Snohomish County PUD No. 1, Water Utility

Standards and Specifications for Design and Construction

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Revised 7-06-2022

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Standard Details

Snohomish County PUD No. 1, Water Utility

Standards and Specifications for Design and Construction

1.0 Introduction

This Section outlines the general and specific construction requirements for water systems operated and maintained by or for Snohomish County PUD No. 1 (DISTRICT).

2.0 Design Standards

2.1 Water Source Development

2.1.1 Water Source Construction

New water sources must be designed to meet the Department of Ecology (Ecology) and DOH regulations and design guidelines. Reference documents include but not limited to RCW 18.104, Water Well Construction, administered by DOH; WAC 173-160, Minimum Standards for Construction and Maintenance of Water Wells, administered by Ecology; and WAC 246-290 or 246-291, regulations regarding the health aspects of public water system, as administered by DOH.

All test and production wells must be drilled in accordance with detailed drilling and testing specifications, which have either been prepared by, or approved by the DISTRICT.

All new groundwater sources shall be provided with an access port for insertion of devices to measure depth to water and a meter to measure total production.

2.1.2 Water Rights

Water rights must be obtained in accordance with Ecology regulations and procedures. Water rights documents,

correspondence, and other associated records will be maintained by the DISTRICT.

2.1.3 Water Quality

Water quality must be proven to conform with the Federal Safe Drinking Water Act (as amended); DOH criteria specified in WAC 246-290 for Group A systems; DOH criteria specified in WAC 246-291, for Group B systems; and/ or any additional requirements of the Snohomish Health DISTRICT.

The DISTRICT reserves the right to reject any source whose water quality does not meet these criteria, or sources having excessive costs associated with treatment requirements.

2.2 Transmission, Storage, and Distribution

2.2.1 Pipe Materials

The DISTRICT'S standard material for water mains is AWWA C151 ductile iron Class 52, meeting the criteria specified in these Standards and Specifications. Should soil testing determine that the surrounding soils are corrosive, or should a ground survey indicate stray electrical current is present, the DISTRICT may require that the ductile iron pipe be encased in 8-mil thick polyethylene per ANSI/AWWA C105 prior to backfill. Pipe materials other than ductile iron shall be allowed only at the discretion of the DISTRICT.

If allowed, buried polyethylene pipe shall be fusion-welded joints and PVC pipe shall use gasketed joints. Pipe used above grade or in vaults shall be ductile iron or brass whenever practical. PVC pipe shall not be used above grade for any pressure applications. Copper tracer wire shall be installed over all nonmetallic pipes. Tracer Wire shall be AWG 12/1 Gauge (Gage Size 12, One Conductor Solid Copper), Underground UL Rated for Direct Burial (typical of all tracer wire required by District).

PVC or polyethylene pipe shall not be used in soils with existence of or potential for hydrocarbon contamination. Ductile iron pipe used in such soils shall use Nitrile gaskets.

2.2.2 Pipe Sizing

All water pipe shall be sized based on the minimum standard established below or larger as determined by the hydraulic (pressure and velocity) requirements of the water system using domestic and fire demands which may be reasonably expected over the life of the pipe. Final approval of water pipe sizing shall rest solely with the DISTRICT'S Engineering Senior Manager.

Extensions and replacements to and within the DISTRICT'S system shall be sized whichever is the more stringent of:

1. To provide at least 40 psi, during peak hourly design flow conditions, at every service connection (meter) point throughout the distribution system; and

2. To provide at least 20 psi, during fire flow at maximum day demand with the fire suppression and equalizing storage depleted, at all points throughout the distribution system. Fire flow shall be per DISTRICT policy or as required by the governing body or bodies with jurisdiction over the work, which ever is greater); and

3. To flow water no faster than 8 fps under the conditions stated in condition (1) and (2) above.

4. Water mains shall be a minimum of 8-inch CL 52 ductile iron on all public and private right-of-ways and where future looping is anticipated by the DISTRICT within ½ mile. Water mains shall be a minimum of 12-inch CL 52 ductile iron on all public and private right-of-ways where future looping is ***NOT*** anticipated within ½ mile. Four-inch CL 52 ductile iron will be allowed on dead-end runs less than 300 Lf. in length where looping is not anticipated and where it is in accordance with the governing fire flow requirements. Sizing of mains smaller or of different materials shall be allowed only at the sole discretion of the DISTRICT.

5. All 8-inch and larger water mains shall be capable of providing not less than 500 gpm flow for operational flushing while maintaining 30 psi residual at all points in the system.

6. Water main sizing shall be in accordance with the DISTRICT'S current Water System Plan and the DISTRICT'S 20-year Capital Improvement Program.

2.2.3 Pipe Layout

All water pipe shall be designed to lie in public road right-of-way, or if not available, on a dedicated, recorded utility easement. Permanent easements shall be a minimum of 20 feet in width. Trench layout shall be designed in such a way to accommodate the standard trench depth. All pipe shall maintain a positive or negative slope between respective high and low points in the waterline; high points shall be fitted with air-vacuum release assemblies. Every high point greater than three pipe diameter where the pipeline converts from a positive grade to a negative grade requires an air vacuum release valve. In addition, it is required (unless directed otherwise by PUD engineering) that air valves be installed every half mile or 2500 feet on straight horizontal runs (AWWA M51). All dead ends (and low points if required) shall be fitted with flushing assemblies. All layouts by private consultants shall be reviewed and approved by the DISTRICT for conformance with these and other requirements prior to issuance of final construction documents.

2.2.4 Storage Facilities

Minimum storage requirements are based on the components listed below:

(a) Operational storage is the storage volume devoted to supplying the water system under normal operation when sources of supply are in the "off" status. Generally, a 3-foot operating band is designated for operational storage in each of the DISTRICT'S storage facilities.

(b) Equalizing storage is needed to meet peak hourly demands in excess of the DISTRICT'S supply capacity, which is designed to provide peak day demands. Based on typical diurnal variation in demands, the required equalizing storage is 22.75 percent of the peak day demands served by each storage facility. The bottom elevation of the equalizing storage volume should maintain at least 40 psi throughout the zone served by the tank during the peak hour demand.

(c) Standby storage is equal to two times the average day demands served by each storage facility. When a tank is served by multiple

reliable wells, standby storage can be reduced to the volume needed for two average days with the largest producing well out of service. The bottom elevation of the standby storage volume should maintain at least 20 psi throughout the zone served by the tank during an average day demand.

(d) Fire storage is based on the maximum design fire flow and duration for the zone served by the tank. This volume may be split between multiple tanks located within the same pressure zone. The bottom elevation of the fire storage should maintain at least 20 psi throughout the zone served by the tank during the design fire flow plus maximum day demand. Fire storage can be nested with the standby storage volume.

(e) Dead storage is any volume at the bottom of the tank that cannot provide a minimum of 20 psi to the highest customer fed by gravity from the tank or through a booster pump station with backup power.

2.2.5 Pressure Requirements

Water systems shall be designed to maintain a minimum residual pressure of 40 psi at meter outlets under peak hourly design flow conditions, excluding fire demand. Furthermore, water systems shall be hydraulically designed to provide service connections with a pressure range of 40-100 psi.

2.2.6 Pressure Reducing Stations

Pressure reducing valve installations will utilize the DISTRICT'S standard for all sizes of installations. The typical installation consists of a main line PRV, with smaller diameter bypass PRV with flow and test ports; a pressure relief valve; and a complete PRV bypass. Refer to the DISTRICT'S standard details for further information.

2.2.7 Fire Flow

All DISTRICT facilities will be designed and constructed to meet or exceed the requirements of the local fire prevention authority or the DISTRICT minimum standards shown below, whichever is greater. For water systems requiring fire flow capability, the design shall be adequate to maintain, under fire flow conditions plus maximum day demand with the fire suppression and equalizing storage depleted, a minimum of 20 psi residual at all

points throughout the distribution system as per WAC 246-290-230 requirements.

Lot Size		Flow Requirement
a)	Less than 1 acre	1,000 gpm
b)	Multi-family/commercial/industrial	1,500 gpm

A "cluster development" shall be evaluated according to the effective size of the building lots, based upon the relative distances between residential construction. Modifications to this requirement are permitted if approved by the DISTRICT, at its sole discretion.

2.2.8 Fire Hydrant Spacing

For developments requiring 500 gpm minimum operational flows, fire hydrants shall be spaced at 1200' intervals with no lot further than 600' from the nearest hydrant. For developments requiring fire flow as noted in section 2.2.7 above fire hydrant spacing shall be 600' with no lot further than 300' from the nearest hydrant or as determined by the local fire prevention authority, whichever is more stringent.

2.2.9 Valve Placement

At the discretion of the DISTRICT, valves may be installed at any crosses or tees. The number of valves at each intersection shall equal the number of connecting lines. In addition, unvalved water mainline lengths of pipe shall not exceed 600 feet in school, commercial, or multi-family areas, and 1200 feet in other service areas.

2.2.10 Water and Sewer Line Separation

Transmission and distribution water piping shall be separated at least 10 feet horizontally from waste disposal piping, drain fields, and/or waste water gravity or forced mains. The bottom of the water main shall be 18 inches above the top of the sewer component. All parallel and crossing installations of water and sewer lines shall be in accordance with the latest revisions of the WAC and Department Ecology criteria for septic system and sewage works design.

2.2.11 Pump Stations

Main supply and booster pump stations will be designed consistent with the site conditions; i.e., above ground, masonry or wood frame structure with metal roof; in vault, in-line submersible turbine; or buried, steel pre-fabricated and assembled. Where appropriate, previous pump station designs will be duplicated with appropriate changes, thus minimizing design time and overall construction costs.

Pump systems serving an area with reservoir storage shall be sized to refill the reservoir(s) in 72 hours while meeting maximum day demands. Pump systems serving an area without storage shall be sized to provide at least peak hour demands. Maximum day demands and peak hour demands shall be based on the build-out of the area to be served, as determined by the DISTRICT in coordination with the local land use authority. All DISTRICT pump stations shall include the following items, as a minimum:

1. Minimum 6-inch reinforced concrete floor (2,500 psi minimum 28-day strength).
2. Floor drain properly plumbed away from the building to daylight or an approved storm sewer system. Floor drain shall be a minimum of 6-inch diameter. (Placement of outfall need to take in consideration of environmental sensitive areas).
3. Interior and exterior paint, color per DISTRICT selection.
4. Lockable steel door (BEST cylinder, core and keyway to match existing DISTRICT factory registered key system).
5. Composition shingle, tile, shake, metal, or other roofing material approved by DISTRICT.
6. Proper pump house venting (eaves, wall dampers, doors, etc.).
7. Wiring installed per National Electric Code (NFPA 70).
8. Thermostat-controlled wall heater.
9. Suitable interior and exterior lighting.
10. Manual electrical power transfer switch and emergency power inlet receptacle.
11. All interior and underslab piping shall be sized for potential build out of the area to be served.

12. Interior piping of Schedule 40 brass, Type L copper, or ductile iron. Manifold(s) shall be secured. Flexible connections required for pump(s).

13. Pipe penetrations through the floor (or wall) shall be sleeved or wrapped with a bond breaker (e.g. roofing felt). Pipe and fittings under the floor slab shall be restrained with Grip-Rings or Mega-Lugs.

14. Pump(s) installed and secured. Duplex/replacement pump if required by DISTRICT. Motor(s) shall meet NEMA 12.6C. Booster pumps shall be ANSI end-suction type; Goulds or approved equal.

15. Flanges and valves at pressure tank(s), booster pump(s), etc. to allow removal of equipment.

16. Controls and telemetry to be compatible with the DISTRICT'S SCADA System.

17. Pump low suction shutoff switch.

18. Pump control pressure switch/telemetry interface.

19. ASME pressure relief valve, properly rated based on flow/system pressures.

20. Master (source) meter installed within the pump house.

21. Bladder tank(s), if required.

22. On well systems (well casing need to be min. 6" above grade.

23. System documentation (restrictive covenant, water right, geologic report, wellhead protection plan, pump tests, etc.).

24. Raw water tap installed minimum 6 inches above floor.

25. Disinfection/treatment system, as required.

26. Static water surface level determination system.

27. Comply with additional requirements of Urban and Rural Standards indicated below, as applicable.

28. Motor control(s) shall conform to DISTRICT Standards and specific requirements will vary depending on motor size and voltage requirements. For pumps serving a pressure zone with a storage reservoir, a PRV shall be plumbed to allow water to return to the suction pressure zone for fire demands; the valve shall be forced closed

during pump runs. There shall also be a valved bypass between pressure zones; the valve shall be normally closed.

29. Skid-mounted, pre-manufactured pump/pressure tank units installed within the appropriate structure (as described below) may be allowed for service to a small portion of a service area (pressure zone) subject to the DISTRICT'S review and acceptance of the equipment.

Pump station structures shall be constructed according to one of the following two standards, to be selected by the DISTRICT. The selection of which standard shall be followed will be based on the expected lifetime of the structure, compatibility with surrounding land uses, and potential exposure to vandalism or other damage. In general, the permanent pump station requirements will be required on all structures intended for a useful life of 10 years or more, or pump stations sited in areas where vandalism is likely to occur as determined by the DISTRICT. Temporary pump station structure requirements will be allowed for structures intended for a useful life under 10 years in length and sited in areas where vandalism to the structure is unlikely.

(a) Permanent pump station structures shall be of solid grouted reinforced concrete masonry unit (CMU) construction. Unless otherwise dictated by the building department of the local government having jurisdiction, the exterior of the building shall be split-face CMU, roof shall be wood framed with standing seam metal roofing with matching gutters and downspouts, and doors and frames shall be hollow metal. The interior of the building shall be furred out from the CMU block as necessary to install 2" XPS foam R10 insulation covered with ½" ACX plywood. Color selection shall be by the DISTRICT.

There shall be exterior access to two separate rooms for electrical generator and pumping control equipment. Skid-mounted pump/pressure tank units may be allowed for temporary service to a small portion of a service area (pressure zone) that will expand within the life of the pump station.

(b) Temporary pump station structures shall be of insulated 2x6 wood framed construction meeting UBC. Floor plates shall be pressure treated. Exterior sheathing shall be at least shop grade T-1-11 plywood, minimum ½-inch thickness. Interior sheathing shall be ½-inch ACX plywood. Roof shall be composition shingle, minimum 35-year warranty. Gutters and downspouts of front fascia only. All color selection(s) shall be made by the DISTRICT. There shall be exterior access to two separate rooms for electrical generator and pumping control equipment.

2.3 Water Services

2.3.1 Standard Water Services

All water services shall be metered and protected from backflow. Meter size shall be based on Uniform Plumbing Code fixture count criteria. Water mains constructed in platted areas shall include the installation of water service lines to common or individual property corners or as individually approved by the DISTRICT. All meter boxes shall be placed in non-traffic areas where possible. Water service installation shall include all materials indicated on the appropriate standard detail. Service lines that are part of a water main extension shall be installed concurrent with the water main installation. Services shall be connected to the water mains and extended to the customer's property line, prior to pressure and bacteriological testing of the water main, if applicable.

Service lines for standard domestic water service will normally be 1-inch diameter Type K soft copper pipe or One-inch polyethylene pipe, rated for 200 psi service, with a copper tracer wire may be used where required by soil conditions or aggressive water chemistry, as determined by the DISTRICT.

Service lines for 1½ and 2-inch water services will normally use 2-inch diameter soft type K copper pipe. Two-inch polyethylene pipe, rated for 200 psi service, with a copper tracer wire may be used where required by soil conditions or aggressive water chemistry, as determined by the DISTRICT.

Service lines for water services larger than 2" shall use ductile iron pipe of at least Thickness Class 52, sized for velocity and flow requirements.

In areas where static pressures are low, demands through the water service will be near the meter's limit, or the service line will be unusually long, the DISTRICT/customer should consider upsizing the service line to minimize frictional pressure losses and water velocity.

The customers are responsible for installation of their own supply line from the water meter to the point of use. Customer supply lines should generally not exceed 300 feet from the meter to the point of use, in order to maintain adequate pressure/flow. Customer supply lines over 300 feet are not prohibited; however, the DISTRICT cannot assure adequate pressure/flow for these services.

Refer to the DISTRICT'S standard drawings for more information.

2.3.2 Irrigation Water Services

Designers of each new large irrigation system shall submit Water Balance calculations and other data required to justify demands to the DISTRICT for review before the new irrigation service is approved and installed. All irrigation services shall be equipped with an appropriate backflow assembly as determined by the DISTRICT in accordance with applicable cross connection policies. The new irrigation customer shall complete an Irrigation Agreement with the DISTRICT as a condition of service. Refer to the DISTRICT'S standard drawings for more information.

2.3.3 Backflow Prevention

Please note that all commercial installation (including tenant improvements) shall require premise isolation (an RPBA in an above grade heated enclosure). Such assembly shall be installed in proximity of the water meter per PUD standard detail.

Minimum standards for the installation and maintenance of backflow prevention assemblies shall be those set forth in the latest edition of "Accepted Procedures and Practice in Cross-Connection Control," as published by the Pacific Northwest Section of the American Waterworks Association (AWWA). The

DISTRICT is authorized to establish higher standards for installation and maintenance of backflow prevention assemblies where they find they are supported by good engineering practice, industry standards, or the protection of public health.

Irrigation and fire services shall be as shown on the approved plans. The degree of hazard shall determine the backflow prevention assemblies required. The DISTRICT shall be the authority on determination of degree of hazard. Backflow devices shall be listed on the current Washington State DOH approved list of backflow preventers. Each backflow device and installation shall be tested and approved prior to activation of service. For more detailed information related to backflow prevention, refer to the DISTRICT'S policies for cross connection control. For specific details refer to the DISTRICT'S standard drawings.

3.0 Material and Construction Specifications

3.1 General

3.1.1 Standard Specifications

All work shall be performed in accordance with those sections referenced in this specification; the current edition of the "Standard Specifications for Road, Bridge and Municipal Construction" prepared by the Washington State Chapter, American Public Works Association (herein referred to as the "Standard Specifications"), and in accordance with the requirements of the DISTRICT and laws of the State of Washington as they may be amended and modified.

3.1.2 Reference Specifications

The latest publications of the following organizations are used as reference and abbreviated as follows:

- ☐ AWWA - American Water Works Association
- ☐ ANSI - American National Standards Institute
- ☐ ASA - American Standards Association
- ☐ ASTM - American Society for Testing and Materials
- ☐ APWA - American Public Works Association
- ☐ PSCAA - Puget Sound Clean Air Agency

- ☐ L & I - Washington State Department of Labor and Industries
- ☐ DOH - Washington State Department of Health
- ☐ DOT - Washington State Department of Transportation

3.1.3 Approved Equal

The term "approved equal" shall mean that the quality and characteristics of equipment or materials intended for use must be equal to that named and must receive the approval of the DISTRICT. The DISTRICT shall be the sole arbiter in the determination of equality.

3.1.4 Inspection

The DISTRICT will provide inspection service for all water system construction. The CONTRACTOR shall inform the DISTRICT 72 hours in advance of scheduled operations. Inspection is required for workmanship, location of waterline appurtenances, excavation within 5" of existing water mains, tie-ins, filling, flushing, pressure tests, bacteriological tests, final cleanup and restoration.

3.1.5 Existing Utilities or Obstructions in the Public Right-of-Way

The CONTRACTOR shall notify the underground utilities locating center at 1-800-424-5555 forty-eight (48) hours prior to construction.

If, in the execution of the work, it becomes necessary to interrupt existing surface drainage, sewers, underdrains, conduit, utilities, or similar underground structures or parts thereof, the CONTRACTOR shall be responsible for, and shall take all necessary precautions, to protect and provide temporary services for same. The CONTRACTOR shall, notify DISTRICT and governing body or bodies as soon as possible and, repair all damage to such facilities or structures due to his construction operations at his own expense. Such work shall be done to the satisfaction of the DISTRICT and to the governing body or bodies with jurisdiction over the work.

3.1.6 Salvage of Material

Unless otherwise indicated on the plans or in the specifications, all non-asbestos containing fittings, pipe and other related items shall be and remain the property of the DISTRICT, and shall be carefully removed, salvaged and stockpiled by the CONTRACTOR within the construction area. At the direction of the DISTRICT the CONTRACTOR shall remove and dispose of unwanted material in an appropriate manner and deliver salvageable material to the DISTRICT desired location.

3.1.7 Disposal of Asbestos Material

Important: materials containing asbestos or contaminated with asbestos in any manner whatsoever less than one (1) foot in length, including but not limited to asbestos cement water pipe, asbestos containing waste materials, including but limited to pipe fittings, protective coveralls, hepa filters and any other protective devices shall be bagged, sealed, labeled, and removed from the trench and properly disposed of in strict accordance with asbestos control standards, with Washington Department of Labor and Industries worker safety regulations, and all other applicable laws and regulations. Asbestos-cement water pipe greater than one (1) foot in length shall be disposed of according to the applicable laws and regulations regarding disposal of asbestos cement water piping.

3.1.8 Petroleum Contaminated Soils Removal and Disposal

Petroleum contaminated soils (PCS's) are defined as those soils encountered during the excavation of the project that are suspected to contain petroleum products. The DISTRICT has, during the design of the project, assessed the project alignment for any evidence of PCS's and has, based on this assessment, no reason to expect that PCS's exist in the project area. However, if PCS's are encountered due to private residential home heating fuels or old unrecorded and abandoned gas station sites, or other PCS contributors, the following procedures shall be followed:

- **CONTRACTOR's PCS preconstruction requirements:**

The CONTRACTOR shall have on site, or, have immediate access to, a state approved "Site Safety Plan" (SSP) listing the

required emergency contacts for certified hazardous waste testing and disposal.

The CONTRACTOR shall be required to have a calibrated gas detector at the job site at all times to monitor trench safety.

- **Contaminated Soils Identification**

Identification of PCS's by visual oil sheen or by the smell of diesel or gas shall require the CONTRACTOR to immediately test the trench for gas fumes with an approved calibrated gas detector and take the appropriate action to ensure safety of the CONTRACTOR and DISTRICT personnel.

The CONTRACTOR shall immediately notify the certified hazardous material testing lab identified on the CONTRACTOR's SSP to take samples and make an assessment the level of the site contamination.

The CONTRACTOR shall stop all excavation, seal the end of the trench with Bentonite Clay or other material impervious to petroleum products and, after samples have been taken, backfill the trench with material suitable for compaction.

If it is determined the soils are not hazardous, the CONTRACTOR may resume excavation of the project. If the soils are hazardous then the CONTRACTOR shall, based on the CONTRACTOR's certified testing lab recommendations, leave the contaminated soils in place and change the project alignment to go around the contaminated area or remove and dispose of the PCS's.

- **Contaminated Soils Removal and Disposal**

If the PCS's are to be removed the CONTRACTOR shall have the material taken to an approved storage yard for further testing and containment. The certified testing lab (identified on the CONTRACTOR's SSP) shall submit to the DISTRICT for review its analysis of the PCS and its recommendation for disposal.

3.1.9 Laws and Safety Regulations

All work performed under this specification shall be in compliance with applicable regulations issued by Washington Department of Labor and Industries, the United States

Environmental Protection Agency, Washington Department of Ecology, Washington Department of Fish and Game, the Puget Sound Clean Air Agency, and any other governing body or bodies with jurisdiction over the work described in this specification. All vehicles utilized for disposal of contaminated waste shall be equipped and marked in accordance with the rules and regulations of the Washington State Department of Transportation, and all CONTRACTOR personnel shall be trained and qualified as may be required by applicable law. The CONTRACTOR shall provide and install trench safety security measures in accordance with the requirements of the Washington Industrial Safety and Health Act, and as necessary to protect workers, the work area, and existing utilities, structures, and other affected properties.

3.1.10 Surface Restoration

Roads, driveways, shoulders, landscaping and all other areas, removed, broken, caved-in, settled or otherwise damaged due to the installation of the improvements, shall be repaired and/or resurfaced to match the existing surface or landscaped areas as directed by the DISTRICT and governing body or bodies with jurisdiction over the work.

1) Private driveways, walks, and other surfaced areas shall be repaired, patched or resurfaced as required for the type of surfacing encountered.

2) Existing landscaping, fences, mailboxes, ornamentation, etc. Shall be restored to original or better than original condition.

3.1.11 Asphalt Concrete Pavement / ATB

The finished patch shall have a minimum thickness as shown on the DISTRICT'S standard drawings and as approved by the governing body with jurisdiction over the work. Before placement of the asphalt concrete patch, the base course material shall be shaped to the same section and slope as the finished grade and compacted to 95 percent maximum dry density at optimum moisture content as determined by standard proctor compaction test, ASTM designation D698, Method D. The asphalt concrete shall be rolled and cross-rolled to obtain thorough compaction. The edges of the patch shall be sealed

with asphalt grade AR 4000. Asphalt concrete shall be hot plant-mix, conforming to Standard Specifications.

All asphalt concrete overlays, which are required by the governing body or bodies with jurisdiction over the work, required due to inadequate patching or patch failure, shall be done at the CONTRACTOR'S expense. The governing body or bodies with jurisdiction over the work shall be the sole judge of whether a patch has failed or is inadequate.

3.1.12 Temporary MC Cold Mix Asphalt

Temporary cold mix patching (if allowed) will be kept to a minimum. All roads, streets, driveways, and other pavement areas, or portions thereof, that are removed during the course of the project and do not receive a final patch on a daily basis shall be patched temporarily with medium curing cold premixed asphalt concrete of a thickness sufficient to allow safe, unimpeded pedestrian and equipment and vehicular traffic over the patched area. Temporary patches shall be placed immediately after backfilling and compacting and removed prior to final patching at the CONTRACTOR'S expense. Temporary patches shall be maintained at all times by the CONTRACTOR prior to removal.

3.1.13 Crushed Rock Surfacing

Existing shoulders and gravel surfaces shall be resurfaced with crushed rock surfacing (5/8-inch minus) as shown on the DISTRICT'S standard drawings and as approved by the governing body with jurisdiction over the work. The finished surface shall match the slope, crown, and grade of the existing surface. Materials and placing shall be in accordance with the applicable provisions of, the Standard Specifications. The crushed rock may be spread in one (1) layer and shall be adequately bladed and mixed to obtain even distribution of the rock. Alternate blading and rolling shall continue until the required finish surface and density is obtained.

The crushed rock shall be compacted to at least 95 percent maximum dry density at optimum moisture content. Water shall be added as necessary during blading and rolling operations to obtain the required compaction.

3.1.14 Dust Control

The CONTRACTOR shall keep all roadway surfaces free of all nuisance materials including, but not limited to, dust, mud, gravel, rock and other debris, in accordance with the requirements of all applicable federal, state and local laws and regulations. The CONTRACTOR shall provide a water truck and a street sweeper to clean all nuisance materials. All impacted roadway surfaces shall be cleaned of dust, mud, and other debris during each working day and at the end of each working day. The DISTRICT will furnish water for such cleaning operations at sites as shown on the Contract Plans and Detail Sheets.

3.2 Material Specifications

3.2.1 Water Piping - General

Pipe shall be new and undamaged. Repair of any damage shall be made by the CONTRACTOR at the CONTRACTOR'S sole cost and expense and in a manner satisfactory to the DISTRICT. See Contract Plans and Detail Sheets for required materials and installation.

Pipe shall be transported and handled in such a manner as to ensure final installation in an undamaged condition. Pipe shall be loaded and unloaded using hoists and lifting straps in such a manner so as to avoid shock or damage. Unloading of pipe will be overseen by the DISTRICT. The CONTRACTOR shall notify the DISTRICT not less than two (2) working days in advance as to the time and location of all pipe delivery.

Any pipe damaged beyond repair, as determined by the DISTRICT in its sole discretion, shall be rejected by the DISTRICT, and the CONTRACTOR shall immediately place all such damaged pipe apart from the undamaged pipe and remove such damaged pipe from the site within 24 hours of rejection by the DISTRICT.

3.2.2 Ductile Iron Pipe

Ductile iron pipe shall be thickness class 52 and conform to the latest edition of AWWA C151. Ductile iron pipe shall be cement lined and sealed in accordance with AWWA C104. Cement

lining thickness shall be 1/16-inch. The pipe joints shall conform to AWWA C111. Pipe joints shall be rubber gasket push-on type, Tyton, or approved equal. Thrust-restraint gaskets shall be used where noted on the plans and as required by field conditions

3.2.3 Poly and PVC Pipe

Poly and PVC pipe are not allowed, unless directed by the DISTRICT.

3.2.4 Pipe Fittings

Materials: Pipe fittings shall be short bodied ductile iron for rated working pressure of 350 pounds per square inch (psi) in accordance with AWWA C110 and AWWA C153. Joints for fitting shall be mechanical joint as per AWWA C111 or flanged joint as per AWWA C115 with rubber gaskets. All fittings shall be cement lined and sealed per AWWA C104.

Fittings shall be Tyler, US Pipe, Sigma, Star Pipe products, or as approved by the DISTRICT. All Mechanical Joints, unless otherwise noted on the plans, shall use Mechanical thrust restraint followers. Mechanical thrust restraint shall be EBAA Iron MegaLug/Flange, Romac, RomaGrip, Star Pipe StarGrip, or as approved by the DISTRICT.

3.2.5 Resilient Seated Gate Valves (2" Through and including 12" Valves)

Valves shall be ductile iron body, coated inside and outside with fusion bonded epoxy coating, non-rising stem and "O" ring packing conforming to AWWA C509. Valves shall be Clow series 6100, M&H style 4067, American AVK Company series 65, Waterous series 500 or Mueller A-2360 and Kennedy KS-RW.

3.2.6 Butterfly Valves (Larger than 12")

Working pressure of 150 P.S.I. or Less

Butterfly valves shall be ductile iron body and shall be of the rubber seat type, Class 150B, and meet the full requirements of AWWA C504. Butterfly valves shall be, Dresser 450, Mueller Class 150 lineseal, Pratt groundhog or as specified on the plans.

Working pressure of 150 P.S.I. or More

Butterfly Valves shall be designed and manufactured for a working pressure of 250 P.S.I. and shall be of the rubber seat type, Class 250B with class 125 flanges (bolt pattern), and meet the full requirements of AWWA C504. Butterfly valves shall be M&H 2500 High Test, Pratt Triton HP-250 or approved equal.

3.2.7 Tapping Tee and Valve

The tapping tee shall be of the size shown listed and shall be **Romac FTS420 or Ford FTSC** Fabricated Carbon Steel Epoxy Coated Tapping Sleeve or approved equal. The tapping valve shall be of the size listed and joint configuration shown. The tapping valve shall conform to the general requirements for resilient seated gate valves, of these specifications.

3.2.8 Combination Air-Vacuum Release Valve Assembly

The 1-inch combination air and vacuum release valves shall be installed in accordance with the DISTRICT'S standard drawings.

3.2.9 Valve Boxes, Marker Posts and Asphalt Protection Pad

Valve boxes shall be cast iron, two-piece, 18 inch x 30 inch, with cast iron lid and shall be style 940 (deep lip style) or approved equal. Valve box extensions shall be provided. Refer to DISTRICT'S standard drawings for details. Three feet square x 6-inches thick asphalt pads shall be provided for all installations in graveled shoulders. Refer to DISTRICT'S standard drawings for details.

3.2.10 Fire Hydrant Assemblies

The fire hydrant assembly shall conform to the DISTRICT'S standard detail. Fire hydrants shall be center stem compression, traffic style conforming to AWWA C502.

The fire hydrant resilient seated valve shall comply with the general requirements for resilient seated gate valves, of these specifications. Valves shall be six (6) inch with flange x

mechanical joint connections. Refer to the DISTRICT'S standard drawings for more details on hydrant installation.

The CONTRACTOR shall field verify the depth of bury required for each fire hydrant installation. The CONTRACTOR shall install a corrugated metal pipe, size/style as directed by the governing body or bodies with jurisdiction over the work in the ditch area adjacent to the hydrant assembly, if requested by the DISTRICT or specified on the DISTRICT plans.

3.2.11 Blow-Off Assemblies

All blow-off assemblies shall be in accordance with the DISTRICT'S standard drawings

3.3 Construction Standards

3.3.1 Installation of Pipe

Pipe and appurtenances shall be handled in such a manner as to ensure delivery to the site and final installation in a sound, undamaged condition. Particular care shall be taken to keep the pipe clean.

Pipe and appurtenances shall be loaded and unloaded in a manner so as to avoid shock or damage. Damaged pipe shall be rejected and the CONTRACTOR shall immediately place all damaged pipe apart from the undamaged pipe and shall remove such damaged pipe from the site within 24 hours. All pipe installation shall be accomplished in accordance with AWWA C600. All pipe shall be laid and joined in accordance with the approved design plans with a trench depth of 48 inches unless otherwise stipulated on the DISTRICT plans or directed by the DISTRICT with all fittings and valves at the required locations and all valve stems plumb. Pipe shall be inspected before it is placed in the trench for debris and structural defects and defects in the interior lining and outside coating. The inside of the pipe barrel shall be clean and Pipe ends shall be protected at all times during construction to prevent debris from entering pipe. All pipes shall be transported and delivered to the site with protective end caps in place and all pipe shall be stored in the same manner. Alternatively, pipe ends may be covered by

taping (or banding) 6 mil plastic in such a manner that shall effectively keep the pipe free from any debris during transport and while the pipe is under site storage conditions (i.e. strung along roadway or stockpiled at a staging area). Pipe shall be laid in accordance with the manufacturer's recommendations. Pipe shall be subject to hydrostatic tests and sterilization as specified hereinafter.

3.3.2 Installation of Valves, Valve Boxes and Asphalt Protection Pad

Valves shall have interiors cleaned of all foreign matter and shall be inspected both in open and closed positions prior to installation. The valves and valve boxes shall be set plumb and the valve boxes shall be centered and placed directly over the valves in such a manner that the valve boxes do not transmit shock or stress to the valves. (Crushed rock 5/8" minus or approved equal) shall be carefully tamped around the valve boxes to a distance of three feet on all sides or to the undisturbed face of the trench if it is closer. An asphalt protection pad shall be placed around the completed valve box installation for those installations in graveled shoulder or non-landscaped areas. Refer to the DISTRICT'S standard drawings for further information.

3.3.3 Installation of Valve Marker Posts

All valves shall have valve marker posts installed in close proximity to the location of the valves. Refer to the DISTRICT'S standard drawings for further information.

3.3.4 Installation of Services

Services as specified in the standard details and shown on DISTRICT plans shall be installed by the CONTRACTOR unless otherwise directed by the DISTRICT. An individual service shall be installed to each lot; size and location as indicated on DISTRICT plans. Services shall be installed at the lot corner unless otherwise directed by the DISTRICT. A single run of copper tubing, unless otherwise directed, shall be used for all service installations.

Standard domestic water services: as shown on the plans and according to DISTRICT standard details.

1-1/2-inch and larger services: as shown on the plans and according to DISTRICT standard details.

Note: meter stop shall be preliminarily installed a minimum of 24-inch above construction grade. The copper service line shall be cut, angle meter stop moved to proper depth and re-installed after final grade is established. The final pressure test shall be performed after the services have been set to final grade and all other utilities that may reasonably impact the water facilities are installed.

Refer to the DISTRICT'S standard drawings for further information.

3.3.5 Installation of Back Flow

Backflow assemblies shall be located immediately downstream of the water service connection (or water meter box), within 1 to 2 feet, and prior to any branch connections. Alternate installation locations must be pre-approved by the DISTRICT.

Installation of approved backflow assemblies shall be in accordance with the "Accepted Procedure And Practice In Cross-Connection Control" Manual, of the Pacific Northwest Section of the American Water Works Association latest edition.

Backflow assemblies selected for installation must appear on the most current Washington State Department of Health list of backflow assemblies approved for installation in Washington State.

Prior to installation of a backflow assembly, the installer or developer or property owner must call the DISTRICT at (425)397-3000 to schedule an inspection.

Following an installation inspection approval by a DISTRICT Inspector, the backflow assembly must be scheduled for an initial test by a Washington State Department of Health certified Backflow Assembly Tester.

The property owner is responsible for initial and **annual** testing of any backflow assembly.

The property owner is responsible for freeze protection of any backflow assembly.

The installer or developer or property owner must provide backflow assembly test cock protection with plugs, caps, or covers.

The Water meter must be installed in order to test the backflow assembly.

For more information or technical assistance, please contact the DISTRICT at (425)397-3000.

3.3.6 Alignment

The location of water mains will generally be on the north and east sides of streets. The main, valves, fittings, and services will be staked by the CONTRACTOR. The CONTRACTOR shall also provide centerline and property corners to adequately locate the new facilities. The main shall be installed as indicated on the DISTRICT plans.

3.3.7 Trench Depth

Trench depth shall be 48 inches, unless otherwise indicated on the DISTRICT plans or directed by DISTRICT.

3.3.8 Installation of Water Main Casing

The work includes the jacking and/or auguring and all related work of steel casing pipes at the location(s) shown on the DISTRICT plan(s).

Materials

The casing pipe shall be smooth steel, bare pipe, size and length as noted on DISTRICT plans, 0.250 inch wall thickness and comply with AWWA C200.

Installation

The casing pipe shall be installed such that no voids or spaces exist along the outside diameter of the pipe over its full length.

Refer to the DISTRICT'S standard drawings for further information.

3.3.9 Concrete Blocking

Provide concrete blocking at all fittings and horizontal or vertical angle points. Conform to the standard detail for general blocking herein and the standard details for vertical blocks. All fittings to be blocked shall be wrapped with 6 mil polyethylene. Concrete blocking shall be properly formed with plywood or other acceptable forming materials and shall not be poured around joints. The forms shall be stripped prior to backfilling. Where required, thrust restraint shall be installed with the use of DISTRICT-approved mechanical restraint devices.

3.3.10 Connection to Existing System

The CONTRACTOR shall make, at its sole expense, all connections to existing piping unless otherwise indicated on DISTRICT plans. All connections to the DISTRICT'S existing system shall comply to the DISTRICT'S construction standards, approved in advance, and be scheduled with the DISTRICT'S construction inspector at least 10 working days in advance of the work. The DISTRICT reserves the right to delay the connection to coordinate with other potential work in the area in order to minimize the impact to our customers. Field conditions may require a change in design due to location of existing utilities. The DISTRICT will redesign affected portions and the CONTRACTOR shall install the facilities at the CONTRACTOR'S expense.

Connections to existing mains may be made with either a cut-in or a hot tap. The DISTRICT reserves the right to require a hot tap if disruption of service through use of cut-in installation is judged to be unduly detrimental. The CONTRACTOR shall be responsible for ensuring that reasonable efforts are made to inform customers of any service connections. If a cut-in is used, a valve must be added to the main line, unless existing valves provide a valve spacing of 1000 feet or less in the vicinity of the new connection.

It is understood that any information concerning existing utilities or obstructions shown on the plans is made available to the CONTRACTOR for informational purposes only, and it is not guaranteed accurate by the DISTRICT. Incompleteness or error in this information shall not be cause for claim against the DISTRICT. It shall be the responsibility of the CONTRACTOR

to determine the actual location and numbers of existing utilities and obstructions.

The CONTRACTOR shall be responsible for the protection and proper operation of all existing piping and appurtenances during construction, and shall take care not to cause or permit any damage to protective coatings or impairment of the operation of the existing system in any way whatsoever. All pipe and materials used when connecting to existing systems shall be disinfected with a solution of water and chlorine (200 parts per million) and rinsed with clean water prior to connection

The CONTRACTOR shall protect all existing utilities, structures, and landscaping from damage of any kind; any such damage shall be repaired by the CONTRACTOR at no expense to the DISTRICT.

If a connection is to be made to an existing asbestos-cement water main, the CONTRACTOR shall obtain all permits or authorization, provide all necessary worker certifications, and have on-site required protective clothing and disposal bags. No asbestos-related work shall begin without proper permits, certifications, protective clothing, and disposal bags.

3.3.11 Temporary Construction Connection to Existing System

Temporary Construction connections shall be provided by means of a DISTRICT installed (at developer cost) RPBA and meter (hydrant watchdog). Contractor shall install a temporary blow-off (field located per the DISTRICT'S inspector instructions) to accommodate connection via hydrant watchdog to the DISTRICT'S water system. Alternatively, at the DISTRICT'S discretion an in-line DCVA of appropriate size may be required by PUD staff. Permanent connection to the DISTRICT'S existing water system will only be allowed **after** PUD inspector verifies satisfactory results of the bacteriological and pressure tests.

3.3.12 Valve Operation

Only DISTRICT personnel are permitted to operate valves on the DISTRICT existing water system, including emergencies unless personnel, property or environmental safety is threatened. Exposing a potable water line during construction without the DISTRICT's approval can result in a penalty being imposed per DISTRICT policy and procedure manual.

3.3.13 Earthwork

Clearing, Grubbing, and Excavation

Specifications covering clearing, grubbing and excavation apply to all work in which the DISTRICT has obtained a permit(s) and agreements or easements to do such work. If, in the course of the project, damage is occurring or may occur to the public right-of-way and/or private property, the CONTRACTOR shall adjust his/her mode of operation to alleviate such damage. The DISTRICT may stop work if proper work procedures are not instituted to eliminate or reduce damage.

All damage to public and private property shall be restored to the satisfaction of the DISTRICT and the appropriate governing body or bodies with jurisdiction over the work.

Clearing and grubbing of the access areas and work site shall be accomplished in advance of excavation and move-in of equipment and materials. Clearing and grubbing shall conform to the Standard Specifications. The CONTRACTOR shall remove and dispose of all debris at a approved disposal site which meets State and Snohomish County standards.

Foundation Preparation and Bedding

Foundation preparation and bedding shall be in accordance with the applicable provisions of the Standard Specifications.

In case unstable or unsuitable existing material is encountered at the trench bottom, the DISTRICT may direct the use of suitable bedding material that shall be

placed in accordance with the Standard Specifications. Wet trench conditions will not necessarily be considered an indication of unstable conditions. The trench shall be de-watered and an inspection made by the DISTRICT to determine the suitability of the trench material.

Bedding Material

Bedding material is required around valves, fittings and services and shall consist of crushed rock 5/8" minus or approved equal; provided, however, that the source and quality of such material shall be subject to approval by the DISTRICT.

Trench Backfill and Compaction

Trench backfill and compaction shall be in accordance with the DISTRICT and the appropriate governing body or bodies with jurisdiction over the work.

Imported trench backfill material shall be placed in loose lifts no greater than 12 inches thick. Each lift shall be compacted by mechanical means to at least 95 percent of the modified Proctor maximum dry density as determined by the ASTM D 1557 test procedure, and to a firm and non-yielding condition. The CONTRACTOR shall maintain the backfill material moisture content within 2 percent of the optimum moisture content as determined by the ASTM D 1557 test procedure.

In cases where existing native soil removed from excavations will be used as trench backfill, the backfill material shall be placed in loose lifts no greater than 10 inches thick. Each lift shall be compacted by mechanical means to at least 95 percent of the modified Proctor maximum dry density as determined by the ASTM D 1557 test procedure, and to a firm and non-yielding condition. The CONTRACTOR shall maintain the backfill material moisture content within 2 percent of the optimum moisture content as determined by the ASTM D 1557 test procedure.

3.4 Testing and Sterilization

3.4.1 Hydrostatic Pressure Test

Prior to final acceptance of the system, the entire system shall be subject to hydrostatic pressure testing for 2 hours at 250 pounds per square inch (psi) at the lowest point of main being tested and a minimum of 200 psi at the highest point (or as directed by the DISTRICT). Note that the District requires the main to be pressure tested in increments **of no greater than 1500 feet**. If the pressure at the end of the two hour test (with out pumping) is between 245 and 250 psi, then hydrostatic testing allowance shall be as described below in tabular form (see 3.4.2 Leakage Tests). **If the pressure falls below 245 PSI, then the water pipe being tested has failed for that portion of main.** Test shall be conducted with hydrants open against port caps. After all utilities are installed and angle stops reset to final grade, any leaks or imperfections developed under said pressure shall be remedied by the CONTRACTOR before final acceptance of the system. The CONTRACTOR shall provide all necessary equipment and shall perform all work connected with the tests and conduct said tests in the presence of a DISTRICT inspector. The scale of the pressure gage used for the pressure test shall have a minimum of 2 psi increments. Insofar as practical, tests shall be made with pipe joints, fittings and valves exposed for inspection. Preliminary pressure tests are recommended for water mains after services are installed.

3.4.2 Leakage Tests

Leakage tests shall be made concurrently with the hydrostatic pressure test and shall only be allowed if during the 2 hour pressure test the pipe being tested has maintained at least 245 psi after being pressurized a single time. If the pressure during the test has not fallen to less than 245 psi **(with out any re-pumping)**, then hydrostatic testing allowance shall be as follows:

Allowable Leakage Per 1000 Ft. Of Pipeline - Gallons Per 2 hours

Nominal Pipe Diameter – inches	**4**	6	8	12
Gallons Per 2 hours	0.47	0.71	0.95	1.42

3.4.3 Disinfection and Bacteriological Purity Test

Disinfection of the new water system shall be required prior to completion of the project and connection to the public water system and shall be in accordance with AWWA C651, and the drinking water standards of the State of Washington Department of Health and shall be NSF approved. The concentration of chlorine in the water shall be 50 parts per million throughout the pipe and this solution shall be held for a period of 24 hours. Disinfection of the entire water system installed or disturbed including pipe, pipe fittings, valves and appurtenances, is required to conform with the specifications stated herein.

After the water main has been successfully sterilized and flushed, the DISTRICT's inspector will take a representative number of bacteriological purity tests.

A satisfactory bacteriological report must be obtained and provided to the DISTRICT before the main is placed in service.

3.4.4 Disposal of Chlorinated Water

Water containing chlorine residuals shall not be disposed of into any storm drainage system, creek, stream, river, or lake.

Water with high chlorine residuals (above drinking water levels) shall be flushed into a tanker truck and disposed of in an appropriate manner.

Other methods of flushing and disposal of chlorinated water must be approved by the DISTRICT.

3.5 Traffic Maintenance

CONTRACTORS shall conduct work so as to interfere as little as possible with public travel. CONTRACTORS shall also provide and maintain suitable detour routes. The CONTRACTOR shall obtain written permission/permit from the appropriate jurisdiction for road closures, except verbal

permission may be used in an emergency. Work which involves State or County road rights of way shall be restricted to the hours between 8:00 a.m. and 5:00 p.m. and no work shall be allowed in such rights of way on Saturdays, Sundays or Holidays unless authorized by the governing jurisdictions and by the DISTRICT.

3.6 Safety

CONTRACTORS will be solely and completely responsible for conditions at job sites, including safety of all persons and property during the performance of work. This requirement will apply continuously and not be limited to normal working hours.

The CONTRACTOR shall comply with safety and health standards identified in the current edition of the "Standard Specifications for the Road, Bridge and Municipal Construction," published by DOT and the APWA (Washington State Chapter), including, without limitations, Section 1-07.1 and 1-07.23 of these specifications.

The CONTRACTOR shall prepare a Traffic Control Plan, in accordance with DOT requirements and the Manual on Uniform Traffic Control Devices (MUTCD).

General Notes

1. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST VERSION OF THE DISTRICT'S "STANDARDS AND SPECIFICATIONS FOR DESIGN AND CONSTRUCTION." CONTRACTOR SHALL HAVE A COPY OF THIS DOCUMENT AND A MINIMUM OF TWO SETS OF THE APPROVED WATER PLANS ON-SITE AT ALL TIMES. THE LATEST VERSION OF THE DISTRICT'S STANDARDS CAN BE FOUND AT https://www.snopud.com/account/services/water/get-water/policies-and-procedures/?hilite=water+policies UNDER THE LINK LABELED "Appendix A: Standards & Specifications for Design & Construction (3 MB)"

2. BEFORE COMMENCING ANY CONSTRUCTION, CONTRACTOR SHALL ATTEND A PRE-CONSTRUCTION MEETING WITH THE DISTRICT'S ENGINEER AND WATER INSPECTOR. APPROVED DRAWINGS ARE SUBJECT TO MINOR FIELD ADJUSTMENTS AS REQUIRED BY PUD WATER INSPECTOR.

3. THE CONTRACTOR SHALL NOTIFY THE UNDERGROUND UTILITIES LOCATING CENTER AT **811** 48 HOURS PRIOR TO CONSTRUCTION. CONTRACTOR TO VERIFY LOCATION OF EXISTING CULVERTS AND UNDERGROUND UTILITIES. ANY CONFLICT WITH EXISTING UTILITIES TO BE MITIGATED AT THE SOLE EXPENSE OF THE DEVELOPER.

4. ALL FILLING AND FLUSHING OF THE NEWLY INSTALLED MAIN SHALL BE THROUGH A DISTRICT PROVIDED (AT DEVELOPER COST--$900 NON-REFUNDABLE PLUS USUAGE) RPBA AND METER (SITE SPECIFIC FILL STATION, I.E. HYDRANT WATCHDOG). INSTALL A TEMPORARY BLOW OFF (FIELD LOCATED PER THE DISTRICT'S INSPECTOR INSTRUCTIONS) TO ACCOMMODATE CONNECTION VIA HYDRANT WATCHDOG TO THE DISTRICT'S WATER SYSTEM. ALTERNATIVELY, AT THE DISTRICT'S DISCRETION AN IN-LINE DCVA OF APPROPRIATE SIZE MAY BE REQUIRED BY PUD STAFF. PERMANENT CONNECTION TO THE DISTRICT'S EXISTING WATER SYSTEM WILL ONLY BE ALLOWED AFTER PUD INSPECTOR VERIFIES SATISFACTORY RESULTS OF THE BACTERIOLOGICAL AND PRESSURE TESTS.

5. THE CONTRACTOR WILL MAINTAIN A SET OF DISTRICT APPROVED PLANS ON SITE AT ALL TIMES WITH AS-BUILT INFORMATION THAT THE DISTRICT'S INSPECTOR CAN REQUEST TO VERIFY. UPON CONSTRUCTION COMPLETION, THE CONTRACTOR SHALL PROVIDE THE DISTRICT WITH A COPY OF ALL AS-BUILTS GENERATED THROUGHOUT THE COURSE OF THE PROJECT. PRIOR TO FINAL PLAT ACCEPTANCE, THE DEVELOPER SHALL SUBMIT STAMPED COMPLETED AS-BUILT DRAWINGS ON MYLAR TO THE DISTRICT'S ENGINEER.

6. ALL DISTRICT FACILITIES (HYDRANTS, WATER MAINS, AND METERS) SHALL BE PLACED IN THE COUNTY/CITY RIGHT OF WAY OR **IN A DISTRICT APPROVED WATER/UTILITIES EASEMENT**.

7. ALL COMMERCIAL SERVICES SHALL INSTALL AN RPBA IMMEDIATELY DOWNSTREAM OF AND ADJACENT TO THE METER. ALL IRRIGATION SERVICES SHALL INSTALL A DCVA IMMEDIATELY DOWNSTREAM OF AND ADJACENT TO THE METER. SUCH ASSEMBLY SHALL BE TESTED PRIOR TO INITIATION OF WATER SERVICE. ALL COMMERCIAL FIRE SERVICES SHALL HAVE A DCDA INSTALLED IN A VAULT IN PROXIMITY OF THE CONNECTION TO THE WATER MAIN. ALL RESIDENTAL FIRE SERVICES SHALL HAVE A DCVA INSTALLED IN PROXIMITY OF THE METER WITH THE EXCEPTION OF A POTABLE "FLOW THROUGH" RESIDENTIAL FIRE SYSTEM.

8. DISCHARGE WATERS CONTAINING CHLORINE RESIDUALS SHALL BE DISPOSED OF IN A PROPER MANNER AS DIRECTED BY THE DISTRICT'S INSPECTOR. IN NO CIRCUMSTANCES SHALL WATER CONTAINING CHLORINE BE DISCHARGED INTO NATURAL SURFACE WATERS.

9. ANY IMPACTS TO EXISTING PUD WATER FACILITIES DUE TO THE DEVELOPER'S PROPOSAL SHALL BE MITIGATED AT THE DEVELOPER'S EXPENSE.

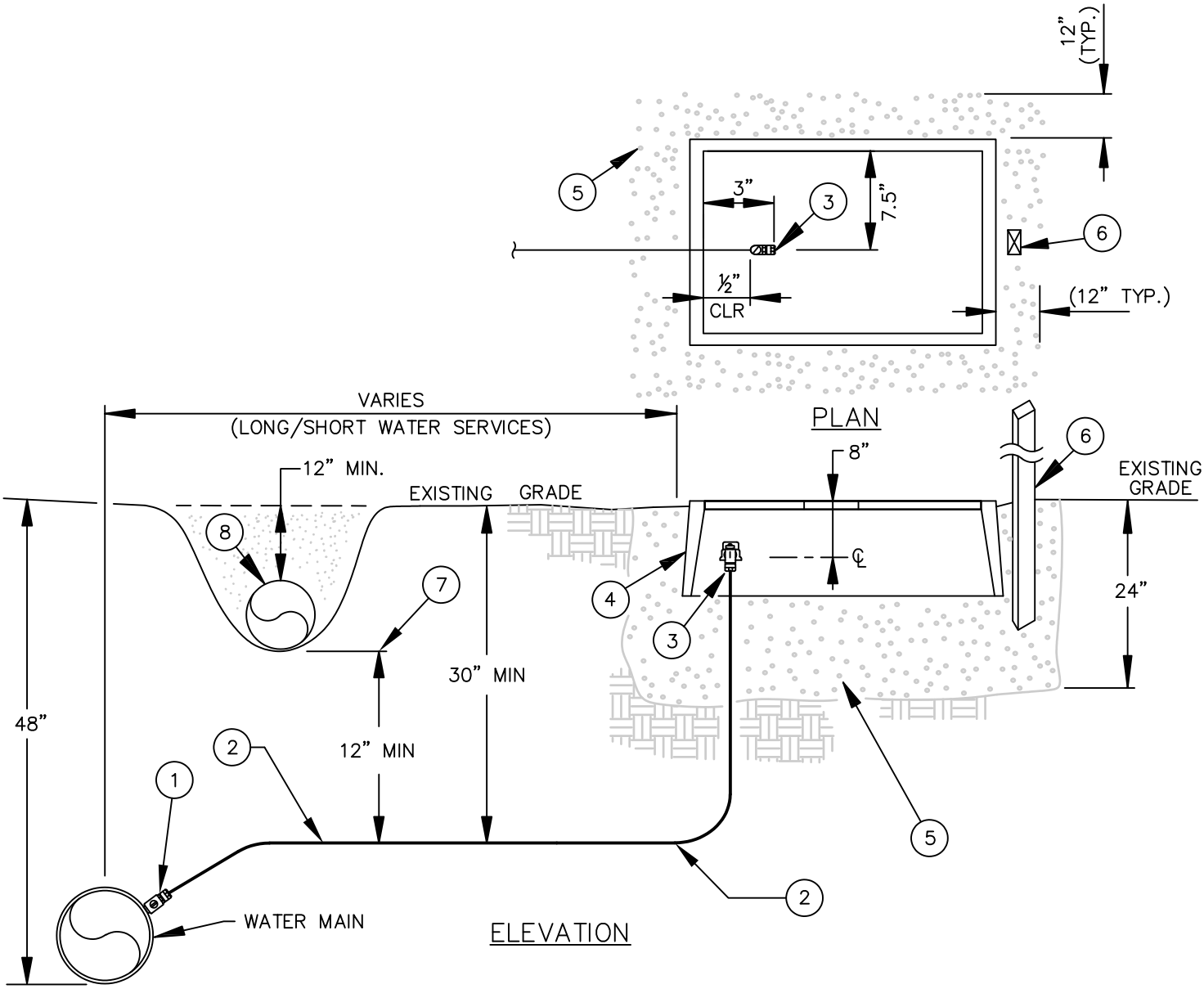
10. THE DISTRICT WILL SECURE THE UTILITY RIGHT-OF-WAY PERMIT REQUIRED FOR INSTALLATION OF WATER MAINS AND APPURTENANCES. THE DEVELOPER SHALL SECURE ALL PERMITS REQUIRED FROM LOCAL AND STATE AGENCIES INCLUDING BUT NOT LIMITED TO LANE CLOSURE, TRAFFIC CONTROL, GRADING AND ALL MATTERS RELATED TO ASBESTOS WORK, REMOVAL AND DISPOSAL (IF APPLICABLE TO THE PROJECT). WORK ON ASBESTOS-CEMENT PIPE SHALL NOT COMMENCE WITHOUT PROPER PERMITS, CERTIFICATIONS, WORKER PROTECTIVE CLOTHING AND BREATHING APPARATUS, AND APPROVED ASBESTOS DISPOSAL BAGS.

11. ALL NEW PLATS (AND COMMERCIAL PROJECTS) WILL REQUIRE A 3-VALVE CLUSTER WITH APPROPRIATE MAIN SIZE VALVES AT **EACH** SUPPLY POINT OF CONNECTION TO THE PUD'S WATER SYSTEM. TIE-IN LOCATIONS MUST BE POT-HOLED AND VERIFIED FOR DEPTH, SIZE AND MATERIAL AT LEAST ONE DAY PRIOR TO SHUTDOWN. CONTRACTOR SHALL SCHEDULE SHUTDOWNS WITH THE DISTRICT AT LEAST FIVE (5) WORKING DAYS IN ADVANCE. CONNECTION TO PUD WATER SYSTEM INCLUDING SWABBING WITH CHLORINE DISINFECTANT SHALL NOT BE DONE WITH OUT PUD STAFF PRESENT. NO EXCEPTIONS SHALL BE MADE UNLESS SPECIFIED ON THE APPROVED PLANS BY THE PUD'S ENGINEER.

12. ALL WATER SERVICES TO BE INSTALLED ON **EXISTING PUD MAINS** SHALL BE INSTALLED BY PUD CREWS AT DEVELOPER'S COST. LIKEWISE ANY RETROFIT REQUIRED TO EXISTING PUD FACILITIES SHALL BE DONE BY PUD CREW (VIA A CUSTOMER CONTRACT) AT DEVELOPER COST.

13. PRESSURE TEST SHALL BE FOR TWO HOURS AT 250 PSI. IF THE PRESSURE AT THE END OF THE TWO HOUR TEST (WITH OUT PUMPING) IS BETWEEN 245 AND 250 PSI, THEN HYDROSTATIC TESTING ALLOWANCE SHALL BE AS DESCRIBED IN TABULAR FORM IN **AWWA C600**. IF THE PRESSURE FALLS BELOW 245 PSI, THEN THE WATER PIPE BEING TESTED HAS FAILED. PRESSURE TEST SHALL BE AGAINST HYDRANT PORTS (WITH HYDRANT FULLY OPEN), AGAINST ALL CLOSED BLOW OFF ASSEMBLY CAPS WITH VALVE FULLY OPEN AND AGAINST ALL ANGLE METER STOPS. THE CURB STOP ON AIR RELEASE VALVES SHALL BE CLOSED FOR THE PRESSURE TEST AND THEN OPENED AFTER SATISFACTORY TESTING.

14. ALL MECHANICAL JOINTS, UNLESS OTHERWISE NOTED ON THE PLANS, SHALL USE MECHANICAL THRUST RESTRAINT FOLLOWERS. MECHANICAL THRUST RESTRAINT SHALL BE EBAA IRON MEGALUG/FLANGE, ROMAC, ROMAGRIP, STAR PIPE STARGRIP, OR AS APPROVED BY THE DISTRICT. ALL DEAD ENDS (INCLUDING THOSE CREATED VIA A TEMPORARY BLOW OFF) AND ALL BENDS SHALL USE RESTRAINED JOINT. FOR 8" MAIN ANY BEND WILL BE RESTRAINED APPROXIMATELY 120' UTILIZING 2 MEGA LUGS AND 6 FIELD-LOK GASKETS (OR APPROVED EQUAL). ANY 8 INCH DEAD END (INCLUDING ALL DEAD END CREATED BY TEMPORARY BLOW-OFFS) WILL BE RESTRAINED APPROXIMATELY 60'UTILIZING 1 MEGA LUG AND 3 FIELD-LOK GASKETS. ALL JOINTS OF ANY FIRE SERVICE FROM THE MAIN INTO THE MECHANICAL ROOM SHALL BE 100% MECHANICALLY RESTRAINED. FOR 12" DI MAIN A BEND SHALL BE RESTRAINED APPROXIMATELY 160' USING 8 TOTAL FIELD-LOK GASKETS AND 2 MEGA-LUGS AND A DEAD-END RUN SHALL BE RESTRAINED 80' UTILIZING 4 FIELD-LOK GASKETS WITH 1--MEGALUG. LIKEWISE, A 16" MAIN SHALL BE RESTRAINED APPROXIMATELY 180' AT A BEND UTILIZING 10 FIELD-LOK GASKETS AND 2-MEGA-LUGS. A DEAD 16" RUN SHALL BE RESTRAINED APPROXIMATELY 90' UTILIZING 5 FIELD-LOK GASKETS AND A MEGA-LUG. PLEASE ALSO SEE STANDARD DETAIL 800.



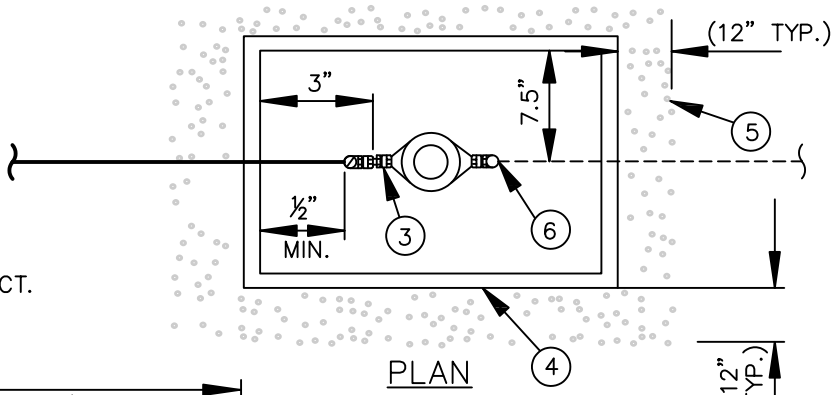
LEGEND

1. 1" AWWA THREAD X MUELLER 110 (OR A.Y. MCDONALD OR FORD QUICK JOINT) BALL CORPORATION STOP.
2. 1" TYPE "K" SOFT COPPER TUBING – CUT TO FIT–ONE CONTINUOUS LENGTH.
3. TRUE 1" MUELLER 110 (OR A.Y. MCDONALD OR FORD QUICK JOINT) BALL ANGLE METER STOP. INSTALL A WILKINS MODEL NR3HRSCDULU PRV AHEAD OF METER AS DIRECTED BY DISTRICT. PRV INSTALLATION WITH A ⅝" X ¾" METER REQUIRES INSTALLATION OF A FORD A34–NL METER COUPLING ADAPTER COMPACT BODY STYLE, ¾" PRV ADAPTOR MIP X ¾" MALE METER THREADS AND ¾" STRAIGHT METER SWIVEL NUT X ¾" MIP.
4. METER BOX SHALL BE SIGMA/RAVEN RMB–152712 OR MID–STATES MSBCF1527–12. LID SHALL BE NICOR B65NLBLKWAThS.
5. 12" IN WIDTH AND 24" IN DEPTH OF 5/8" CRUSHED ROCK SURROUNDING THE METER BOX.
6. MARK BACK SIDE OF SERVICE WITH BLUE 8' 2x4 (5' EXPOSED)
7. MAINTAIN A MINIMUM OF 12" CLEARANCE UNDER EXISTING OR PROPOSED DRAINAGE DITCH OR CULVERTS.
8. INSTALL CULVERT (MIN. LENGTH 10') FOR ALL SERVICES UNLESS OTHERWISE DIRECTED BY DISTRICT. INSTALL CULVERT PER CITY OF LAKE STEVENS AND/OR SNOHOMISH COUNTY EDDS.

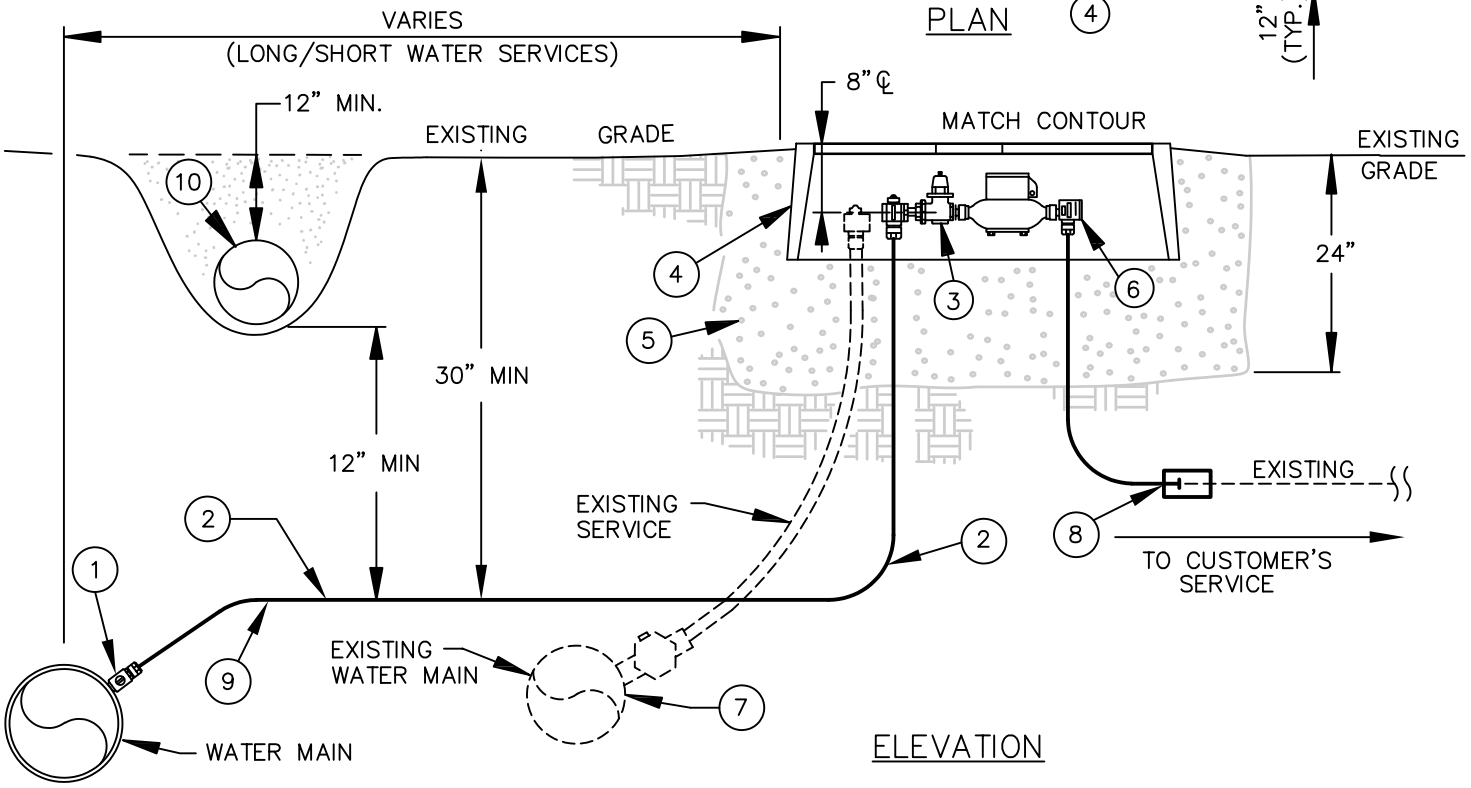
SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	1" STANDARD DOMESTIC WATER SERVICE	DATE 2022 ENGR MMS	STANDARD 101

NOTES:

1. ALL EXISTING PRV DEVICES WILL BE TRANSFERRED OR REPLACED TO NEW SERVICE AT METER LOCATION.
2. ALL COMMERCIAL SERVICES ARE TO BE BACK FLOW PROTECTED WITH AN RPBA.
3. RELOCATE SERVICE AS DIRECTED BY DISTRICT.



PLAN

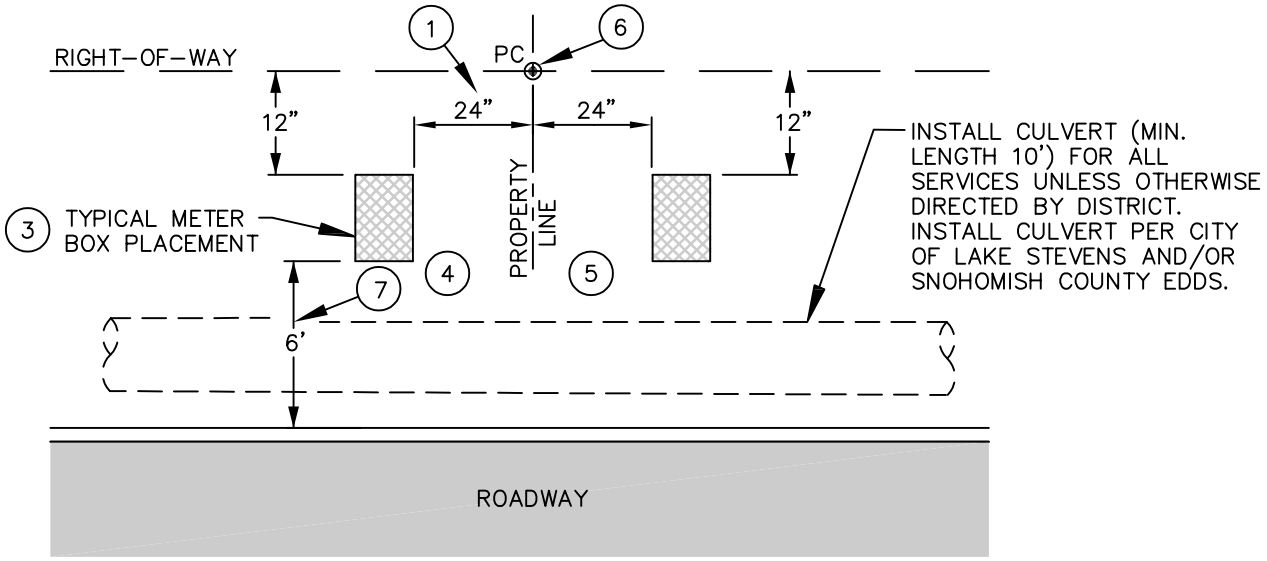


ELEVATION

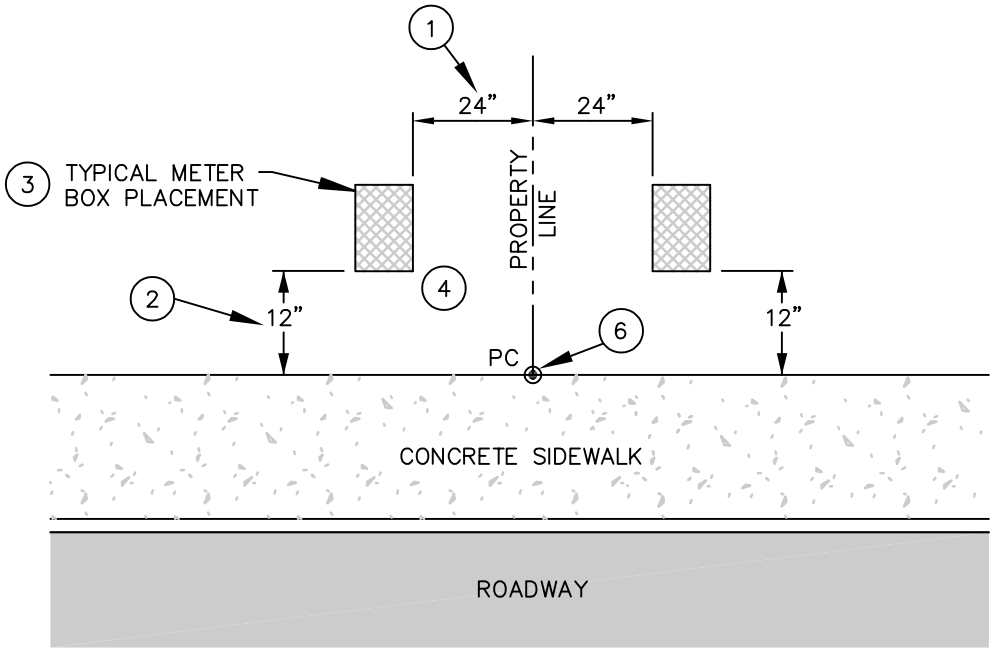
LEGEND

1. 1" AWWA THREAD X MUELLER 110 (OR A.Y. MCDONALD OR FORD QUICK JOINT) BALL CORPORATION STOP.
2. 1" TYPE "K" SOFT COPPER TUBING – CUT TO FIT–ONE CONTINUOUS LENGTH.
3. TRUE 1" MUELLER 110 (OR A.Y. MCDONALD OR FORD QUICK JOINT) BALL ANGLE METER STOP. INSTALL A WILKINS MODEL NR3XLHRSCDU PRV AHEAD OF METER AS DIRECTED BY DISTRICT. PRV INSTALLATION WITH A ⅝" X ¾" METER REQUIRES INSTALLATION OF A FORD A34–NL METER COUPLING ADAPTER COMPACT BODY STYLE, ¾" PRV ADAPTOR MIP X ¾" MALE METER THREADS AND ¾" STRAIGHT METER SWIVEL NUT X ¾" MIP.
4. REPLACE EXISTING METER BOX WITH SIGMA/RAVEN RMB–152712 OR OLDCASTLE/CARSON HW 1527BCF HDPE W/12" BODY. REPLACE EXISTING LID WITH NICOR B65NLBLKWAThS.
5. 12" IN WIDTH AND 24" IN DEPTH OF 5/8" CRUSHED ROCK SURROUNDING THE METER BOX.
6. REPLACE EXISTING METER AND INSTALL ANGLE SINGLE CHECK UNLESS DIRECTED OTHERWISE BY THE DISTRICT'S INSPECTOR.
7. IF EXISTING WATER MAIN IS TO REMAIN IN SERVICE, CLOSE EXISTING CORPORATION STOP AND CUT EXISTING SERVICE LINE AT CORPORATION STOP.
8. 3/4" OR 1" TYPE–K COPPER PER METER SIZE. PROVIDE NECESSARY FITTINGS TO TRANSITION TO CUSTOMER SERVICE.
9. ALL NEW WATER SERVICE LINES SHALL BE INSTALLED IN A STRAIGHT LINE FROM WATER MAIN TO METER BOX.
10. INSTALL (MIN. LENGTH OF 10') CULVERT FOR ALL SERVICES UNLESS OTHERWISE DIRECTED BY DISTRICT. INSTALL CULVERT PER CITY OF LAKE STEVENS AND/OR SNOHOMISH COUNTY EDDS. SIZE DETERMINED BY SNO. COUNTY &/OR PLANS.

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	EXISTING 1" SERVICE REPLACEMENT	DATE 2022 ENGR MMS	STANDARD 102



ROADWAY WITHOUT SIDEWALK

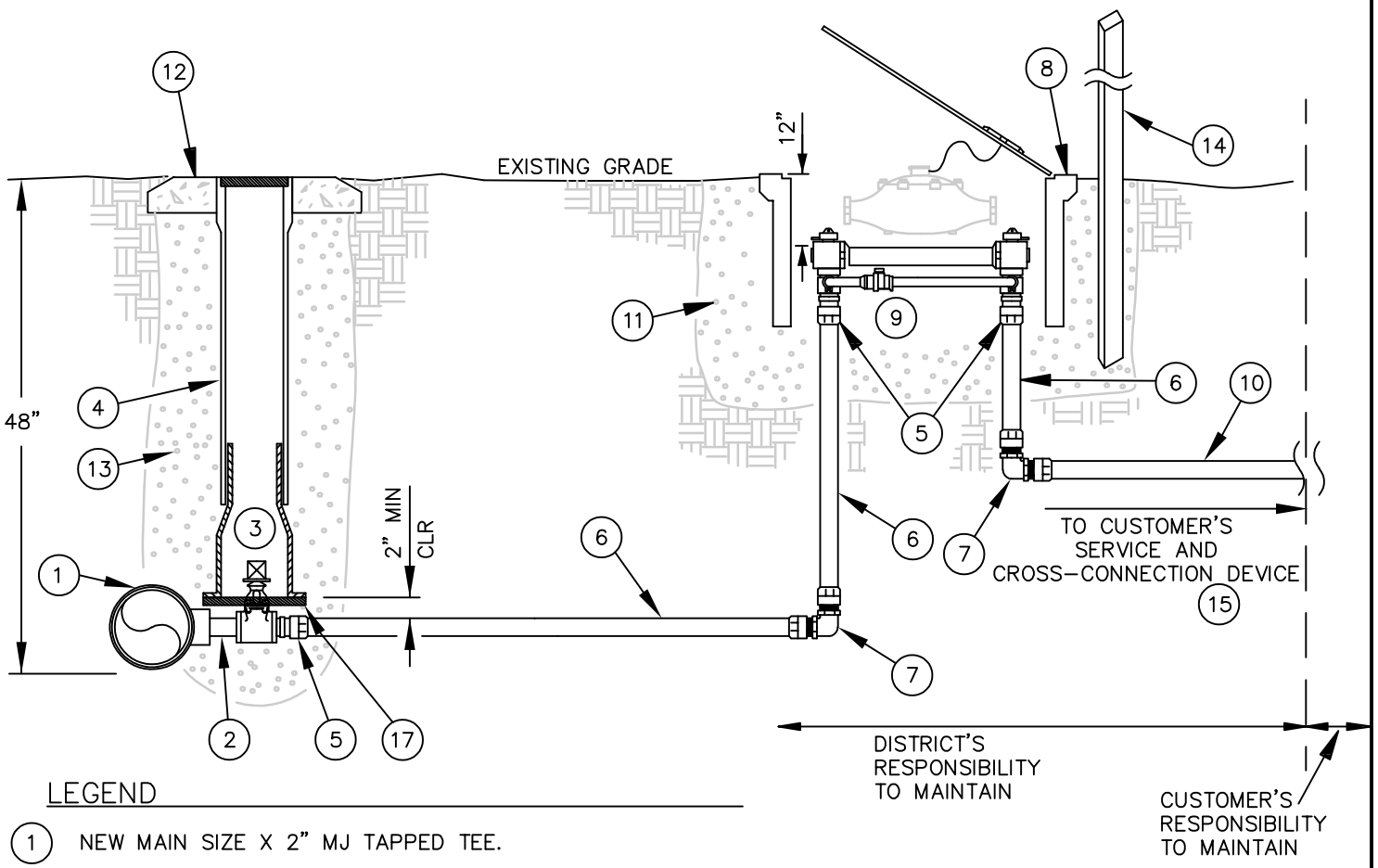


ROADWAY WITH SIDEWALK

LEGEND

1. ALL METER BOXES SHALL BE PLACED 2' FROM PROPERTY CORNERS.
2. METERS SHALL BE PLACED 1' BEHIND SIDEWALK AT SIDEWALK GRADE.
3. METERS SHALL BE PLACED IN NON-TRAFFIC AREAS WHERE POSSIBLE.
4. ALL SERVICE TAPS SHALL BE A MINIMUM OF 10' UPSTREAM OF BLOW-OFF ASSEMBLY.
5. MAINTAIN A MINIMUM OF 12" CLEARANCE UNDER EXISTING OR PROPOSED DRAINAGE DITCH OR CULVERTS.
6. PROPERTY CORNERS SHALL BE CLEARLY LOCATED PRIOR TO SERVICE INSTALLATION.
7. METERS SHALL BE PLACED 6' FROM EDGE OF ASPHALT.

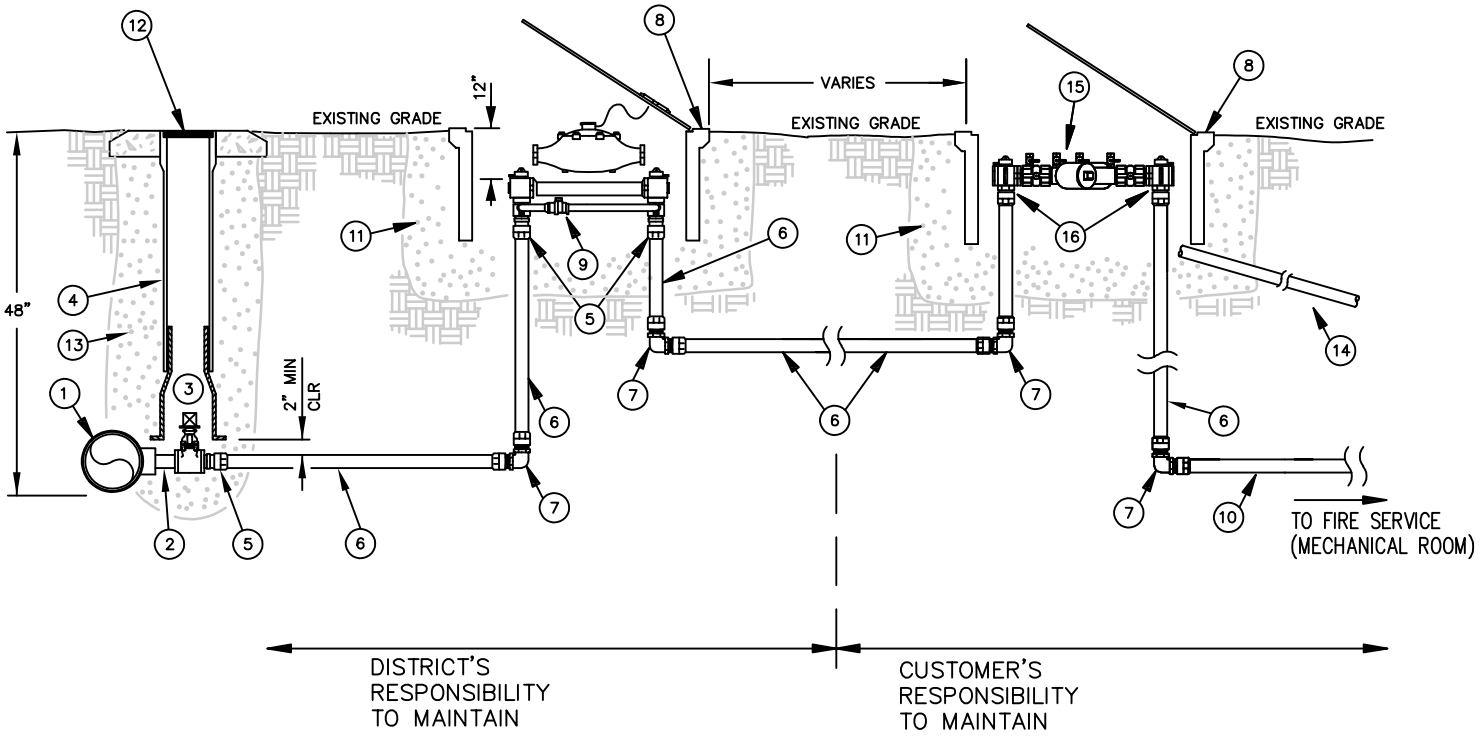
SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	TYPICAL GUIDELINES FOR PRE-RUN WATER SERVICES	DATE 2021 ENGR MMS	STANDARD 103



LEGEND

1. NEW MAIN SIZE X 2" MJ TAPPED TEE.
2. 2" BRASS NIPPLE (6" LONG)
3. 2" THREADED RESILIENT SEATED GATE VALVE.
4. VALVE BOX (SEE STANDARD DETAIL 407)
5. 2" MUELLER 110 (OR FORD QUICK JOINT) X M.I.P. STRAIGHT COUPLING.
6. 2" TYPE K STRAIGHT LENGTH OF SOFT COPPER OR BRASS TUBING AS APPROVED BY THE DISTRICT. PIPE SHALL BE CUT TO FIT IN ONE CONTINUOUS LENGTH.
7. 2" MUELLER 110 (OR A.Y. MCDONALD OR FORD QUICK JOINT) QUARTER BEND COUPLING.
8. MID-STATES MSBCF1527-12 OR SIGMA CORP RMB152712-SWM-[B OR W] AND NICOR LID B65NBLKWATSBU. APPROVED H20 LOAD RATING.
9. 2" METER SETTER WITH CHECK VALVE, 1" HIGH BYPASS A.Y. MCDONALD METER SETTER 30F708WDFF776.
10. 3' MINIMUM STRAIGHT LENGTH OF 2" TYPE K SOFT COPPER TAIL PIECE.
11. 12" IN WIDTH AND 24" IN DEPTH OF 5/8" CRUSHED ROCK OR SAND BEDDING SURROUNDING THE METER BOX.
12. VALVE PROTECTION PAD – REFER TO DISTRICT STANDARD 404.
13. 5/8" CRUSHED ROCK OR SAND BEDDING SURROUNDING THE VALVE BOX.
14. MARK BACK SIDE OF SERVICE WITH BLUE 8' 2x4 (5' EXPOSED)
15. ALL COMMERCIAL METERS REQUIRE AN RPBA IN A HOT BOX. REFER TO DISTRICT STANDARD 604A, 604B, AND 604C.
16. SET VALVE BOX ON ETHAFOAM 2" THICK (TYP)

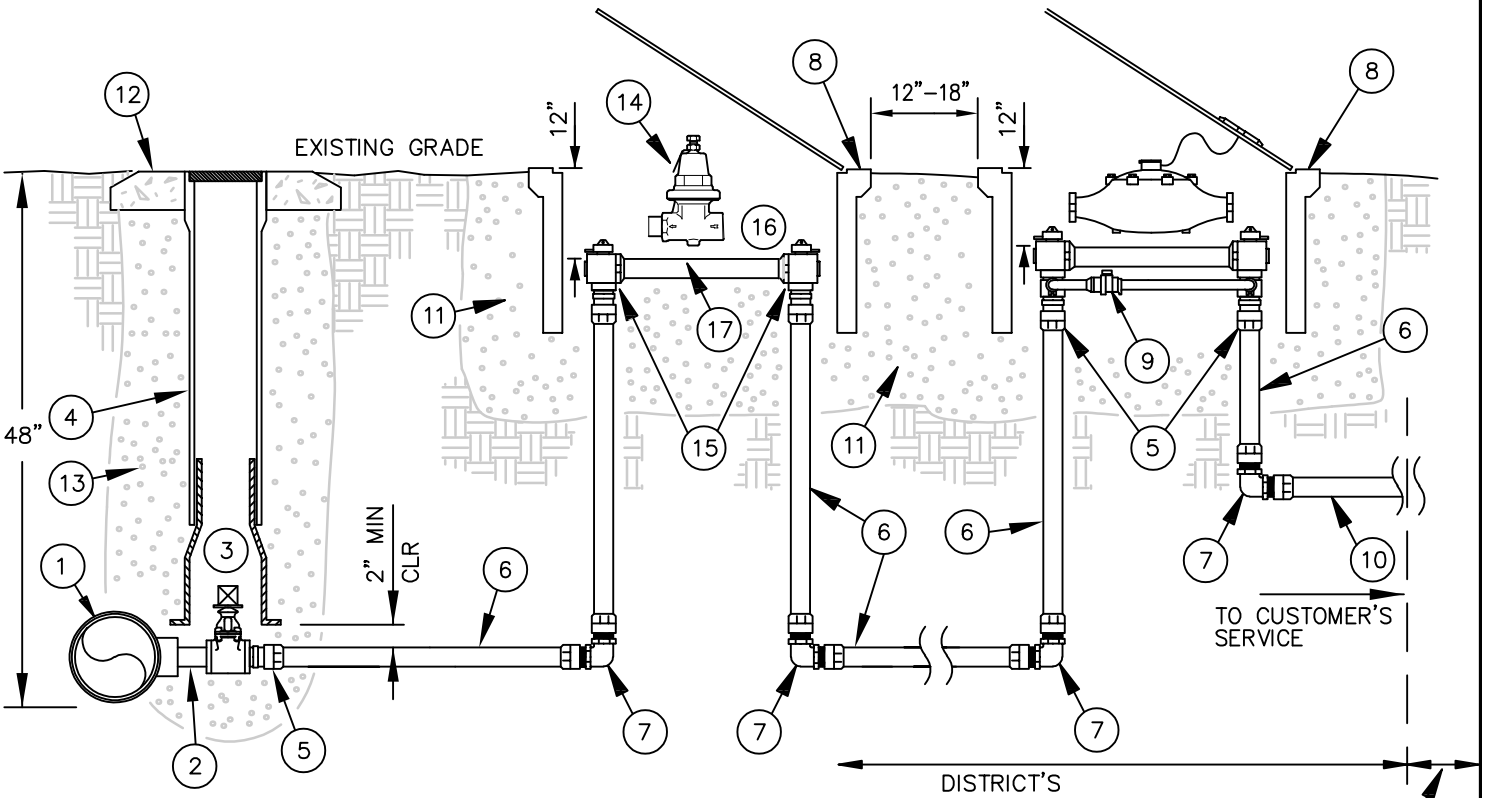
SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	1 1/2" – 2" STANDARD METER INSTALLATION	DATE 2021 ENGR MMS	STANDARD 111



LEGEND

1. NEW MAIN SIZE X 2" MJ TAPPED TEE.
2. 2" BRASS NIPPLE (6" LONG).
3. 2" THREADED RESILIENT SEATED GATE VALVE.
4. VALVE BOX (SEE STANDARD DETAIL 407)
5. 2" MUELLER 110 (OR FORD QUICK JOINT) X M.I.P. STRAIGHT COUPLING.
6. 2" TYPE K STRAIGHT LENGTH OF SOFT COPPER OR BRASS TUBING AS APPROVED BY THE DISTRICT. PIPE SHALL BE CUT TO FIT IN ONE CONTINUOUS LENGTH.
7. 2" MUELLER 110 (OR A.Y. MCDONALD OR FORD QUICK JOINT) QUARTER BEND COUPLING.
8. MID STATES MSBCF1730–18 AND MSBCF 1730–RL. APPROVED H20 LOAD RATING.
9. 2" METER SETTER WITH CHECK VALVE, 1" HIGH BYPASS A.Y. MCDONALD METER SETTER 30F708WDFF776.
10. 3' MINIMUM STRAIGHT LENGTH OF 2" TYPE K SOFT COPPER TAIL PIECE.
11. 12" IN WIDTH AND 24" IN DEPTH OF 5/8" CRUSHED ROCK OR SAND BEDDING SURROUNDING THE METER BOX.
12. VALVE PROTECTION PAD – REFER TO DISTRICT STANDARD 404.
13. 5/8" CRUSHED ROCK OR SAND BEDDING SURROUNDING THE VALVE BOX.
14. 3" SCHED. 40 PVC DRAIN LINE TO DAYLIGHT OR STORM SYSTEM.
15. 2" DOUBLE CHECK VALVE ASSEMBLY. ASSEMBLY MUST BE LISTED ON CURRENT WASHINGTON STATE APPROVED LIST OF BACKFLOW PREVENTION ASSEMBLIES. ALL TEST COCKS SHALL BE EQUIPT WITH BRASS PLUGS. INSTALLATION, ANNUAL TESTING, AND MAINTENANCE OF THE ASSEMBLY SHALL BE THE RESPONSIBILITY OF THE CUSTOMER. DCVA SHALL BE TESTED BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER (BAT) AND INSPECTED BY THE DISTRICT PRIOR TO TURNING THE WATER ON. CONTACT DISTRICT FOR TEST FORMS AND TO SCHEDULE INSPECTION. DCVA SHALL HAVE 12" CLEARANCE TO PEA GRAVEL WHICH SHALL BE A MINIMUM OF 12" DEEP. REFER TO DISTRICT STANDARD DETAIL 606.
16. 2" MUELLER 300 – 110 ANGLE METER VALVE (B–24276) WITH BRASS METER FLANGE (FORD CF38–77–1.937)

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	2" MULTI FAMILY RESIDENTIAL FIRE SERVICE	DATE 2021 ENGR MMS	STANDARD 112



LEGEND

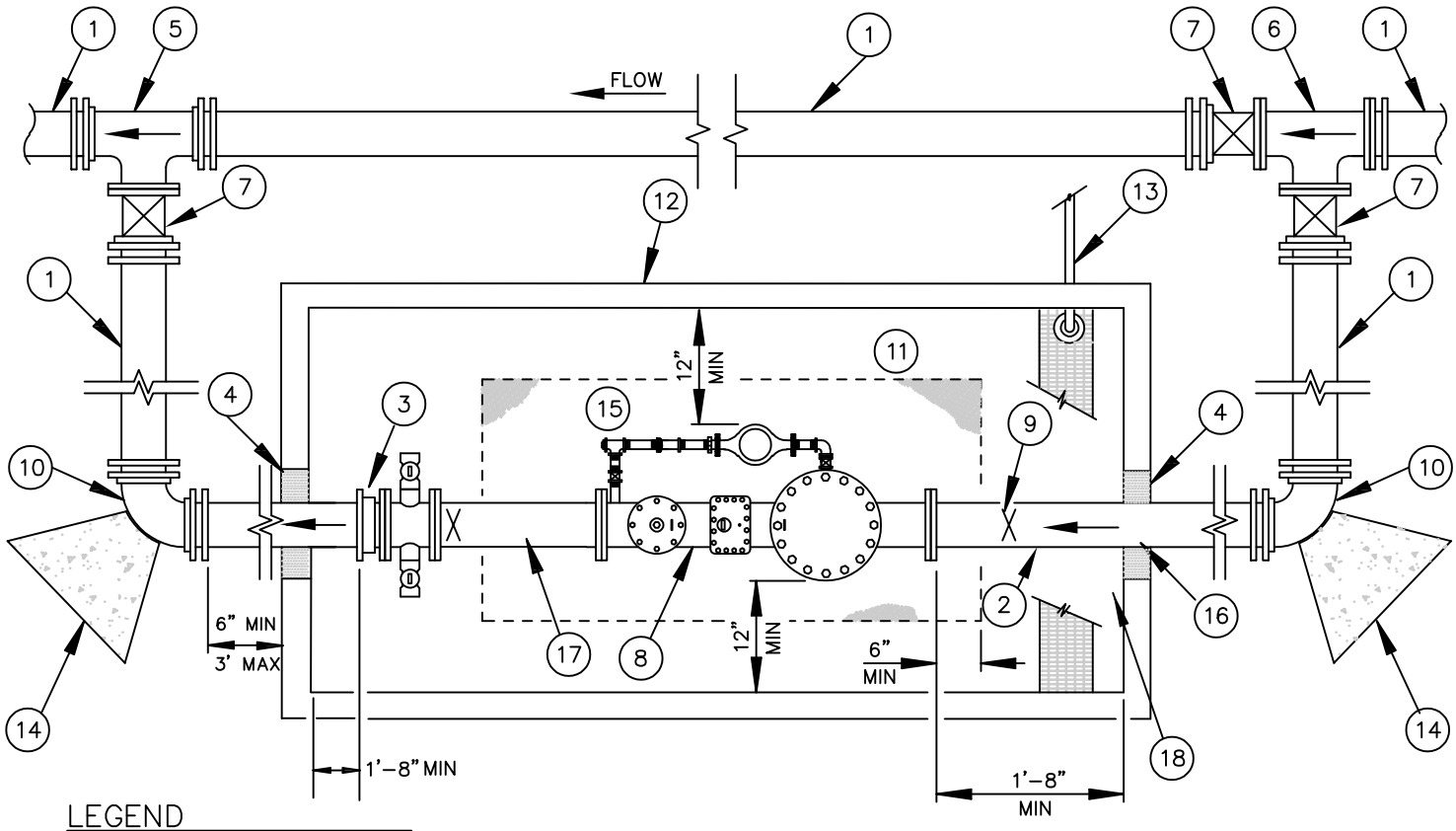
1. NEW MAIN SIZE X 2" MJ TAPPED TEE.
2. 2" BRASS NIPPLE (6" LONG).
3. 2" THREADED RESILIENT SEATED GATE VALVE.
4. VALVE BOX (SEE STANDARD DETAIL 407)
5. 2" MUELLER 110 (OR FORD QUICK JOINT) X M.I.P. STRAIGHT COUPLING.
6. 2" TYPE K STRAIGHT LENGTH OF SOFT COPPER OR BRASS TUBING AS APPROVED BY THE DISTRICT. PIPE SHALL BE CUT TO FIT IN ONE CONTINUOUS LENGTH.
7. 2" MUELLER 110 (OR A.Y. MCDONALD OR FORD QUICK JOINT) QUARTER BEND COUPLING.
8. MID STATES MSBCF1730–18 AND MSBCF 1730–RL. APPROVED H20 LOAD RATING.
9. 2" METER SETTER WITH CHECK VALVE, 1" HIGH BYPASS A.Y. MCDONALD METER SETTER 30F708WDFF776.
10. 3' MINIMUM STRAIGHT LENGTH OF 2" TYPE K SOFT COPPER TAIL PIECE.
11. 12" IN WIDTH AND 24" IN DEPTH OF 5/8" CRUSHED ROCK OR SAND BEDDING SURROUNDING THE METER BOX.
12. VALVE PROTECTION PAD – REFER TO DISTRICT STANDARD 404.
13. 5/8" CRUSHED ROCK OR SAND BEDDING SURROUNDING THE VALVE BOX.
14. 2" WILKINS PRV MODEL NR3. 2" METER FLANGES, & 2" NIPPLES (4" IN LENGTH).
15. 2–2" COMP. X ANGLE MTR STOPS.
16. CONTRACTOR TO BUILD JUMPER FOR PURPOSE OF 250 PSI PRESSURE TEST.
17. 2" TEST SPOOL

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO 1

2" STANDARD METER INSTALLATION WITH 2" PRV

DATE 2021
ENGR MMS

STANDARD
113



LEGEND

1. DUCTILE IRON PIPE.
2. DUCTILE IRON PIPE (PExFL).
3. MEGA FLANGE.
4. NON-SHRINK GROUT.
5. TEE (MJxFL) W/MEGA LUGS.
6. TEE (FL) W/(FLxMJ) ADAPTOR.
7. GV (FLxMJ W/MEGA LUG).
8. METER ASSEMBLY SEE NOTES.
9. PIPE SUPPORT
10. 90 DEGREE BEND (ALL MJ W/MEGA LUGS).
11. L.W. (H-20 WHERE TRAFFIC LOADED) SHOCK ABSORBING CYLINDER ASSISTED LIDS (OR EQUAL) APPROVED BY DISTRICT.
12. UTILITY VAULT CO PRECAST VAULT. VAULT SHALL HAVE 2-COATS OF ASPHALTIC SOLUTION, GALVANIZED LADDER W/ LADDER-UP SAFETY POST.
13. 4" GRAVITY SUMP DRAIN EXTEND TO DAYLIGHT OR STORM DRAINAGE SYSTEM.
14. CONC THRUST BLOCK SEE STD DRAWING 301.
15. FLANGE SPOOL WITH TWO 2" TEST OUTLETS & 2" BALL CORPS 2-1/2" NST MALE ADAPTOR W/CAPS.
16. STRAIGHT LENGTH OF PIPE EQUIVALENT TO 6 TIMES PIPE DIAMETER FROM 90 DEG BEND TO FLANGE OF METER
17. FLANGE SPOOL LENGTH TO BE 6 TIMES DIAMETER OF PIPE
18. 6" PVC OR EQUAL DRAIN. SLOPE TO DAYLIGHT OR TIE INTO STORM DRAIN SYSTEM.
    ONLY WITH DISTRICT WRITTEN APPROVAL INSTALL ZOELLER SUBMERSIBLE SUMP PUMP 3/10 HP MODEL NO. M53-D OR GCS AUTOMATIC SUMP DRAIN EJECTOR ASSY MODEL #996633-51-2.

NOTES

1. MINIMUM VAULT INSIDE HEIGHT SHALL BE 78".
2. METER SHALL BE NEPTUNE PROTECTUS AND HAVE A 6" MINIMUM CLEARANCE BETWEEN FLOOR AND LOWEST PART OF METER.
3. MINIMUM CLEARANCE BETWEEN METER AND TOP OF VAULT SHALL BE 36".
4. MINIMUM CLEARANCE BETWEEN METER AND SIDE WALL SHALL BE 12".
5. PIPING SHALL BE COATED WITH 1-COAT OF RUST RED PRIMER AND 2-COATS SAFETY BLUE ENAMEL.
6. PIPING AND VALVES SHALL BE SUPPORTED BY "STAND-ON" PIPE SUPPORTS (OR APPROVED EQUAL). THE NUMBER OF AND PLACEMENT OF SUPPORT STANDS TO BE DETERMINED BY THE ENGINEER ACCORDING TO SIZE OF PIPE AND METER.
7. METER SHALL BE EQUIPPED W/T-10 REMOTE READS. READER PADS SHALL BE MOUNTED TO THE EXTERIOR OF THE VAULT LID.

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	METER VAULT FOR 3" AND LARGER	DATE 2021 ENGR MMS	STANDARD 121

HYDRANT PORT SCHEDULE

NOTES: ALL HYDRANTS SHALL BE FURNISHED WITH 4–1/2" NST PUMPER PORT.

SIZE OF STORZ ADAPTOR DEPENDENT UPON FIRE DISTRICT JURISDICTION OF INSTALLATION.

FIRE DISTRICT 4	(SNOHOMISH)	4" STORZ ADAPTER
FIRE DISTRICT 8	(LAKE STEVENS)	4" STORZ ADAPTER
FIRE DISTRICT 14	(NORTH COUNTY FIRE & EMS)	4" STORZ ADAPTER
FIRE DISTRICT 17	(GRANITE FALLS)	4" STORZ ADAPTER
FIRE DISTRICT 16	(LAKE ROESIGER)	NO STORZ REQUIRED
FIRE DISTRICT 22	(CORBIN)	4" STORZ ADAPTER
FIRE DISTRICT 26	(GOLD BAR)	NO STORZ REQUIRED
MARYSVILLE FIRE DISTRICT		5" STORZ ADAPTER

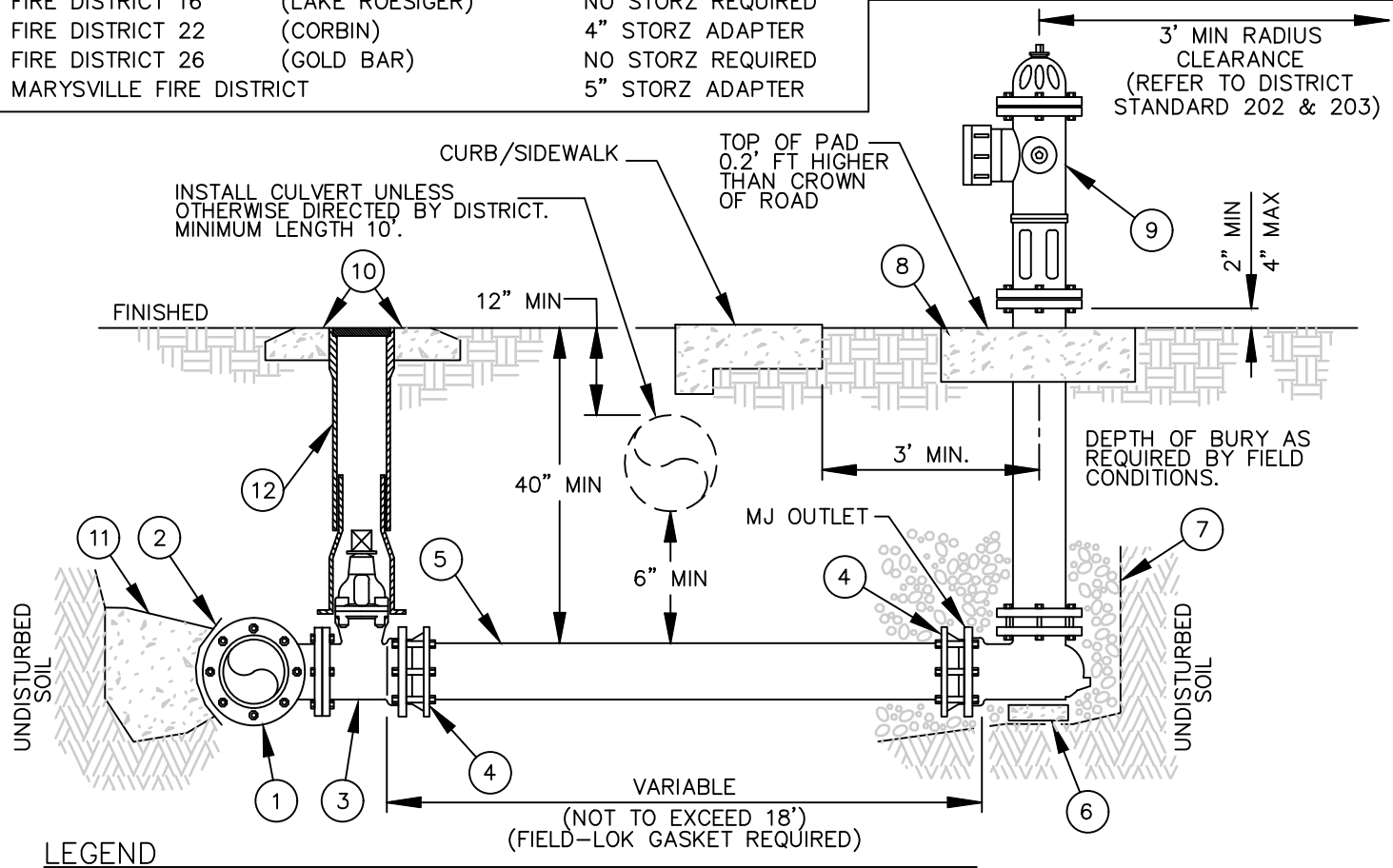
HYDRANT PAINT SCHEME

BODY–SAFETY YELLOW

BONNET–SAFETY COLOR AS FOLLOWS:

COLOR	CAPACITY (GPM)
LIGHT BLUE	1500 OR GREATER
GREEN	1000 TO 1499
ORANGE	500 TO 999

NOTES: PAINT SHALL BE OIL BASED AND HAND BRUSH APPLIED



LEGEND

1. MAIN SIZE X 6" TEE (MJXFL) OR AS NOTED ON THE DISTRICT PLANS.
2. 2–LAYERS OF 6–MIL POLY WRAP AROUND FITTINGS.
3. 6" RESILIENT SEATED GATE VALVE (FLXMJ).
4. 6" MEGA–LUG.
5. 6" CL–52 DUCTILE IRON PIPE.
6. 1–18"X18"X4" CONCRETE SUPPORT BLOCK.
7. 1/4–CUBIC YARD OF 7/8" WASHED DRAIN ROCK AROUND BASE. WRAP IN 6–MIL PLASTIC SHEETING.
8. 36"X36"X8" CONCRETE COLLAR ADJUSTED TO FINISH GRADE WITH BROOM FINISH.
9. APPROVED FIRE HYDRANT (REFER TO APPROVED LIST BELOW).
10. VALVE PROTECTION PAD – REFER TO DISTRICT STANDARD 404.
11. CONCRETE THRUST BLOCK – REFER TO DISTRICT STANDARD 301.
12. VALVE BOX – REFER TO DISTRICT STANDARD 407.

NOTES

1. APPROVED HYDRANTS:
   MUELLER CENTURION A–423; M&H STYLE 929T; CLOW MEDALLION; AMERICAN AVK SERIES 2780 WATROUS.
2. DEPTH OF HYDRANT BURY SHALL BE AS REQUIRED BY FIELD CONDITIONS.
3. WHERE 6" PIPE LENGTH EXCEEDS 17 FEET ONE JOINT MAY BE ALLOWED WITH A FIELD–LOK GASKET. DISTRICT INSPECTION IS REQUIRED DURING THE INSTALLATION OF FIELD–LOK GASKET. 8" MAIN REQUIRED ON NEW CONSTRUCTION.
4. BLUE TOP TRAFFIC REFLECTOR SHALL BE INSTALLED IN ACCORDANCE WITH FIRE DISTRICT STANDARDS.

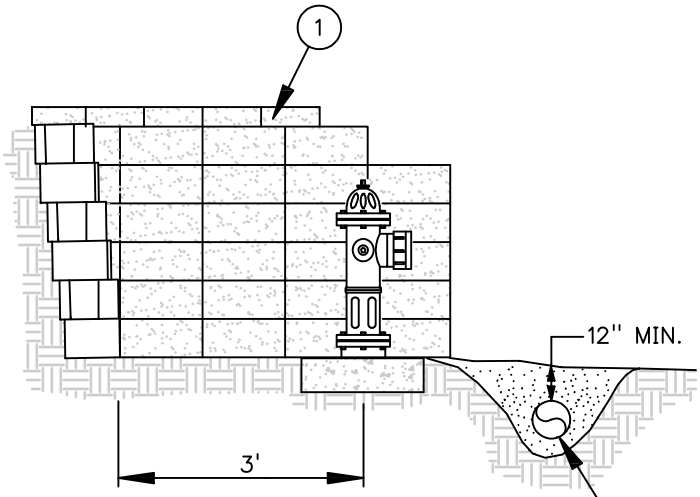
SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1

FIRE HYDRANT ASSEMBLY

DATE 2021

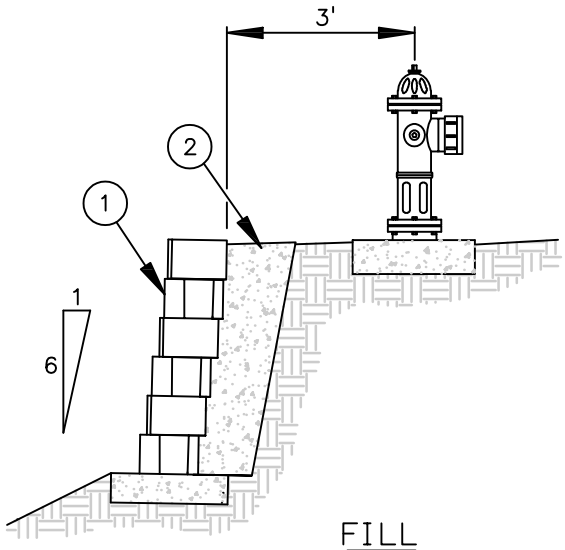
ENGR MMS

STANDARD **201**



CUT

INSTALL 12" ø CULVERT UNLESS OTHERWISE DIRECTED BY DISTRICT. INSTALL CULVERT PER CITY OF LAKE STEVENS AND/OR SNOHOMISH COUNTY EDDS. MINIMUM CULVERT LENGTH 10'.



FILL

LEGEND

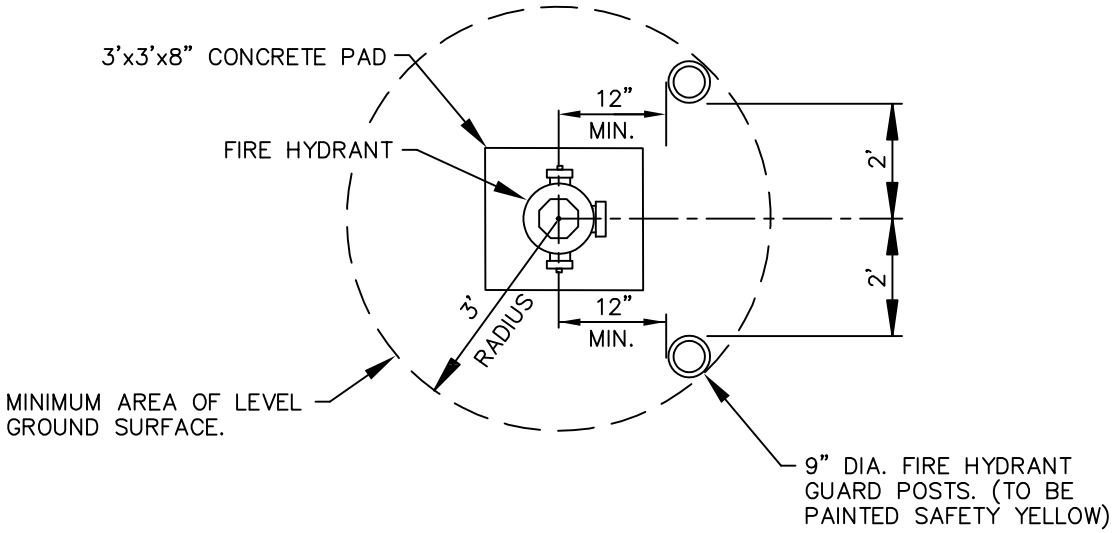
(1) INSTALL CORNERSTONE F100 BLOCK UNITS. ESTABLISH A COMPACTED AGGREGATE LEVELING PAD. PLACEMENT OF FIRST COURSE BLOCKS ON LEVELING SAND. BACKFILL TO PROPER DENSITY. STACK TO DESIRED HEIGHT (4' MAX HEIGHT). ON THE FINAL COURSE CLEAN THE TOP OF THE BLOCK UNITS BY REMOVING THE NUBS AND SWEEPING DEBRIS. ADHERE CAPS TO THE BLOCK UNITS WITH A CONCRETE ADHESIVE.

(2) COMPACTED SELECT FILL MATERIAL AS REQUIRED BY THE DISTRICTS INSPECTOR.

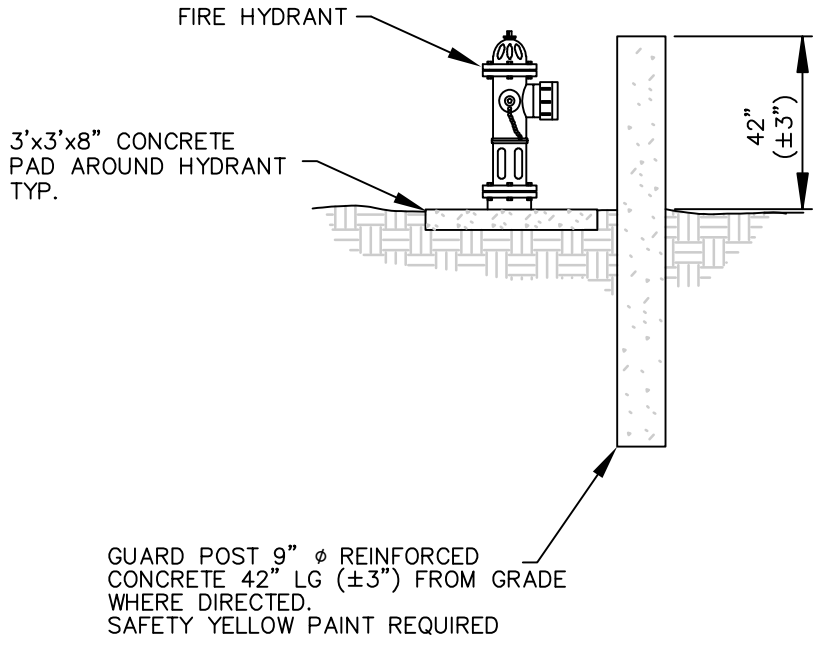
NOTES

1. IN THE EVENT THAT CUT OR FILL SLOPES EXCEED 3:1, A WALL SHALL BE REQUIRED AS SHOWN ABOVE.
2. MAXIMUM WALL HEIGHT OF 4–FEET.
3. 3–FEET MINIMUM CLEARANCE IS REQUIRED AROUND THE HYDRANT IN ALL DIRECTIONS.

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	FIRE HYDRANT CUT OR FILL	DATE 2021 ENGR MMS	STANDARD 202

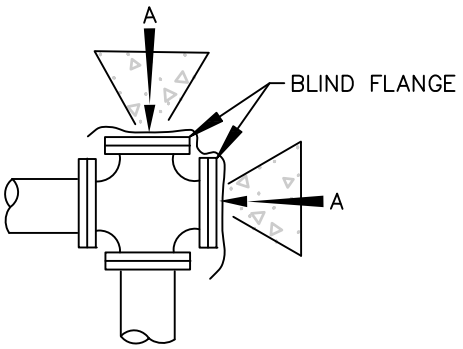


PLAN

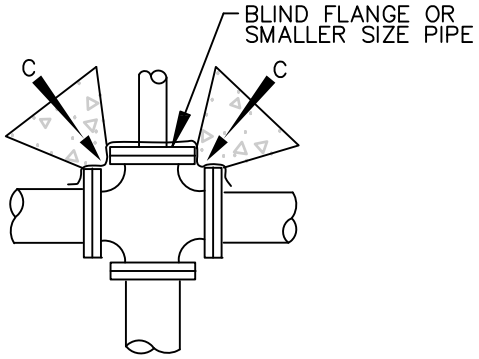


ELEVATION

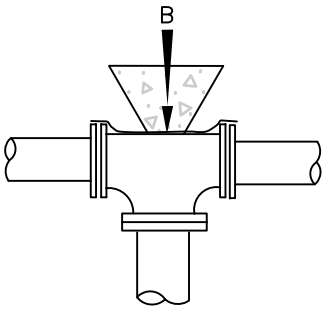
SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	FIRE HYDRANT GUARD POST	DATE 2021 ENGR MMS	STANDARD 203



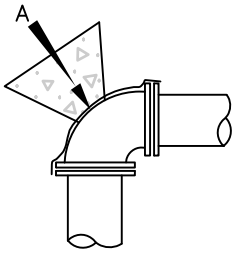
CAPPED CROSS



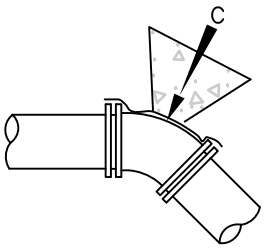
CROSS



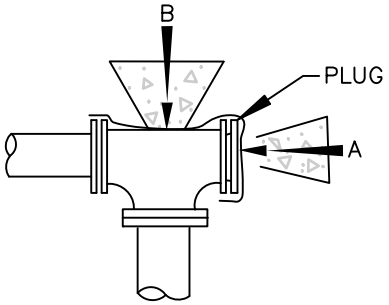
TEE



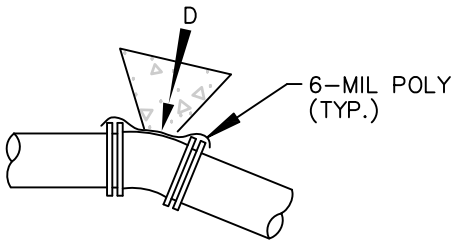
90° BEND



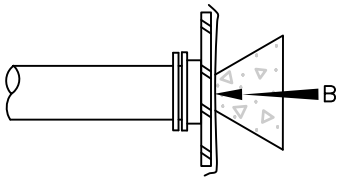
45° BEND



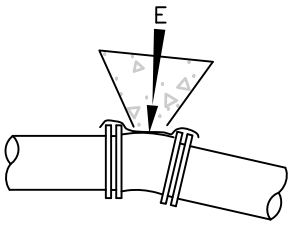
TEE



22-½° BEND



CAP



11-¼° END

NOTES

1. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.
2. BEARING AREA OF CONCRETE THRUST-BLOCK BASED ON 200 PSI PRESSURE AND SAFE SOIL BEARING LOAD OF 2,000 POUND PER SQUARE FOOT.
3. AREAS MUST BE ADJUSTED FOR OTHER PIPE SIZES, PRESSURES AND SOIL CONDITIONS.
4. CONCRETE BLOCKING SHALL BE CAST IN PLACE AND HAVE A MINIMUM OF 1/4 SQUARE FOOT BEARING AGAINST THE FITTING.
5. NO CONCRETE SHALL BE PLACED NEAR BOLTS.
6. BLOCK SHALL BEAR AGAINST FITTINGS ONLY AND SHALL BE CLEAR OF JOINTS TO PERMIT TAKING UP OR DISMANTLING OF JOINT.
7. CONTRACTOR SHALL INSTALL BLOCKING ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS UNDER ALL CONDITIONS OF SERVICE.
8. CONTRACTOR SHALL PLACE A 6-MIL FILM BETWEEN THE CONCRETE AND THE FITTING.

THRUST BLOCK – TABLE
MIN. BEARING AREA AGAINST UNDISTURBED SOIL
SQUARE FEET

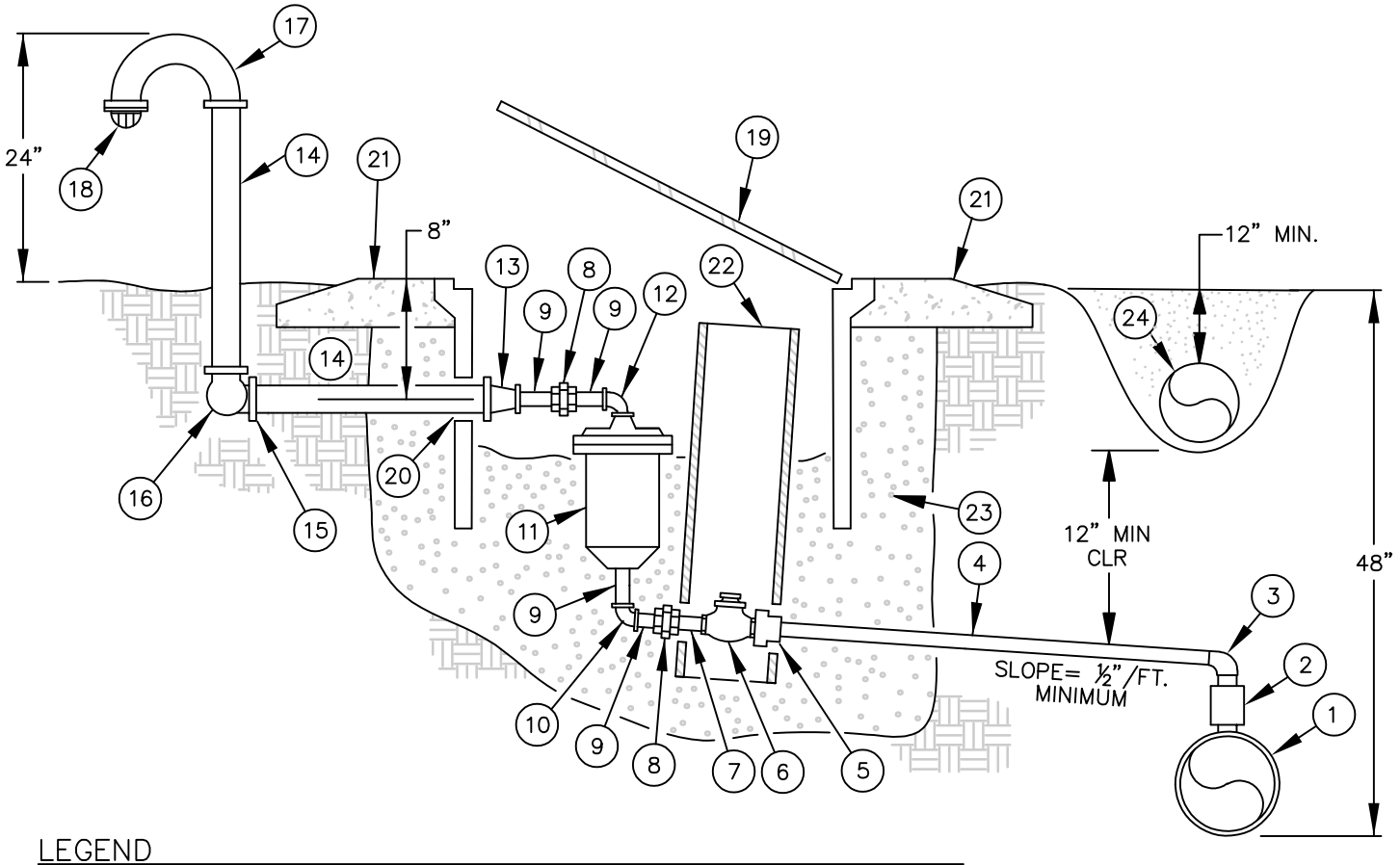
PIPE Size	A(ft.)^2	B(ft.)^2	C(ft.)^2	D(ft.)^2	E(ft.)^2
4"	3	1	1	1	1
6"	4	4	2	1	1
8"	7	6	4	2	1
10"	11	10	6	3	2
12"	16	14	9	5	3
14"	22	19	12	6	3
16"	29	25	16	8	4
18"	36	31	20	10	5
20"	45	39	24	13	6
22"	54	47	29	15	8
24"	64	56	35	18	9
28"	87	76	48	24	12
30"	101	87	55	28	14
36"	145	125	78	40	20
42"	197	171	107	55	27
48"	257	223	140	71	36

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO 1

CONCRETE BLOCKING

DATE 2013
ENGR BEW

STANDARD
301



LEGEND

1. WATER MAIN – CLASS 52 DUCTILE IRON
2. 1" AWWA TAPER THREAD x M.I.P. MUELLER (OR FORD OR AY MCDONALD) BALL VALVE CORPORATION STOP
3. FIP X MUELLER 110 (OR FORD OR AY MCDONALD) QUICK JOINT 90° ELBOW
4. 1" TYPE "K" COPPER TUBING
5. 110 x M.I.P. (OR FORD OR AY MCDONALD)
6. 1" MUELLER (OR FORD OR AY MCDONALD) BALL VALVE CURB STOP
7. 1" BRASS NIPPLE (3" LENGTH) (1–TOTAL)
8. 1" BRASS UNION (2–TOTAL)
9. 1" BRASS NIPPLE (2" LENGTH) (4–TOTAL)
10. 1" 90° BRASS ELBOW
11. 1" COMBINATION AIR AND VACUUM RELIEF VALVE REFER TO APPROVED LIST BELOW
12. 1" BRASS STREET ELBOW
13. 2" X 1" GALV. REDUCER
14. 2" GALV. PIPE (LENGTH TO FIT)
15. 2" GALV. 90° STREET ELBOW
16. 2" GALV. 90° ELBOW
17. 2" GALV. RETURN BEND
18. BEEHIVE STRAINER (BRASS OR GALVANIZED), MALE FOR 2" PIPE.
19. MID STATES MSBCF1730–18 AND MSBCF 1730–L OR APPROVED H–20 LOAD RATING.
20. 2–½" ø HOLE SAW CUT IN BOX FOR PIPE PENETRATION.
21. CONCRETE PROTECTION PAD – REFER TO DISTRICT STANDARD 404.
22. 6" PVC PIPE ADAPT PVC TO FIT OVER CURB STOP (LENGTH TO FIT)
23. 12" IN WIDTH AND 24" IN DEPTH OF ⅝" CRUSHED ROCK OR SAND BEDDING SURROUNDING THE BOX. BACKFILL VAULT TO BONNET ON VALVE
24. INSTALL (MIN. LENGTH OF 10') 12" ø CULVERT. INSTALL CULVERT PER SNOHOMISH COUNTY EDDS.

NOTES

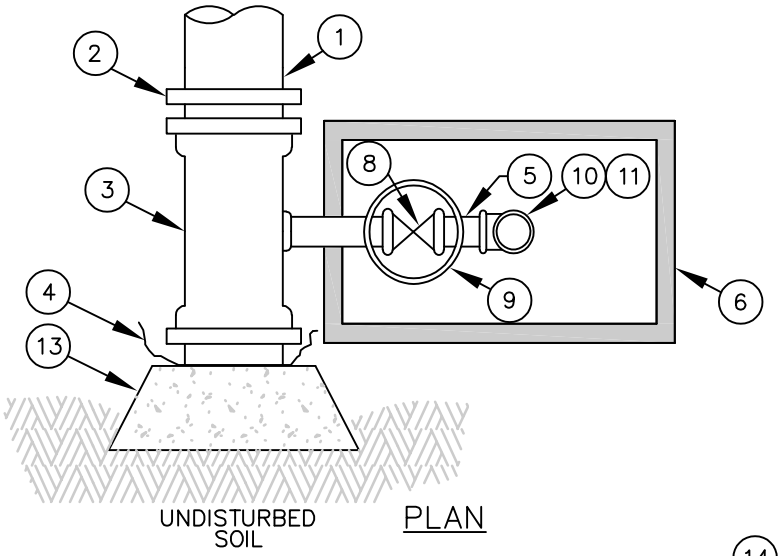
1. APPROVED A.V. VALVES:
   APCO NO.143–C; VAL–MATIC 201C;
   CRISPIN CRUL–10, ARI, AND GOLDEN ANDERSON 945
2. PAINT METER BOX LID & CANE ASSEMBLY
   (2) COATS SAFETY BLUE,
   OIL BASED ENAMEL – HAND BRUSH APPLIED
3. AIR & VACUUM RELEASE VALVE ASSEMBLY SHALL BE INSTALLED AT HIGH POINT OF LINE. IF HIGH POINT FALLS IN A LOCATION WHERE THE ASSEMBLY CANNOT BE ACCOMMODATED THE CONTRACTOR SHALL FORCE A HIGH POINT IN THE WATER MAIN TO LOCATION THAT CAN.

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO 1

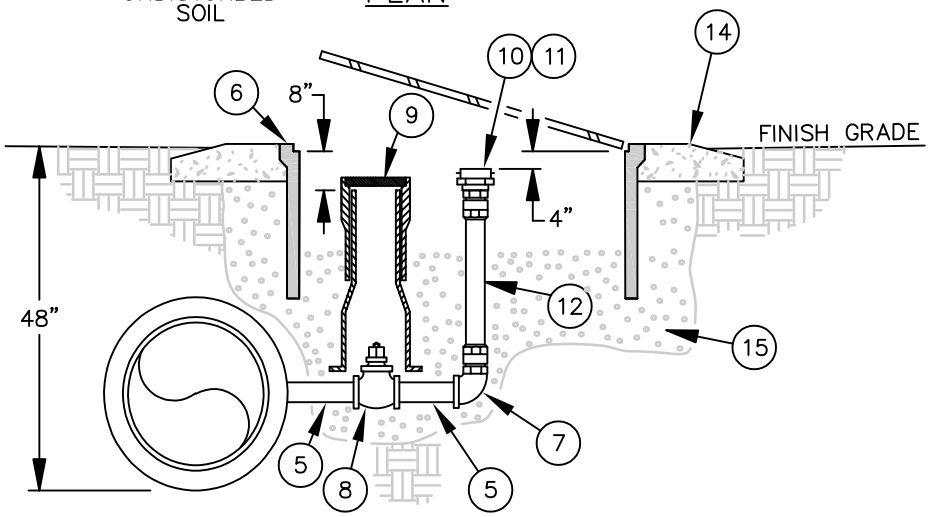
1" COMBINATION AIR/VACUUM RELEASE VALVE ASSEMBLY

DATE 2021
ENGR MMS

STANDARD
401



PLAN



ELEVATION

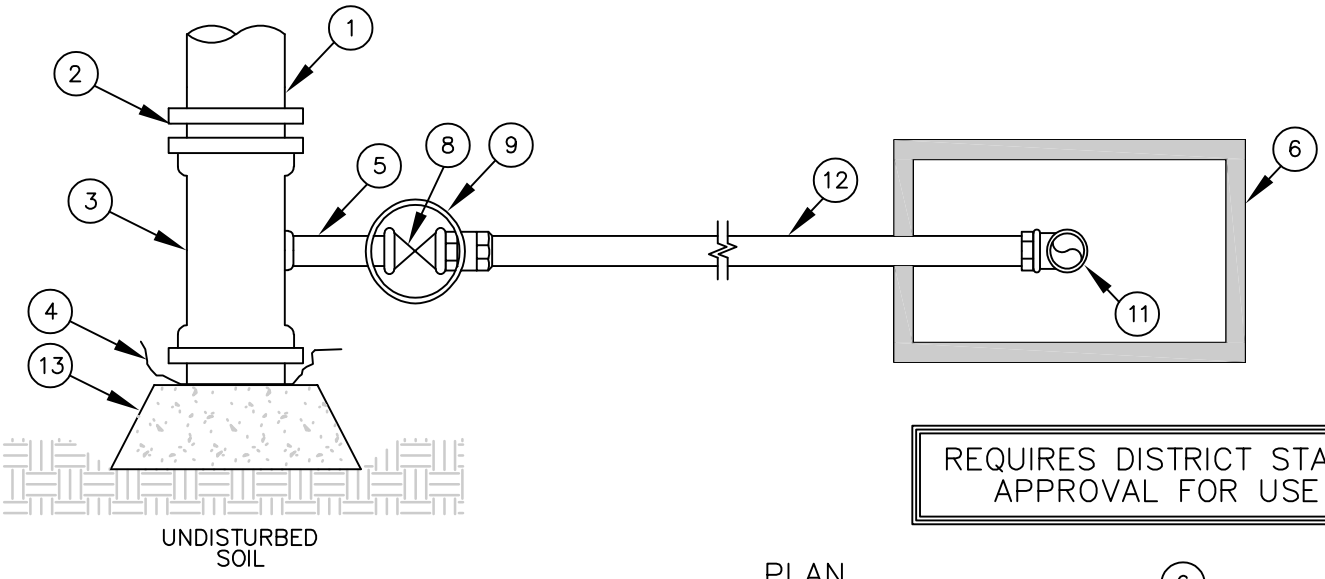
LEGEND

1. CLASS–52 DUCTILE IRON WATER MAIN. MECHANICALLY RESTRAINED (SEE DISTRICT GENERAL NOTE 14 FOR TOTAL LENGTH OF RESTRAINED PIPE).
2. MEGA–LUG
3. MAIN SIZE X 2" I.P. TEE (MJ); 1–MAIN SIZE SOLID PLUG (MJ)
4. 6–MIL POLY WRAP AROUND FITTINGS
5. 2" BRASS NIPPLES (6" LONG)
6. MID STATES MSBCF1730–18 AND MSBCF 1730–L. APPROVED H20 LOAD RATING.
7. 2" MUELLER 110 (OR FORD OR AY MCDONALD QUICK JOINT) X F.I.P. 90°(FIP x COMP) BEND COUPLING. NO DRAIN HOLE SHALL BE DRILLED.
8. 2" THREADED RESILIENT SEATED GATE VALVE
9. 18" X 30" VALVE BOX (STYLE 940) 6" SOIL PIPE SHALL BE USED IF EXTRA DEPTH IS REQUIRED
10. 2" MUELLER 110 (OR FORD OR AY MCDONALD QUICK JOINT) X F.I.P. THREAD STRAIGHT COUPLING
11. 2" X 2–½" BRASS NST HOSE ADAPTOR AND CAP
12. 2" STRAIGHT TYPE "K" COPPER
13. CONCRETE THRUST BLOCKING AS REQUIRED REFER TO DISTRICT STANDARD 301
14. CONCRETE PROTECTION PAD – REFER TO DISTRICT STANDARD 404.
15. 12" IN WIDTH AND 24" IN DEPTH OF 5/8 " CRUSHED ROCK OR SAND BEDDING SURROUNDING THE BOX.

NOTES

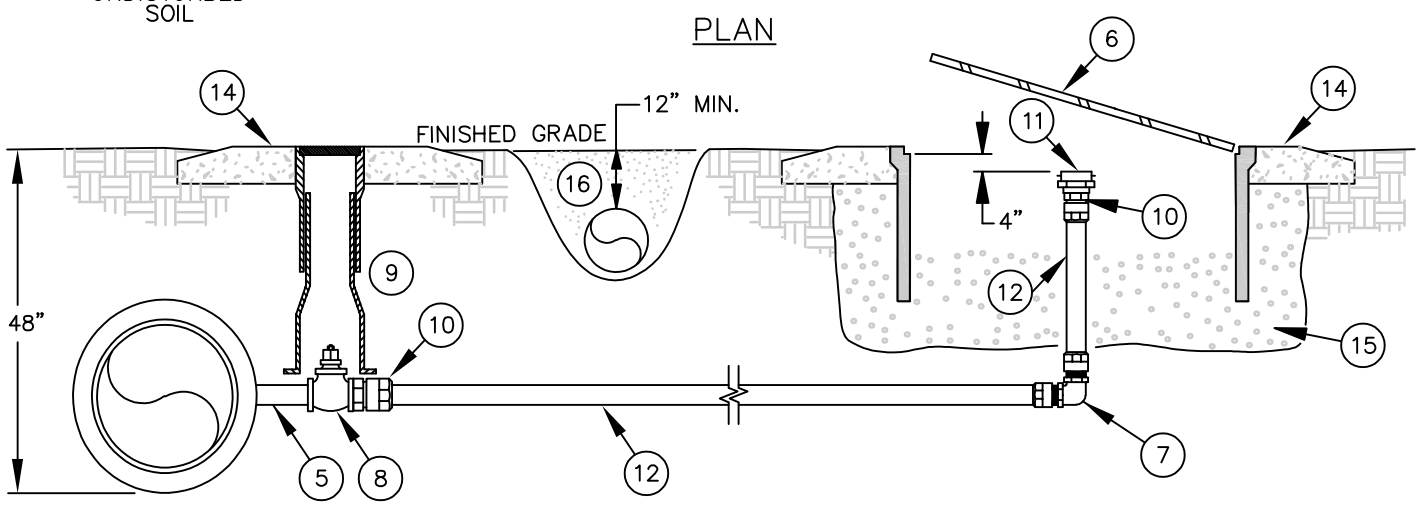
1. PAINT METER BOX LID WITH (2) COATS SAFETY BLUE, OIL BASED ENAMEL (HAND BRUSH APPLIED).
2. CONTRACTOR MAY USE 2" THREADED BRASS NIPPLES AND 2" BRASS F.I.P. FITTINGS IN LIEU OF COMPRESSION FITTINGS.
3. LOCATE BLOW–OFF IN NON–TRAFFIC AREAS WHERE POSSIBLE (REFER TO STANDARD 403 AS NECESSARY).

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	2" FLUSH STYLE BLOW–OFF ASSEMBLY	DATE 2021 ENGR MMS	STANDARD 402



REQUIRES DISTRICT STAFF APPROVAL FOR USE

PLAN



ELEVATION

LEGEND

1. CL–52 DUCTILE IRON WATER MAIN. MECHANICALLY RESTRAINED (SEE DISTRICT ENGINEER FOR TOTAL LENGTH OF RESTRAINED PIPE).
2. MEGA–LUG
3. MAIN SIZE X 2" I.P. TEE (MJ); 1–MAIN SIZE SOLID PLUG (MJ)
4. 6–MIL POLY WRAP AROUND FITTINGS
5. 2" BRASS NIPPLES (6" LONG)
6. MID STATES MSBCF1730–18 AND MSBCF 1730–L. APPROVED H20 LOAD RATING.
7. 2" MUELLER 110 (OR FORD OR AY MCDONALD QUICK JOINT) (90° BEND COMP x COMP) NO DRAIN HOLE SHALL BE DRILLED.
8. 2" THREADED RESILIENT SEATED GATE VALVE
9. 18" X 30" VALVE BOX (STYLE 940)
10. 2" MUELLER 110 (OR FORD OR AY MCDONALD QUICK JOINT) X F.I.P. THREAD STRAIGHT COUPLING
11. 2" X 2–1/2" BRASS NST HOSE ADAPTOR AND CAP
12. 2" STRAIGHT TYPE "K" COPPER
13. CONCRETE THRUST BLOCKING AS REQUIRED REFER TO DISTRICT STANDARD 301
14. CONCRETE PROTECTION PAD – REFER TO DISTRICT STANDARD 404.
15. 12" IN WIDTH AND 24" IN DEPTH OF 5/8" CRUSHED ROCK OR SAND BEDDING SURROUNDING THE BOX.
16. INSTALL (MIN. LENGTH OF 10') 12" ø CULVERT. INSTALL CULVERT PER SNOHOMISH COUNTY EDDS OR CITY OF LAKE STEVENS EDDS.

NOTES

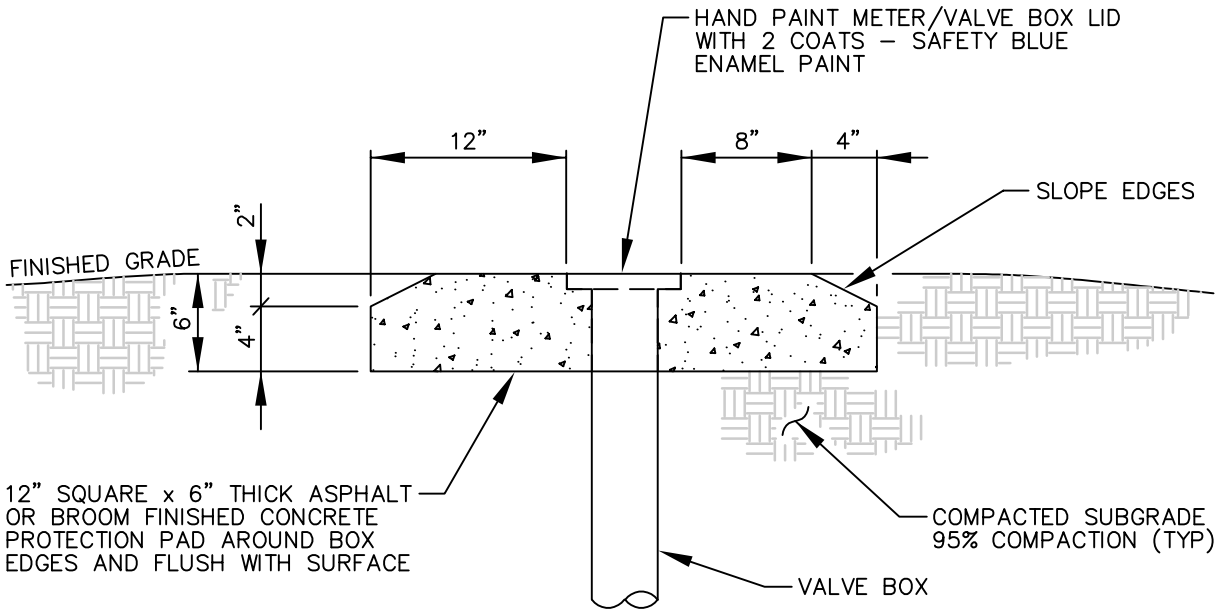
1. PAINT METER BOX LID WITH (2) COATS SAFETY BLUE, OIL BASED ENAMEL (HAND BRUSH APPLIED).
2. CONTRACTOR MAY USE 2" THREADED BRASS NIPPLES AND 2" BRASS F.I.P. FITTINGS IN LIEU OF COMPRESSION FITTINGS.
3. LOCATE BLOW–OFF IN NON–TRAFFIC AREAS WHERE POSSIBLE (REFER TO STANDARD 402 AS NECESSARY).

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO 1

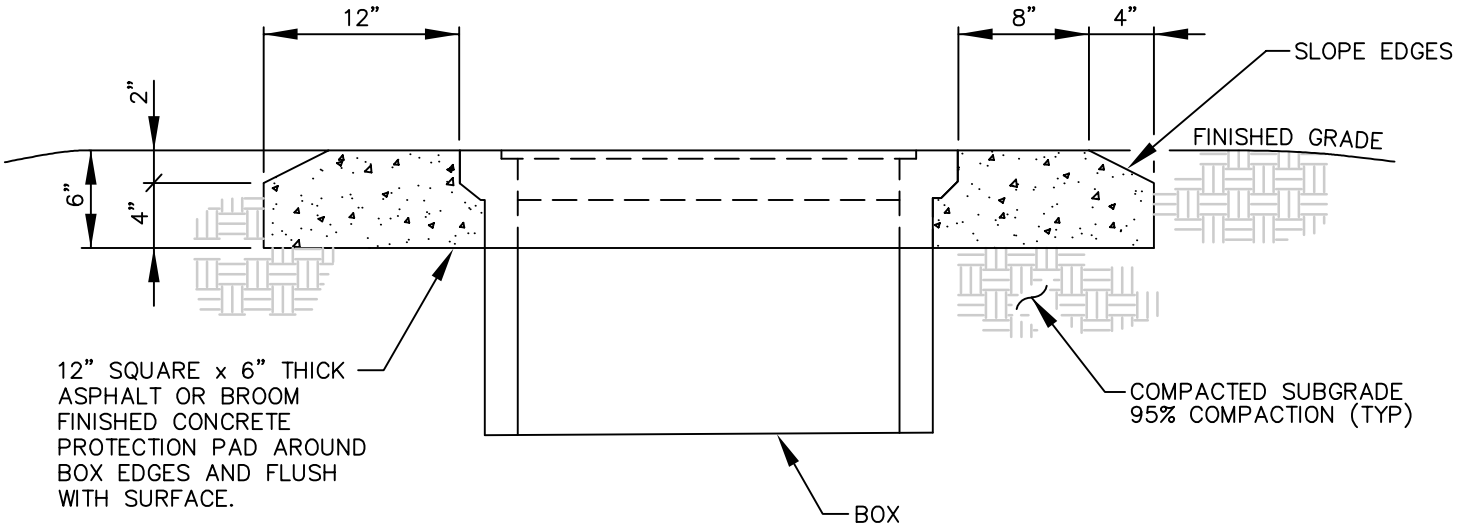
2" FLUSH STYLE BLOW OFF ASSEMBLY (NOT ADJACENT TO MAIN)

DATE 2021
ENGR MMS

STANDARD
403

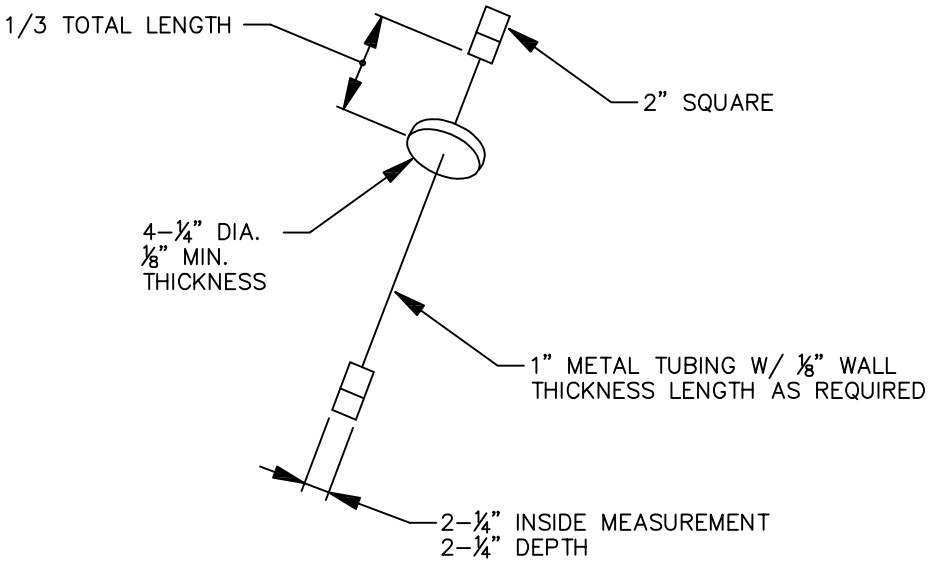


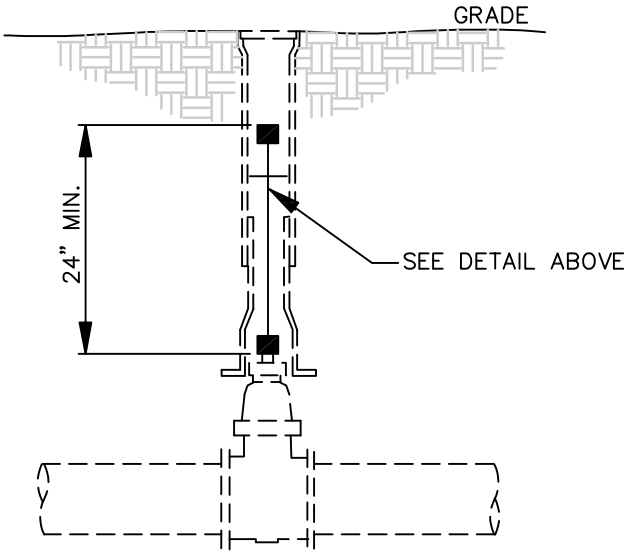
VALVE BOX ELEVATION



BOX ELEVATION

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	PROTECTION PAD DETAIL	DATE 2021 ENGR MMS	STANDARD 404

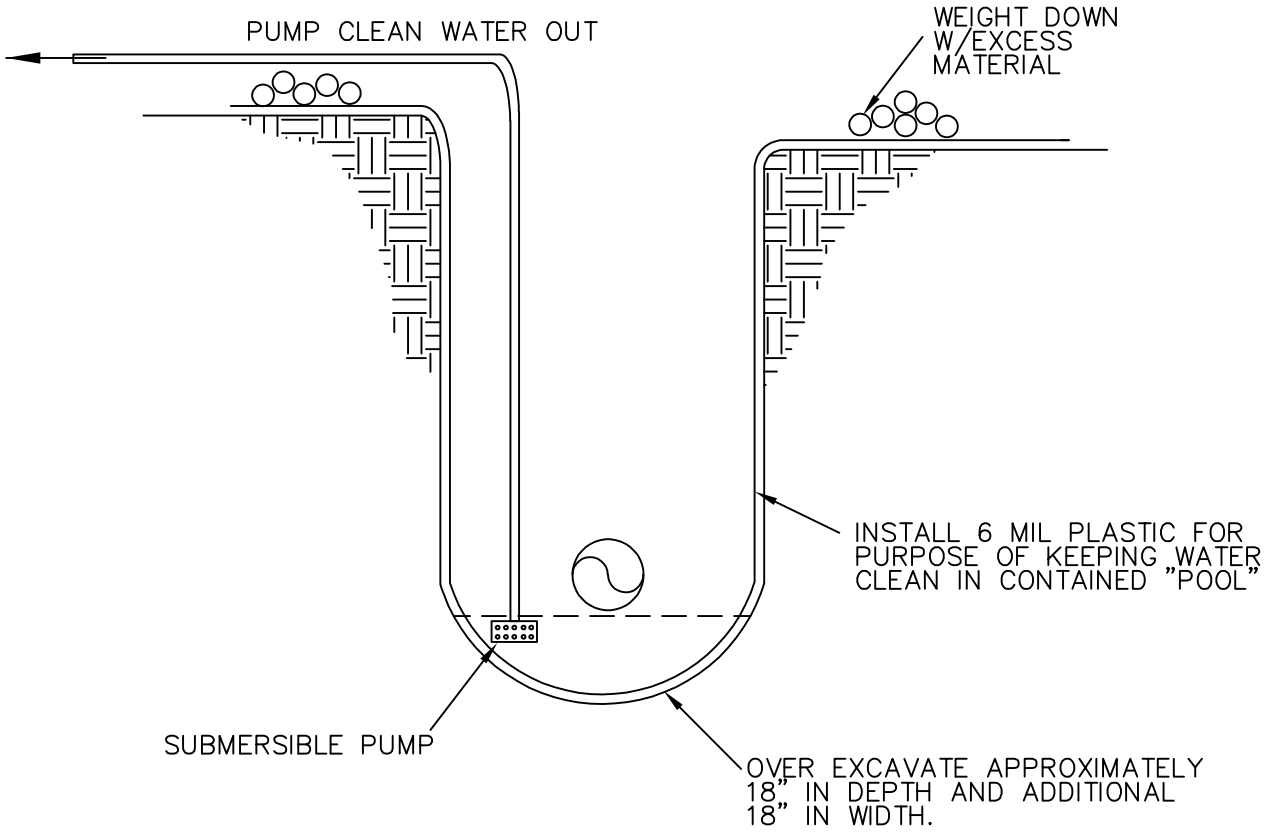




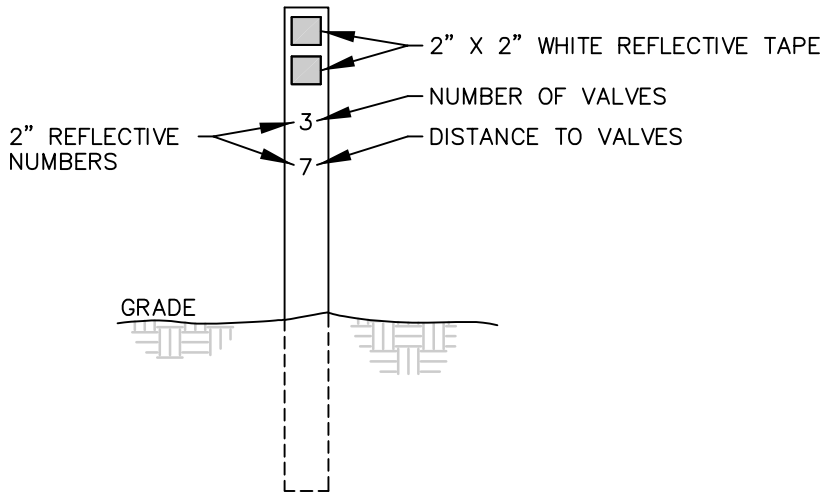
NOTES

1. EXTENSIONS ARE REQUIRED WHEN THE VALVE NUT IS MORE THAN 36" INCHES BELOW FINISHED GRADE. EXTENSIONS ARE TO BE A MINIMUM OF 24" LONG. ONLY ONE EXTENSION TO BE USED PER VALVE. VALVE EXTENSION TO BE WITHIN 24" OF FINISHED GRADE.

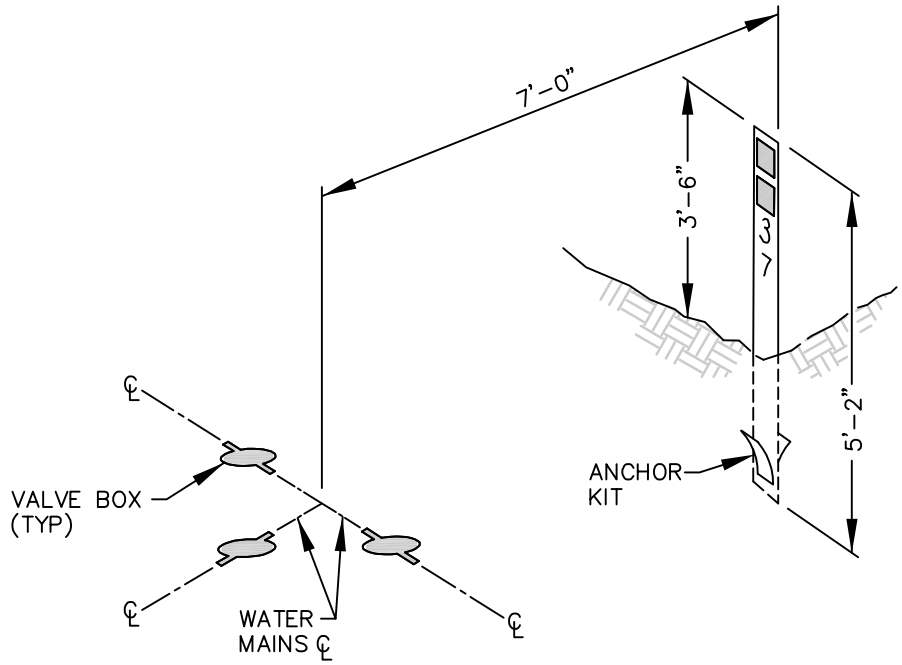
SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	OPERATING NUT EXTENSION DETAIL	DATE 2021 ENGR MMS	STANDARD 405



SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	TIE–IN DE–WATERING DETAIL	DATE 2021 ENGR MMS	STANDARD 405A



MARKER POST DETAIL

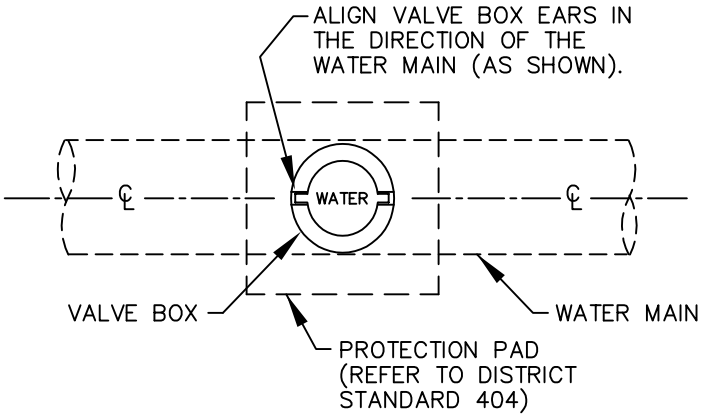


MARKER POST INSTALLATION DETAIL

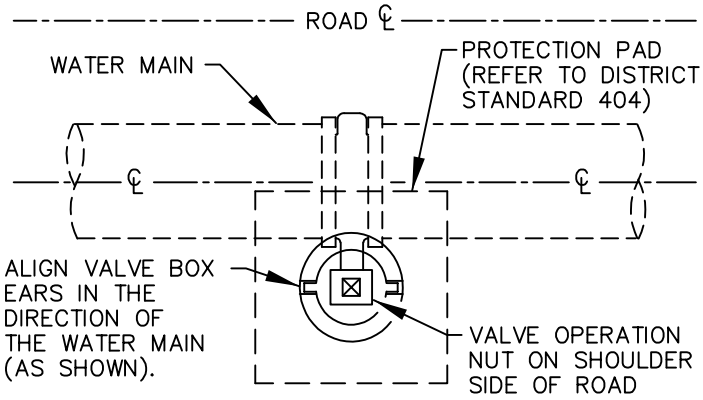
NOTES

1. VALVE MARKER SHALL BE CARSONITE CRM3-066-08 BLUE WITH 2-ANCHORS (ANCHOR BARB KIT) AT BOTTOM OF MARKER.
2. MARKER SHALL BE SITUATED IN A SAFE AND LOGICAL LOCATION.
3. THE POST SHALL BE SET AT RIGHT ANGLES TO THE ROADWAY FROM THE VALVE USE APPROPRIATE INSTALLATION TOOLS AND METHODS.

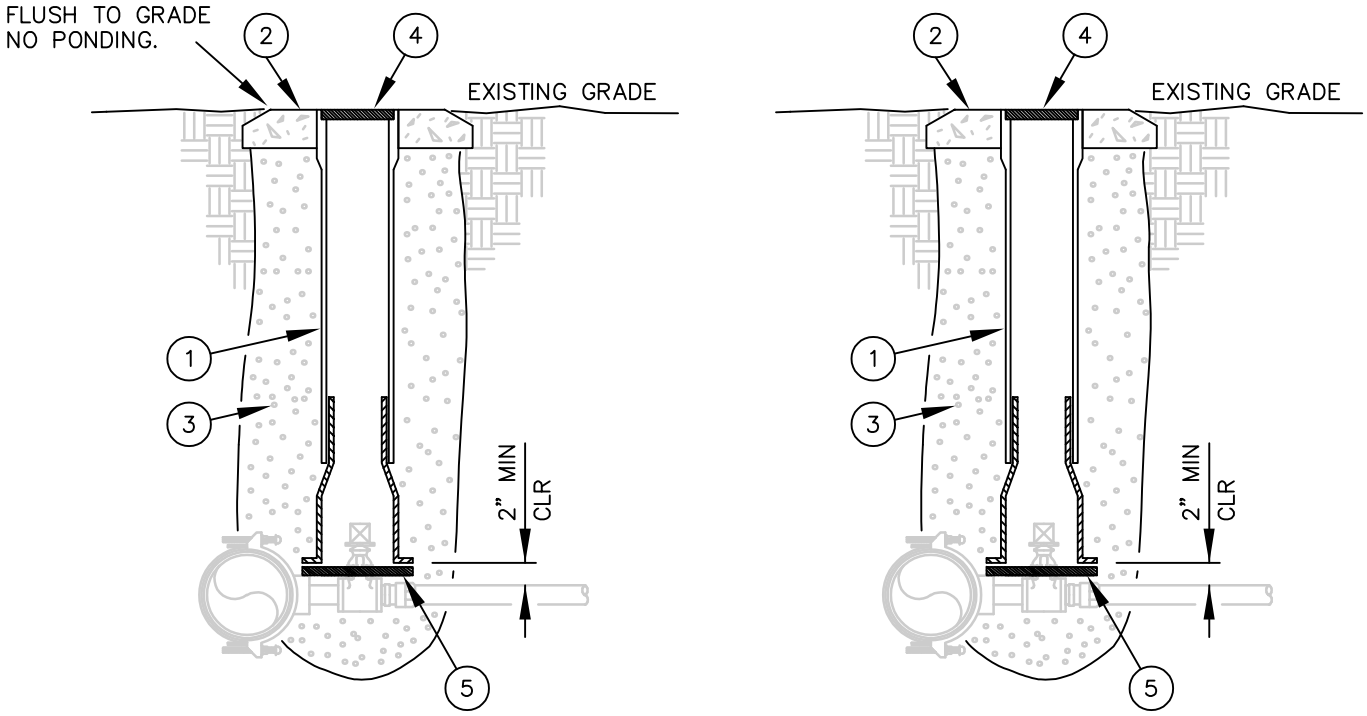
SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	VALVE MARKER POST DETAILS	DATE 2021 ENGR MMS	STANDARD 406



VALVE BOX EAR DETAIL



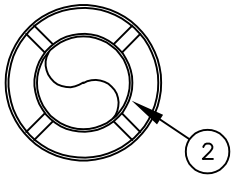
BUTTERFLY VALVE BOX DETAIL



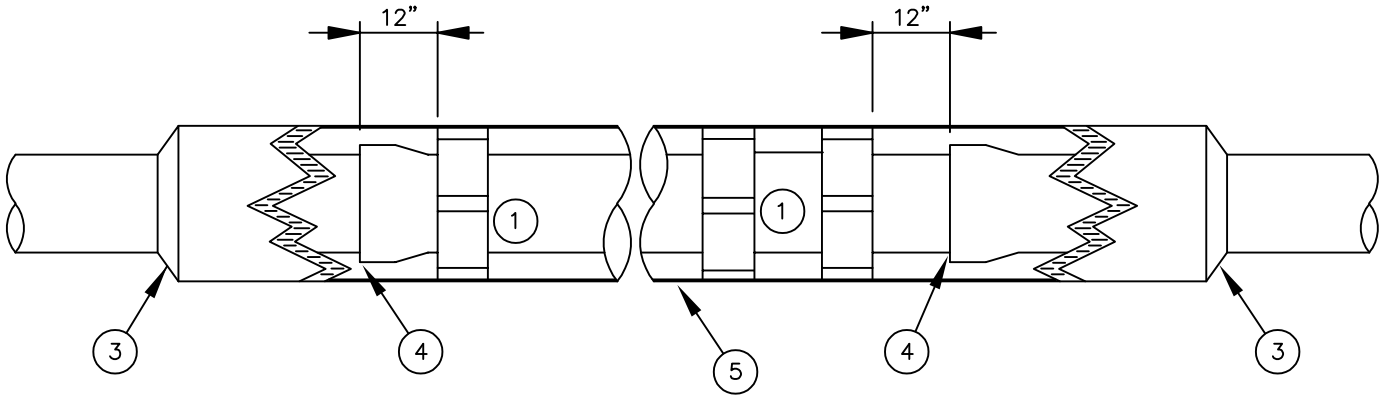
LEGEND

1. 18" OR 30" VALVE BOX (STYLE 940) 6" SOIL PIPE SHALL BE USED IF EXTRA DEPTH IS REQUIRED.
2. VALVE PROTECTION PAD – REFER TO DISTRICT STANDARD 404.
3. 5/8" CRUSHED ROCK OR SAND BEDDING SURROUNDING THE VALVE BOX COMPACTED TO 95%. COMPACTION TEST REQUIRED AT ALL VALVE CLUSTER LOCATIONS.
4. USE EAST IRON VALVE BOX OR APPROVED EQUAL. ITEM # VBST940L.
5. SET VALVE BOX ON ETHAFOAM 2" THICK (TYP)
6. HAND PAINT METER/VALVE BOX LID WITH 2 COATS – SAFETY BLUE ENAMEL PAINT

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	VALVE BOX DETAIL	DATE 2021 ENGR MMS	STANDARD 407



PLAN

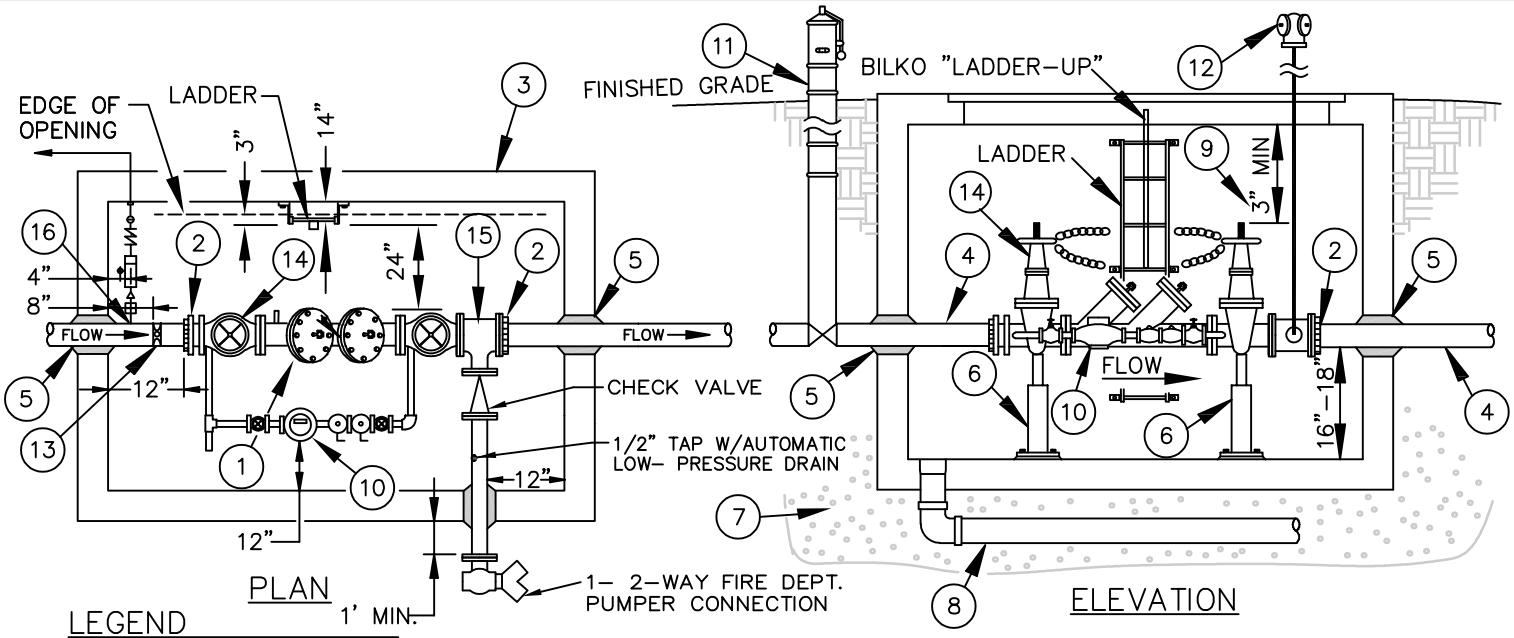


ELEVATION

LEGEND

1. 3 CALPICO MODEL M–8–SS OR M–12–SS (3 SPACERS PER JOINT OF PIPE) CASING INSULATORS. INSULATORS TO BE LOCATED APPROX. 18" FROM BELL, 18" FROM SPIGOT END AND CENTER OF EACH JOINT OF PIPE
2. D.I. PIPE CENTERED IN CASING
3. MODEL "C" LINX–SEAL MODULAR SEAL
4. FIELD LOK GASKETS SHALL BE USED ON ALL JOINTS OF PIPE IN CASING
5. CASING PIPE PER PLAN

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	TYPICAL CASING DETAIL	DATE 2021 ENGR MMS	STANDARD 501



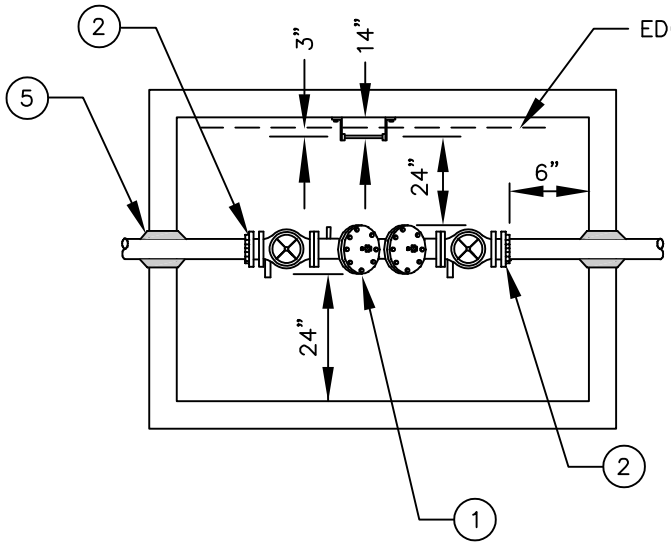
LEGEND

1. UL-FM LISTED SOFTSEATED STATE APPROVED DOUBLE DETECTOR VALVE (FLxFL) ASSEMBLY INCLUDING 2-O.S.&Y RESILIENT SEATED GATE VALVES, TEST COCKS, ¾" BRASS OR COPPER BYPASS WITH IN LINE VALVES.
2. MEGAFLANGE (ADDITIONAL OR ALTERNATIVE METHODS OF RESTRAINT MAY BE REQUIRED).
3. PRECAST CONCRETE VAULT WITH LW PRODUCTS OR HALLIDAY SERIES W2S ALUMINUM HYDRAULIC LIFT ASSISTED LIDS (H-20 TRAFFIC LOADED). PROVIDE GALVANIZED STEEL LADDER W/ BILKO LADDER-UP SAFETY POST INSTALLED IN SUCH AWAY THAT VAULT ACCESS DOES NOT INTERFERE WITH INSTALLED EQUIPMENT MAINTENANCE. VAULT SHALL HAVE 2-COATS OF ASPHALTIC SOLUTION (SIZE AND STYLE APPROVED BY THE PUD'S ENGINEER).
4. CL-52 DUCTILE IRON PIPE (SIZED AS REQUIRED).
5. WATER TIGHT GROUT SHALL BE USED IN ALL VAULT PENETRATIONS.
6. TWO (2) GALVANIZED ADJUSTABLE PIPE SUPPORTS FOR 2-½" ø AND LARGER PIPE.
7. FOUNDATION GRAVEL AS REQUIRED.
8. INSTALL A 6" PVC OR EQUAL DRAIN W/GRATING ON INLET. SLOPE TO DAYLIGHT OR TIE INTO STORM DRAIN SYSTEM.
9. 3" MIN. CLEARANCE FROM UNDERSIDE OF VAULT LID TO STEM OF OS&Y WHEN FULLY OPEN.
10. ¾" METER (METER PROVIDED BY DISTRICT AT DEVELOPER'S EXPENSE), METER SHALL BE EQUIPPED WITH T-10 OMR.
11. POST INDICATOR VALVE, LOCATED WITHIN 4' OF VAULT.
12. FIRE DEPARTMENT CONNECTION (FDC) AND CHECK VALVE (PER SNOHOMISH COUNTY FIRE AND PLUMBING CODES)
13. 2" ROMAC 202N SADDLE, 2" FORD BALLCORP, 2" X 2-½" HOSE ADAPTOR W/CAP
14. INSTALL ALARM FOR OS+Y VALVES PER FIRE DISTRICT STANDARD IF REQUIRED.
15. FL X FL TEE (MAIN SIZE X MAIN SIZE)
16. AT PUD'S SOLE DISCRETION IN LIEU OF 6"DRAIN INSTALL 1"TAP UPSTREAM OF DCDA, 1"COPPER OR BRASS TO ELECTRIC SUMP PUMP; AT DEVELOPER COST (NOTE THIS INCLUDS GFC AND CUSTOMER SERVICE AGREEMENT FOR WATER USAGE) PUD METER TO BE PURCHASED AND INSTALLED; DISCHARGE PIPING 1-½"SCHEDULE 40 PVC, ORIENT VAULT SUCH THAT SUMP IS LOCATED UPSTREAM OF ASSEMBLY WHERE EJECTOR TAP IS LOCATED. INSTALL GALVANIZED STEEL STANDOFF BRACKET WITH 2" CHANNEL BY 12"-16" STANDOFF FOR MOUNTING OF EJECTOR PUMP; LAG TO CONCRETE WALL; NOTE DCVA INTEGRAL TO EJECTOR ASSEMBLY MUST BE TEST BY BAT.

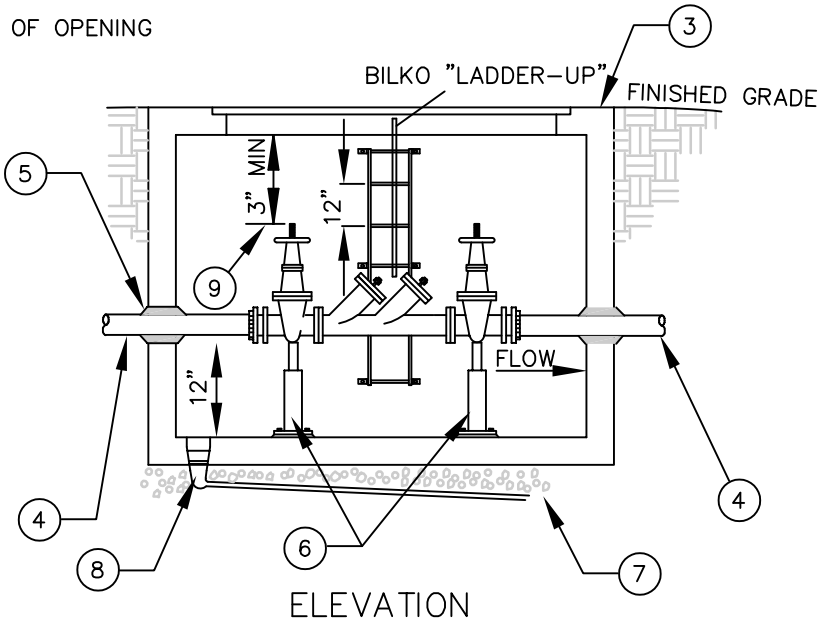
NOTES

1. TEE AND GATE VALVE REQUIRED ON MAIN. WITH AMPRO LOCKING BOX LID.
2. TEST COCKS ARE REQUIRED TO BE PLUGGED IF ASSEMBLY IS INSTALLED UNDERGROUND.
3. MAXIMUM HEIGHT OF ASSEMBLY IS FIVE FEET UNLESS AN OSHA APPROVED PLATFORM IS PROVIDED.
4. MINIMUM INSIDE VAULT HEIGHT AS APPROVED BY THE ENGINEER, FOR 3" SERVICE AND LARGER.
5. ALL DIMENSIONS ARE MINIMUM CLEARANCE REQUIREMENTS.
6. ASSEMBLY REQUIRES CERTIFICATION UPON INSTALLATION AND RECERTIFICATION ANNUALLY BY A
7. WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER. (BAT TEST SHALL BE WITNESSED BY DISTRICT CROSS-CONNECTION CONTROL SPECIALIST)
8. FIRE DEPARTMENT CONNECTION (FDC) MUST BE DOWNSTREAM OF ASSEMBLY.

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	DOUBLE DETECTOR CHECK ASSEMBLY (DCDA) "FIRE SYSTEM"	DATE 2021 / ENGR MMS	STANDARD 601



PLAN



ELEVATION

LEGEND

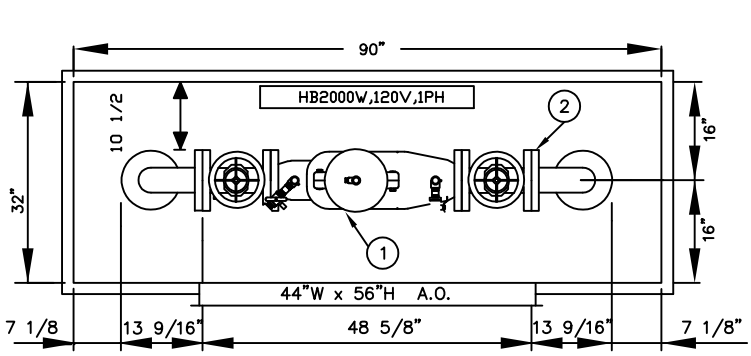
1. UL–FM LISTED SOFTSEATED STATE APPROVED DOUBLE CHECK VALVE ASSEMBLY INCLUDING: 2–O.S.& Y RESILIENT SEATED GATE VALVES, AND TEST COCKS WITH PLUGS.
2. UNI–FLANGE (ADDITIONAL OR ALTERNATIVE METHODS OF RESTRAINT MAY BE REQUIRED)
3. PRECAST CONCRETE VAULT WITH LW PRODUCTS OR HALLIDAY SERIES W2S ALUMINUM LIFT ASSISTED LIDS (H–20 TRAFFIC LOADED). PROVIDE GALVANIZED STEEL LADDER W/ BILKO LADDER–UP SAFETY POST INSTALLED IN SUCH AWAY THAT VAULT ACCESS DOES NOT INTERFERE WITH INSTALLED EQUIPMENT MAINTENANCE. VAULT SHALL HAVE 2–COATS OF ASPHALTIC SOLUTION (SIZE AND STYLE APPROVED BY THE PUD'S ENGINEER).
4. DUCTILE IRON PIPE (SIZED AS REQUIRED) CLASS 52.
5. WATER TIGHT GROUT SHALL BE USED IN ALL VAULT PENETRATIONS.
6. 2 – GALVANIZED ADJUSTABLE STAND–ON PIPE SUPPORTS FOR 2–1/2" DIM AND LARGER PIPE.
7. FOUNDATION GRAVEL AS REQUIRED.
8. INSTALL A 6" PVC OR EQUAL DRAIN W/GRATING ON INLET. SLOPE TO DAYLIGHT OR TIE INTO STORM DRAIN SYSTEM.
9. 3" MIN CLEARANCE FROM UNDERSIDE OF VAULT LID TO STEM AND OS&Y WHEN FULLY OPEN.
10. ¾" METER (METER PROVIDED BY DISTRICT AT DEVELOPER'S EXPENSE), METER SHALL BE EQUIPPED WITH T–10 OMR.

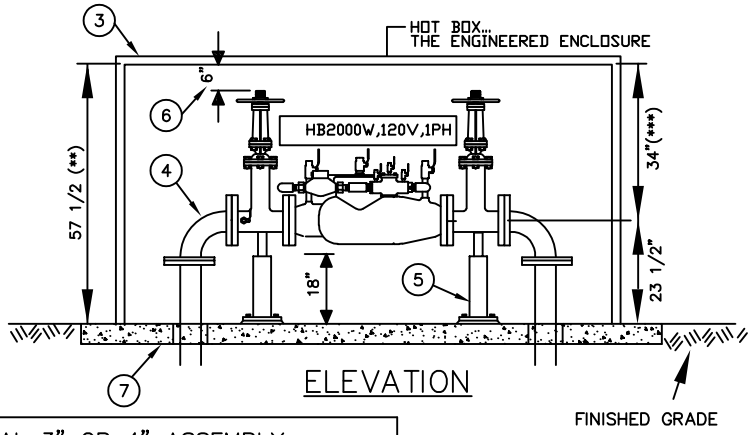
PER DISTRICT APPROVAL ONLY

NOTES

1. TEE AND GATE VALVE REQUIRED ON MAIN. SINGLE DETECTOR CHECKS ARE NOT APPROVED BACKFLOW PREVENTION DEVICES.
2. ASSEMBLY REQUIRES CERTIFICATION UPON INSTALLATION AND RECERTIFICATION ANNUALLY.
3. TEST COCKS ARE REQUIRED TO BE PLUGGED IF ASSEMBLY IS INSTALLED UNDERGROUND.
4. MAXIMUM HEIGHT OF ASSEMBLY IS FIVE FEET UNLESS AN OSHA APPROVED PLATFORM IS PROVIDED.
5. MINIMUM INSIDE VAULT HEIGHT IS 78", OR AS APPROVED BY THE ENGINEER, FOR 3" SERVICE AND LARGER.
6. ALL DIMENSIONS ARE MIN CLEARANCE REQUIREMENTS.
7. THE PURPOSE OF THIS STANDARD IS TO SERVE AS A GUIDELINE FOR MEETING THE DISTRICT'S REQUIREMENTS. VARIATIONS AND CHANGES ARE LIKELY DEPENDING ON SITE CONDITIONS ETC.

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	DOUBLE CHECK VALVE ASSEMBLY (DCVA) 3" & LARGER SERVICES FOR IRRIGATION SERVICE	DATE 2021 ENGR MMS	STANDARD 602





NOTE: DIMENSIONS ABOVE ARE FOR A TYPICAL 3" OR 4" ASSEMBLY. DIMENSIONS OF ACTUAL ASSEMBLY MAY DIFFER.

LEGEND

1. UL–FM LISTED SOFTSEATED WASHINGTON STATE APPROVED REDUCED PRESSURE DETECTOR ASSEMBLY INCLUDING: 2–O.S.& Y RESILIENT SEATED GATE VALVES, TEST COCKS.
2. MEGA–FLANGE (ADDITIONAL OR ALTERNATE METHODS OF RESTRAINT MAY BE REQUIRED)
3. HEATED ENCLOSURE (AS MANUFACTURED BY HOT BOX CO OR AN APPROVED EQUAL). ABOVE GROUND INSTALLATIONS. ENCLOSURE WALL SHALL BE „ THICK MARINE GRADE ALUMINUM. EXTERIOR WILL BE PAINTED WITH AN APPROVED PAINT, PROVIDED WITH SUFFICIENT INSULATION TO PREVENT FREEZING.
4. DUCTILE IRON PIPE (SIZED AS REQUIRED) CLASS 52.
5. GALVANIZED ADJUSTABLE STAND–ON PIPE SUPPORT FOR 2–1/2" DIAM AND LARGER PIPE.
6. 6" MIN CLEARANCE FROM UNDERSIDE OF VAULT LID TO STEM OF OS&Y WHEN FULLY OPEN.
7. CONCRETE SLAB; DIMENSIONS ARE A MINIMUM 4" GREATER THAN AS DEFINED BY PERIMETER OF BOX.

NOTES

1. TEE AND GATE VALVE REQUIRED ON MAIN.
2. ALL DIMENSIONS ARE MINIMUM CLEARANCE REQUIREMENTS.
3. ASSEMBLY REQUIRES CERTIFICATION UPON INSTALLATION AND RECERTIFICATION ANNUALLY.
4. REFER TO STATE AND LOCAL PLUMBER/BUILDING CODES AND STANDARDS FOR PROPER INSTALLATION.

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) 3" AND LARGER	DATE 2021 ENGR MMS	STANDARD 603

BACKFLOW INSTALLATION NOTES:

1. All commercial services shall require premise isolation. Backflow assemblies for purposes of premise isolation shall be located immediately downstream of the water service connection (or water meter box), within 1 to 2 feet, and prior to any branch connections. Alternate installation locations must be pre-approved by the District.

2. Double Check Valve Assemblies for puposes of Irrigation may be installed immediately after branch connection.

3. Installation of approved backflow assemblies shall be in accordance with the Accepted Procedure and Practice in Cross-Connection Control Manual, of the Pacific Northwest Section of the American Water Works Association latest edition.

4. Backflow assemblies selected for installation must appear on the most current listing on University of Sourthern California backflow assemblies approved for installation.

5. Prior to installation of a backflow assembly, the installer or developer or property owner must call the District at 425-397-3000 to schedule an inspection.

6. Following an installation inspection approval by a District Inspector, the backflow assembly must be scheduled for an initial test by a Washington State Department of Health certified Backflow Assembly Tester. A District Cross-Connection Specialist (CCS) in the Water Resources Department must witness the initial testing of the backflow assembly.

7. The property owner is responsible for initial and annual testing of any backflow assembly.

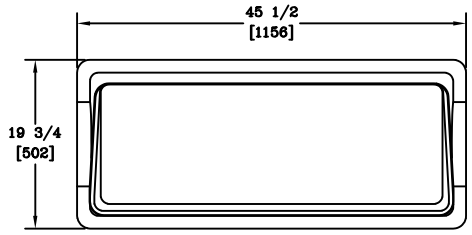
8. The property owner is responsible for freeze protection of any backflow assembly.

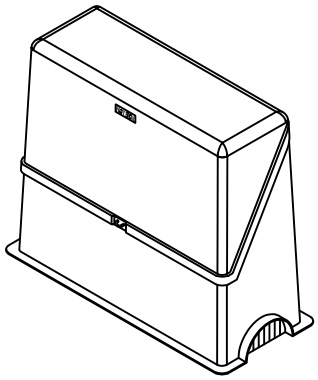
9. The installer or developer or property owner must provide backflow assembly test cock protection with plugs, caps, or covers.

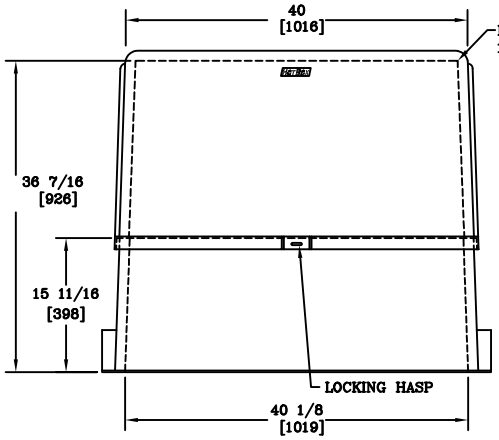
10. The water meter must be installed in order to test the backflow assembly.

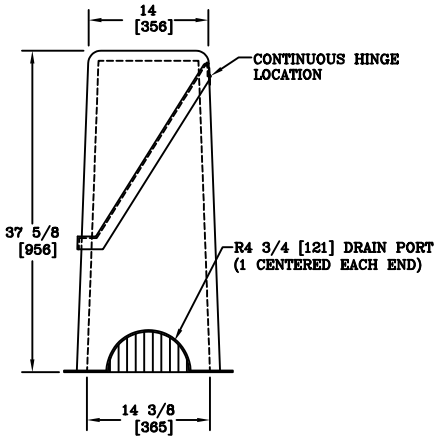
11. Assembly to be tagged with a laminated card having the following information: Tester 's name or company name, date tested, and a phone number the tester can be contacted at. For more information or technical assistance, please contact 425-397-3000.

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	BACKFLOW INSTALLATION NOTES	DATE 2021 ENGR MMS	STANDARD 604A









NOTES:

1. HEAT IS PROVIDED BY A 90WATT, 120V SINGLE PHASE HEAT TRACE TAPE. FOR UNHEATED VERSION REPLACE THE PREFIX "H" WITH AN "L".
2. FOUR INTERNAL BRACKETS AND CONCRETE ANCHORS ARE SUPPLIED WITH THE ENCLOSURE. (NOT SHOWN)
3. STANDARD COLOR IS BEIGE. (OPTIONS AVAILABLE)
4. FOR RECOMMENDED SLAB SIZE ADD 9" [229] TO THE ENCLOSURE EXTERIOR.
5. INTERIOR DIMENSIONS ARE NOMINAL.
6. OLD P/N: HB2T

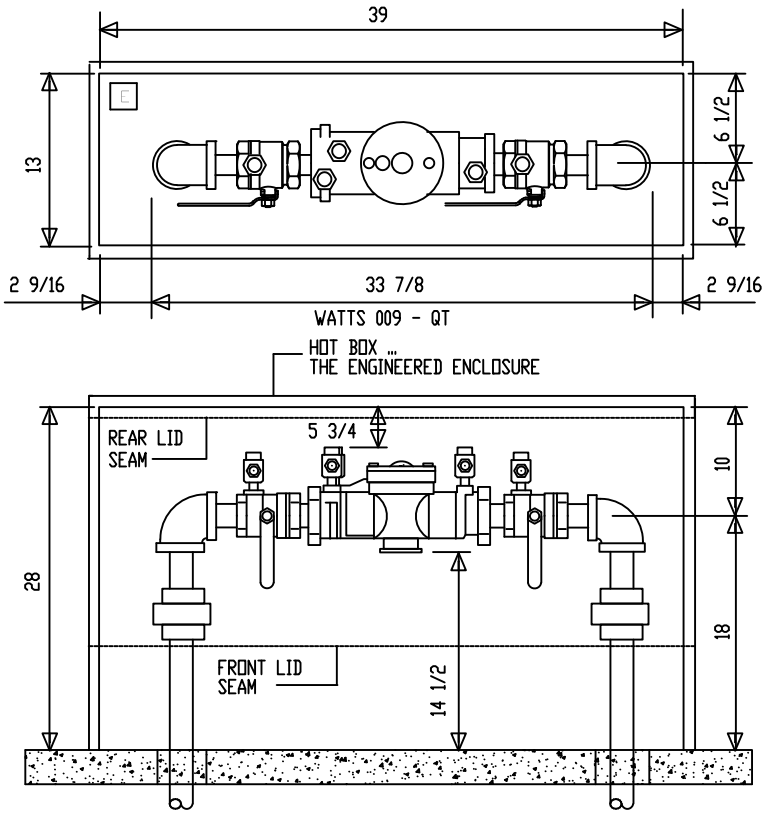
DIMENSIONS ARE IN INCHES OR MILLIMETERS IN BRACKETS UNLESS OTHERWISE NOTED.

	BY	DATE	WEIGHT		LOC
DRN	KPG	9/15/09	65# 29kg	HUBBELL 924 LANE AVENUE JACKSONVILLE, FL 32254 904-786-0204 www.hot-box.com	LC
CHK	KPG	12/15/10	SCALE 1 1/2"=1'	DRAWING DESCRIPTION	REV
ENG				HOT BOX® FIBERGLASS FLIP TOP ENCLOSURE	B
APR			SIZE B		12/10
APR					
PROJECT NUMBER 09906				SHEET 1 OF 1	DRAWING NUMBER HF013039036

THE ABOVE 2" WATTS 009 RPBA WITH A STANDARD NO. HB2T FIBERGLASS ENCLOSURE AS MANUFACTURED BY HOT BOX IS AN ACCEPTABLE INSTALLATION.

OTHER EQUIVALENT INSTALLATION (SUBJECT TO DISTRICT APPROVAL) SHALL BE CONSIDERED.

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) 2" "HOT BOX DETAIL 1 OF 2"	DATE 2022 ENGR MMS	STANDARD 604B



1.

2. ALL DIMENSIONS ARE APPROXIMATED IN INCHES.

   RECOMMENDED SLAB SIZE : 50"L x 24"W x 4" MINIMUM THICKNESS.

3. "E" INDICATES THE ELECTRICAL RECEPTACLE. IT SHALL BE MOUNTED A MINIMUM OF 18" ABOVE THE SLAB.

4. THE ENCLOSURE IS DESIGNED AS A FLIP-TOP TO ASSURE EASIER ACCESS AND MAINTENANCE.

5. THE BACKFLOW PREVENTER SHALL BE HEATED BY AN 18'-0", 90W, 120V, SINGLE PHASE HEAT TRACE TAPE.

6. THE UNIT IS A LB2 WHEN INSTALLED WITHOUT THE HEAT.

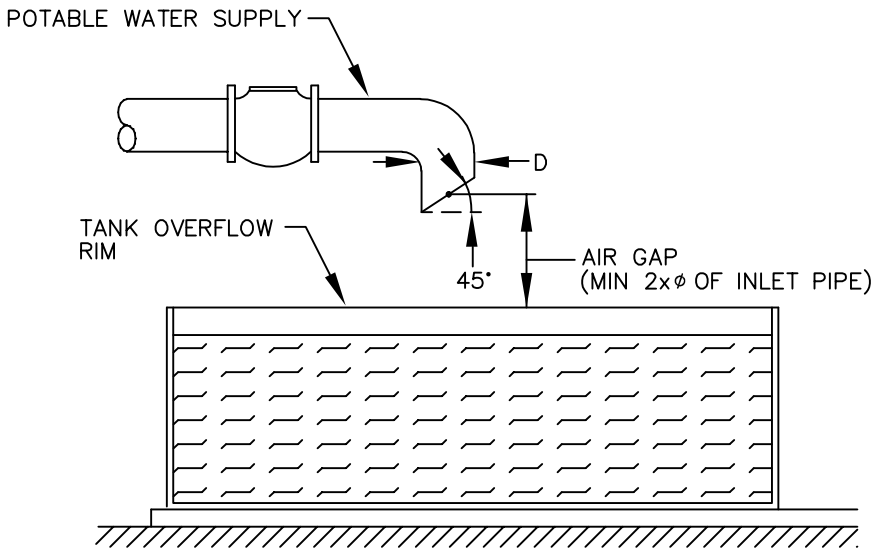
RESTRICTED DRAWING.
PATENT # 4,726,394.

Hot Box 924 LANE AVE. N. JACKSONVILLE, FLORIDA 32254 (904)786-0204 (800)736-0238 FAX (904)783-6965 HTTP: WWW.HOT-BOX.COM	TITLE: 2"WATTS 009-QT (STANDARD #HB2 FIBERGLASS FLIP-TOP)				BY/DATE/DWG: SBT / 10-2-97 2WCQ--11
	ENGINEER / CONTRACTOR :		LOCATION :		APPROVED/DATE :
REV. 1 :	REV. 2 :	REV. 3 :	SCALE :	REP. / DISTRIBUTOR :	QUOTE NO.:

THE ABOVE 2" WATTS 009 RPBA WITH A STANDARD NO. HB2T FIBERGLASS ENCLOSURE AS MANUFACTURED BY HOT BOX IS AN ACCEPTABLE INSTALLATION.

OTHER EQUIVALENT INSTALLATION (SUBJECT TO DISTRICT APPROVAL) SHALL BE CONSIDERED.

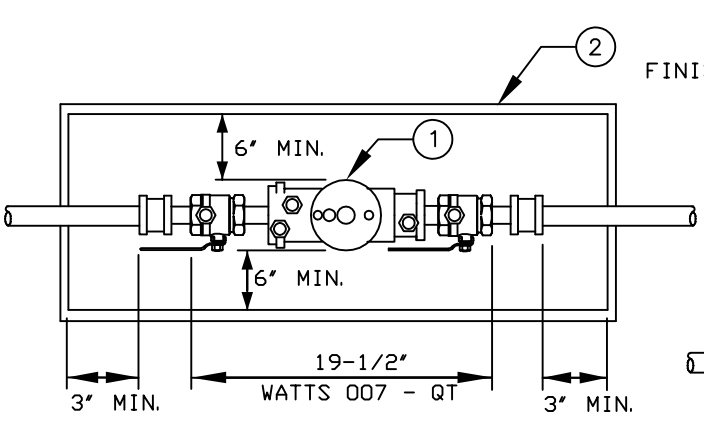
SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) 2" "HOT BOX DETAIL 2 OF 2"	DATE 2013 ENGR BEW	STANDARD **604C**



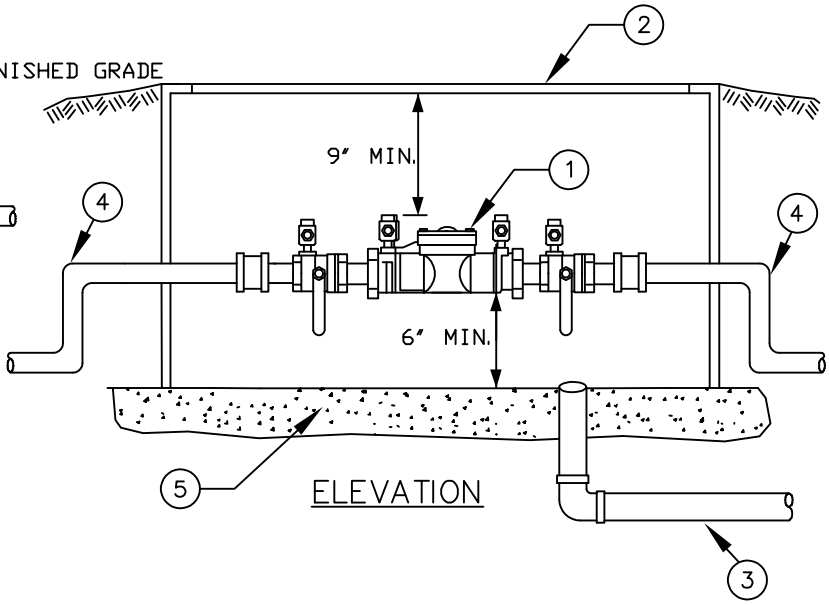
APPROVED AIR GAP SEPARATION

AN APPROVED AIR GAP IS A PHYSICAL SEPARATION BETWEEN THE FREE FLOWING DISCHARGE END OF A POTABLE WATER SUPPLY PIPELINE AND THE OVERFLOW RIM OF AN OPEN OR NON– PRESSURE RECEIVING VESSEL. THESE VERTICAL, PHYSICAL SEPARATIONS MUST BE AT LEAST TWICE THE DIAMETER OF THE INLET PIPE BUT NEVER LESS THAN ONE INCH. IF SPLASHING IS A PROBLEM, TUBULAR SCREENS MAY BE ATTACHED OR THE SUPPLY LINE OUTLET MAY BE CUT AT A 45° ANGLE. IF SUPPLY LINE IS CUT AT A 45° ANGLE THE AIR GAP DISTANCE IS MEASURED FROM THE CENTER OF THE ANGLE. HOSES ARE NOT ALLOWED. BYPASSES ARE NOT ALLOWED. THE INSPECTION OF AIR GAPS SHALL BE INCLUDED IN THE YEARLY TESTING PROGRAM FOR BACKFLOW DEVICES.

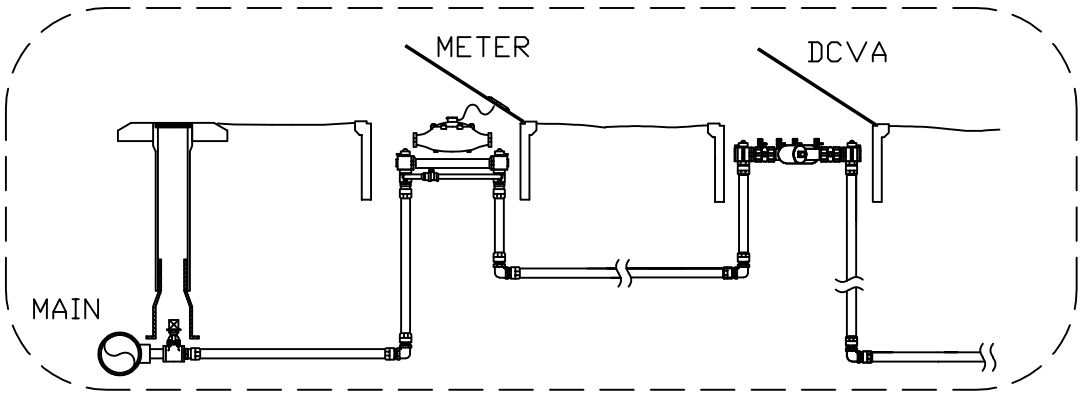
SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	AIR GAP FOR TANK	DATE 2021 ENGR MMS	STANDARD 605



PLAN



ELEVATION



DIAGRAM

LEGEND

(1) WASHINGTON STATE APPROVED DOUBLE CHECK VALVE ASSEMBLY.

(2) IN NON-TRAFFIC AREAS USE:
MID STATES 1527-18 AND MSBCF 1527-RL IF ALL CLEARANCES ARE SATISFIED OR APPROVED EQUAL.
IN TRAFFIC AREAS:
A TRAFFIC LOADED BOX MUST BE USED AND LOCATION APPROVED BY THE THE DISTRICT PRIOR TO INSTALLATION.

(3) DRAIN TO DAYLIGHT OR INSTALLATION OF DRAIN ROCK (PEA GRAVEL) 6" WIDE BY 12" DEEP REQUIRED.

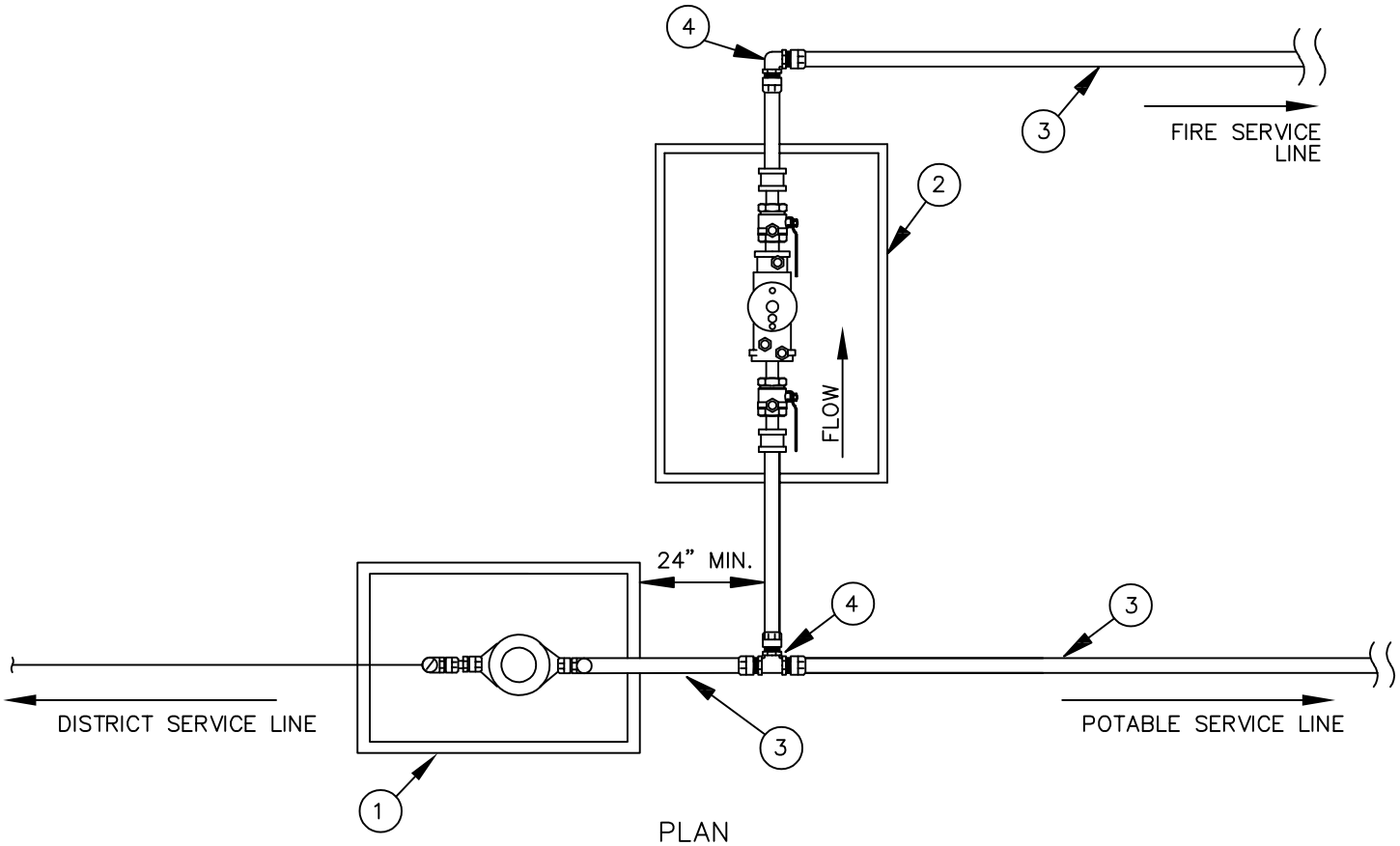
(4) ANGLES MAY BE IN OR OUT OF BOX SO LONG AS SUFFICIENT ROOM IS ALLOWED AT EACH END FOR VALVE OPERATOR AND DCVA REPAIR OR MAINTENANCE.

(5) PROVIDE FREE 100% DRAIN ROCK (PEA GRAVEL--SEE NOTE 3 ABOVE)

NOTES

1. ALL TEST COCKS MUST HAVE BRASS PLUGS.
2. TEST COCKS MUST FACE AS PRESCRIBED BY THE MANUFACTURER AND THE USC FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH SPECIFICATIONS.

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	DOUBLE CHECK VALVE ASSEMBLY (DCVA) 2" & SMALLER	DATE 2021 ENGR MMS	STANDARD 606



PLAN

PLEASE NOTE THAT THE CONFIGURATION OF THE BRANCH FEED FOR THE FIRE SERVICE AND DOMESTIC SERVICE MAY BE OPPOSITE OF THAT SHOWN ABOVE.

LEGEND

(1) 1" STANDARD DOMESTIC WATER SERVICE. REFER TO PUD STANDARD 101.

(2) DOUBLE CHECK VALVE ASSEMBLY (DCVA). SEE PUD STANDARD 606. SIZING AND MATERIAL AS DETERMINED BY THE APPROPRIATE FIRE PREVENTION AUTHORITY. (CUSTOMER RESPONSIBILITY)

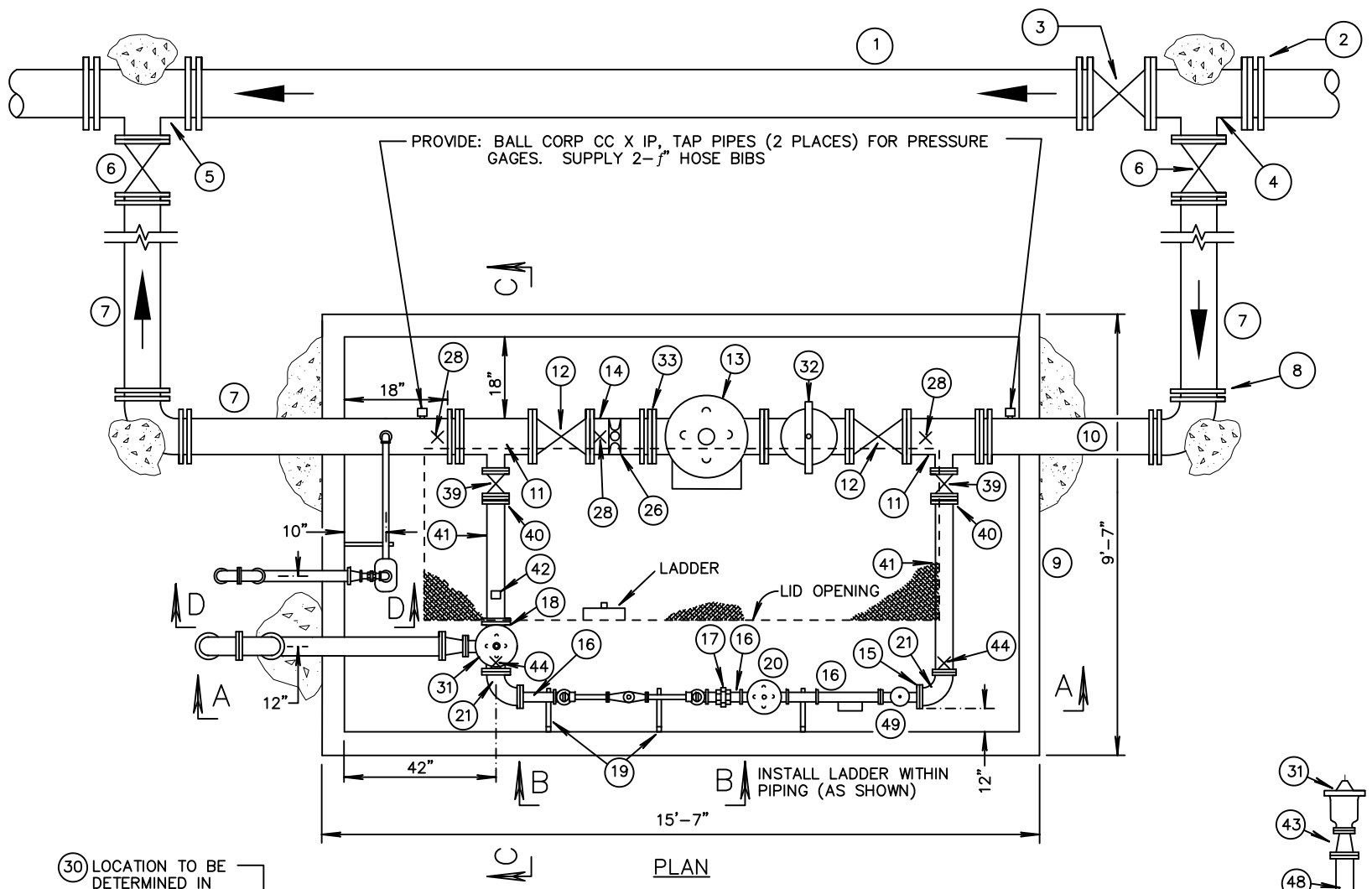
(3) SERVICE LINE SIZING AND MATERIAL AS DETERMINED BY CUSTOMER.

(4) FITTING SIZE AND MATERIAL AS DETERMINED BY CUSTOMER.

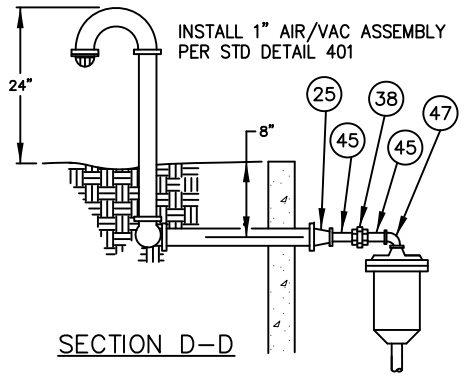
NOTES

1. FOR SYSTEMS DESIGNED AS FLOW THROUGH – A SINGLE SERVICE LINE MAY BE USED AND NO DCVA WILL BE REQUIRED.
2. FOR DOMESTIC PLUS FIRE SYSTEMS OVER 40 GPM – A SEPARATE FIRE SERVICE WILL BE REQUIRED FOR THE FIRE LINE WITH DCVA.
3. INSTALLATION, ANNUAL TESTING, AND MAINTAINING OF THE BACKFLOW PREVENTION ASSEMBLY SHALL BE THE RESPONSIBILITY OF THE CUSTOMER. D.C.VA. SHALL BE TESTED BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER (B.A.T.) AND INSPECTED BY DISTRICT PRIOR TO TURNING THE WATER ON. CONTACT DISTRICT FOR TEST REPORT FORMS.

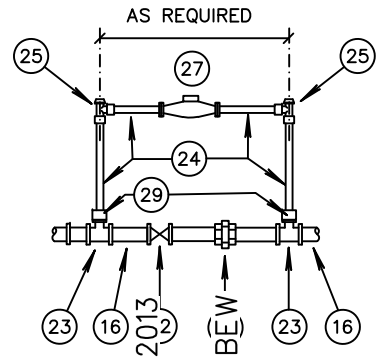
SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	1" SINGLE FAMILY RESIDENTIAL FIRE SERVICE DCVA	DATE 2021 ENGR MMS	STANDARD 607



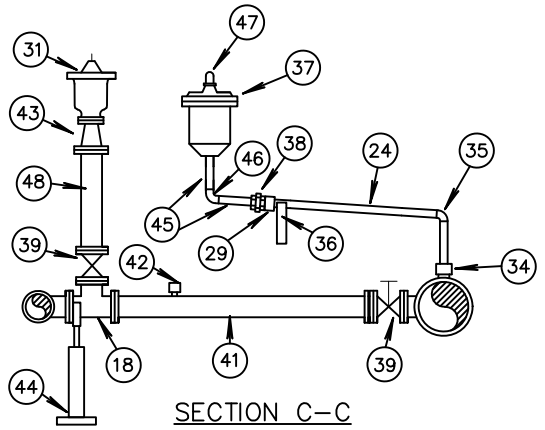
PLAN



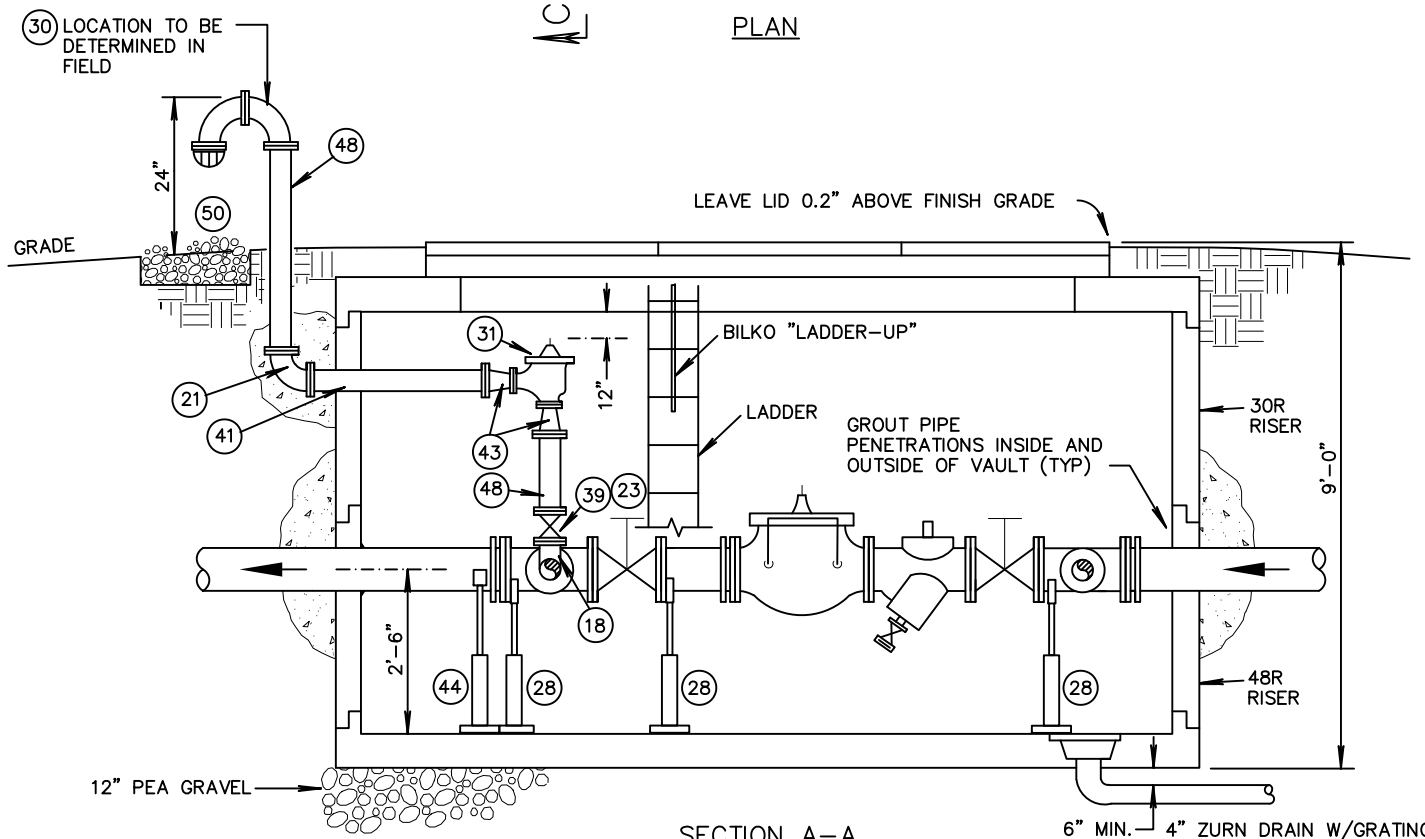
SECTION D–D



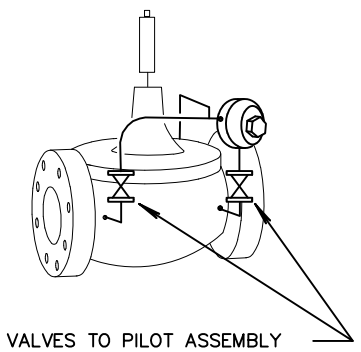
SECTION B–B



SECTION C–C



SECTION A–A



PROVIDE VALVES TO PILOT ASSEMBLY AS SHOWN FOR MARK 13 AND 20

PIPING DETAIL

4" ZURN DRAIN W/GRATING ON INLET 4" PVC DRAIN TO DAYLIGHT OR STORM SYSTEM MIN. SCHEDULE 80 PVC UNDER VAULT TO 5' OUTSIDE VAULT (MIN. SLOPE = 0.005)

IF POSITIVE DRAINAGE FROM VAULT CANNOT BE ACHIEVED A SUMP PUMP SYSTEM WILL BE REQUIRED. DISTRICT WRITTEN APPROVAL REQUIRED FOR SUMP PUMP SYSTEM. INSTALL ZOELLER SUBMERSIBLE SUMP PUMP 3/10 HP MODEL NO. M53-D DISCHARGE NPT 1-1/2 INCH IN LIEU OF DRAIN TO DAYLIGHT.

VAULT MATERIAL LIST

UTILITY VAULT MODEL 814-9-LA
LW PRODUCTS ALUMINUM HYDRAULIC ASSISTED LIDS
(H-20 TRAFFIC LOADED) MODEL HTD-1A 36" X 108" CLEAR OPENING
GALVANIZED STEEL LADDER W/ LADDER-UP SAFETY POST
COATS ASPHALTIC SOLUTION APPLIED TO VAULT EXTERIOR

PAINT SCHEDULE

EXTERIOR OF VAULT BELOW GRADE TWO COATS OF BLACK BITUMASTIC SOLUTION VAULT SHOULD BE DRIED WITH NO MOISTURE PRESENT PRIOR TO APPLICATION OF COATINGS.

PAINT INTERIOR PIPING AND SUPPORTS:
1 – COAT RUST RESISTOR PRIMER RED
2 – COATS SAFETY BLUE, OIL BASED ENAMEL

PAINT STANDPIPE PIPING:
1 – COAT RUST RESISTOR PRIMER RED
2 – COATS SAFETY BLUE, OIL BASED ENAMEL

NOTES

1. ALL TEST COCKS SHOULD HAVE APPROPRIATE PLUGS INSTALLED.
2. FLEXIBLE FITTING WHEN ENTERING AND EXITING VAULT SLEEVE (MJ) WITHIN 5 FEET OF VAULT. IF (MJ) BELL CONNECTION IS WITHIN 5 FEET VAULT, FITTING MAY BE OMITTED (TYPICAL).
3. ADJUST COVER TO MATCH EXISTING GRADE OR 6" ABOVE GRADE IN UNIMPROVED AREA
4. ALL MJ FITTINGS SHALL USE APPROPRIATE THRUST RESTRAINTS.
5. EACH FLOW CONTROL VALVE SHALL REQUIRE THE FOLLOWING: A 316 STAINLESS STEEL SEAT, STEM & EXTERNAL FASTENERS, EPOXY COATED INSIDE AND OUT, AND FACTORY PRE-SET FOR VALVE TO FAIL OPEN. (CALLOUT 13, 20, & 31 BELOW).

LEGEND

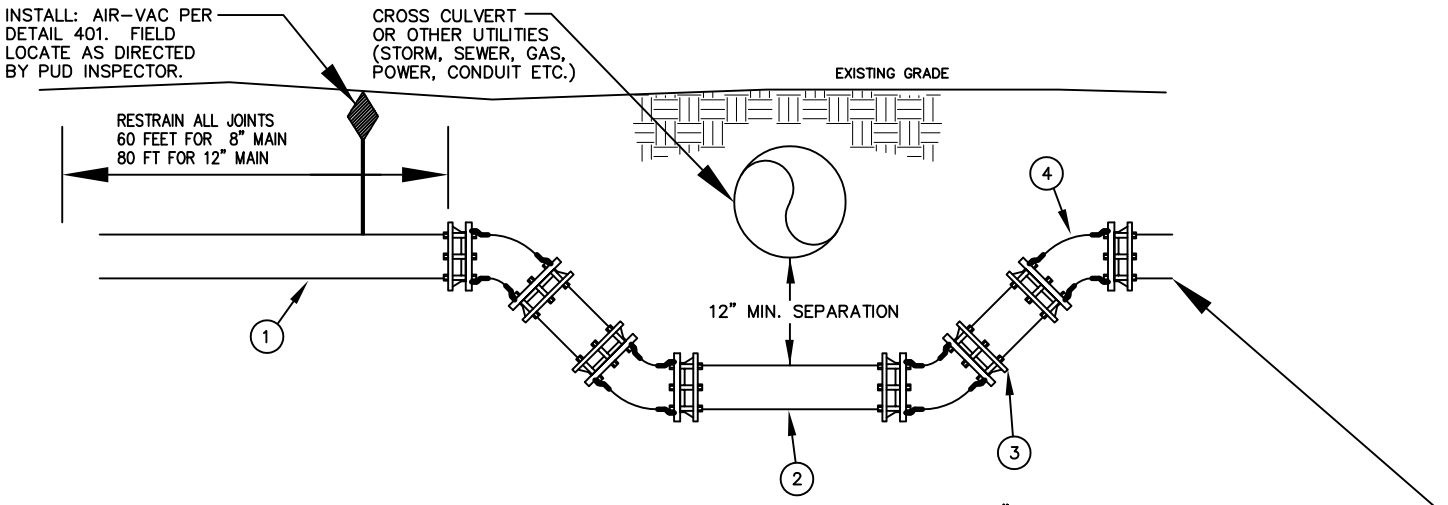
1. PRV SIZE TO MAIN SIZE DI CL 52 (LENGTH TO SUIT)
2. PRV SIZE TO MAIN SIZE FCA
3. PRV SIZE TO MAIN SIZE FL X MJ VALVE W/2" OPERATING NUT
4. (PRV SIZE TO MAIN SIZE X PRV SIZE) FL TEE
5. (PRV SIZE TO MAIN SIZE X PRV SIZE) MJ X FL TEE
6. PRV SIZE FL X MJ VALVE W/2" OPERATING NUT
7. PRV SIZE DI CL 52 (LENGTH TO SUIT)
8. PRV SIZE 90° MJ BEND
9. UTILITY VAULT SIZE SHOWN ON PLAN
10. SPOOL (LENGTH TO SUIT)
11. PRV SIZE X 4" FL TEE
12. PRV SIZE GV (FL) W/HAND WHEEL
13. PRV CLA-VALVE W/POSITION INDICATOR (30-300 PILOT SYSTEM INDICATOR) SINGER PRV OR APPROVED EQUAL
14. PRV SIZE SPOOL PIECE FLANGED ON ONE END (LENGTH TO SUIT)
15. 4" BLIND FLANGE W/2" TAP THREADED
16. 2" BRASS NIPPLE (LENGTH TO SUIT)
17. 2" BRASS STRAIGHT UNION
18. 4" FL TEE
19. 2" PIPE SUPPORT (OFF WALL)
20. 2"-4" PRV CLA-VALVE W/POSITION INDICATOR (30-300 PILOT SYSTEM INDICATOR) SINGER PRV OR APPROVED EQUAL. SIZE DETERMINED BY DISTRICT ENGINEER.
21. 4" 90° FL BEND
22. 2" GATE BRASS VALVE W/HAND WHEEL
23. 2" X 1" BRASS TEE
24. 1" TYPE "K" COPPER TUBING (LENGTH TO SUIT)
25. MUELLER 110 ANGLE METER STOP
26. 2" ROMAC 202N SADDLE, 2" FORD BALLCORP, 2" X 2-1/4" HOSE ADAPTOR W/CAP
27. 1" METER
28. 8" "STANDON" PIPE SUPPORT W/2" STEEL PIPE
29. 1" MULLER 110 X MIP STRAIGHT COUPLING
30. 4" FL 90° BENDS W/LAP JOINT FL W/ 1/4" GALV. WIRE MESH
31. 3" PRESSURE RELIEF VALVE CLA-VALVE, (30-300) PSI RANGE W/POSITION INDICATOR
32. PRV SIZE "Y" STRAINER W/STAINLESS STEEL BASKET, 2" BRASS NIPPLE, 2" BRASS BALL VALVE W/MALE NTS ADAPTER WITH CAP
33. MEGA-FLANGE (EBBA OR APPROVED EQUAL)
34. 1" AWWA TAPER THREAD x 110 BALL CORP. STOP
35. 1" MULLER 110 QUARTER BEND COUPLING
36. 1" PIPE SUPPORT GRINNELL
37. 1" AIR AND VAC RELIEF VALVE
38. 1" BRASS UNION
39. 4" FL VALVE W/HAND WHEEL
40. 4" MEGA FLANGE ADAPTER
41. 4" D.I. CL 52 PIPE FL X PE SPOOL (LENGTH AS REQUIRED)
42. DIRECT TAP W/1" THREADED OUTLET, 1" FORD BALL CORP, & HOSE BIB
43. 4" X 3" FL RED.
44. 4" "STAND-ON" PIPE SUPPORT WITH 2" STEEL PIPE
45. 1" BRASS NIPPLE (LENGTH AS REQUIRED)
46. 1" BRASS 90° BEND
47. 1" BRASS STREET ELBOW
48. 4" FL SPOOL
49. 2"-4" "Y" STRAINER W/BRASS BALL VALVE. SIZE ACCORDING TO NOTE 20 (PER DISTRICT ENGINEER).
50. 36"x36"x12" DEEP SPLASH BLOCK

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1

6"-8" PRESSURE REDUCING VALVE (PRV)

DATE 2020
ENGR MMS

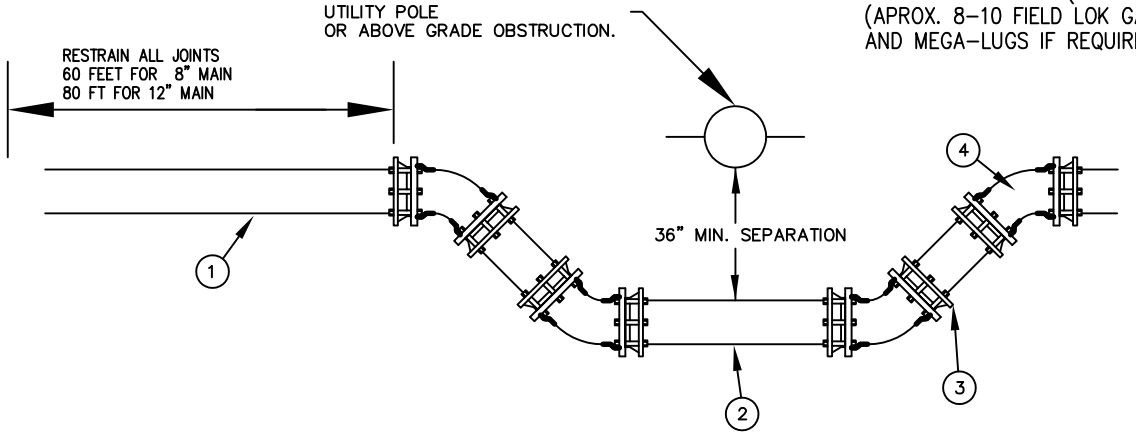
STANDARD 701



PROFILE VIEW OF VERTICAL UTILITY CROSSING

FOR 8 " MAIN RESTRAIN ALL JOINTS 60FT BEFORE AND AFTER (120 FT TOTAL) (APROX. 6-8 FIELD LOK GASKETS TOTAL AND MEGA-LUGS IF REQUIRED)

FOR 12" MAIN RESTRAIN JOINTS 80 FT BEFORE AND AFTER (160 FT TOTAL) (APROX. 8-10 FIELD LOK GASKETS TOTAL AND MEGA-LUGS IF REQUIRED)



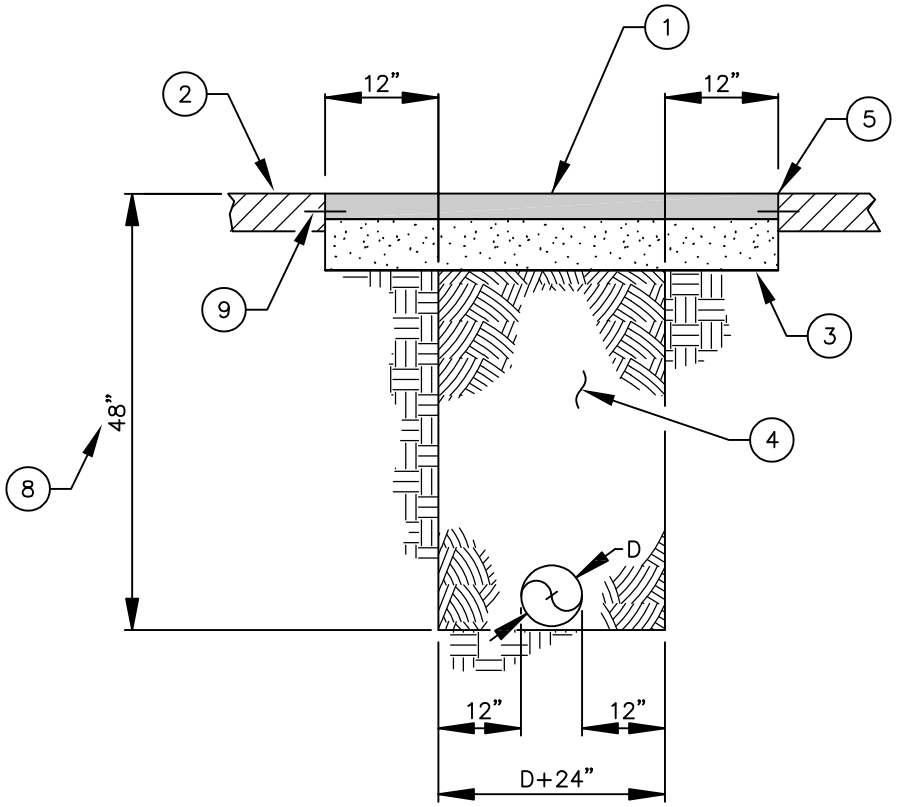
PLAN VIEW OF UTILITY POLE OR ABOVE GRADE OBSTRUCTION CROSSING

NOTE:
ORIENTATION CAN BE VERTICAL OR LATERAL AS REQUIRED. FOR ILLUSTRATION PURPOSES ONLY THE DEFLECTION IS SHOWN AS UNDER POTENTIAL CONFLICT; HOWEVER DEFLECTION CAN BE UP, DOWN LEFT, RIGHT OR ANY ITERATION IN ROTATION AS REQUIRED TO AVOID CONFLICT AREA.

LEGEND

1. 8" OR 12" D.I. MAIN
2. 8" OR 12" D.I. NIPPLE TO LENGTH (TYP)
3. 8- 8" OR 12" MEGA LUGS (TYP)
4. 4- 8" OR 12" 45 DEG. BEND (TYP)

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	AVOIDANCE OF MAIN ALIGNMENT CONFLICTS	DATE 2021 ENGR MMS	STANDARD 800

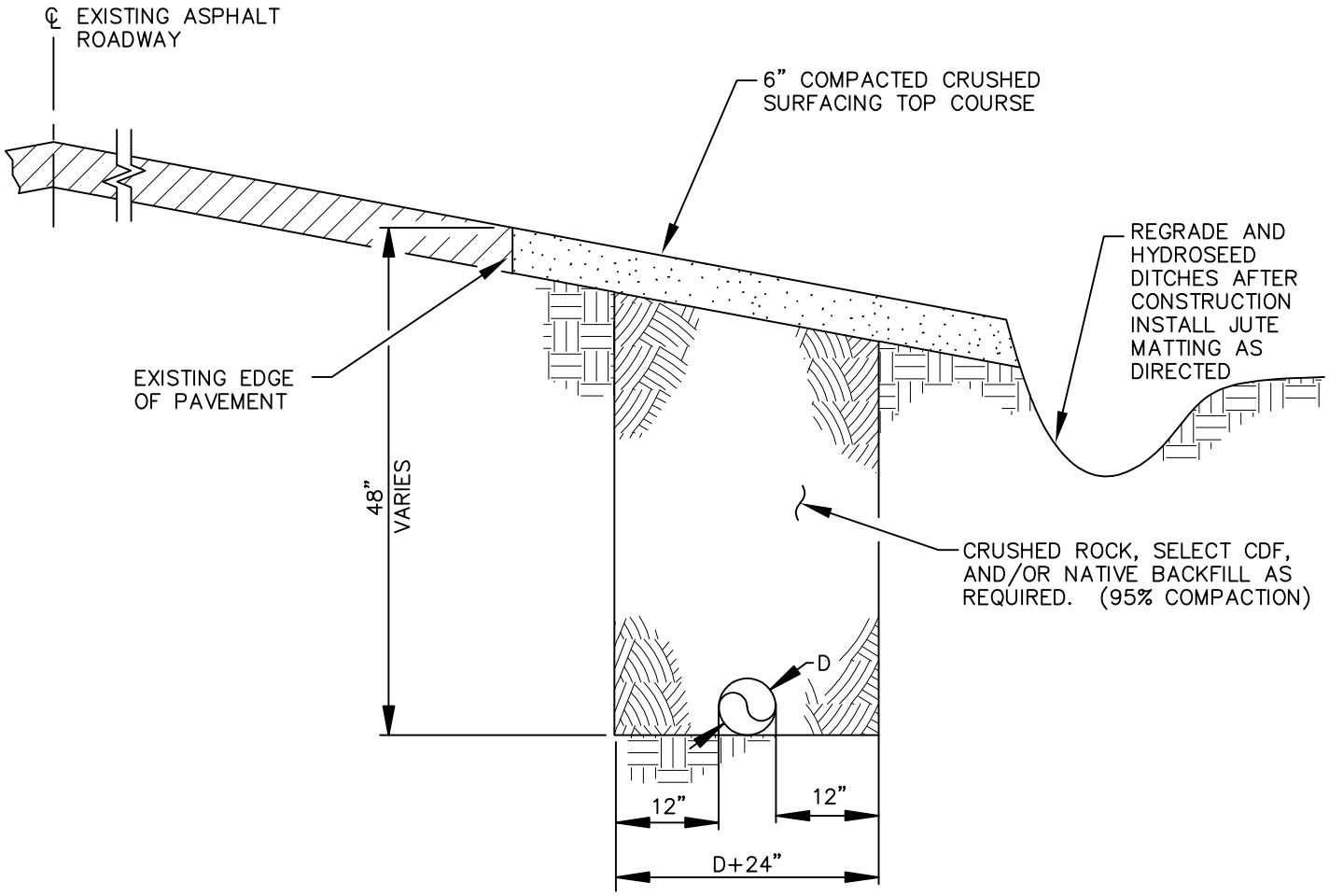


(OR AS ALLOWABLE PER RESPONSIBLE JURISDICTION)

LEGEND

1. LONGITUDINAL TRENCH – 2" ASPHALT CLASS B OVERLAY. TRANSVERSE TRENCH – 2" ASPHALT CLASS B OVERLAY WHERE MULTIPLE CROSSINGS BY SAME UTILITY.
2. EXISTING PAVEMENT.
3. LONGITUDINAL TRENCH – 6" ACP OR 2" ACP + 4" ATB. TRANSVERSE TRENCH – 8" ACP OR 2" ACP + 6" ATB. IF CONCRETE, RESTORATION SHALL BE IN ACCORDANCE WITH THE GOVERNING BODIES OF JURISDICTION OVER THE WORK
4. NATIVE MATERIAL (IF SUITABLE). IMPORTED GRAVEL BORROW OR CRUSHED ROCK, AS REQUIRED, COMPACTED TO 95% MAXIMUM DENSITY. CDF AS REQUIRED BY THE ENGINEER. CONTRACTOR HAS THE OPTION TO BACKFILL THE ENTIRE EXCAVATION TO THE SUBGRADE WITH CSTC.
5. NEAT LINE CUT, CLEAN, HEAT & TACK EDGES WITH SEALER CSS–1 IMMEDIATELY COVERED WITH SAND & SEAL WITH HOT ASPHALT CEMENT.
6. TEMPORARY RESTORATION OF TRENCHES FOR OVERNIGHT USE SHALL BE ACCOMPLISHED BY USING COLD MIX, ATB, OR PINNED STEEL PLATES WITH ASPHALTED EDGES.
7. PATCH SHALL BE MACHINE ROLLED FLUSH WITH EXISTING PAVEMENT AND SHALL BE PLACED IN ACCORDANCE WITH THE GOVERNING BODIES OF JURISDICTION OVER THE WORK.
8. TRENCH DEPTH OVER UNDERGROUND UTILITIES SHALL CONFORM TO SECTION 3.3.1.
9. TRENCHES IN CONCRETE PAVEMENT SHALL BE RESTORED USING TIE BARS OR DOWEL BARS IN ACCORDANCE WITH THE GOVERNING BODIES OF JURISDICTION OVER THE WORK.
10. ALL WORK SHALL BE PREFORMED IN ACCORDANCE WITH THE GOVERNING BODIES WITH JURISDICTION OVER THE WORK
11. VERTICAL TRENCH WALLS SHALL CONFORM TO OSHA REGULATIONS.

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	TYPICAL TRENCH DETAIL IN PAVEMENT	DATE 2021 ENGR MMS	STANDARD 801



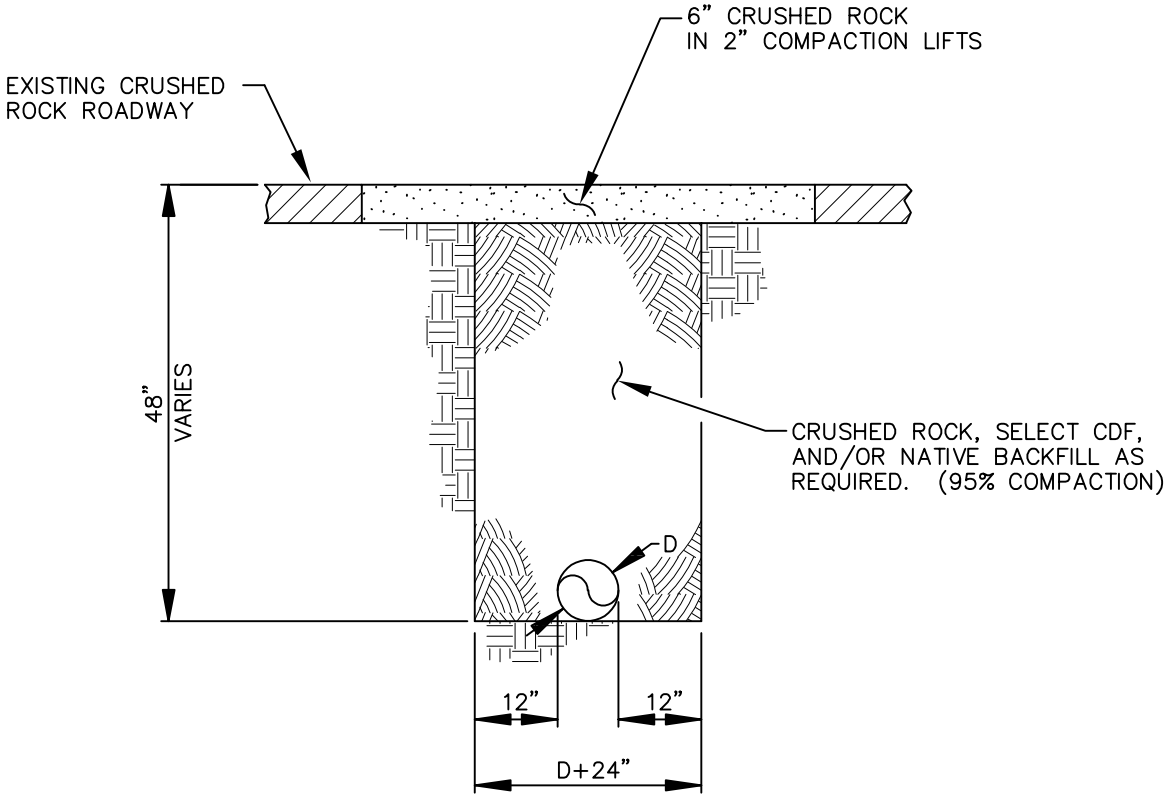
(OR AS ALLOWABLE PER RESPONSIBLE JURISDICTION)

TYPICAL ROADWAY CONSTRUCTION GENERAL NOTES

1. SELECT AND/OR NATIVE BACKFILL MATERIAL SHALL BE FREE FROM MUD, MUCK, ORGANIC MATTER, BROKEN BITUMINOUS SURFACING, AND STONES LARGER THAN 2" IN DIAMETER.

2. COMPACTION SHALL BE 95% OF MAXIMUM DENSITY.

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	TRENCH WITHIN CRUSHED ROCK ROAD SHOULDER	DATE 2021 ENGR MMS	STANDARD 802



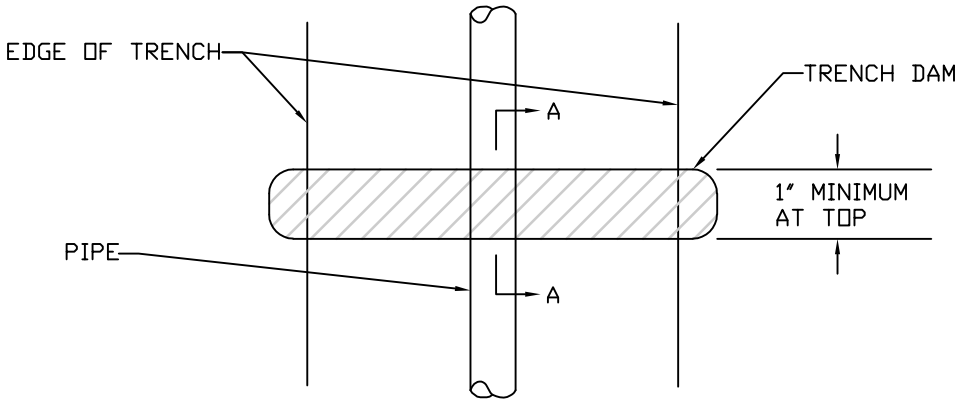
(OR AS ALLOWABLE PER RESPONSIBLE JURISDICTION)

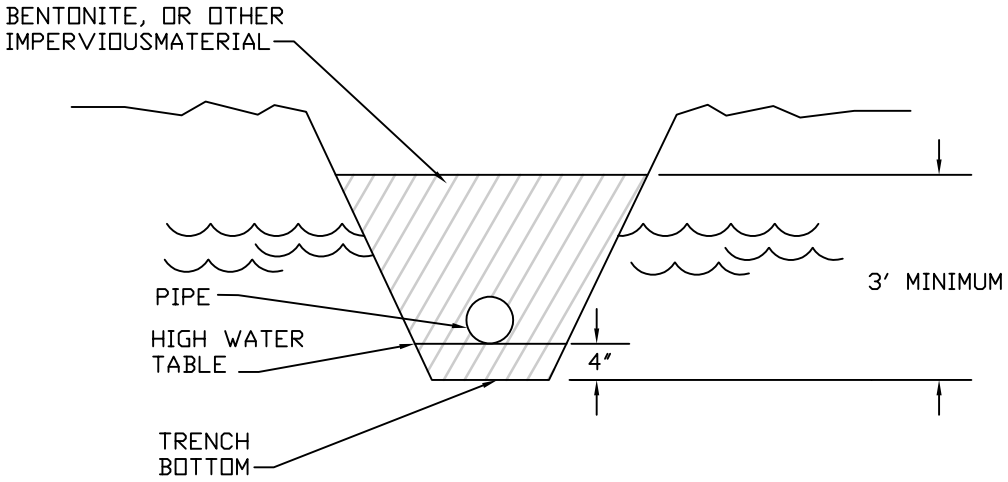
TYPICAL ROADWAY CONSTRUCTION GENERAL NOTES

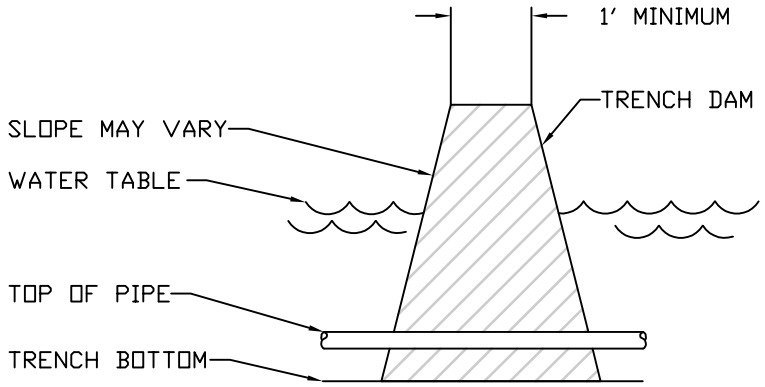
1. SELECT AND/OR NATIVE BACKFILL MATERIAL SHALL BE FREE FROM MUD, MUCK, ORGANIC MATTER, BROKEN BITUMINOUS SURFACING.

2. COMPACTION SHALL BE 95% OF MAXIMUM DENSITY.

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	TYPICAL CRUSHED ROCK TRENCH DETAIL	DATE 2021 / ENGR MMS	STANDARD 803





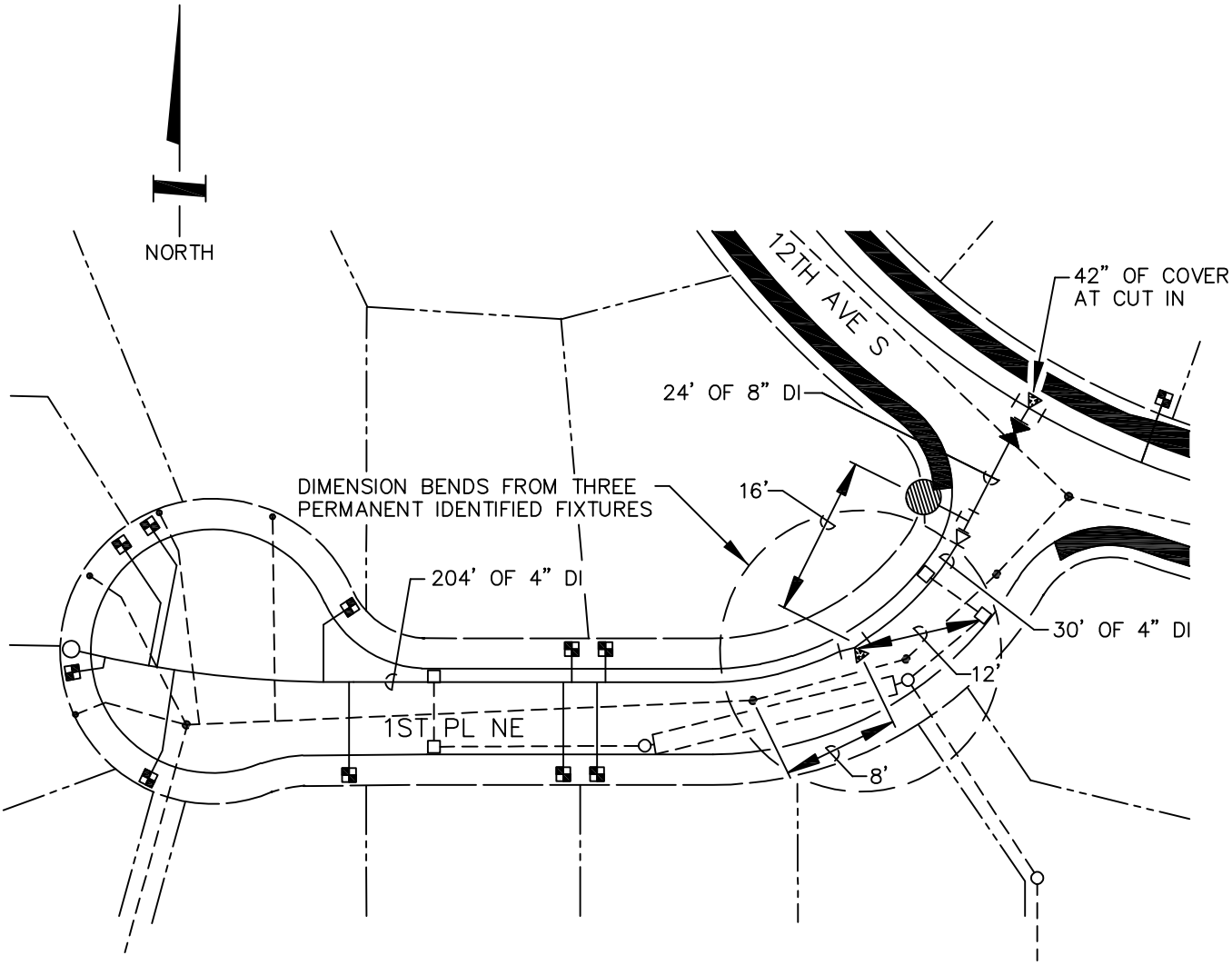


SECTION A-A

NOTES:

1. INSTALL IN HIGH GROUND WATER AREAS, ADJACENT TO WETLANDS AND STREAM CROSSINGS OR AS SHOWN ON PLANS OR AS DIRECTED BY THE DISTRICT.
2. ELEVATION AT TOP OF TRENCH DAM TO VARY BASED ON WATER TABLE AS DIRECTED BY THE DISTRICT.

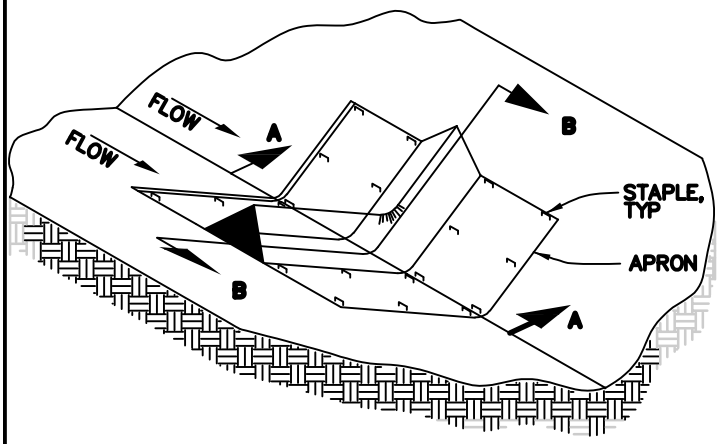
SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	TRENCH DAM	DATE 2021 ENGR MMS	STANDARD 804



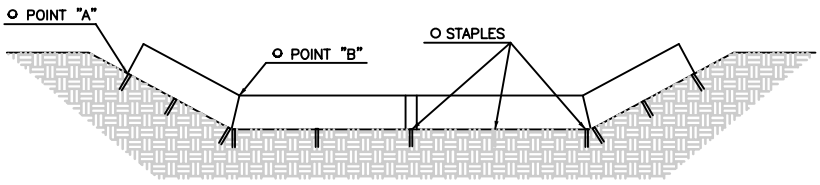
AS-BUILT THE FOLLOWING:

- LOCATION OF ANY BENDS USED
- LENGTH OF PIPE
- DISTANCE FROM CENTERLINE
- DEPTH OF MAIN
- STREET NAME
- NORTH ARROW
- HORIZONTAL SCALE: 1"=20'

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	WATER AS-BUILT DETAIL	DATE 2021 ENGR MMS	STANDARD 901

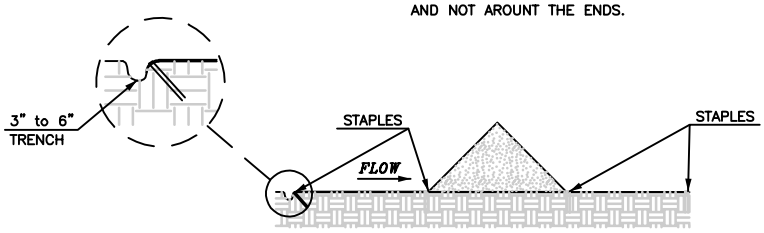


ISOMETRIC VIEW OF CHECK DAM



DIKE SECTION
DETAIL B–B

- POINT "A" MUST BE HIGHER THAN POINT "B" TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUNT THE ENDS.



DETAIL A–A

- STAPLES SHALL BE PLACED WHERE THE UNITS OVERLAP AND IN THE CENTER OF THE 7' UNIT AS SHOWN ONTHE DIAGRAMS

NOTES:

MATERIALS: TEMPORARY SILT DIKES SHALL BE TRIANGULAR–SHAPED, HAVING A HEIGHT OF AT LEAST EIGHT TO TEN INCHES (8" – 10") IN THE CENTER WITH EQUAL SIDES AND A SIXTEEN– TO TWENTY–INCH (16" – 20") BASE. THE TRIANGULAR–SHAPED INNER MATERIAL SHALL BE URETHANE FOAM. THE OUTER COVER SHALL BE A WOVEN GEOTEXTILE FABRIC PLACED AROUND THE INNER MATERIAL AND ALLOWED TO EXTEND BEYOND BOTH SIDES OF THE TRIANGLE TWO TO THREE (2' – 3') FEET. STANDARD LENGTH OF EACH DIKE WILL BE SEVEN FEET (7') UNLESS OTHERWISE INDICATED ON THE PLANS. THE DIKES SHALL BE ATTACHED TO THE GROUND WITH WIRE STAPLES. THE STAPLES SHALL BE NO. 11 GAUGE WIRE AND BE AT LEAST SIX TO EIGHT (6" – 8") INCHES LONG. STAPLES SHALL BE PLACED AS INDICATED ON THE INSTALLATION DETAIL.

THE CONTRACTOR SHALL INSPECT ALL DIKES AFTER EACH RAINFALL EVENT OF AT LEAST 0.5 INCHES OR GREATER. ANY DEFICIENCIES OR DAMAGE SHALL BE REPAIRED BY THE CONTRACTOR. ACCUMULATED SILT OR DEBRIS SHALL BE REMOVED AND RELOCATED AS DIRECTED BY THE ENGINEER. IF THE DIKES ARE DAMAGED OR INADVERTENTLY MOVED DURING THE SILT REMOVAL PROCESS, THE CONTRACTOR SHALL IMMEDIATELY REPLACE DIKES AFTER DAMAGE OCCURS.

13 ELEMENTS OF REQUIRED SWIPPP BMPs:

NOTE THAT IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO COMPLY WITH ALL DEPARTMENT OF ECOLOGY STATUTES INCLUDING ALL STORM WATER MONITORING (BY A CERTIFIED CESCL).

COVERAGE UNDER THE CONSTRUCTION STORMWATER GENERAL PERMIT HAS BEEN APPLIED FOR BY THE DISTRICT, AND WILL BE TRANSFERRED TO THE CONTRACTOR PRIOR TO NOTICE TO PROCEED.

ELEMENT#1– PRESERVE VEGETATION / MARK CLEARING LIMITS

ELEMENT#2 ESTABLISH CONSTRUCTION ACCESS:
ACCESS FROM COUNTY ROAD NO CONSTRUCTION ACCESS NEEDED

ELEMENT#3– CONTROL FLOW RATES:
NONE IS PROPOSED

ELEMENT#4 INSTALL SEDIMENT CONTROLS:
INSTALL JUTE MATTING IN DITCH LINE &/OR SHOULDER SLOPES AS REQUIRED AND/OR AS SHOWN ON THE CONTRACT PLANS

ELEMENT#5 STABILIZE SOILS:
SOIL STABILIZATION IS ACHIEVED BY STRAW AND COVERING AS NEED.

ELEMENT#6 PROTECT SLOPES:
NONE IS PROPOSED

ELEMENT#7 PROTECT DRAIN INLETS:
INSTALL DRAIN IF REQUIRED.

ELEMENT#8 STABILIZE CHANNELS AND OUTLETS:
NONE IS PROPOSED

ELEMENT#9 CONTROL POLLUTANTS:
ALL VEHICLES, EQUIPMENT AND PETROLEUM PRODUCT STORAGE/DISPERSING AREAS WILL BE INSPECTED REGULARLY TO DETECT ANY LEAKS OF SPILLS AND TO IDENTIFY MAINTENANCE NEEDS AND PREVENT LEAKS OF SPILLS.

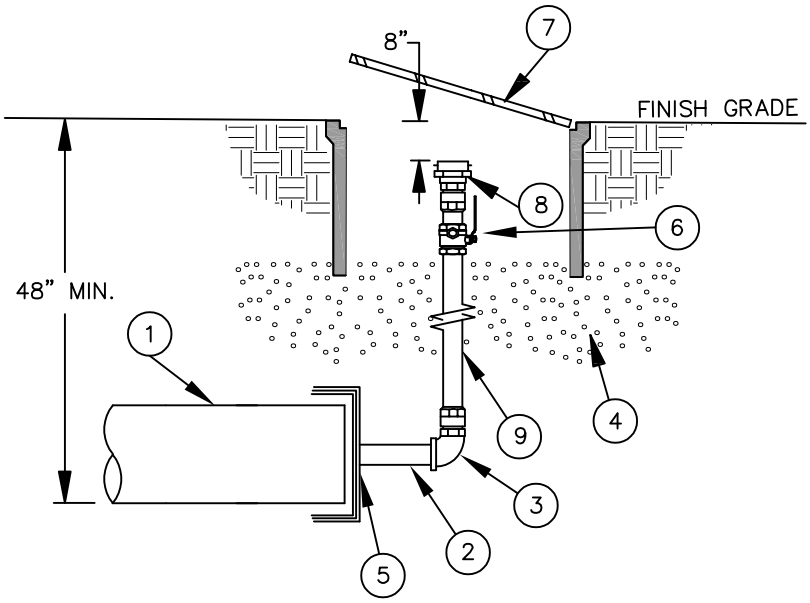
ELEMENT#10 CONTROL DE WATERING:
DE–WATERING AS REQUIRED BY GROUND WATER CONDITIONS

ELEMENT#11 MAINTAIN BMP'S:
ALL BMPS SHALL BE MAINTAINED AND REPAIRED AS NEEDED.

ELEMENT#12 MANAGE THE PROJECT:
MAXIMUM OF 60' OF TRENCH LEFT OPEN PRIOR TO BACKFILL. UNSUITABLE REPLACED WITH 100% CRUSHED ROCK BACKFILL.

ELEMENT #13 PROTECT LOW IMPACT DEVELOPMENT BMPs.

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	13 ELEMENTS OF REQUIRED SWIPPP BMPs:	DATE 2021 ENGR MMS	STANDARD 1002

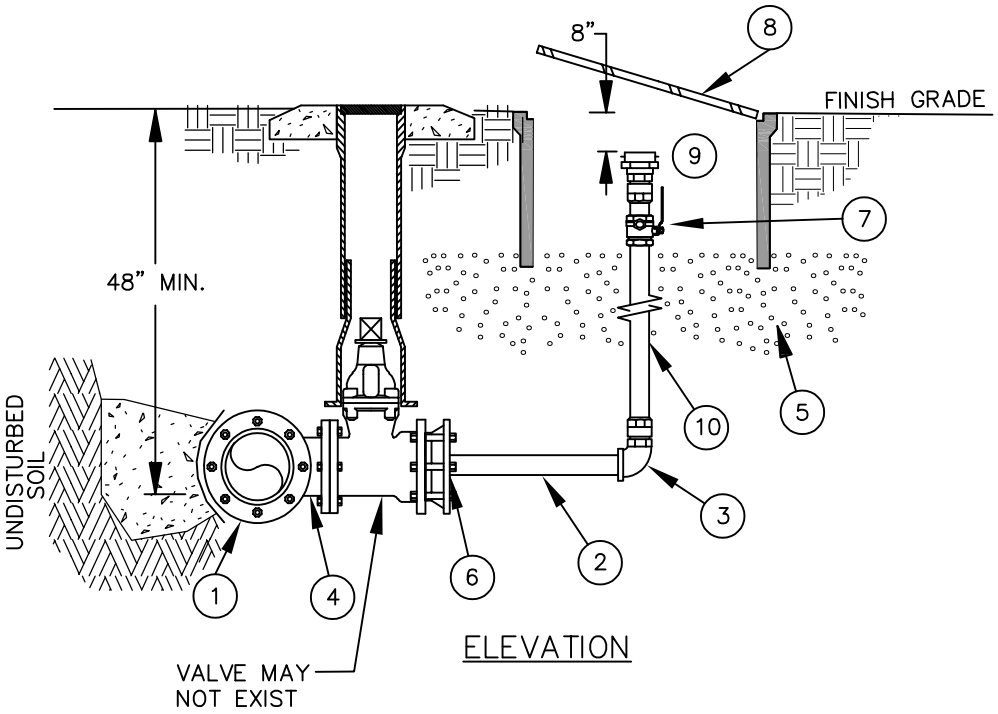


ELEVATION

CONSTRUCTION NOTES:

1. CL–52 DUCTILE IRON WATER MAIN. MECHANICALLY RESTRAINED (SEE DISTRICT ENGINEER FOR TOTAL LENGTH OF RESTRAINED PIPE).
2. 2" BRASS NIPPLE (6" LONG)
3. 2" MUELLER 110 (OR FORD OR AY MCDONALD QUICK JOINT) X F.I.P. 90^ (FIP x COMP) BEND COUPLING. NO DRAIN HOLE SHALL BE DRILLED.
4. 12" IN WIDTH AND 24" IN DEPTH OF 5/8 " CRUSHED ROCK OR SAND BEDDING SURROUNDING THE BOX.
5. 12" MJ CAP TAPPED 2" I.P.
6. 1– 2" 1/4 TURN BALL VALVE (FIP X FIP)
7. TEMPORARY BOX WITH LID OR ENCLOSURE.
8. 1–2" (MIP X COMP) COUPLING
   1–2" COMP X FIP COUPLING
   1–2" X 2 1/2" BRASS NST HOSE ADAPTER AND CAP
9. APPROX. 5' OF 2" STRAIGHT TYPE K COPPER PIPE

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	TEMPORARY BLOW–OFF ASSEMBLY (TYPE A)	DATE 2021 ENGR MMS	STANDARD 1003A



ELEVATION

CONSTRUCTION NOTES:

1. CL–52 DUCTILE IRON WATER MAIN PER PLAN.
2. 2" BRASS NIPPLE (12" LONG)
3. 2" MUELLER 110 (OR FORD OR AY MCDONALD QUICK JOINT) X F.I.P. 90° (FIP x COMP) BEND COUPLING. NO DRAIN HOLE SHALL BE DRILLED.
4. CL–52 TEE
5. 12" IN WIDTH AND 24" IN DEPTH OF 5/8 " CRUSHED ROCK OR SAND BEDDING SURROUNDING THE BOX.
6. MJ PLUG TAPPED 2"
7. 1– 2" 1/4 TURN BALL VALVE (FIP X FIP)
8. TEMPORARY BOX WITH LID OR ENCLOSURE.
9. 1–2" (MIP X COMP) COUPLING
   1–2" COMP X FIP COUPLING
   1–2" X 2 1/2" BRASS NST HOSE ADAPTER AND CAP
10. APPROX. 5' OF 2" STRAIGHT TYPE K COPPER PIPE

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO 1	TEMPORARY BLOW–OFF ASSEMBLY (TYPE B)	DATE 2021 ENGR MMS	STANDARD 1003B