the PUD ordinance.
- B. In areas where gridding or fire flow is not required, the mainline shall be sized to meet required domestic flow.
- C. Minimum size mains shall be 6-inch, except that 4-inch may be permitted on runs less than 300 feet, when there will not be more than eight one inch services, where no fire hydrants are required, and when there is no possibility of future extensions.
- D. Dead end mains normally shall not be allowed. When they are permitted, a blow off assembly will be required. In the event that the “dead end” finishes where there is risk of a vacuum being created due to water shut down, then a Combination Air and Vacuum Release Valve shall be installed in accordance with the Standard Drawings.
- E. All water system installation shall be designed to provide a pressure range at the residence of 30 psi to 90 psi at all times, including during peak demand, unless specifically approved.
- F. Main line pressure reducing devices are to be approved on a per project basis to ensure compliance with the Uniform Plumbing Specialty Code. Vaults for pressure reducing devices shall be in accordance with these standards. Pressure reducing valves may be required at the discretion of PUD on individual services. Such valves will be installed after the meter and will be the responsibility of the home owner to install and maintain.
- G. Water service size shall be evaluated by the developer’s engineer and shall be of sufficient size that the requirements of the section shall be met. Booster pumps shall not be allowed on meter service lines in order to meet this requirement. The meter size shall be no smaller than 3/4-inch unless approved by the Director.
- H. Where requested by the Director, the developer’s engineer shall provide a “pressure available” chart on the water system plan sheet of the construction plans. This sheet shall indicate the calculated pressures theoretically available to each lot during static and peak

demand periods. In such cases it shall be the developer's engineer's responsibility to determine pressures based upon an analysis of the system. All work associated with the analysis shall be paid for by the developer.

### **SHUT-OFF VALVES**

- A. Valves shall be located, whenever possible, at intersections (one valve per each line radiating from the intersection). In general, sufficient valves should be provided to permit shutting down any section of the line, not exceeding 500 feet, with valve operations in not more than three locations.
- B. Valves shall be installed in clusters at pipeline intersections.
- C. Valves 8-inches and smaller shall be resilient seat gate valves.
- D. Valves 10-inches and greater shall be butterfly valves.

### **AIR-RELEASE VALVES**

At high points in the water system, combination air and vacuum release valves (CARV) shall be installed as required by the Director. All Air-Vac, Air Evacuation, and Vacuum Prevention Valves of sizes 2-inches and larger shall vent to the outside of the vault. If construction of the valve does not permit the venting of leakage to the outside of the vault, a screened drain to daylight of at least the supply line size must be provided at a level that will prevent cross connection and/or backflow problems. This decision will be made by the Engineer prior to the plan approval.

### **HYDRANTS**

- A. The number and locations of fire hydrants, fire flow requirements and fire sprinkler components will be determined by Skamania County.
- B. Fire hydrants shall not be connected to mains less than 8-inches, or 6-inches in diameter where the length of 6-inch main is less than 200 feet. As per the UFC, fire hydrants shall be located to allow a 5-foot clear space surrounding the hydrant. For example, street lights, sign posts, protective posts, or retaining walls shall be no closer than 5-feet from the nearest portion of a hydrant. There shall also be no obstructions directly in line with any of the ports of the hydrant.

### **WATER METERS**

- A. Water meters sized three-quarter inch (3/4") or one-inch (1") shall be furnished and set by PUD. The owner is required to make application and pay meter fees prior to the acceptance of the project. PUD will install meters and lock off meter setters and turn on as requested by the owner after acceptance by PUD. Water meters will be set only after box and setter are at proper finished grade.

## ***Policy on Extensions of the Water System and Service***

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- B. Meters one and one-half inch (1-1/2") and larger will be installed by the owner as part of the construction project and will be locked off by PUD. The one and one-half (1-1/2") inch and larger meters will be turned on by PUD by request from the owner after acceptance by PUD.
- C. In plat and short plats, water meter applications will be processed for meter sets and water turned on after acceptance of the water mainline facility by PUD.
- D. All irrigation systems require the installation of state certified backflow devices. All irrigation meters will be set and turned on after acceptance of the water system by PUD. PUD will not accept a water system until all the requirements of the Extension Agreement have been completed and all the fees have been paid.
- E. Adjustments, repairs or replacement of the service line, meter box or setter shall be the responsibility of the property owner.
- F. Any water service modifications requested by a property owner by application shall be billed by PUD on a time and material basis.
- G. Water services are to be single runs from the main line to each meter.

### **FEES AND CHARGES**

All fees and charges related to development shall be in accordance with the latest requirements of the PUD.

### **CROSS CONNECTION CONTROL**

- A. All water system connections to serve buildings or properties with domestic potable water, fire sprinkler systems, or irrigation systems shall comply with the minimum backflow requirements as established by the Department of Health (DOH) and PUD.
- B. The installation of all backflow devices shall be required to protect the existing water system and users from possible contamination. These backflow devices shall be installed in accordance with the requirements of the "Accepted Procedure and Practice in Cross Connection Control" manual, the Uniform Plumbing Code and the Codes.

## **CONTRACT FOR REIMBURSEMENT (LATECOMER AGREEMENTS)**

PUD does not have a policy for reimbursement for utility extensions. Should the developer deem that the utility extension is an undue hardship and will significantly benefit other property owners, the developer may request a latecomer agreement.

## **WATER QUALITY**

The quality, taste and odor of water drawn from new construction water mains shall be the same as the water in the existing facility classed as acceptable for use by PUD. Should the water not be acceptable for use because of taste, required steps as approved by PUD shall be accomplished to attain water quality acceptable for use.



## DESIGN STANDARDS

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All extensions to the water system shall conform to the most recent edition of the design standards of PUD and *Standard Specifications*. The system shall be capable of future expansion and be constructed of permanent materials.

### PLANS AND SPECIFICATIONS

The installation of water extensions shall be in accordance with construction plans and specifications prepared by the developer's engineer and reviewed and approved by PUD. All work and materials shall be in accordance with this document and the *Standard Specifications*. Where conflicts exist the more stringent specification shall apply as approved by PUD.

### CONNECTIONS TO EXISTING PIPELINES

- A. Connections may be made to existing pipes under pressure with a tapping machine by determining the size and type of pipe and installing tapping sleeve to fit complete with tapping gate valve. Where cut-ins are permitted to be made in existing pipes, the work shall be conducted at such a time and in such a manner as to minimize the interruption of service. Cut-in time must be approved by PUD. Necessary pipe, fittings and gate valves shall be assembled at the site ready for installation prior to the shutting-off of water in the existing main. Once the water has been shut off, the work shall be performed vigorously and shall not be halted until the line is restored to service. Operation of all water main line valves shall be by PUD. PUD shall witness all wet taps and cut-in connections and requires forty-eight (48) hours notice an approval by PUD.
- B. The Contractor shall have the responsibility of giving at least a forty-eight (48) hour notice to PUD and affected customers of intention to disrupt service.
- C. Pipes to be abandoned shall be capped with mechanical couplings.

### ROADWAY CROSSING

The owner shall use the method which has been designed on the plans and is acceptable to PUD and the government or private agency having control of the road. Permits are required and shall be obtained prior to construction approval.

## **TRENCH EXCAVATION**

- A. Clearing and grubbing where required shall be performed within the easement or public right-of-way and as permitted by the property owner and/or governing agencies. Debris resulting from the clearing and grubbing shall be disposed of by the developer.
- B. Trenching for water mains shall be completed in accordance with Section 7-10 of the *Standard Specifications*.
- C. Trenching and shoring operations shall not proceed more than one-hundred (100') feet in advance of pipe laying without written approval of PUD.
- D. Where a utility crosses under an existing asbestos cement water main or where a trench alters the bedding of an existing asbestos cement water main, the existing A.C. pipe shall be cut three feet (3') minimum from each side of the trench wall and replaced with a corresponding size ductile iron pipe Class 52. The ductile iron pipe shall be connected to A.C. pipe with transition couplings.
- E. Contractor shall furnish a watertight plug of the appropriate size which shall be installed in the end of water main when work is delayed or stopped at the end of the work shift.
- F. All open trenches shall be filled at the completion of each day's work. Open trenches over night shall not be allowed. Permanent and temporary trench restoration requirements shall be per the government or private agency having control of the road.

## **PIPE IN FILLED AREAS**

Special treatment may be required at the discretion of PUD. This treatment may consist of compacting the backfill in six-inch (6") layers, careful choice of backfill materials, use of Mechanical Joint Ductile Iron Pipe in short lengths, or such other reasonable method or combinations as may be necessary or as required by PUD.

## **PIPE INSTALLATION FOR WATER MAINS**

The work necessary to excavate, bed, and backfill water pipelines shall conform to the requirements of Section 7-11 of the *Standard Specifications* and the Standard Drawings.

- A. **Pipe and Fittings**  
Water main pipe material shall be C900 PVC, Class 150, and Class 52 ductile iron fittings in accordance with Section 7-09 of the *Standard Specifications*.
- B. **Permissible Deflection of Joints**  
Wherever it is necessary to deflect pipe from a straight line either in a vertical or horizontal plane, or where long-radius curves are permitted, the amount of deflection allowed shall not exceed the manufacturer's recommendations:

C. Downtime Protection

When stopping work for the day, the contractor shall plug pipe ends to prevent rodents, other small animals, or debris from entering the pipe. Use an inflatable ball as a plug in addition to a tight-woven canvas, securely tied around outside of pipe end.

D. Trace Wire

Trace wire shall be installed on all water lines including service lines. The wire shall be attached to the lines at 15-foot intervals and shall be brought to the surface at all junctions and termini using methods approved by the Engineer. Wires shall be brought up into a junction box or pedestal. Trace wire material for water lines shall be 12 gauge, soft drawn, insulated, and shall be blue in color.

Splices shall be made with a kit containing a "T" shaped open cell centering device and a plastic bag of urethane and hardener which is mixed at the time of installation or heat shrinkable insulating tubing. Heat shrinking insulating tubing shall consist of a mastic lined heavy wall polyolefin cable sleeve. The resin used with the "T" shaped open cell centering device shall be a quick curing flexible compound with an approximate set-up time of 4 minutes at 72 degrees F.

A continuity test shall be performed on tracer wire with inspector present prior to paving roadway.

The tracer wire on main lines shall be connected to each service by using a lug connector and attaching the connector to the saddle bolt on each saddle. The wire shall be stripped ½" then inserted into the lug connector. The connection shall be water tight to prevent corrosion. If two wires are to be joined, they are to be twisted together prior to being inserted into the lug connector.

## **BEDDING AND BACKFILL**

Use imported bedding for all water main pipe. Bed and backfill pipe and appurtenances in accordance with the requirements of the government or private agency having control of the road and Section 7-09 of the *Standard Specifications*.

## **SEWER/WATER SEPARATION**

Maintain a minimum horizontal separation of 10 feet between sanitary sewers and any existing potable water lines, and a minimum vertical separation of 18 inches between the bottom of the water line and the crown of the sewer. Sewer lines should be lower than water lines and installed in separate trenches.

## HYDROSTATIC TESTS

All water mains and appurtenances shall be tested in accordance with Section 7-09.3(23) of the *Standard Specifications*. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished and operated by the Contractor. The PUD must be notified a minimum of 48 hours prior to testing and must be present when tests are performed. PUD shall witness the test; if the test does not pass inspection for any reason, additional trips required to witness the test shall be at the owner's expense.

### A. Isolation of Existing Systems Prior to Testing

Existing water pipelines shall be protected from contamination during the testing process for new construction. Use of special "blind flanges" will be necessary if the line being tested cannot be adequately separated from existing systems. The developer's engineer shall submit shop drawings and proposed procedures to PUD prior to installing any special testing device.

### B. Filling the Main for Testing

The mains shall be filled with water and allowed to stand under pressure a sufficient length of time to allow the escape of air and allow the lining of the pipe to absorb water. The Contractor shall be responsible for providing the water necessary to fill the pipelines for testing purposes.

### C. Testing Duration

The test shall be accomplished by pumping the main up to the required pressure, stopping the pump for 1 hour, and then pumping the main up to the test pressure again. During the test, the section being tested shall be observed to detect any visible leakage. A clean container shall be used for holding water for pumping up pressure on the main being tested. This makeup water shall be sterilized by the addition of chlorine to a concentration of 50 mg/l, in accordance with AWWA Standards. The allowable leakage shall be calculated in accordance with the allowance determined in Section 7-09.3(23) of the *Standard Specifications*.

### D. Correction of Excessive Leakage

Should any test of pipe laid disclose leakage greater than the allowable leakage, locate and repair the defective joints or pipe until the leakage of a subsequent test is within the specified allowance.

## STERILIZATION AND FLUSHING OF WATER MAINS

Sterilization and flushing of newly laid pipe shall be performed after a successful pressure test and prior to obtaining a bacteriological report meeting the requirements of Sections 7-09.3(24) and 7-09.3(24)A of the *Standard Specifications*.

### A. Flushing

Sections of pipe to be disinfected shall first be flushed to remove any solids or contaminated material that may have become lodged in the pipe. Tap shall be provided large enough to develop a velocity meeting the requirements of Section 7-09.3(24)A of the *Standard Specifications*.

### B. Sterilization

Pipeline intended to carry potable water shall be sterilized before placing in service. Sterilizing procedures shall conform to AWWA C-60 1 as hereinafter modified or expanded, and Section 7-09.3(24) of the *Standard Specifications*.

### C. Disposal of Sterilizing Water

Dispose of sterilizing water in an approved manner. Do not allow sterilizing water to flow into a waterway without adequate dilution or other satisfactory method of reducing chlorine to a safe level. The Contractor shall dechlorinate using ascorbic acid (Vitamin C), or another non-sulfide, environmentally friendly dechlorination method for all water that will be released to storm drains or other receiving waters. Dechlorination procedures are to be submitted in writing and approved by the Director prior to flushing system. Chemicals shall be used per manufacturer's recommended doses and application requirements.

## BACTERIOLOGICAL TESTING

Before being placed into service and following the successful hydrostatic test and disinfection/flushing procedures, a satisfactory report shall be obtained from the local or State Health Department on samples collected from representative points in the new system. Samples will be collected and bacteriological tests will be obtained by PUD staff. Testing shall be performed per the requirements outlined in Section 7-09.3(24) of the *Standard Specifications*.

## **VALVES FOR WATER MAINS**

Materials and construction shall be in accordance with Section 7-12 of the *Standard Specifications* and the Standard Details.

## **HYDRANTS**

Materials and construction shall be in accordance with Standard Details Sheets. Fire hydrants shall have Storz fittings.

## **SERVICE CONNECTIONS**

Materials and construction shall be in accordance with Section 7-15 of the *Standard Specifications* and the Standard Details.

## **CROSS CONNECTION CONTROL AND BACKFLOW ASSEMBLIES**

Backflow prevention assemblies shall be provided in accordance with the PUD Cross Connection Control Manual.

## **REQUIREMENTS FOR WATER SYSTEM VAULT INSTALLATIONS**

To ensure proper operation and accessibility of all assemblies, the following requirements shall apply to installation of these assemblies, unless otherwise approved by PUD. Vaults shall be constructed per the Standard Details.

- A. The vault shall be sealed with Crystal Seal or approved equal on the outside of the vault. Vault penetrations shall be sealed with non shrink grout from the outside. Apply water proof coating over grout. Backfill around vault per the manufacturer's specifications.
- B. Access to be through an H-20 rated standard Bilco door or approved alternate.
- C. Provide approved ladder if the vault or chamber depth is 5-foot 0-inches or greater and entry is through the vault or chamber roof. Ladders shall include a Model 1 Bilco LadderUP safety post or approved equal.
- D. Adequate drainage for the vault or chamber shall be provided. (Drainage to piped storm systems allowed with check valve).
- E. Vault must be equipped with a moisture proof light fixture if adequate lighting is not available.
- F. Vault is to have no other use, except for use described by these standards.
- G. Vault shall be installed on undisturbed base or compacted 3/4"-0" gravel base.

- H. No piping shall be installed in excess of 3-feet above the vault floor.
- I. Assembly is to be adequately supported from the floor, and suitably restrained from movement. Supports shall consist of steel supports or approved equal; no wood supports shall be used.
- J. All electrical wiring shall be inspected by the Washington State Electrical Inspector (Permit is required).
- K. The assembly shall be readily accessible with adequate room for maintenance.
- L. all new services are to be pressure tested and disinfected by the contractor and proven to be bacteriologically safe from the existing main to the vault.

### **BACKFLOW PREVENTION DEVICE ASSEMBLY VAULTS**

Backflow prevention device assembly vaults shall be constructed in accordance with the standard drawings and requirements of this section. Backflow vaults shall be on private property and located outside of public easements.

### **FIRE SERVICES AND DOMESTIC SERVICES**

- A. No part of the backflow prevention assembly shall be submerged in water or installed in a location subject to flooding. In a vault or chamber, adequate drainage shall be provided; and test cocks shall be plugged. The plugs shall not be of dissimilar metals.
- B. The backflow assembly shall be protected from freezing and other severe weather conditions.
- C. All backflow assemblies shall have a minimum 12-inch clearance on the backside, 24-inch clearance on the test-cock side, and 12-inches below the assembly. Adequate clearance (6-inches minimum) must be maintained above gate-valve stem at full extension. Headroom of 6-foot, 0 inches is required in vaults without a full opening top. Access to the device and to any vault or chamber shall remain clear at all times.

### **SPECIAL FOR FIRE SERVICE ONLY**

- A. Fire Service backflow prevention assemblies shall be installed at the property line, or edge of the public water line easement. The fire service from the public main to the backflow assembly shall be privately owned and meet all PUD's Standard Drawings.
- B. Only approved resilient seat indicating valves are allowed on fireline assemblies.

- C. Only approved Double Detector Check Valve Assemblies are to be used for system containment on fire line services. The meter on the bypass assembly shall read in cubic feet.
- D. Fire Line Flow and Tamper Switches installed, as required by UBC sec. 3803, must be connected to a monitored fire detection system approved by the Fire Marshal. The tamper switches are required on the OS and Y gate valves in the vault, as well as any other indicating control valves on the fire protection system. Electrical inspection and permit is required.
- E. The remote reader (if allowed) shall be rigidly mounted on an exterior building wall (near the domestic meter), enclose in a metal box with a slot opening which allows reading the remote without opening the box, and at an elevation of 5-feet above the ground level.

The remote reader shall have the same number configuration as the metering device itself, and read in cubic feet. All wires to the remote reader shall be enclosed in a heavy plastic or rigid metal conduit. All wiring shall be in conformance with appropriate sections of the National Electric Code.

### **WATER METER VAULTS**

- A. The vault is to be provided and installed by the contractor, per Standard Drawings.
- B. The contractor will provide a meter size uni-flange on the inside of the vault 6-inches from the wall on the inside of the vault on the incoming (upstream) side. PUD will install the meter, bypass, valves, and tee's. The contractor will then provide the other flange and exit the vault.

### **PRESSURE REDUCING VALVE VAULTS**

PRV vaults are unique to each situation. The engineer shall detail the vault on the plans and submit for review. PUD will review the vault for size and compliance with the general requirements listed under this section.

### **APPURTENANCES**

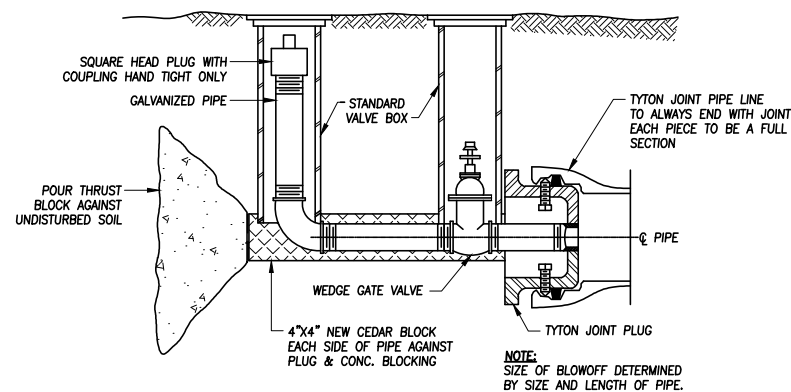
- A. Air and Vacuum Release Valves
  1. Air and vacuum release valves shall be APCO Valve and Primer Corporation, "Heavy-Duty", combination air release valve, or equal.
  2. Installation shall be as shown on the standard Details.
  3. Piping and fittings shall be copper or brass. Location of the air release valves as shown on the plans is approximate. The installation shall be set at the high point of



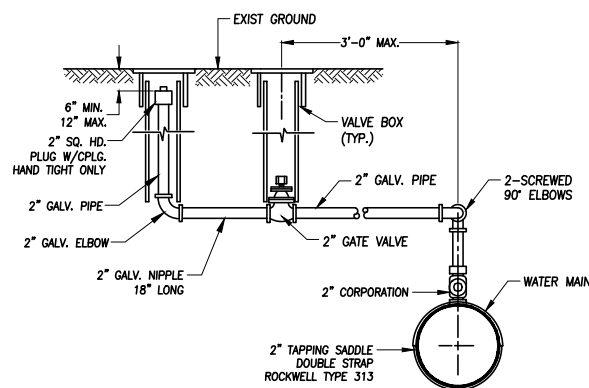
## *Design Standards*

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the line. Water line must be constructed so the air release valve may be installed in a convenient location.



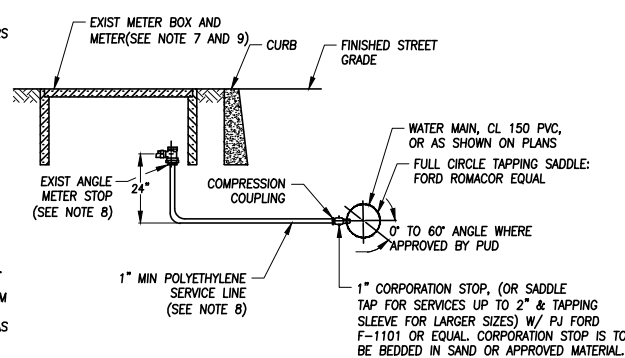
**STANDARD TEMPORARY CONSTRUCTION BLOWOFF ASSEMBLY**  
NTS



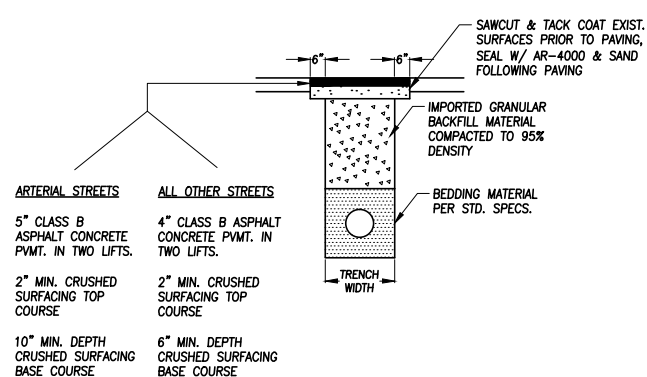
**STANDARD MANUAL AIR RELEASE VALVE**  
NTS

- NOTES:**
- CONTRACTOR SHALL CONTACT PUD (509-427-5129) 48 HOURS PRIOR TO INSTALLING ANY SERVICE STUBS.
  - CONTRACTOR IS HELD RESPONSIBLE TO AVOID CONFLICT WITH OTHER UTILITIES BY COORDINATION OF LOCATION. "ONE-CALL" 696-4848.
  - NO CONNECTIONS WILL BE ALLOWED TO AN EXISTING SERVICE PRIOR TO AN APPROVED BAC-T TEST.
  - STUB SERVICES SHALL BE PRESSURE TESTED WITH THE MAIN LINE AND BE CAPABLE OF WITHSTANDING THE MAINS TEST PRESSURE.
  - APPROVED EQUAL APPLIES ON ALL MATERIAL CALL OUTS.
  - ALL COMPRESSION FITTINGS TO HAVE STAINLESS STEEL INSERTS.
  - SOME METER BOXES & METERS MAY REQUIRE RELOCATION FROM PRIVATE PROPERTY TO EDGE OF RIGHT-OF-WAY. EXTEND PRIVATE SIDE OF CONNECTION TO NEW METER BOX LOCATION AS NECESSARY. COORDINATE WITH PUD. PUD HAS PREVIOUSLY OBTAINED RIGHT-OF-ENTRY PERMITS.
  - REPLACE EXIST SERVICE W/ 1-INCH MIN SERVICE, OR LARGER AS NOTED ON PLANS, UP TO EXIST ANGLE METER STOP. MAY REQUIRE ADDITIONAL FITTINGS AND PIPE (INCIDENTAL TO WATER SERVICE PAY ITEM).
  - PUD WILL PROVIDE NEW METER BOXES FOR CONTRACTOR TO INSTALL AS DEEMED NECESSARY BY PUD. COORDINATE WITH PUD.

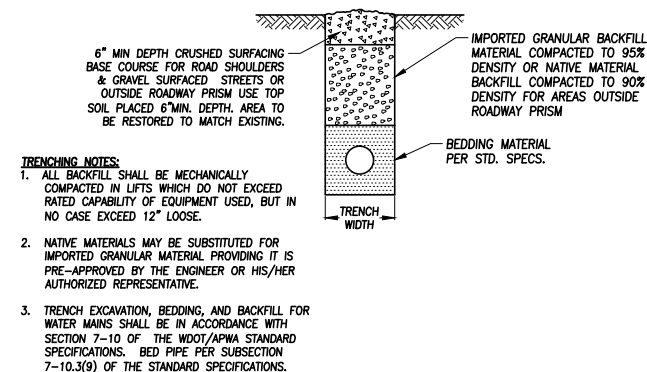
**STANDARD 3/4" & 1" WATER SERVICE**  
NTS



**STANDARD BLOWOFF ASSEMBLY (PERMANENT)**  
NTS

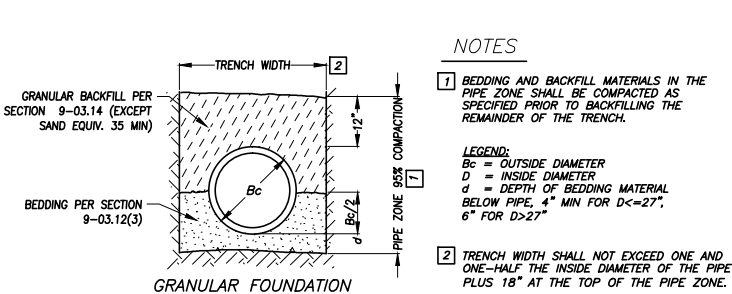


**BITUMINOUS PAVED STREETS**  
NTS

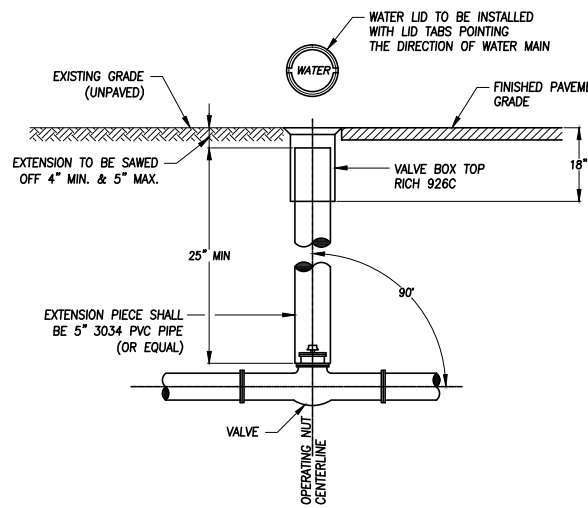


**ROAD SHOULDERS, GRAVEL SURFACED STREETS AND AREAS OUTSIDE ROADWAY PRISM**  
NTS

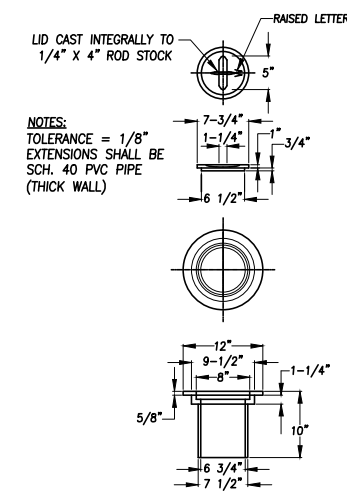
- TRENCHING NOTES:**
- ALL BACKFILL SHALL BE MECHANICALLY COMPACTED IN LIFTS WHICH DO NOT EXCEED RATED CAPABILITY OF EQUIPMENT USED, BUT IN NO CASE EXCEED 12" LOOSE.
  - NATIVE MATERIALS MAY BE SUBSTITUTED FOR IMPORTED GRANULAR MATERIAL PROVIDING IT IS PRE-APPROVED BY THE ENGINEER OR HIS/HER AUTHORIZED REPRESENTATIVE.
  - TRENCH EXCAVATION, BEDDING, AND BACKFILL FOR WATER MAINS SHALL BE IN ACCORDANCE WITH SECTION 7-10 OF THE WDOT/APWA STANDARD SPECIFICATIONS. BED PIPE PER SUBSECTION 7-10.3(9) OF THE STANDARD SPECIFICATIONS.



**PIPE BEDDING DETAILS (RIGID PIPE)**  
NTS



**STANDARD VALVE BOX & COVER**  
NTS



**STANDARD THRUST BLOCK**  
NTS

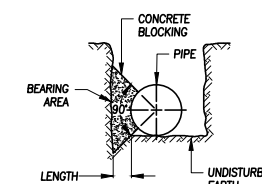
- NOTES:**
- BEDDING AND BACKFILL MATERIALS IN THE PIPE ZONE SHALL BE COMPACTED AS SPECIFIED PRIOR TO BACKFILLING THE REMAINDER OF THE TRENCH.
  - TRENCH WIDTH SHALL NOT EXCEED ONE AND ONE-HALF THE INSIDE DIAMETER OF THE PIPE PLUS 18" AT THE TOP OF THE PIPE ZONE.
- LEGEND:**  
Bc = OUTSIDE DIAMETER  
D = INSIDE DIAMETER  
d = DEPTH OF BEDDING MATERIAL BELOW PIPE, 4" MIN FOR D<=27", 6" FOR D>27"

- NOTES:**
- WHERE DIRECTED BY THE ENGINEER, GRANULAR TRENCH FOUNDATION STABILIZATION SHALL BE PLACED PRIOR TO PLACEMENT OF THE BEDDING. SIZE AND DEPTH ARE DEPENDENT ON SOIL CONDITIONS.
  - BEDDING AND BACKFILL MATERIALS IN THE PIPE ZONE SHALL BE COMPACTED AS SPECIFIED PRIOR TO BACKFILLING THE REMAINDER OF THE TRENCH.
  - FOR ROCK AND OTHER INCOMPRESSIBLE MATERIALS, THE TRENCH SHALL BE OVEREXCAVATED A MINIMUM OF 6" AND FILLED WITH GRANULAR MATERIALS AS DIRECTED BY THE ENGINEER.
  - BACK FILL AND COMPACTION ABOVE THE PIPE ZONE SHALL BE AS SHOWN IN STANDARD PLAN NO. S-1-3.
  - INSTALLATION SHALL CONFORM TO UNIBELL PLASTIC PIPE ASSN. STANDARD SPEC. UNI-B-5 (LATEST EDITION) EXCEPT AS NOTED.
  - FINAL INSTALLATION TO BE TESTED PER SECTION 7-17.3(4)(H) OF THE STANDARD SPECIFICATIONS.
  - ALTERNATIVE PRE-COVER MATERIALS ARE ALLOWABLE FROM PIPE CENTERLINE TO ONE FOOT ABOVE THE TOP OF PIPE. ALTERNATE PRE-COVER MATERIALS MUST BE PREAPPROVED BY THE INSPECTOR AND MAY BE SAND, CRUSHER SCREENINGS, GRAVEL, OR OTHER CLEAN GRANULAR MATERIAL CONTAINING NO ROCK LARGER THAN 1-1/4" IN LENGTH.
  - APPROVAL FOR SUCH ALTERNATE MATERIALS WILL BE GRANTED UPON CONFIRMATION BY TEST OF ITS COMPLIANCE WITH THESE REQUIREMENTS. SUBMIT 50 LB. SAMPLE FOR TESTING TO A LABORATORY APPROVED BY SKAMANIA PUD PRIOR TO START OF PIPE INSTALLATION WORK. ACCEPTANCE OF THE TEST RESULTS REQUIRES A MINIMUM OF FIVE BUSINESS DAYS TO COMPLETE.

**PIPE BEDDING DETAILS (FLEXIBLE PIPE)**  
NTS

SOIL BEARING = 2000 LB/FT <sup>2</sup>					
PIPE SIZE	HORIZ. BENDS	BEARING AREA S.F.	VOL. OF BLOTTING C.F.	LENGTH OF BLOTTING	
4"	TEE 90°	2.3	0.8	0.88	
	45°	3.2	1.4	1.06	
	22-1/2°	1.7	0.5	0.73	
6"	TEE 90°	4.7	2.4	1.24	
	45°	6.6	4.0	1.53	
	22-1/2°	3.6	1.6	1.05	
8"	TEE 90°	8.0	5.4	1.83	
	45°	11.4	9.0	2.00	
	22-1/2°	6.2	3.6	1.37	
10"	TEE 90°	12.1	9.9	2.50	
	45°	17.1	16.7	2.46	
	22-1/2°	9.3	6.6	1.69	
12"	TEE 90°	17.1	16.7	2.37	
	45°	24.2	28.0	2.93	
	22-1/2°	13.1	11.2	2.01	

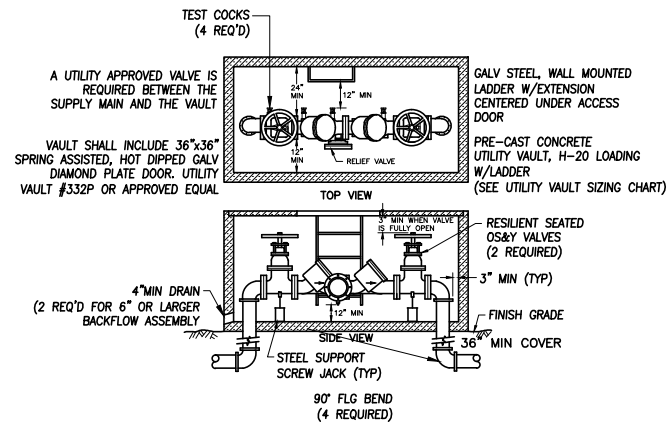
- NOTES:**
- THRUST BLOCKING SHALL BE POURED IN PLACE WITHOUT DIRECT CONTACT TO THE PIPE OR FITTINGS. PROTECTIVE MATERIAL SUCH AS TAR PAPER SHALL BE PLACED BETWEEN THE CONCRETE AND PIPE OR FITTINGS.
  - THRUST BLOCKING SHALL BE POURED AGAINST FIRM UNDISTURBED SOIL.
  - CONCRETE FOR ALL BLOCKING SHALL HAVE A 28-DAY MINIMUM COMPRESSIVE STRENGTH OF 2,300 P.S.I.
  - CONCRETE BLOCKING FOR VERTICAL BENDS SHALL BE PER APWA STD. PLAN NO. B-22.
  - LAYOUT TO BE APPROVED BY THE INSPECTOR PRIOR TO AND AFTER CONCRETE POUR.



**GENERAL NOTES & REQUIREMENTS**

- SPECIFICATIONS FOR ALL MATERIALS AND CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE "STANDARD SPECIFICATIONS FOR ROAD, BRIDGE & MUNICIPAL CONSTRUCTION", MOST RECENT EDITION, AS PREPARED BY THE WASHINGTON STATE CHAPTER OF THE APWA, EXCEPT AS NOTED HEREIN.
- ALL REFERENCES TO APWA SPECIFICATIONS SHALL MEAN THEIR LATEST REVISION.
- THE CONTRACTOR SHALL NOTIFY THE SKAMANIA PUD (509-427-5126) 24 HOURS PRIOR TO THE START OF CONSTRUCTION. INSPECTION AND APPROVAL OF THE CONSTRUCTION WILL BE BY SKAMANIA PUD. A SATISFACTORY PRESSURE AND BACTERIOLOGICAL TEST FOR THE WATER CONSTRUCTION IS REQUIRED FOR APPROVAL.
- WHEN CONSTRUCTION IS TO TAKE PLACE WITHIN A CITY OR COUNTY RIGHT-OF-WAY AN APPROVED TRAFFIC CONTROL PLAN WILL BE REQUIRED PRIOR TO THE START OF CONSTRUCTION.
- WHERE EXISTING SERVICE MUST BE INTERRUPTED, THE CONTRACTOR SHALL NOTIFY THE SKAMANIA PUD AND ALL CUSTOMERS AFFECTED AS TO THE DATE AND DURATION OF THE INTERRUPTION. NOTIFICATION MUST BE DONE 24 HOURS IN ADVANCE OF INTERRUPTION. THE CONTRACTOR SHALL SCHEDULE CONSTRUCTION TO PROVIDE MINIMUM INTERRUPTION OF SERVICES AS DETERMINED BY THE INSPECTOR. UNDER NO CIRCUMSTANCES SHALL A CONTRACTOR SCHEDULE A WATER MAIN SHUT-DOWN WITHOUT THE REQUIRED 24 HOUR NOTICE. THE CONTRACTOR SHALL NOT OPERATE THE UTILITY'S WATER FACILITIES WITHOUT APPROVAL FROM THE CONSTRUCTION INSPECTOR.

By	APPR.	DATE	No.	REVISIONS	DESIGNED	SCALE	PUD NO.1 OF SKAMANIA COUNTY 1492 WIND RIVER HIGHWAY P.O. BOX 500 CARSON, WA 98610 (509) 427-5126	JOB NUMBER	PUD NO.1 OF SKAMANIA COUNTY	DRAWING NUMBER
					DRAWN	HOR. NTS				
					CHECKED	VERT. NTS				
					APPROVED	FIELD BOOK	N/A			
								DATE	STANDARD WATER DETAILS	SHEET of
								11/04		



TEST COCKS (4 REQ'D)

A UTILITY APPROVED VALVE IS REQUIRED BETWEEN THE SUPPLY MAIN AND THE VAULT

VAULT SHALL INCLUDE 36" x 36" SPRING ASSISTED, HOT DIPPED GALV DIAMOND PLATE DOOR. UTILITY VAULT #332P OR APPROVED EQUAL

GALV STEEL, WALL MOUNTED LADDER W/EXTENSION CENTERED UNDER ACCESS DOOR

PRE-CAST CONCRETE UTILITY VAULT, H-20 LOADING W/LADDER (SEE UTILITY VAULT SIZING CHART)

RELIEF VALVE

TOP VIEW

RESILIENT SEATED OS&Y VALVES (2 REQUIRED)

3" MIN (TYP)

4" MIN DRAIN (2 REQ'D FOR 6" OR LARGER BACKFLOW ASSEMBLY)

SIDE VIEW

STEEL SUPPORT SCREW JACK (TYP)

36" MIN COVER

90° FLG BEND (4 REQUIRED)

REDUCED PRESSURE PRINCIPLE BACKFLOW ASSEMBLIES ARE DESIGNED FOR BOTH BACK SIPHONAGE AND BACK PRESSURE. ALL ASSEMBLIES SHALL BE APPROVED BY CURRENT STATE AND LOCAL REGULATIONS AND SHALL BE INSTALLED HORIZONTAL ONLY.

ALL VAULTS SHALL BE PRE-APPROVED PRIOR TO INSTALLATION. VAULTS SHALL BE LOCATED AT PROPERTY LINE OR EASEMENT LINE AND ON CUSTOMER'S PROPERTY WITH 3' MINIMUM CLEARANCE FROM ALL STRUCTURES. GROUT PIPE PENETRATIONS WITH WATER-TIGHT GROUT.

ALL WATER LINES WITHIN 40' OF THE VAULT SHALL BE CL 52 DI PIPE WITH FLG OR RESTRAINED MJ JOINTS. NEW WATER FACILITIES SHALL BE DISINFECTED, FLUSHED, AND PRESSURE TESTED PRIOR TO INSTALLING THE BACKFLOW ASSEMBLY. THE CUSTOMER SHALL PROTECT THE BACKFLOW ASSEMBLY FROM FREEZING AND FLOODING.

THE BACKFLOW ASSEMBLY SHALL BE TESTED AFTER INSTALLATION PRIOR TO ACCEPTANCE AND ALSO YEARLY THEREAFTER BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER. A COPY OF ALL TEST RESULTS SHALL BE PROVIDED TO THE WATER UTILITY.

ABOVE GROUND INSTALLATION REQUIRED

### STANDARD REDUCED PRESSURE PRINCIPLE BACKFLOW ASSEMBLY 2 1/2" & LARGER

NTS

#### GENERAL BACKFLOW PROTECTION REQUIREMENTS

(1) STATE APPROVED BACKFLOW PREVENTION DEVICES SHALL BE INSTALLED TO PROTECT THE WATER SYSTEM FROM ALL SOURCES OF POTENTIAL CROSS-CONNECTIONS INCLUDING: ALL FIRE PROTECTION AND IRRIGATION SYSTEMS, BOILERS, CHILLERS, CHEMICAL ADDITIONS, BOOSTER PUMPS, OTHER WATER SOURCES, AND BUILDINGS TALLER THAN 30'.

(2) ALL HOSEBIBS SHALL BE PROTECTED WITH VACUUM BREAKERS.

(3) ACCESS LADDERS IN BACKFLOW ASSEMBLY VAULTS SHALL BE GALV STEEL W/EXTENSIONS AND SHALL BE CENTERED UNDER ACCESS DOOR.

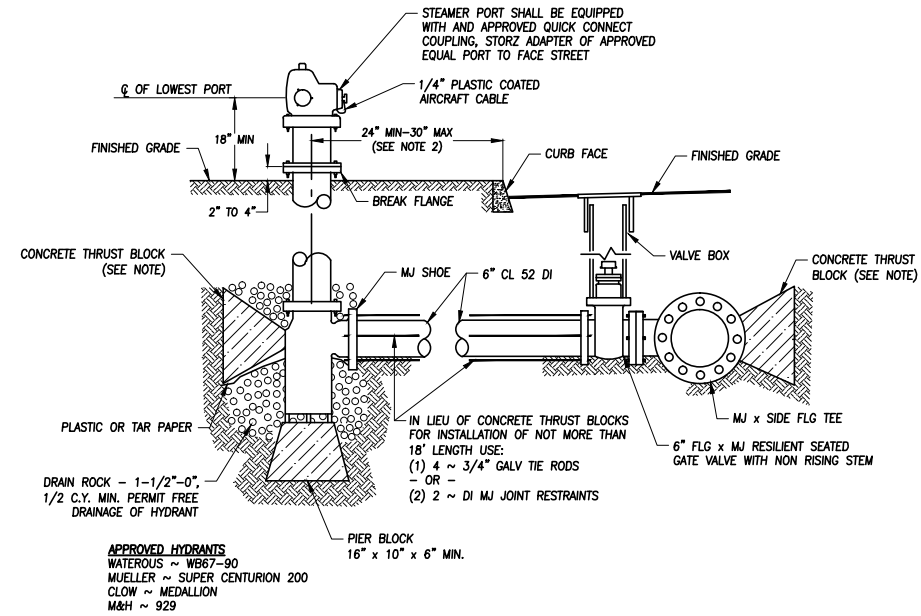
(4) DETERMINATION OF APPROPRIATE BACKFLOW PROTECTION ASSEMBLIES WILL BE AT THE DISCRETION OF THE UTILITY. WHEN SITE ACCESS IS NOT PROVIDED BY THE CUSTOMER THEN AN RPBA WILL BE REQUIRED.

(5) MAINTENANCE AND ANNUAL TESTING OF BACKFLOW ASSEMBLIES SHALL BE THE RESPONSIBILITY OF THE CUSTOMER. ALL TEST RESULTS SHALL BE PROVIDED TO THE UTILITY.

#### UTILITY VAULT SIZING CHART

RPBA MINIMUM SIZE	MINIMUM VAULT
3-1/2"	877-94
4"	678-94
6"	778-94
8"	887-94
10"	918-94

UTILITY VAULT CO. OR APPROVED EQUAL



### STANDARD FIRE HYDRANT ASSEMBLY

NTS

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					DRWN	HOR. NTS				
					CHEK	VERT. NTS				
					APPR	FIELD BOOK	N/A			
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