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Cedar River Water & Sewer District

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VOLUME IV

Standard Specifications for Water System Extensions

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DISTRICT STANDARD SPECIFICATIONS FOR WATER SYSTEM EXTENSIONS

STANDARD SPECIFICATIONS FOR WATER WORKS CONSTRUCTION

1. WATERWORKS MATERIALS

1.a GENERAL

All contractor supplied materials shall be new and undamaged. All reference specifications herein shall be of the latest revision.

1.b PIPE

1. Ductile Iron Pipe Required

a. Standard: AWWA C151
b. Cement lining: AWWA Standard C104
c. Exterior Coating: Bituminous coated per AWWA C104
d. Class: Class 52 or as specified in the Special Provisions/Contract Drawings
e. Type of Joint: 1. Tyton joint or as specified in the Special Provisions/Contract Drawings.
2. Restrained Joints: "Field Lok" gaskets for bell and spigot joints are allowed on a case by case basis. Use of "Field Lok" gaskets shall be submitted and approved during review before plans are approved. "Thrust Lock" boltless restrained pipe by Pacific States, or alternate as approved by District, may be required instead of "Field Lok" gaskets. Contractor shall submit alternate for "Thrust Lock" restrained pipe prior to commencement of construction for review and approval. All restrained joints shall be painted blue.

2. Polyvinyl Chloride (PVC) Pipe (when approved for site specific use)

a. Standard: AWWA C900
b. Class: Cl. 150 minimum or as specified in the Special Provisions/Contract Drawings
c. Standard Dimension Ratio: SDR 18
d. Gasket ASTM 477

3. Plastic Service Pipe

a. Standards: High molecular weight polyethylene (AWWA C901, ASTM 1248) type 3, grade 3 (PE3408) DRISCO, of all virgin material (CS-255-63) or alternate as approved by District. Must carry NSF seal of approval. Two sizes will be permitted: 1" and 2" size. 1" pipe shall be iron pipe size and 2" pipe shall be copper tube size.

b. Type of Joint: Brass compression fittings. See section D1.c.4

c. Working pressure: 200 psi at 73.4^{o}_{F}.

4. Copper Service Pipe

Type “K” annealed, use of brass compression fittings is permitted. See section D1.c.4

1.c FITTINGS

1. Cast or Ductile Iron

a. Standard: AWWA C110
b. Compact (Ductile Iron): Per AWWA C153.
c. Class: At least equal to class of pipe.
d. Type of Joints: Compatible with pipe or with an adapter or as specified in the Special Provision/Contract Drawings
e. Lining: Cement lining per AWWA C104.

2. Fittings for PVC Pipe

Cement lined AWWA C-104, Ductile Iron AWWA C-110 or Cast Iron AWWA C153.

3. Special

Special fittings shall be as specified in the Special Provisions/Contract Drawings.

4. Brass

All brass fittings shall be “No Lead” domestic manufactured to the Federal NSF 61 Standard. All brass fittings shall be clearly stamped “NL” (the acronym for No Lead)

1.d VALVES

1. Gate Valves

a. Standard: AWWA C515-01 or C-509 optional
b. Description: Gate valves shall be ductile iron body, resilient-seated gate valves. Stem nuts shall be identical with District's existing equipment. All valves shall open counter-clockwise and be of the non-rising stem type.
c. Working pressure: 200 psi unless specified otherwise.
d. Type of Joint: Unless otherwise noted valves shall be flanged with machined flange faces or mechanical joint.

2. Butterfly Valves

Butterfly valves shall in design, material, and workmanship, conform to the

standards of AWWA C504. All other specifications shall be provided in the Special Provisions/Contract Drawings.

3. Backflow Prevention Devices

All back flow prevention devices shall be consistent with Washington State Department of Health "Approved Cross-Connection Control Devices" Listings. They shall be tested and certified at time of installation.

4. Air and Vacuum Release Valves

Air and vacuum release valves shall be Rennselear Figure 372, or equal, as approved by the District.

5. Control Valves

Pressure Reducing, Pressure Relief, Pump Control and other hydraulic Globe Valves shall be CLA-VAL Automatic Valve or approved equal.

1. Pressure Reducing and pressure sustaining valves shall be CLA-VAL Model 92-01 BCS (Auxiliary valve 92-01 BCS) with epoxy coating, a valve position indicator, open & close speed control, a sight gage, spring range 30 - 300 psi.
2. See approved plans for site specific control valve specifications

6. Valve Boxes

Valve boxes and tops shall be Cast Iron City of Seattle standard cover with drop handle. Bottom section length shall be 42" minimum adjusted to fit field condition for the particular project or as specified in the Special Provision/Contract Drawings.

1.e FIRE HYDRANT ASSEMBLIES

1. Hydrant

Standard: AWWA C502

2. Description (See also Standard Plans No. 1 & 2)

Hydrants shall be Clow Medallion, Mueller, M&H 129, or Kennedy Guardian with MJ end. Operating nuts shall be identical with District's existing equipment. The hydrants shall be equipped with one (1) pumper nozzle 5" Storz nozzle cap and cable x 4-1/2" N.S. threads, two (2) 2" hose ports N.S. treads, 1-1/4" pentagon operating nuts, and open by turning counter clockwise. Hydrant valve diameter shall be a minimum of 5-1/4". Hydrants shall be flanged at ground line. Hydrant shall be so constructed that the direction of pumper connection may be rotated to face the roadway. Hydrant shall be of traffic type with designed replaceable break points and shall have a variable length riser. All nozzles shall be equipped with bronze nipples screwed into the hydrant and locked in place. Minimum depth of clear cover over the pipe shall be three (3) feet. Hydrant paint shall be as shown on the standard

plans. Installation to include placement of Hy-Lites reflector button Model BB-2110 (or equal) with Crafco Quikstix adhesive (or equal) within 12" of the center of the pavement on the side the hydrant is located. An area of minimum 5' radius behind the hydrant shall be kept clear of all natural or man-made obstructions.

Hydrant bury depths are to correspond with the water main depth at all hydrant installation locations. Due to the varying depth of water main, hydrant bury depths may need to be adjusted (there is no **standard bury** for fire hydrants). Such hydrant bury adjustments shall be incidental to the unit price bid, and no requests for additional compensation will be considered.

3. Piping

a. All hydrant laterals shall be thickness class 52 ductile iron.

b. Lateral pipelines to Hydrants less than 50' in length shall be a minimum of 6" diameter. Laterals over 50' in length shall be a minimum of 8" in diameter.

c. MEGALUG retainer glands required at all lateral pipe to fitting or approved equal.

d. "Field Lok" gaskets are approved for lateral pipe lines to hydrants over one length of pipe. Joints shall be painted blue.

e. Provide cast in place concrete blocking against hydrant tee in accordance with Standard Plan No. 7.

4. Hydrant Paint

See Water Standard Plan #1

1.f SERVICE CONNECTION EQUIPMENT

1. Water Meters

Meters shall be furnished by the District. Meters shall be Neptune Touch Read System.

2. Corporation Stops

Corporation stops shall be bronze alloy, ball valve type with 1" I.P. thread inlet and 1" copper thread outlet, Ford, Mueller, or equal, as approved by the Inspector. (Ford FB-700 is preferred.)

3. Saddles

Pipe saddles shall be ductile iron, suitable for installation on the type and class of pipe being used. Bands shall be flattened and properly formed to fit the outside diameter of the pipe. Bands, bolts, and nuts shall be hot-dip or electro-galvanized. Double bands shall be employed on pipe 8" and larger. Single wide flat bands shall be used on pipe 6" and smaller. Gaskets shall be good quality red rubber, or neoprene. (Ford 202 for 1" service preferred.)

4. Service Connections

1" Service connection: See water standard plan # 3 for details
2" Service connection; See water standard plan # 4 for details

5. Tracer Wire

Tracer wire shall be stripped and laid with a positive connection at the corporation stop, spiraled around pipe, brought to surface and secured to service line end. Wire shall be 10 gauge copper solid strand, outer insulation shall be blue.

6. Service Connection Equipment Bedding

All polyethylene and/or copper service lines, blow-off assemblies and air and vacuum relief valve assemblies shall have sand bedding as described in section D1.j. Bedding for the above listed equipment is to be installed from the connection point at the main along the entire length of the poly or copper line to the point at which the line or appurtenance surfaces. Bedding material shall be a minimum radius of 1' around the entire line or appurtenance. The bedding requirement may be increased at the District Inspector's discretion should soil conditions warrant. See water standard plans 3 and 4 for details

1.g JOINTING MATERIALS

1. Rubber Gaskets

a. Standard: hhg-156 Type III, ASTM-D-1330, Grade 1 and 2, SBR 22 Premium Red Rubber or Neoprene.

1.h GUARD POSTS

1. Hydrant Guard Post

a. Standard: Washington State Department of Transportation(Wash DOT) Standard Specifications for Road, Bridge, and Municipal Construction Latest Edition, Section 9-30.5(6),

b. Description: 9" diameter by 6 feet long precast concrete. Exposed surfaces shall be free from honeycomb or other serious defects.

c. Paint: Thoroughly clean and dry portion of post to be painted. Paint

with 2 coats minimum white oil based gloss enamel paint.

2. Valve Marker Post A

a.	Standard:	See Detail
b.	Description:	Concrete posts, 4” x 4” by 42” long.
c.	Paint:	White, same as hydrant guard post.
d.	Markings:	The distance from the valve marker to the valve shall be stenciled on the post in 2” tall black enamel paint.

3. Valve Marker Post B

a. Where approved by District
b. Standard: As specified on project approved plans

1.i CONCRETE

1. Bedding Concrete

Concrete for pipe bedding shall be Portland cement concrete containing not less than four (4) sacks of cement per cubic yard. The water/cement ratio shall be 8.2 gallons per sack of cement. The fine aggregate shall not be less than 30% or more than 50% of the total weight of the aggregate.

2. Miscellaneous Concrete Structures

Concrete for encasement, blocking and other structures shall be Portland cement concrete containing not less than six (6) sacks of cement per cubic yard and produce a 28-day compressive strength of not less than 3,000 psi. The fine aggregate shall not be less than 30% or more than 50% of the total weight of the aggregate. The concrete shall have a maximum slump of five (5) inches.

Core samples and testing of the concrete may be required as directed by the Inspector.

1.j GRAVEL

1. Foundation Gravel

1. General:
Foundation gravel to be used shall be a type and gradation to provide a solid compact bedding in the trench. Since trench conditions vary, foundation gravel requirements will change. Bedding requirements for two trench bottom conditions are described as follows:

b. Condition One:
Where silty soil or fine sandy soil is encountered that will flow in a stream of water, the gravel should consist of clean bank run sand and gravel, free from dirt, topsoil, and debris, and containing not less than 35% retained on a 3” mesh sieve and 100% passing a 2” screen. This foundation gravel shall be

used only in a dry trench bottom, free from quick and/or running sand.

c. Condition Two:
Where clay, peat or other soft materials are encountered which may be saturated with water but which will not break down into fine particles and flow as silt or sand will, the trench shall be over excavated to a depth as required by soils engineer and foundation gravel used. The foundation gravel shall be of such gradation that 100% will pass a 3" screen with at least 90% retained on a 1" screen. The foundation thus stabilized shall be leveled to provide a uniform pipe foundation by using a well-graded gravel ranging in size from 1/4" to 3/4".

2. Bedding Material

Bedding material shall consist of clean, granular, well graded sand and gravel material of which 100% will pass the U.S. Standard 3/4" opening, and not more than 3% will pass the U.S. No. 200 (wet sieve), with a minimum sand equivalent of 50 per the test methods of the Materials Laboratory of the Department of Highways, Olympia, Washington (unless otherwise approved by the District/Engineer).

3. Backfill Material

Backfill material shall be 100% 3" diameter or less, and may be bank run which has been passed through a 3" screen with a binder content of not more than 20% and reasonable grading from fine to coarse (unless otherwise approved by Engineer). All right of way crossings shall be backfilled to specification of governmental agency having jurisdiction.

1.k LUMBER

Lumber for timbering and sheeting shall be of good quality, reasonably straight grained, and free from weakening knots or other defects. Rough sawed, unplaned lumber will be acceptable unless otherwise specified.

1.l GATED DEVELOPEMENTS

Developers shall deliver to District 3 remote gate entry devices providing District staff 24 hour 7 days per week access to all gated projects.

SECTION 2. WATERWORKS CONSTRUCTION

2.a GENERAL

Except as otherwise noted herein, all work shall be conducted in accordance with the most current edition of the Standard Specifications for Road, Bridge, and Municipal Construction prepared by the Washington State Department of Transportation and American Public Works Association, hereafter referred to as the Standard Specifications, and according to the recommendations of the manufacturer of the material or equipment used.

2.b CLEARING AND GRUBBING

Clearing and grubbing work shall be performed within the confines of the area indicated on the plans, and as staked out in the field. All resulting debris shall be disposed of by the Contractor and the cleared area cleaned up in a neat and workmanlike manner and as specified on the approved project plans. No debris or litter shall be left lying in the cleared area. **Areas outside of the clearing limits shall not be disturbed in any manner.**

2.c EXCAVATION

1. Normal Conditions

Trenches shall be excavated to the line and depth to provide a cover of 42" for pipe 8" and less and 48" for pipe over 8", over the top of the pipe unless otherwise specified in the approved plans. Trench widths shall be only as necessary for adequate working space. The maximum trench width at the top of the pipe shall normally be the outside diameter of the pipe barrel plus 16 inches. The top width of the trench shall not exceed the outside diameter of the pipe plus 30 inches. All excavation and shoring shall conform to WAC 296.

2. Special Conditions

a. Pavement cutting (per appropriate governmental agency standards):

In trenching through an existing pavement, the open cut shall be a neat-line cut by either saw cutting or jack hammering a continuous line.

1) Concrete - pavement shall be cut one foot outside the edge of the trench on each side. The concrete shall be cut on a straight line and shall be beveled so that the cut will be approximately 12 inches wider at the top than at the bottom.

2) Asphalt - pavement shall be cut one foot outside the edge of the trench on each side. Pavement shall be cut ahead of the trenching equipment to prevent excessive tearing up of the surface and to eliminate ragged edges.

b. Rock Excavation:

All ledge rock that requires systematic drilling and blasting for its removal, and boulders exceeding one-half cubic yard in volume, shall be removed to provide a minimum clearance of twelve inches (12") under the pipe.

c. Dewatering:

Pipe trenches shall be kept free from water, during excavation, pipe laying, and jointing, pipe embedment and backfilling, in a manner compliant with accepted best management practices and the governmental agency having jurisdiction. Surface water shall be diverted, and ground water shall be kept pumped down, or otherwise removed, to the extent necessary to keep the

trench free from water and the bottom stable.

Before trenching operations begin, the Contractor shall have available on the site of the Work sufficient pumping equipment and/or other machinery to insure that the provisions of the above paragraph can be maintained.

d. Timbering and Sheeting:

The Contractor shall provide and install timbering and sheeting as necessary to control trench width to protect workmen, the Work, and existing structures, utilities and other properties in accordance with title 296 WAC. Timbering and sheeting shall be removed unless specific permission is granted by the Inspector to leave it in place. No timbering and/or sheeting shall be permitted to remain above the top of the pipe.

e. Tunneling

See approved project plans for specific details. Standard water casing detail is shown on Water Standard Construction Plan 15

f. Highway Crossing:

See approved project plans for specific details. Standard water casing detail is shown on Water Standard Construction Plan 15

g. Over-Excavation:

Trench bottoms shall be over excavated as necessary to remove all unstable soil and eliminate “boiling” or “quick” conditions to such depth as to provide a firm base. Over excavated materials shall be replaced with foundation material as specified on page D-7. Over-excavation for purposes of these specifications will be deemed to include the loosening of subgrade material below the grade of the pipe or appurtenance, as well as the physical removal of material below the grade of the pipe or appurtenance. In the event of over-excavation, the Contractor shall provide, at his own expense, suitably compacted bedding material (D2.d), in place, to the required grade.

If the over-excavation consists of the loosening of the parent material below grade, the Contractor shall remove the loose material, at his own expense, and backfill with suitable bedding material as noted above. The suitability of such bedding material shall be approved by the District.

2.d FOUNDATION AND BEDDING

1. General

Proper preparation of foundation, placement of foundation material where required, and placement of bedding material shall precede the installation of all pipe. This shall include necessary leveling of the native trench bottom or the top of the foundation material as well as placement and compaction of required bedding

material to a uniform grade. The entire length of pipe will rest firmly on a well compacted material.

2. Foundation

Where over-excavation has been necessary, foundation material shall be placed and compacted to form a suitable base for the replacement of the required thickness of bedding material. Foundation material shall be as described in section D1.j.1

3. Bedding

Bedding shall consist of the leveling of the bottom of the trench or the top of the foundation material and the furnishing, placing, and compaction of bedding materials under the pipe and along the sides to a minimum depth of six (6) inches over the top of the pipe or as required by the Inspector. Minimum thickness of the layer of bedding material required under any portion of the pipe shall be four (4) inches for all pipe sizes of 27 inches diameter and smaller, and six (6) inches for all pipe sizes of 30 inches diameter and larger. Bedding material shall be thoroughly rammed and tamped around the pipe with the proper tools, so as to provide firm and uniform support over the full length of all pipe and fittings. Care shall be taken to prevent any damage to the pipe or its protective coating.

2.e INSTALLATION OF PIPE AND FITTINGS

1. Alignment

Alignment shall be within 0.5 feet of the specified alignment. Minimum separation for all parallel utilities the District water facilities is three feet inside edge to inside edge. Minimum separation for all perpendicular crossings is two feet inside edge to inside edge.

2. Pipe Laying

Pipe laying shall be done in accordance with the specifications and instructions of the manufacturer of the kind of pipe used, subject to the approval of the Inspector. Tools designed especially for installing each particular type and kind of pipe shall be used. All pipe ends shall be square with the longitudinal axis of the pipe, maximum 1/4” out of square as measured across the diameter of the pipe, and shall be reamed and otherwise smoothed so that good connections can be made. All operations for any special type of pipe, joint or connection shall be carefully done in accordance with the manufacturer's instructions.

Any installation or repair which involves Asbestos-Cement pipe shall be in accordance with Puget Sound Air Pollution Control Agency guidelines for handling, removal and disposal of asbestos materials.

3. Contamination Prevention

Dirt, ground water and/or other foreign material shall be prevented from entering the

pipe or appurtenances during handling or laying operations. Any pipe or fitting that has been installed with dirt or foreign material in it shall be removed, cleaned and relayed. The open ends of pipe and fittings shall be plugged with a temporary watertight plug whenever work is stopped and/or whenever water in the trench threatens to enter the pipe.

4. Blocking or Bracing

Concrete for Blocking or Bracing shall:

1) Be in accordance with the Standard Details.
2) Be placed in back of all fittings having unbalanced thrust.
3) Be placed so as to secure bearing on undisturbed earth.
4) Bear against fittings only, shall be clear of joints and have plastic wrapping so as to permit taking up or dismantling joint.
5) Be formed with lumber or timber.
6) Be free of entrapped air pockets, removal method as approved by District/Engineer.
7) Shall have a smooth finish.

Precast blocking shall not be used without prior written approval from the District. Blocking shall not be covered up without approval of the Inspector.

2.f INSTALLATION OF AUXILIARY EQUIPMENT

1. Valves

a. General

Valves shall be set at places designated by the approved plans. Before placing in the trench in a vertical position, each valve shall be carefully inspected for defects. The valve shall be bedded similar to pipe and fittings.

b. Valve Box

Cast iron valve boxes shall be set so they will be in a vertical alignment to the gate valve operating stem. The operating stem shall extend such that the operating nut is no more than 36” from finished grade. An operating nut extension shall be installed when the ground surface is more than 36” above the valve operating nut. Valve operating nut extensions shall have 2” diameter shafts. The lower casting of the unit is to be installed using ETHAFOAM pad ring, and shall not rest directly upon the body of the gate valve or upon the water main. The upper casting of the unit is to be placed in proper alignment and to such an elevation that it’s top will be at final grade. Lock down valve boxes to be used in locations as shown on the approved plans or as designated by the governmental agency having jurisdiction. Valve boxes shall be used in full sections only. Installation of partial sections is not allowed. Valve box tops installed outside of pavement shall be cast in concrete as shown on water construction standard plan #10.

c. Valve Marker Posts

Painted concrete marker posts shall be set for all valves except auxiliary hydrant valves. The post shall be set at right angles to the road from the valve and shall be situated in a safe and reasonably conspicuous location, normally at the property line, with the approximate distance to the valve stenciled in 2" black numerals on the face of the marker post.

d. Air and Vacuum Relief Valve Assemblies

Installation shall be as shown in the Standard Details. The assembly shall be set at the high point of the line. A valve guard post shall be placed where there is danger of damage.

e. Blow-off Valve Assemblies

Installation shall be as shown in the Standard Details. The blow-off shall be installed in such a position and location that waste water can be disposed of without damage to surrounding property.

2. Fire Hydrant Assemblies

a. Hydrant

Fire hydrant assemblies shall be made and installed according to Fire hydrant standard installation plans 1 & 2. Each hydrant assembly shall be inspected and adjusted as above specified for valves. Hydrant trenches shall be excavated to not more than two (2) feet beyond the back side of the hydrant. All hydrants shall remain bagged until the entire system is complete and accepted. Fire hydrant extensions are not acceptable to compensate for errors in final grade calculation. In areas where the hydrant ground flange is not within 6” of the final grade the hydrant shall be replaced with the correct bury hydrant

b. Piping

Hydrant laterals shall consist of a section of thickness class 52 Ductile Iron 6 or 8 inch pipe from the main to the hydrant and shall include an auxiliary gate valve set vertically and placed in the line as indicated in the standard plan for hydrant settings. “Field Lok” gaskets are approved for lateral pipe lines to hydrants over one length of pipe. Joints shall be painted blue.

c. Retainer Glands

Use Megalug or approved equivalent style retainer glands

d. Retaining Walls

Retaining walls shall be installed at all hydrant locations having a 2 to 1 or greater slope and shall be constructed of block designed for use in either gravity retaining wall structures or mechanically stabilized, geogrid

reinforced soil retaining structures. Block shall be Mutual Materials Cornerstone F-100 series or approved equal. Block wall material specifications shall be submitted for approval by District prior to purchase.

3. Service Connection Equipment

All service connections to water mains shall be made using saddles of the size and type suitable for use with the pipe being installed. Care shall be exercised to assure that the main is not damaged by installation of the saddle.

Service pipe shall be poly water service as specified in Paragraph D1.b.. The depth of trenching for service connection piping shall provide three (3) feet of cover over the top of the pipe.

2.g CONNECTION TO EXISTING SYSTEM

1. General

Where connections to the existing system are to be made in existing pipes, the Work shall be conducted at such a time and in such a manner as to minimize the interruption of service. Necessary pipe, fittings, and valves shall be assembled at the site ready for installation prior to shutting-off of water in the existing main. Once the water has been shut-off, the Work shall be prosecuted vigorously and shall not be halted until the line is restored to service. Installation shall be as shown in the approved plans.

No direct connections to the existing system will be allowed without an approved backflow prevention device until the newly constructed mains have been tested for pressure and purity and approved in accordance with District Standards.

The Contractor shall discuss the proposed interruption schedule with the District a minimum of 96 hours prior to the requested time of interruption. It is the District's discretion whether the District or Contractor shall notify each of the affected water users in writing a minimum of 48 hours prior to the interruption. Only District personnel are authorized to operate District valves.

2. "Cut-in" Connection

The cut-in shall be as shown in the approved plans, and shall be made only with the approval of, and under direct inspection by, the Inspector.

3. "Tapping" Connection

The tap shall be as shown in the approved plans. All tapping connections must be approved by District engineer. Submittals required.

2.h BACKFILLING

1. General

Trench compaction and restoration must be done as detailed below during the trench backfill process, so as to cause least disruption to traffic. Backfilling of trenches shall be made with the same materials excavated from the trenches unless those materials are found to be unsuitable by the Inspector. Prior to the backfilling, all form of lumber and debris shall be removed from the trench. Care shall be exercised to see that large rock, stumps, logs, etc., are excluded from material used for backfill. Machine backfilling shall be carried on so that the trench is continually filled from the end.

2. Consolidation, Grading, and Compaction

Backfill shall be mechanically compacted to 95% of maximum density. Throughout the length of any pipe run, backfill at depths over 4 feet shall be compacted to 90% maximum density by mechanical compaction. The top 4 feet of the trench line shall then be mechanically compacted to 95%. All densities shall be determined by testing specified in Section 2-03.3 (14) D of latest WSDOT Standard Specifications. Contractors shall provide compaction reports to the District verifying the required compaction. A minimum of two compaction tests shall be taken for each 200 linear feet of main line trench, or as designated by the District Inspector; one test at subgrade and one at 50% of trench depth.

In any trench in which 95% density cannot be achieved with existing backfill, the top 4 feet shall be replaced with gravel base as specified in the WSDOT latest edition Standard Specifications, Section 9-03.10. This new material shall then be mechanically compacted to 95%.

Restoration of asphalt pavement shall include a minimum of 4 inches of crushed surfacing material and 2 inches of asphalt concrete Class B or comparable surfacing approved by the District and or governmental agency having jurisdiction. Roadway shall then be overlaid full width with a minimum of 1 inch compacted asphalt concrete Class B. Any exceptions to this overlay requirement will be on a case-by-case basis, subject to approval by the District. Concrete pavement shall be restored consistent with Section 5-05 of the WSDOT latest edition Standard Specifications. Any traffic lane affected by the trenching shall be replaced full-width.

3. Cuts Across Road Alignment

Public Roads shall be restored to the standards of the governmental agency having jurisdiction. Private roads shall be restored as shown on the approved plans.

4. On Proposed Traveled Roadways (e.g. new subdivisions)

When working in areas of proposed traveled County/City roadway, backfill compaction shall be achieved throughout the entire depth of the trench by mechanical compaction. Compaction requirements shall comply with the specifications of the agency having jurisdiction or District standards whichever are greater. Written verification shall be provided by the contractor/developer prior to acceptance of the project by the District.

5. Excess or Insufficient Material

Excess material shall be removed and disposed of at an approved reclamation facility at contractor/developer expense. Imported materials required to properly complete backfilling shall be hauled in and placed by the Contractor/Developer at their own expense.

6. Holding Backfill on Steep Slopes

Where, in the opinion of the Inspector, there is a danger of backfill being washed away due to steepness of the slope in the direction of the trench, material shall be held in place as follows:

Backfill to eighteen (18) inches below the top of trench. Then, at intervals, as specified by the Inspector, two (2) 2 x 6 posts at least four (4) feet long, shall be driven into the backfill, one on either side of the pipe, at about right angles to the slope of the ground, and broadside facing in the direction of the trench. These posts shall be supported on the downhill side by 2 x 4 stakes at least three (3) feet long, driven at an angle of 45 degrees, about twelve (12) inches into undisturbed ground in the trench sides. Tops of posts and stakes shall be driven approximately flush with the ground surface. Three (3) 2 x 6 crosspieces, cut to fit tightly between the trench sides, shall then be laid against the uphill sides of the posts, to form an 18-inch bulkhead, and then crosspieces and stakes shall be securely spiked to the posts. Backfilling shall then be completed as previously described.

7. Barricades

Newly backfilled areas shall be immediately and adequately barricaded and marked to warn motorists and pedestrians. All driveways and road crossings shall be restored to the standards of the governmental agency having jurisdiction. Proper and sufficient warning signs shall be so placed as to adequately warn the public away from hazardous areas.

2.i PAVEMENT RESTORATION

1. Time Interval

No repaving shall be attempted until after the backfill has been mechanically compacted. During the interim period prior to restoration, the trench surface shall be maintained by the Contractor in such a manner acceptable to the governmental agency having jurisdiction and as may be necessary to safely accommodate traffic.

2. Base Course

Where asphaltic concrete pavement has been cut for trenching, backfill shall be removed the width of the trench and to such depth as required permitting installation of six and one-half inches compacted depth of sub-grade gravel. The top surface shall be rolled or tamped to proper elevation to receive the final paving as called for. Where Portland cement concrete paving has been cut for trenching, backfill shall be removed the width of the trench and to such depth as required to permit the

installation of sub-grade material as may be required by the authority having jurisdiction.

3. Paving

a. Bituminous

Bituminous paving shall be of the same type and quality as the original pavement. Materials and method of construction shall be subject to approval by the Inspector and acceptable to the governmental agency having jurisdiction. Batch Plant monitoring may be required by the governmental agency having jurisdiction at Contractor/ Developer expense.

b. Concrete

Concrete replacement shall be undertaken at such time as may be fixed by the authority having jurisdiction Final concrete replacement shall be made to the standards of the authority having jurisdiction.

SECTION 3. WATERWORKS TESTING

3.a GENERAL

No connections shall be made between the existing distribution system and the pipelines constructed under this Contract not having achieved successful pressure and purity test results without a Washington State Department of Health approved backflow prevention device installed in the connecting line. Any connection must be witnessed by the District/Engineer. The District/Engineer at all times shall have access to the Work and to the locations where the Work is in preparation. The Developer at all times shall maintain proper facilities for such access.

The waterworks disinfection and testing sequence prior to connection to the District system follow in sections D3.b through D3.e:

All pipe and appurtenances shall be cleaned, disinfected, flushed, tested for leakage and purity after backfill to subgrade has been completed. The Contractor shall furnish all labor, tools, equipment and materials necessary to complete the tests and to perform any work incidental thereto.

3.b DISINFECTION OF WATER MAINS

1. Procedure During Construction

In addition to the procedures for preventing contamination during pipe installation described in paragraph D2.e.3, the following procedures shall be maintained:

a. The interior of all pipe, fittings, and auxiliary equipment stockpiled on the project shall be kept free of dirt and other foreign matter at all times.

b. Prior to lowering the pipe or auxiliary equipment into the trench each item

shall be carefully inspected inside and thoroughly cleaned of any dirt or foreign matter.

c. Water used for rinsing or lubricating during construction shall be clean and contain 50 ppm chlorine.

d. A tight stopper or bulkhead shall be placed at the open end of the pipe at all times when pipe is not being inserted into the section already laid.

2. Procedure for Initial System Filling

Upon completion of water system installation and prior to placing into service, all new mains, appurtenances and repaired portions of, or extensions to existing mains and appurtances shall be disinfected by chlorination. The process is as follows:

The system is filled for the first time with the chlorinating agent. All valves, services lines or other appurtenances shall be filled in conjunction with pipe line filling. Fire Hydrants are to be filled to the bonnet and remain in the open position. The system is purged of all air and charged to line pressure.

District Inspector will check chlorine residuals at random locations throughout the system. A chlorine residual of at least 50 parts per million (ppm) must be present throughout the system

The system stands for 24 hours allowing the solution to disinfect the system.

After the 24 hour detention period the inspector checks the chlorine residuals at the same locations checked after the initial fill. A chlorine residual of not less than 10 ppm free chlorine shall remain in the system.

3.c FLUSHING

1. Flushing System and Appurtances

After disinfection of the treated system, appurtenances and repaired portions of, or extension to existing mains, all pipes shall be thoroughly flushed through all hydrants, blow-offs, services, or other approved means with water of sufficient velocity to assure that all solids and contaminated materials have been removed until the replacement water throughout the system shows, upon test, the absence of chlorine in excess of that carried in the source of supply for flushing.

When flushing after disinfection, the Contractor/Developer shall be responsible for the disposal of treated water flushed from the system. The wastewater shall be completely neutralized for protection of aquatic life in the receiving water before disposal into any natural drainage channel. The Contractor/Developer shall be responsible for disposing of disinfecting solution to the satisfaction of state and local authorities.
Flushing into the sanitary sewage collection system is an acceptable method for disposal of treated water, these activities must be coordinated through the District.

Clear, clean, uncontaminated water used in flushing may be directed to an approved storm water runoff conveyance systems at the District's discretion. Contractor shall use care to prevent erosion or flooding caused by flushing procedures.

Flushing shall be accomplished as follows:

a. The Contractor shall schedule and organize his work so as to use flushing water during off-peak hours only.

b. The District shall be notified a minimum of 48 hours prior to the time of water main flushing.

c. Flushing shall be done only in the presence of a representative of the District.

d. Flushing shall be done through hydrants and all appurtances. Where hydrants or appurtances are not available then a tap shall be provided large enough to develop a high velocity flush in the main.

e. Each section of newly laid pipes between valves or dead ends shall be flushed independently.

f. Fire hydrants and other dead end appurtenances shall be flushed simultaneously with the main line.

g. All service lines and connections shall be flushed.

3.d HYDROSTATIC PRESSURE TEST

1. General

After the water mains have been disinfected and flushed, they shall be hydrostatically tested in sections of convenient length (of approximately 1500') as approved by the Inspector.

The mains shall be pressure tested prior to achieving purity after completion of flushing of highly chlorinated water as approved by the Inspector. The system to be tested must be physically separated from the District's Water System during such tests.

Hydrostatic pressure test equipment shall be cleaned, disinfected and flushed prior to connection to pipe system to be tested. Test equipment shall be kept clean of dirt and foreign matter at all times. The test equipment shall be rinsed or swabbed as necessary using a water solution containing a minimum of 50 ppm chlorine. Following disinfection the pressure test equipment shall be flushed with potable water prior to connection to system to be tested. A potable water source shall be used to pump system to test pressure. Potable water shall also be used throughout the hydrostatic test procedure and to serve as a source of make-up water between hydrostatic pressure tests.

2. Equipment

The pumps, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished by the Contractor. The District will provide the gauge for the witnessed pressure test. Water meters used to measure water used to re-pressurize the line shall be positive displacement with a sweep unit hand registering 1 gallon per revolution as approved by the Inspector. All water used to re-pressurize shall be pumped from a container sized and graduated appropriately to measure the amount of water used.

Where the District has water available for testing, it will be furnished without charge. Where water is not available from the District, the Contractor shall provide water for testing from a source approved by the District.

3. Procedure

a. Preparation

1) Tests shall be made after service lines are installed.

2) Tests shall be made only after backfilling over any joints or fittings. All backfill must be to elevation of subgrade before start of testing and purity process.

3) At points where pressure reaction and movement may occur, the pipe shall be properly blocked or braced. Where permanent blocking is not required, the Contractor shall furnish and install temporary blocking and remove it after testing.

4) Prior to calling out the Inspector to witness the pressure test, the Contractor shall have all equipment set up completely ready for operation and shall have successfully performed the test to assure himself that the system is in a satisfactory condition to pass the test.

b. Test

1) The system shall be filled with water and all air removed prior to starting the test.

2) The system shall then be pumped up to a hydrostatic pressure equal to 250 psi at all elevations tested. In no case shall the test pressure exceed 200 percent of the safe working pressure of the class of pipe tested.

3) The pump shall then be stopped for a period of 15 minutes.

4) The system shall then be pumped up again to the test pressure.

5) The quantity of water required to restore the pressure shall then be recorded.

4. Acceptance

Acceptability of the test will be determined by two factors:

a. The quantity of water lost from the system during the 15 minute test period shall not exceed the quantities shown in the following table:

Pipe Diameter (inches)	6	8	10	12	14	16
Water Loss (GPH/1000 L.F. Pipe)	0.71	0.95	1.19	1.42	1.66	1.90
Water Loss/1000 L.F. Pipe (15 minute test)	0.18	0.24	0.30	0.36	0.42	0.48

These figures are established by the Ductile Iron Pipe Research Association.

b. There shall not be an appreciable or abrupt loss in pressure during the fifteen (15) minute test period.

3.e PURITY TESTING

1. General

Purity samples are taken after the system has been disinfected, the chlorinated disinfection water flushed from the system and completion of pressure testing. The system must stand undisturbed for a minimum of 24 hours before purity samples are drawn. The 24-hour detention period begins after the chlorinated disinfection water is flushed from the system and pressure testing is completed. If pressure testing requires more than 24 hours from the time the highly chlorinated water used to disinfect the system is flushed, a short flush of the system may be allowed. Should the contractor wish to flush, flushing shall be scheduled at a time approved by the District Inspector. If the system is flushed after the completion of pressure testing the 24-hour detention period required for purity sampling shall commence at the completion of the flush. Additional flushing water will be charged to the Contractor/Developer at the Districts discretion

2. Purity Sampling

After disinfection and pressure testing has been completed, the Inspector will arrange for taking purity samples. Scheduling of purity sampling must take into account that the samples are delivered to the testing laboratory by District Staff and the samples must arrive at the laboratory before 1:00PM Monday through Friday. A contractor/developer representative should witness the drawing of the samples. Staff and equipment, as approved by the Inspector, shall be provided by the developer/contractor to assist in the drawing of the samples.

3. Laboratory testing

Purity test procedures require a minimum of 48 hours to complete from the time the

laboratory begins the test procedure. The District will be notified by the testing laboratory as to whether the samples have passed or failed. Notifications are only on working days; District staff will notify the Contractor/Developer of the test results.

4. Unsatisfactory purity test results

Should the initial treatment result in an unsatisfactory purity test, the system shall be cleaned with a pipe pig following accepted industry standard procedures, then the chlorination and flushing procedure detailed above shall be repeated . Failure to get a satisfactory result on the purity test shall be considered as a failure of the Contractor to keep the pipe clean during construction, or to properly disinfect the system, and Contractor/Developer shall be required to clean, repair or replace any portions of the system until a satisfactory test is achieved. Water required to accomplish the above shall be paid for by the Contractor/Developer. **Failure of one sample in the system shall indicate a failure of the entire system**

3.f SITE CLEANUP

1. Schedule

Final cleanup work shall be completed as closely behind the construction work as it is physically possible to do so.

2. Materials disposal

All excess material, rocks, logs, debris, etc., shall be disposed of by the Contractor at an approved reclamation facility. No debris shall be disposed of by dumping on private property.

3. Drainage ditches

Drainage ditches affected by the construction operation shall be left in as good or better condition than what existed prior to beginning work.

4. Cleanup Completion

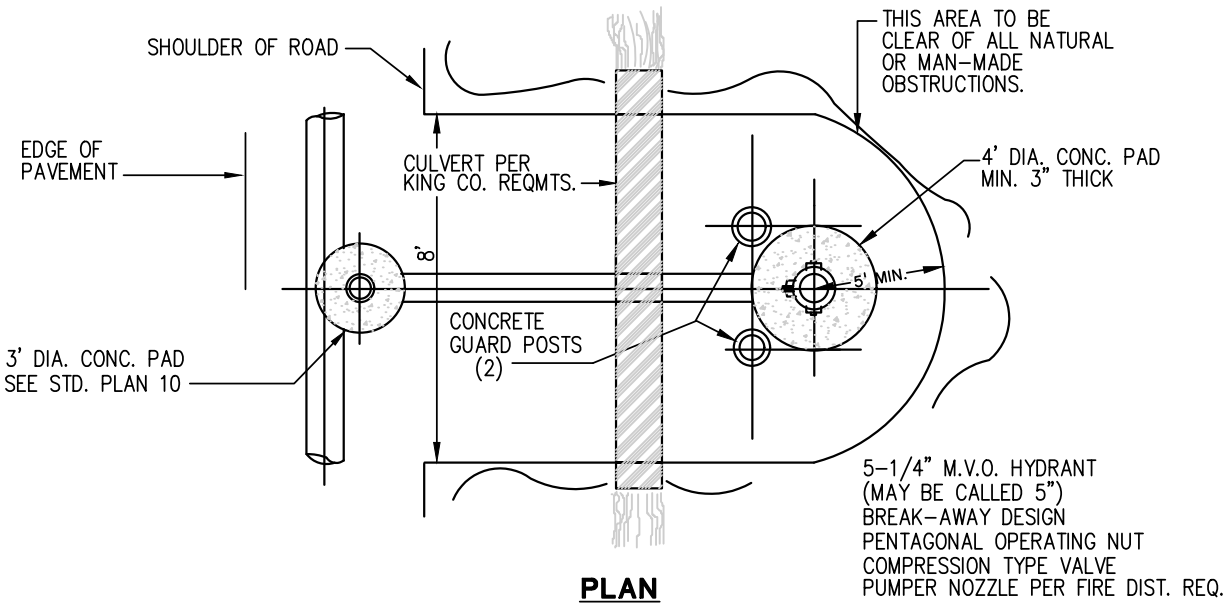
Upon completion of all cleanup work, the entire site shall have a neat and workmanlike appearance.

3.g OPERATIONAL TEST

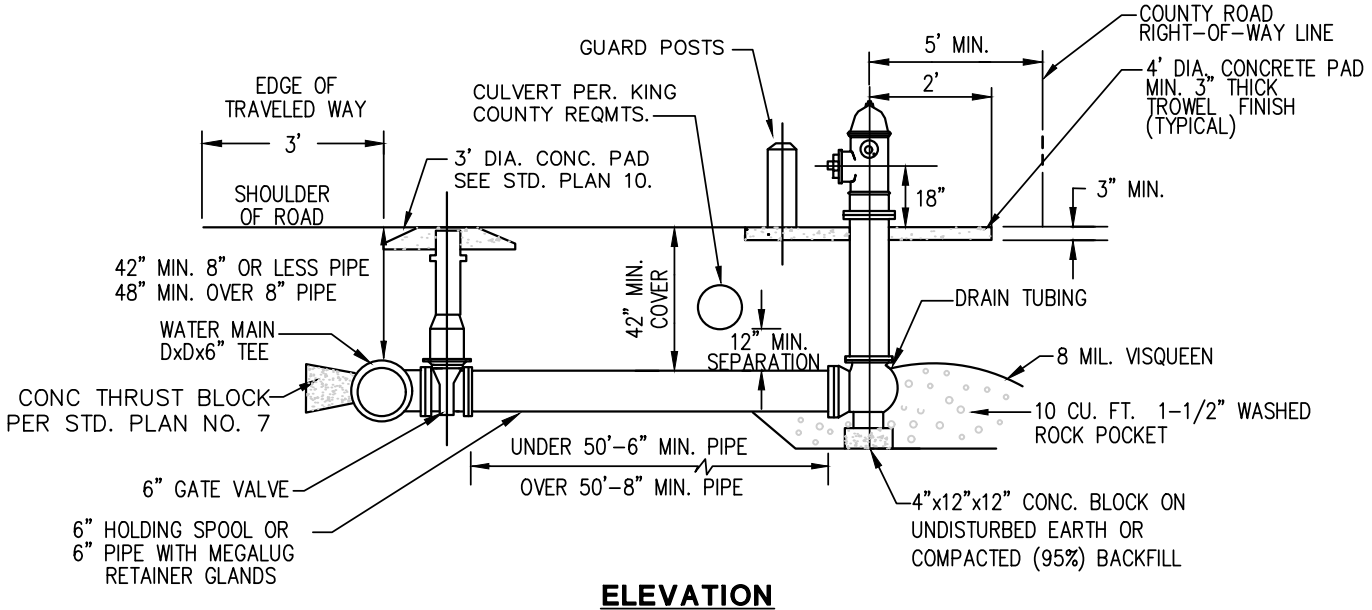
After the Extension has been disinfected, passed the hydrostatic test and before final acceptance, the entire system shall be operated by the Contractor at normal pressure for a period of not less than ten (10) days. Any leaks or defects discovered in the system shall be repaired and the operational test continued until the system is satisfactory to the Inspector. Contractor shall verify that all service lines are active prior to final acceptance. No provision of this section shall be construed as waiving any provision of the Contractor's guarantee.

4 WATER CONSTRUCTION STANDARD PLANS

PLAN 1	FIRE HYDRANT ASSEMBLY
PLAN 2	FIRE HYDRANT INSTALLATIONS SPECIAL CONDITIONS
PLAN 3	1-INCH SERVICE CONNECTION
PLAN 4	2-INCH SERVICE CONNECTION
PLAN 5	2-INCH BLOW-OFF
PLAN 6	CUT-IN TO EXISTING LINES
PLAN 7	HORIZONTAL CONCRETE BLOCKING
PLAN 8	VERTICAL CONCRETE BLOCKING
PLAN 9	PIPE ANCHORS
PLAN 10	VALVE BOX ASSEMBLY DETAIL
PLAN 11	VALVE BOX EXTENSION DETAIL
PLAN 12	FIRE SPRINKLER CONNECTION DETAIL FOR DDCV
PLAN 13	PRESSURE REDUCING VALVE VAULT DETAIL
PLAN 14	DOUBLE DETECTOR CHECK ASSEMBLY
PLAN 15	STANDARD CASING DETAIL
PLAN 16	2-INCH AIR & VACUUM RELIEF VALVE
PLAN 17	GUARD AND MARKER POSTS
PLAN 18	HILL HOLDER
PLAN 19	3", 4", AND 6" METERS
PLAN 20	GRAVEL ACCESS ROAD
PLAN 21	A.C. MAIN CROSSING
PLAN 22	TRACER WIRE INSTALLATION
PLAN 23	SIPHON PUMP ASSEMBLY
PLAN 26	WATERMAIN PHYSICAL SEPARATION



PLAN



ELEVATION

NOTES:

1. USE RESTRAINED JOINTS (MEGALUG RETAINER GLANDS) AT ALL LATERAL PIPE TO FITTINGS. PIPE-TO-PIPE JOINTS SHALL BE "THRUST-LOCK" BOLTLESS RESTRAINTS BY PACIFIC STATES CO. OR FIELD-LOK GASKETS IF HYDRANT LATERAL RUN EXCEEDS (1) STANDARD PIPE LENGTH.
2. AN OPERATING NUT EXTENSION SHALL BE INSTALLED WHEN THE GROUND SURFACE IS MORE THAN 36" ABOVE THE VALVE OPERATING NUT.
3. HYDRANT SHALL BE PRIME-COATED WITH STEELCOTE SR-53, HEAVY DUTY BRUSH TYPE OR APPROVED EQUAL. TOP COATS SHALL BE STEELCOTE ACID AND OIL RESISTANT ENAMEL NO. 44-68, COLOR: WHITE, BRUSH TYPE OR APPROVED EQUAL.
4. STENCIL ON FACE OF HYDRANT BARREL WITH 2" CONTRASTING LETTERS, THE DISTANCE FROM THE HYDRANT TO THE GATE VALVE IN FEET AND INCHES.
5. FINISH ALL EXPOSED METAL PER SPECIFICATIONS.
6. GUARD POSTS TO BE USED ONLY AS DIRECTED BY DISTRICT INSPECTOR.
7. HYDRANT BURY DEPTHS ARE TO CORRESPOND WITH WATERMAIN DEPTH AT ALL HYDRANT INSTALLATION LOCATIONS. DUE TO THE VARYING DEPTH OF WATERMAIN, HYDRANT BURY DEPTHS MAY NEED TO BE ADJUSTED (THERE IS NO STANDARD BURY FOR FIRE HYDRANTS). SUCH HYDRANT BURY ADJUSTMENTS SHALL BE INCIDENTAL TO THE UNIT PRICE BID(S), AND NO REQUESTS FOR ADDITIONAL COMPENSATION WILL BE CONSIDERED.

DEC 2012

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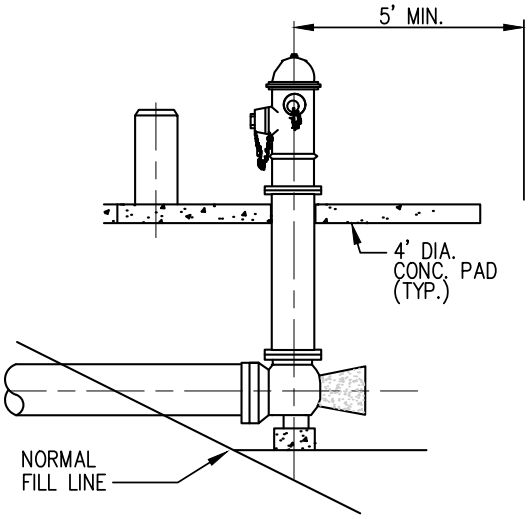
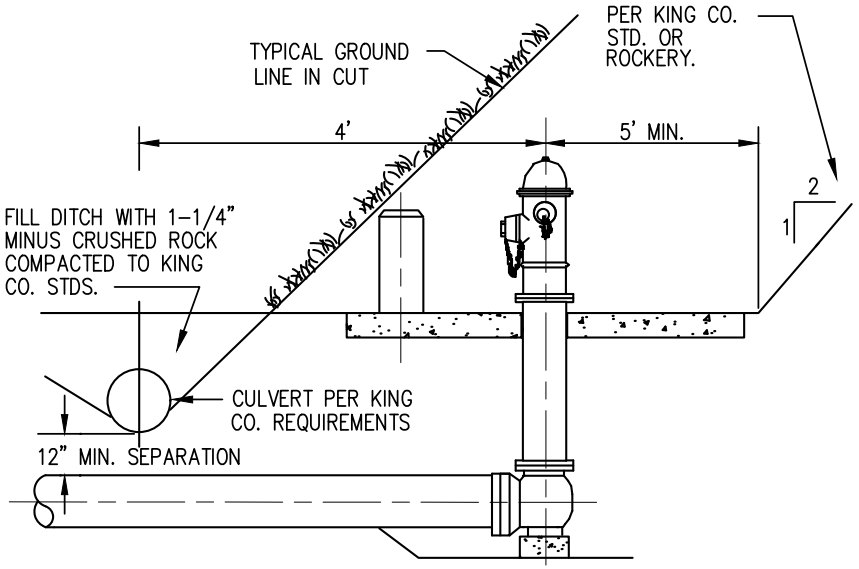
FIRE HYDRANT ASSEMBLY

Water Construction Standard Plan No. 01

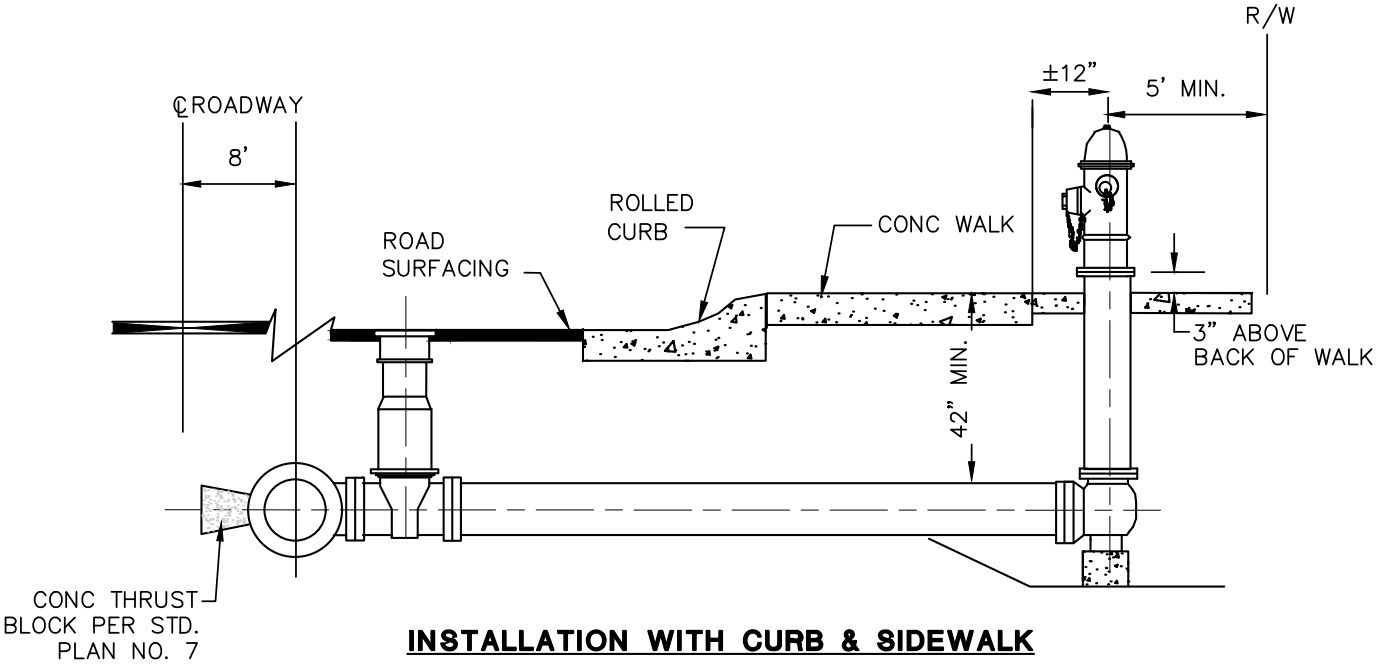
CEDARRIVER
WATER & SEWER DISTRICT



INSTALLATION IN ROAD FILL



INSTALLATION IN ROAD CUT



INSTALLATION WITH CURB & SIDEWALK

Note:

Guard posts not required unless specified by the Engineer.

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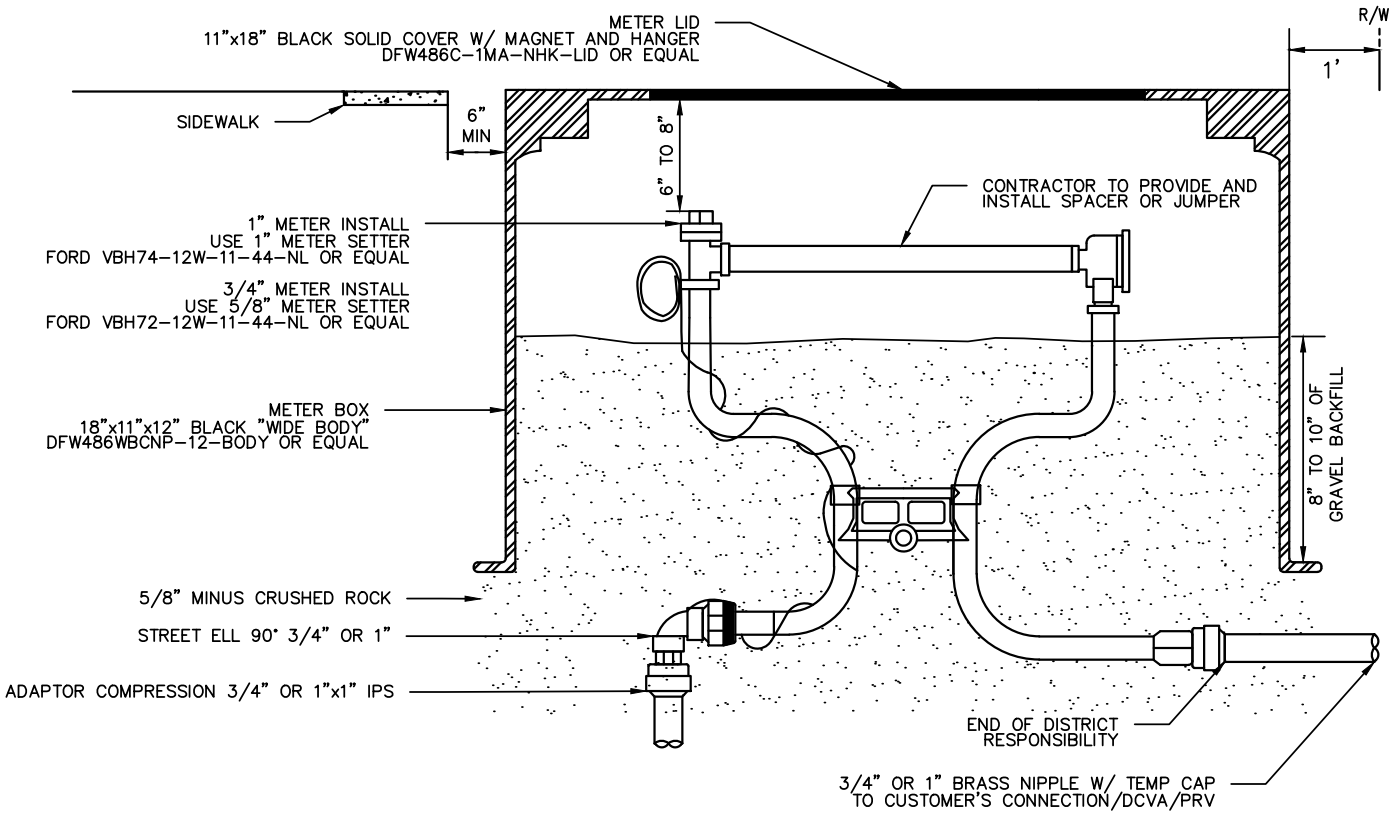
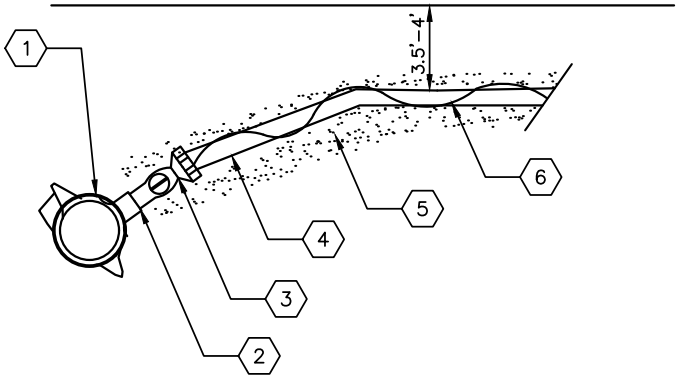
FIRE HYDRANT INSTALLATION SPECIAL CONDITIONS

Water Construction Standard Plan No. 02

CEDARRIVER
WATER & SEWER DISTRICT





KEYED NOTES:

1. TAP 1" FIPT DOUBLE STRAP SS SADDLE ROMAC 202-S OR EQUAL.
2. BALLCORP 1" MIPx1" MIP FB500 OR EQUAL.
3. 1" FIPTx1" IPS COMPRESSION OR EQUAL.
4. SERVICE PIPE 1" IPS HDPE 250 PSI SIDR 7 OR EQUAL.
5. BED AND BACKFILL WITH SAND 1' RADIUS AROUND TUBING FROM MAIN TO SETTER.
6. 10 GAUGE BLUE SOLID COPPER TRACING WIRE OR EQUAL. STRIP 1' WIRE AND ATTACH TO SADDLE OR CORP AND WRAP AROUND PIPE. LEAVE 2-3 FEET OF WIRE IN THE METER BOX.

GENERAL NOTES:

1. CENTER METER SETTER IN METER BOX; FRONT-TO-BACK, SIDE-TO-SIDE.
2. PRESSURE OVER 80 PSI REQUIRES A PRIVATE PRV DOWNSTREAM OF THE METER.
3. DEVELOPER/OWNER SHALL COMPLETE AN APPLICATION FOR THE METER WITH THE DISTRICT.
4. THE DISTRICT WILL INSTALL THE METER, ADAPTERS, AND GASKETS IN THE SETTER.
5. PRIOR TO A TWO YEAR MAINTENANCE BOND RELEASE, THE OWNER SHALL RESTORE METER BOX COMPONENTS WHEN DIRECTED BY THE DISTRICT.
6. IF A BACKFLOW ASSEMBLY IS REQUIRED, THE ASSEMBLY MUST BE INSTALLED 3 TO 5 FEET FROM THE METER PRIOR TO ANY TEES OR BENDS. SEE DISTRICT CROSS CONNECTION CONTROL PROGRAM DETAILS.
7. ALL BRASS SHALL BE DOMESTIC AND MARKED NO LEAD.
8. STIFFENERS MUST BE USED FOR COMPRESSION ADAPTER TO HDPE SERVICE PIPE.
9. DISTRICT WILL ACCEPT "OR EQUAL" DETERMINED BY THE DISTRICT INSPECTOR.

NOT TO SCALE

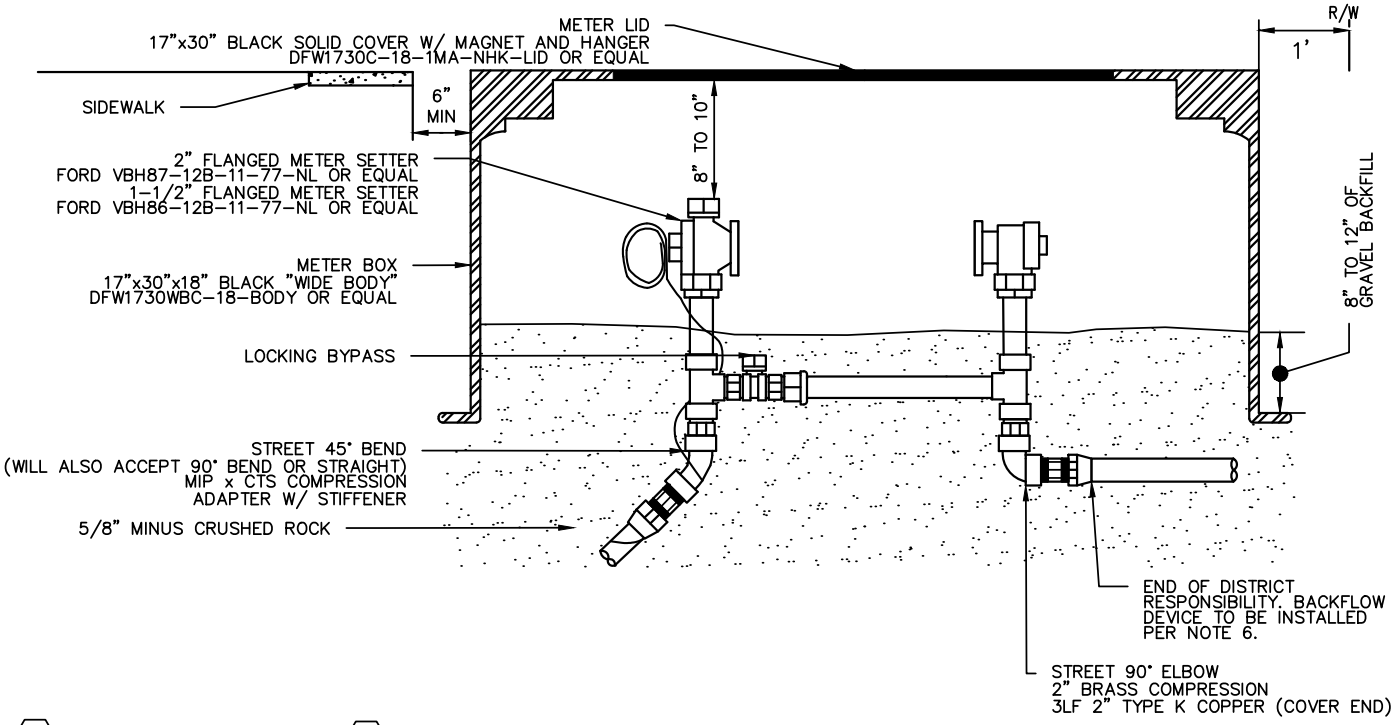
REV MAR 2025

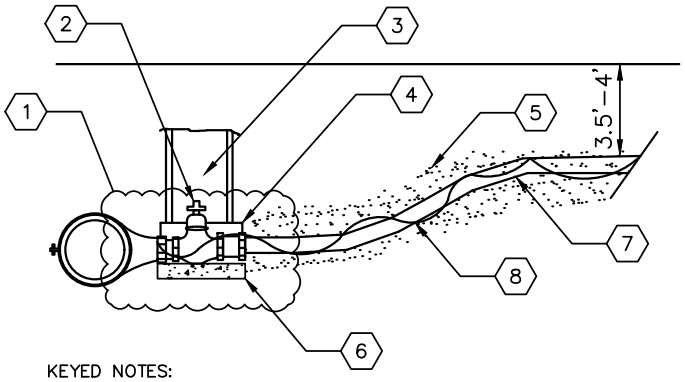
PACE

1-INCH SERVICE CONNECTION FOR 3/4" OR 1" METER

Water Construction Standard Plan No. 03

CEDARRIVER WATER & SEWER DISTRICT





KEYED NOTES:

1. TAP 2" DOUBLE STRAP SADDLE, 2" ADAPTER M.I.P.x2" CTS COMPRESSION, 2" RS VALVE, & 2"x3" STAINLESS STEEL NIPPLE.
2. 2" SQUARE OPERATING NUT.
3. VALVE AND VALVE BOX SEE STD. PLANS 10 & 11.
4. ETHA FOAM PAD
5. BED AND BACKFILL WITH SAND 1' RADIUS AROUND TUBING FROM MAIN TO SETTER.
6. CONCRETE BLOCK UNDER VALVE.
7. SERVICE PIPE 2" CTS HDPE 250 PSI SDR9 OR EQUAL.
8. 10 GAUGE BLUE SOLID COPPER TRACING WIRE OR EQUAL. STRIP 1' WIRE AND ATTACH TO SADDLE OR CORP AND WRAP AROUND PIPE. LEAVE 2-3 FEET OF WIRE IN THE METER BOX.

GENERAL NOTES:

1. CENTER METER SETTER IN METER BOX; FRONT-TO-BACK, SIDE-TO-SIDE.
2. PRESSURE OVER 80 PSI REQUIRES A PRIVATE PRV DOWNSTREAM OF THE METER.
3. DEVELOPER/OWNER SHALL COMPLETE AN APPLICATION FOR THE METER WITH THE DISTRICT.
4. THE DISTRICT WILL INSTALL THE METER AND GASKETS IN THE SETTER.
5. PRIOR TO A TWO YEAR MAINTENANCE BOND RELEASE, THE OWNER SHALL RESTORE METER BOX COMPONENTS WHEN DIRECTED BY THE DISTRICT.
6. IF A BACKFLOW ASSEMBLY IS REQUIRED, THE ASSEMBLY MUST BE INSTALLED 3 TO 5 FEET FROM THE METER PRIOR TO ANY TEES OR BENDS. SEE DISTRICT CROSS CONNECTION CONTROL PROGRAM DETAILS.
7. ALL BRASS SHALL BE DOMESTIC AND MARKED NO LEAD.
8. DISTRICT WILL ACCEPT "OR EQUAL" DETERMINED BY THE DISTRICT INSPECTOR.

NOT TO SCALE

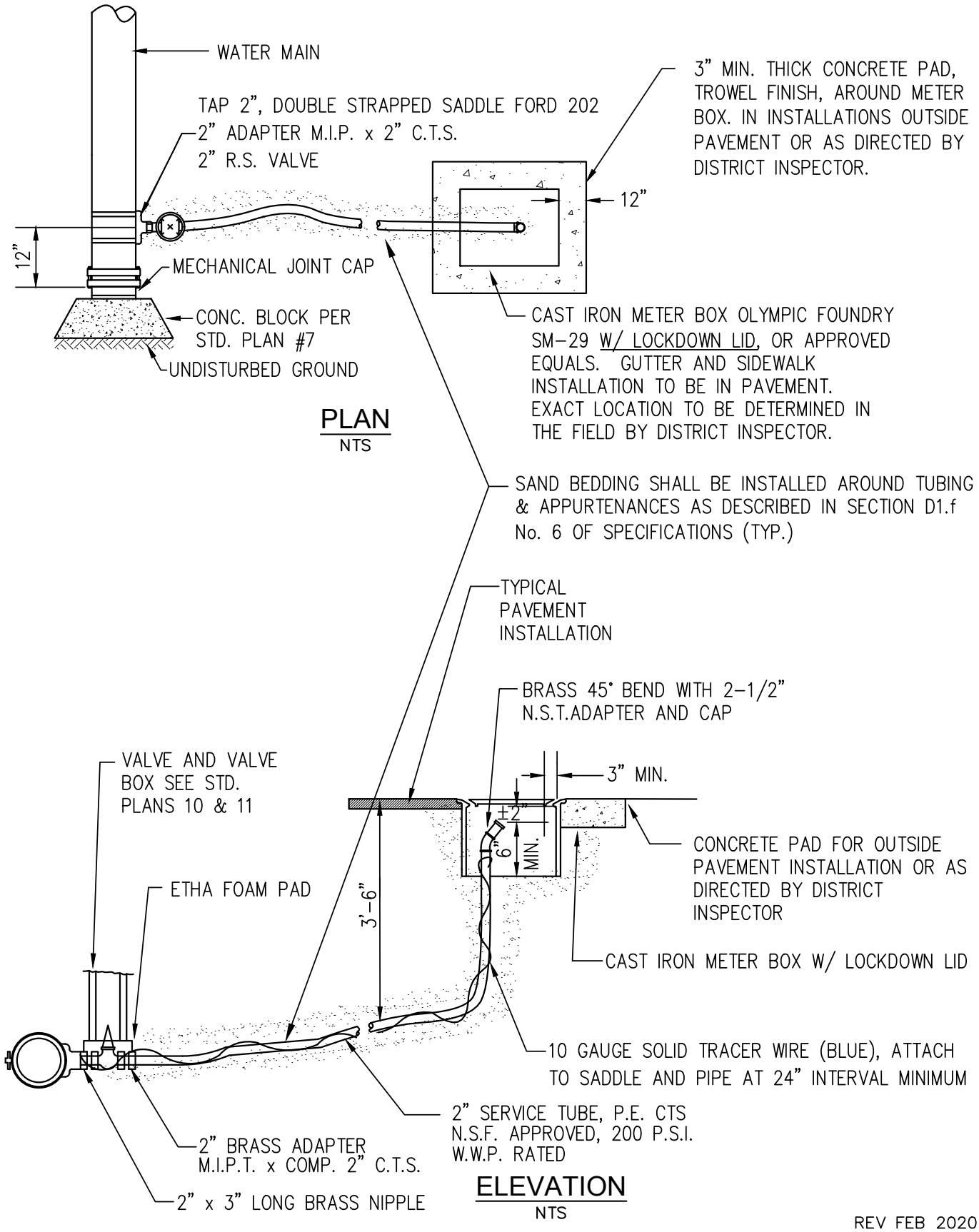
REV MAR 2025

PACE

2-INCH SERVICE CONNECTION FOR 1-1/2" OR 2" METER

Water Construction Standard Plan No. 04

CEDARRIVER WATER & SEWER DISTRICT



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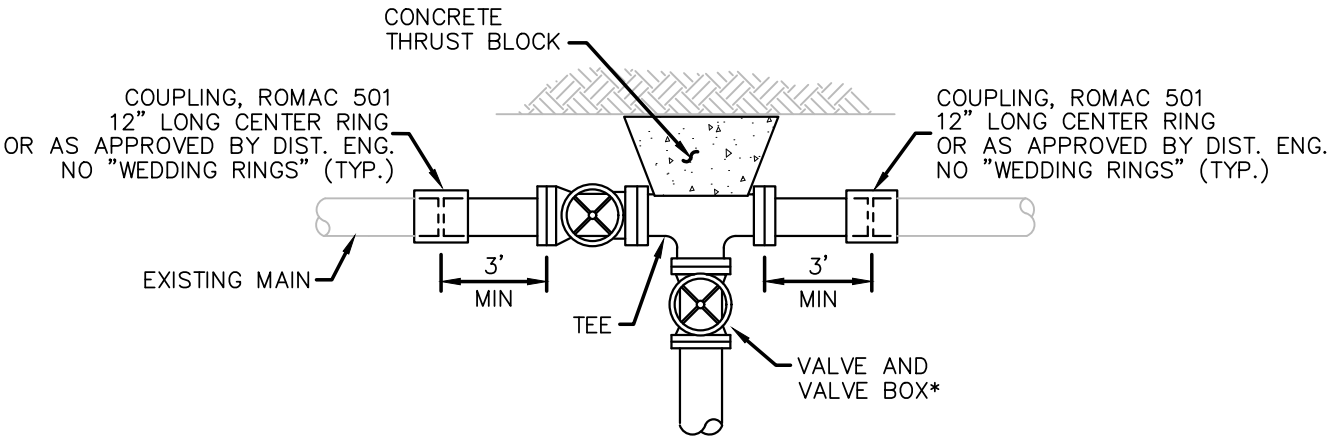
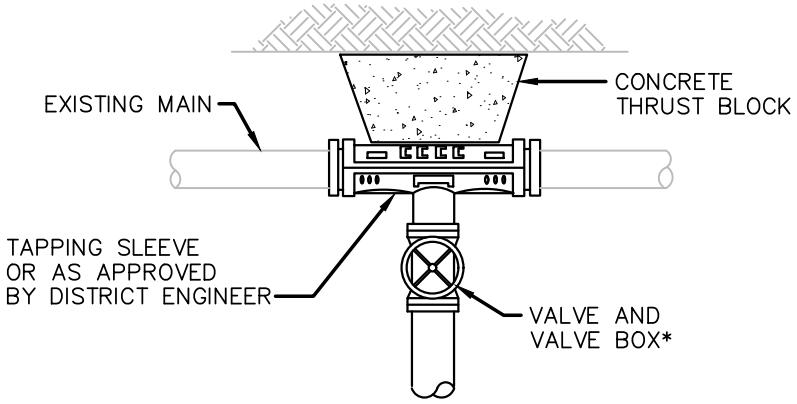
2" BLOW-OFF

Water Construction Standard Plan No. 05

CEDARRIVER
WATER & SEWER DISTRICT



CUT-IN



PRESSURIZED

NOTES:

*1. VALVES TO BE CONFIGURED AS SHOWN ON APPROVED PLANS.

REV FEB 2020

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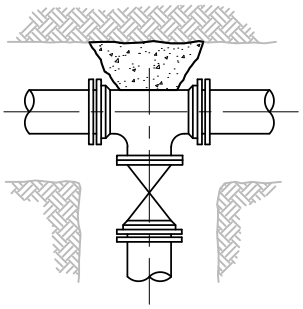
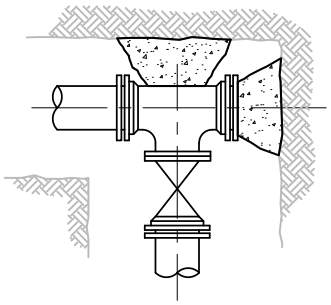
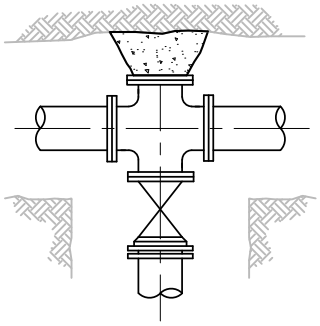
CUT-IN TO EXISTING LINES

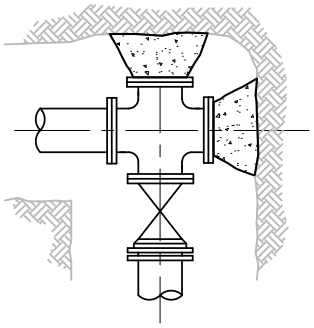
Water Construction Standard Plan No. 06

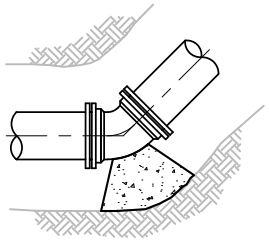
CEDARRIVER
WATER & SEWER DISTRICT











PIPE SIZE DIAMETER (INCHES)	BEARING AREA OF BLOCK SQ FT				
	TEE & CROSS	90° BEND	45° BEND	22i° BEND	11r° BEND
4"	3	3	1	1	1
6"	4	4	2	1	1
8"	7	7	4	2	1
10"	11	11	6	3	2
12"	16	16	9	5	3
16"	20	28.5	16	8	4

Notes:

1. All thrust blocks shall be formed in place. Blocks shall not be backfilled prior to specific approval by the District inspector, and the first stages of the concrete curing process is evident.
2. Minimum bearing areas based on 250 p.s.i. water pressure, and allowable soil bearing load of 2,000 pounds per square foot.
3. Areas may be adjusted for other pipe sizes, pressures and soil conditions at the sole discretion of the District.
4. Concrete blocking shall be cast in place and shall have a minimum or 1/4 square foot bearing against the fitting.
5. Concrete blocking shall bear against fittings only and shall be clear of joints to permit dismantling or other work.
6. Blocking shall withstand full test pressure as well as normal operating pressures under all conditions of service.
7. Gate valves shall be anchored to concrete blocking with bearing areas as shown in table.
8. See specification D2.e.4 for blocking or bracing.
9. Concrete blocking shall cure a minimum of 24 Hours before filling the system.

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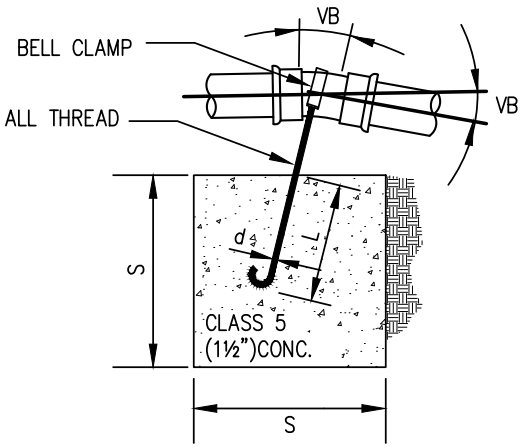
HORIZONTAL CONCRETE BLOCKING

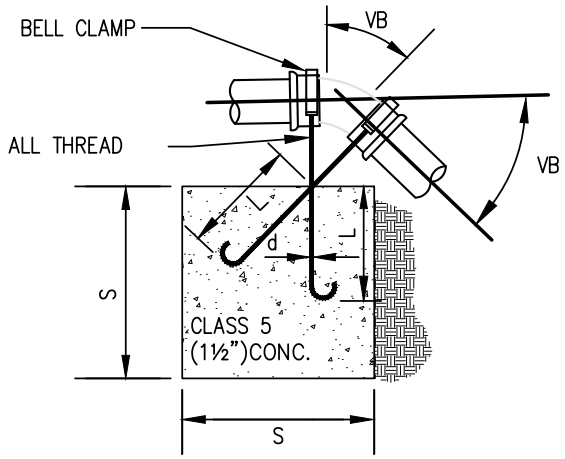
Water Construction Standard Plan No. 07

CEDARRIVER
WATER & SEWER DISTRICT

TYPE "A" BLOCKING
FOR 11¼°/22½° VERTICAL BENDS



TYPE "B" BLOCKING
FOR 45° VERTICAL BENDS



PAINT SHACKLE RODS WITH
2 COATS OF COAL TAR OR
ASPHALT PAINT

TYPE "A" BLOCKING FOR 11¼°/22½° VERTICAL BENDS						
		VB		S	d	L
PIPE SIZE Nom. diameter – inches	TEST PRESSURE psi	VERTICAL BEND degrees	CONC. BLOCKING cu. ft.	SIZE OF BLOCK feet	DIAMETER OF SHACKLE RODS inches	DEPTH OF RODS IN CONCRETE feet
4"	300	11¼°	8	2.0	3/4"	1.5
		22½°	11	2.2		2.0
6"	300	11¼°	11	2.2	7/8"	2.0
		22½°	25	2.9		
8"	300	11¼°	16	2.5	7/8"	2.0
		22½°	47	3.6		
12"	250	11¼°	32	3.2	7/8"	2.0
		22½°	88	4.5	7/8"	3.0
16"	225	11¼°	96	4.5	7/8"	3.0
		22½°	215	6.0	1–¼"	4.0

TYPE "B" BLOCKING FOR 45° VERTICAL BENDS						
4"	300	45°	30	3.1	5/8"	2.0
6"			68	4.1		
8"			123	5.0		
12"	250		232	6.1	7/8"	2.5
16"	225		478	7.8	1–1/8"	4.0

All others To be designed by Engineer

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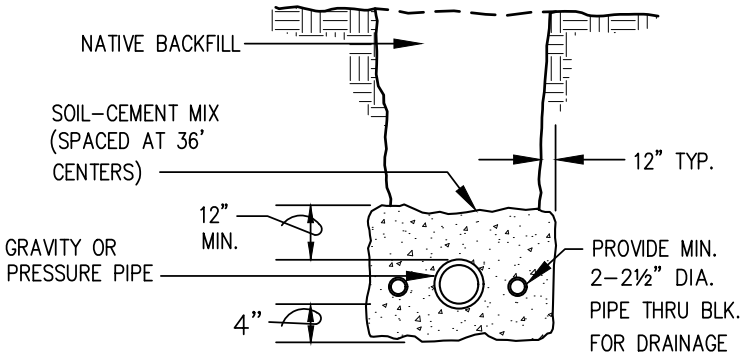
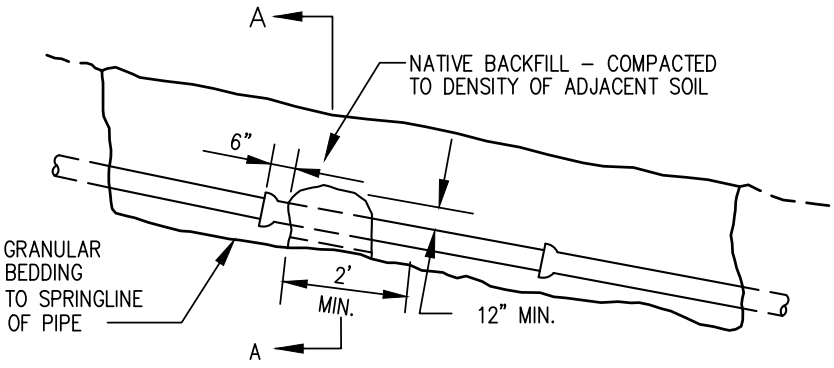
VERTICAL CONCRETE BLOCKING

Water Construction Standard Plan No. 08

CEDARRIVER
WATER & SEWER DISTRICT





Soil cement blocks placed over and around pipe. Tamped into place before placing backfill. Use 10 percent cement with 90 percent native soil and water to suit to form a dry mix that will hold its shape when molded into a ball. Omit soil cement blocks on slopes less than 15 percent

Note:

" Thrust–Lock" boltless restrained joints by Pacific States Pipes Co. or approved equal by District can be used as an alternate to Pipe Anchors.

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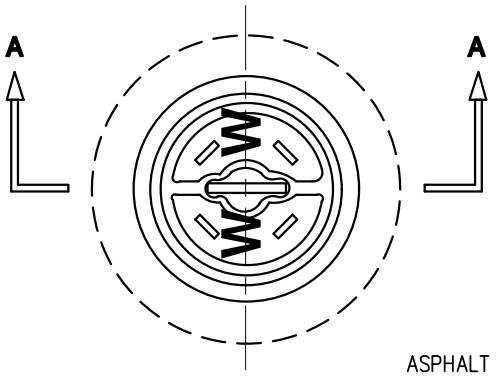
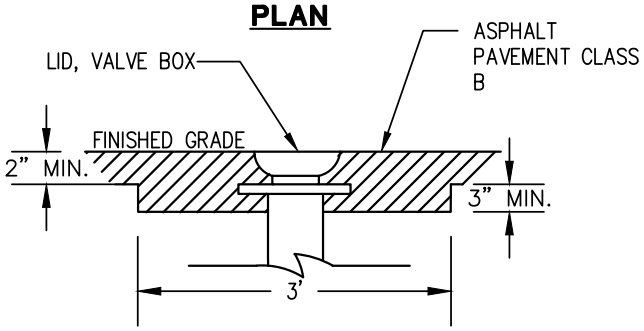
PIPE ANCHORS

Water Construction Standard Plan No. 09

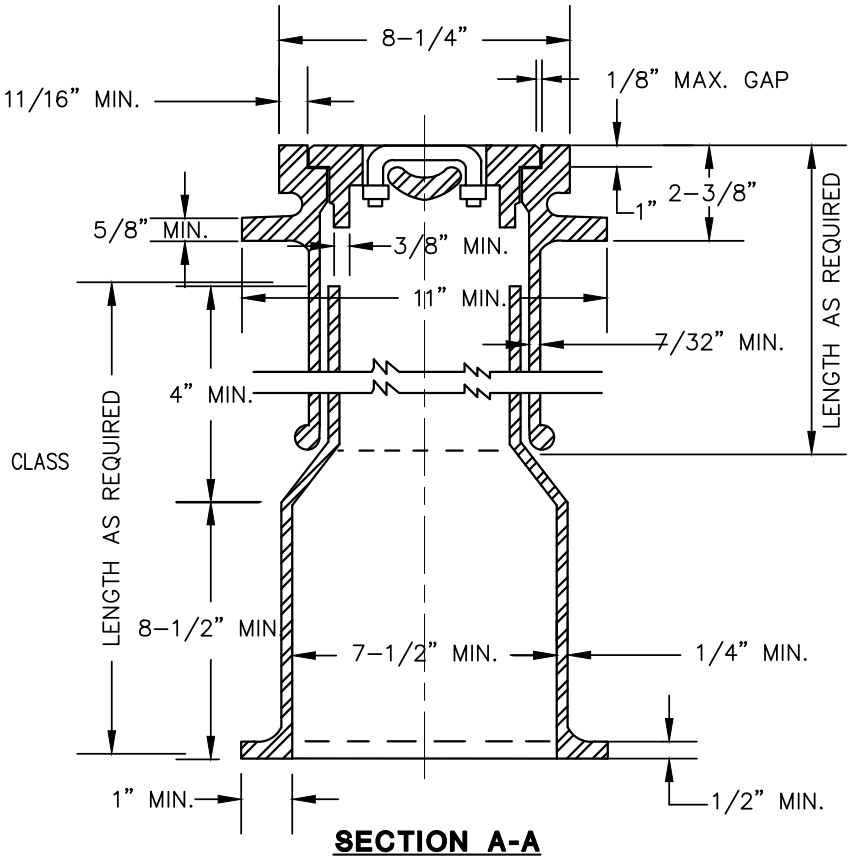
CEDARRIVER
WATER & SEWER DISTRICT



PLAN



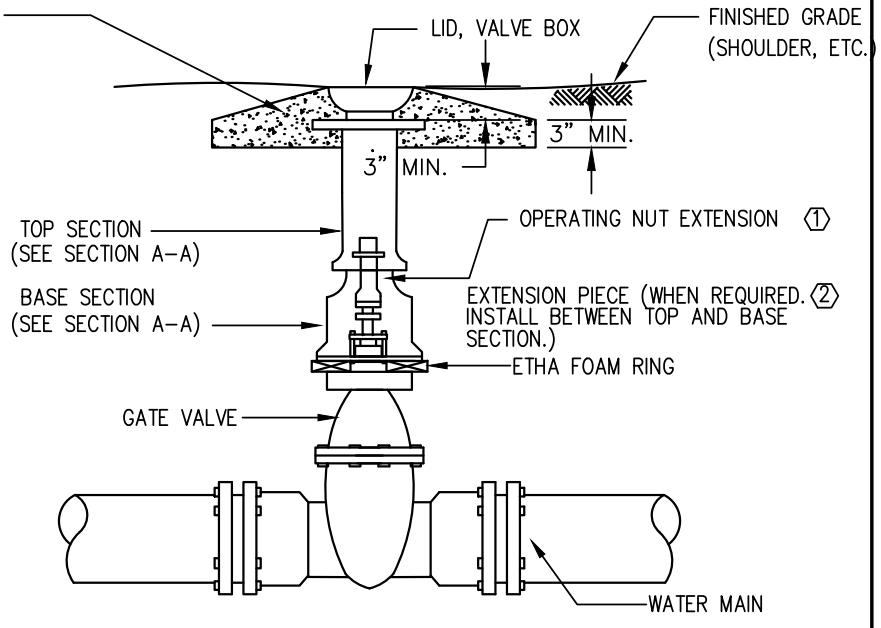
TOP SECTION PAVEMENT INSTALLATION



SECTION A-A

TOP SECTION INSTALLATION OUTSIDE PAVEMENT

3 FT. DIA. CONC. PAD WHEN VALVE IS OUTSIDE PAVEMENT. PAD TO BE TROWEL FINISHED AND SLOPED UP TO 1/4"-3/8" ABOVE VALVE CASE.



NOTES:

1. ALL WATERMAIN IN EASEMENTS SHALL BE INSTALLED WITH A NUMBER 10 GAUGE SOLID BLUE SHEATHED TRACER WIRE. THE TRACER WIRE SHALL BE SECURED TO THE CROWN OF THE WATER MAIN BEFORE THE INSTALLATION OF THE TOP COURSE OF BEDDING.

2. TRACER WIRE SHALL RUN FROM WATER VALVE BOX TO WATER VALVE BOX AS SHOWN IN STD. DRAWING NO. 22.

CAST IRON VALVE BOX ASSEMBLY TYPICAL SETTING DETAIL

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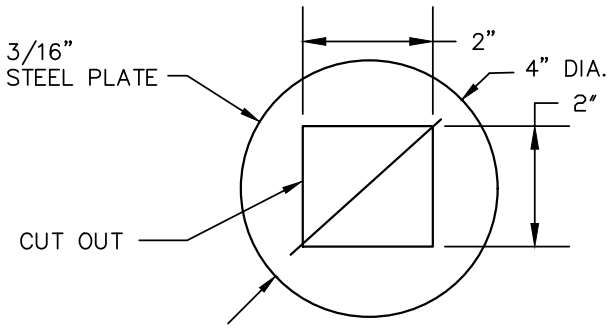
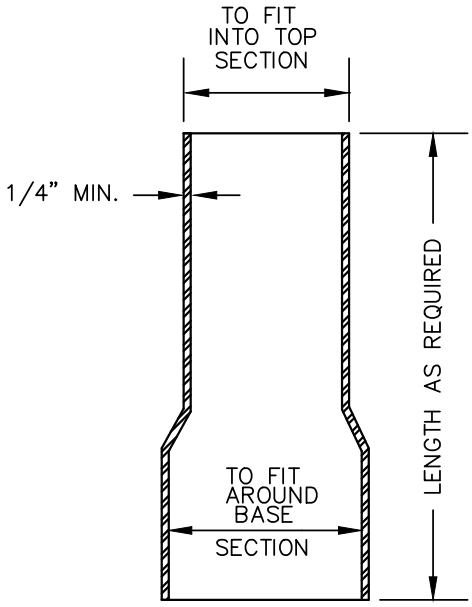
VALVE BOX ASSEMBLY

Water Construction Standard Plan No. 10

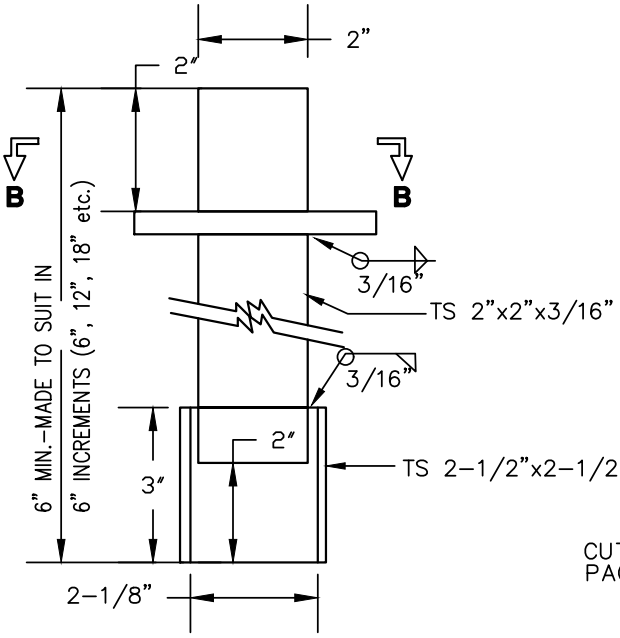
CEDARRIVER
WATER & SEWER DISTRICT



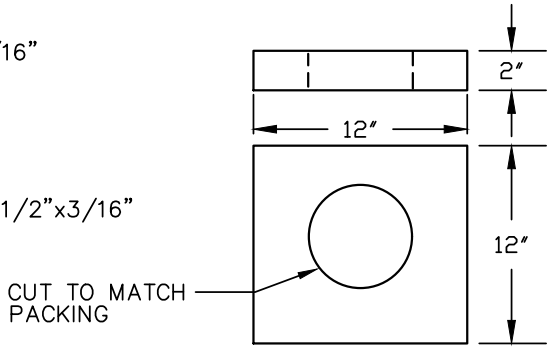
B-B



EXTENSION PIECE ⟨2⟩
(WHEN REQUIRED)



OPERATING NUT EXTENSION DETAIL



PLASTIC FOAM GASKET DETAIL
ETHA FOAM PAD RING

Notes:

Frame and cover shall be tested for accuracy of fit and shall be marked in sets for delivery.

Castings and extensions shall be hot-dipped in asphaltic varnish, Royston Roskote #612xm or approved equal.

Valve box top and lid shall be Olympic Foundry #045. Valve box base shall be Olympic Foundry #940-42.
All castings shall be ductile or grey cast iron.

⟨1⟩ An operating nut extension shall be installed when the ground surface is more than 36" above the valve operating nut.

⟨2⟩ Extension pieces (when used) shall conform to the minimum thickness requirements and shall fit into the top section and over the bottom section.

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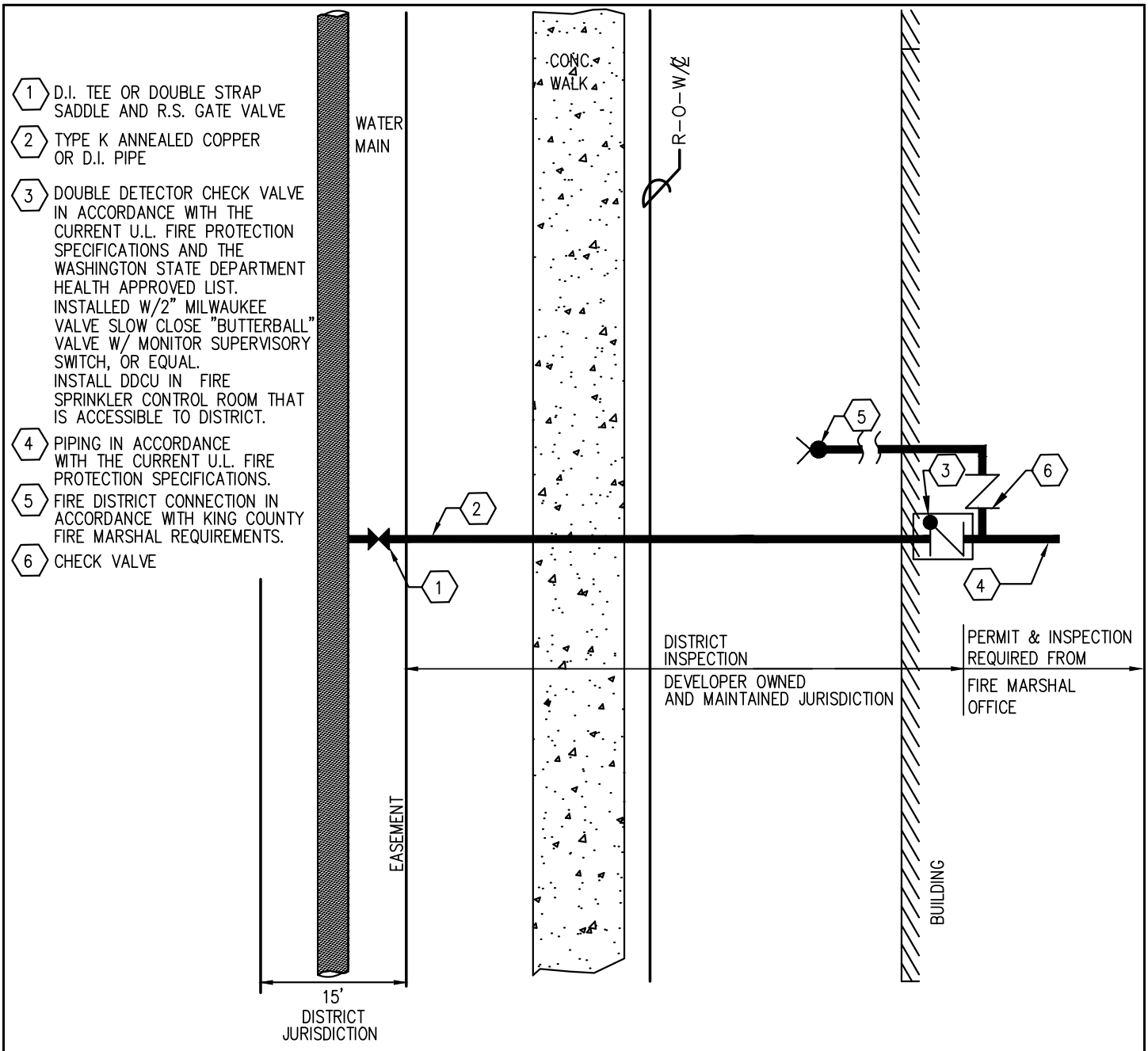
VALVE BOX EXTENSION

Water Construction Standard Plan No. 11

CEDARRIVER
WATER & SEWER DISTRICT



3" AND UNDER DEVICE

NTS

(FOR LARGER SUPPLY LINE SEE STANDARD PLAN 14)

Notes:

1. Piping, valve and meter sizes shall be designed, sized and certified by a certified fire systems designer, and approved by the King County Fire Marshal and the Cedar River Water and Sewer District, prior to construction.
2. All construction shall conform to the Cedar River Water and Sewer District Standard Specifications and the UL Fire Protection Specifications.

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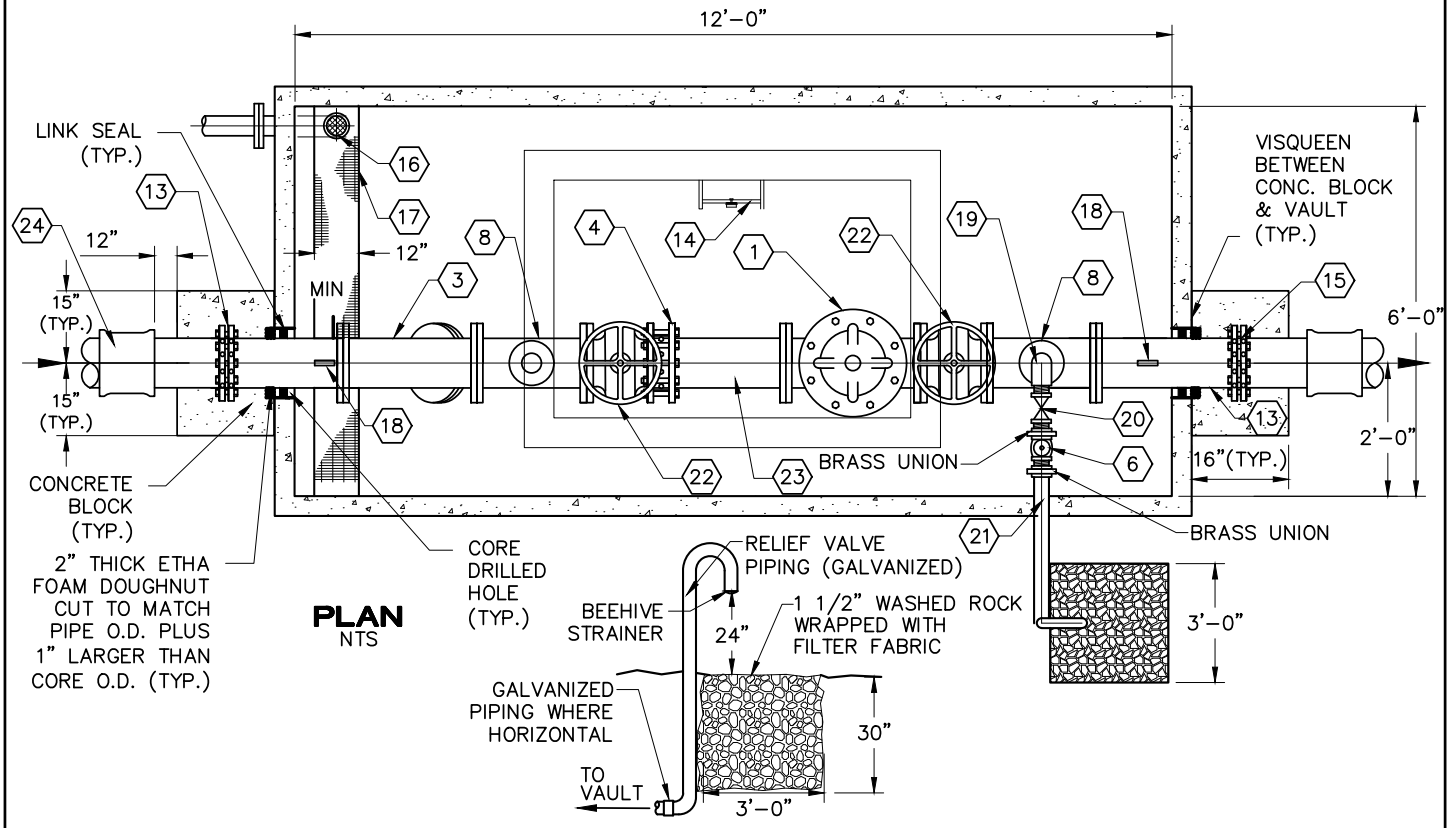
FIRE SPRINKLER CONNECTION FOR DDCV

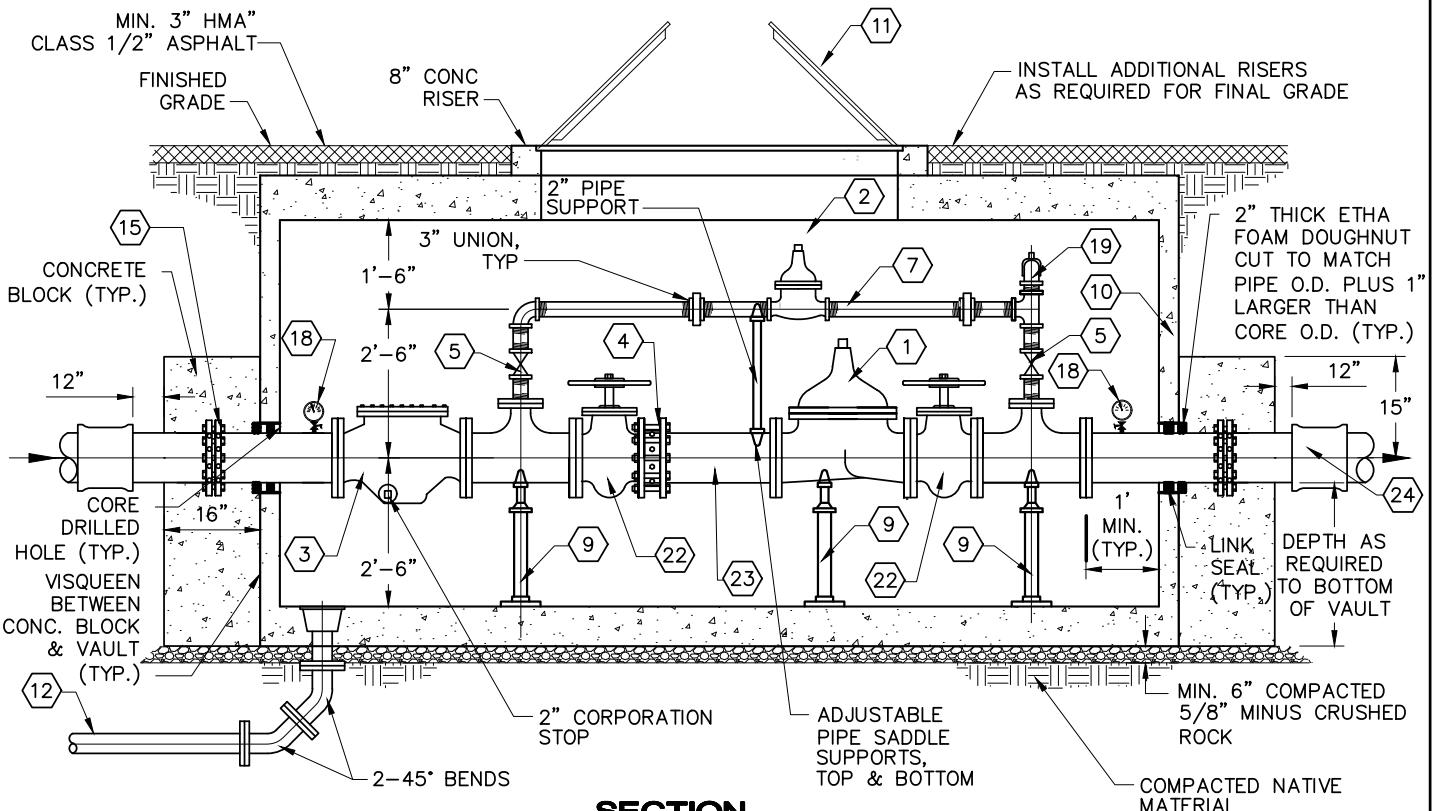
Water Construction Standard Plan No. 12

CEDARRIVER
WATER & SEWER DISTRICT



PLAN
NTS

GRAVEL SUMP DETAIL
NTS



SECTION
NTS

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PRESSURE REDUCING VALVE VAULT

Water Construction Standard Plan No. 13

Page 1 of 2

CEDARRIVER
WATER & SEWER DISTRICT

PRV PARTS LIST

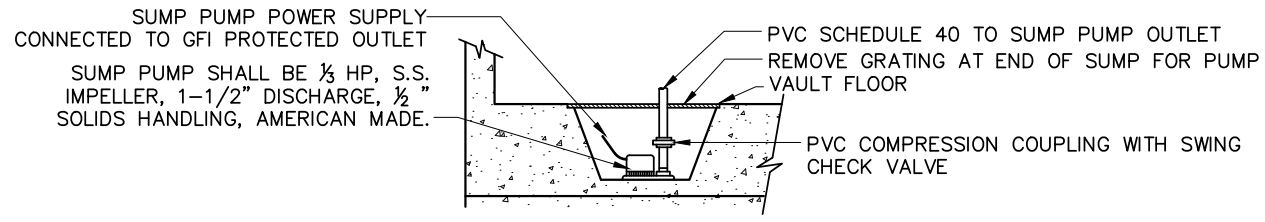
1. 8" PRV (FL), CLA VAL NO. 6-92-01 BCS W/ EPOXY LINING, VALVE POSITION INDICATOR & SIGHT GAUGE, SPEED CONTROL
2. 3" PRV (FLANGED), CLA VAL NO. 92-01 BCS W/ EPOXY LINING, AND VALVE POSITION INDICATOR, & SIGHT GAUGE SPEED CONTROL
3. 8" STRAINER, CLA-VAL, "X43H", H STYLE STRAINER OR APPROVED EQUAL, FL X FL
4. FLANGED COUPLING ADAPTER, SMITH-BLAIR NO. 912 OR APPROVED EQUAL W/ ANCHOR STUDS
5. 3" RS GATE VALVE W/ HAND WHEEL, THREADED
6. RELIEF VALVE CLA-VAL 2" 50-01 GLOBE STYLE, THREADED FOR 2" RELIEF LINES (CLA-VAL 3" 50-01 GLOBE STYLE, FLANGED FOR 3" RELIEF LINES) W/ NIPPLE
7. SCHEDULE 40 3" THREADED BRASS PIPE, UNION & FITTINGS (ALL BYPASS PIPING)
8. 8" X 4" DI TEE, FL X FL, W/ 4" BLIND FLANGE TAPPED FOR 3"
9. ADJUSTABLE PIPE SUPPORT, GRINNEL NO. 264 OR APPROVED EQUAL
10. 6' X 12' END SUMP VAULT W/ SOLID WALLS (NO KNOCKOUTS), UTILITY VAULT NO. 612-LA OR APPROVED EQUAL. ALL JOINTS ARE TO BE GROUTED
11. 4' X 6' DOUBLE LEAF ALUMINUM HATCH, LW PRODUCTS CO. RATED FOR H-20 LOADING
12. 4" DI DRAIN TO DAYLIGHT W/ RODENT-PROOF SCREEN AT DAYLIGHT OR CONNECT TO STORM STRUCTURE
13. 8" DI FL X PE SPOOL
14. FREESTANDING ALUMINUM LADDER. WITH "LADDER-UP" SAFETY POST, BILCO CO. MODEL 2 OR APPROVED EQUAL, ATTACH TO SIDE OF HATCH AND FLOOR
15. UNI-FLANGE SERIES 400 WTH UNITORQUE SET SCREWS CENTERED IN CONCRETE BLOCK
16. 9" FLOOR DRAIN, ZURN NO. 551 W/ GRATING ON INLET
17. FLOOR SUMP W/ GALVANIZED GRATING
18. 1/2" BRASS BALL VALVE TAPPED INTO PIPE CONNECT 4" SS GLYCERIN FILLED PRESSURE GAUGE. 0-160 PSI ON OUTLET SIDE, 0-200 PSI ON INLET SIDE. FIGURE INTERVAL AT 2 PSI GRADUATION INTERVAL, NOSHOK 40.500 OR EQUAL
19. BRASS STREET ELBOW FOR RELIEF LINE IN TOP OF TEE W/ NIPPLE
20. 2" BALL STYLE ISOLATION VALVE FOR 2" RELIEF VALVE (3" RS GATE VALVE W/ HAND WHEEL TURNED TO SIDE TO ALLOW OPERATION FROM VAULT FLOOR FOR 3" RELIEF VALVE) W/ NIPPLE
21. 2" BRASS PRESSURE RELIEF DISCHARGE LINE WITH UNION, 180° RETURN ELBOW & BEEHIVE STRAINER 2' ABOVE GRADE. DRILL 1/8" HOLE IN RELIEF VALVE PIPE DIRECTLY ABOVE BURRIED ELBOW, COORDINATE DISCHARGE LOCATION W/ DISTRICT
22. 8" RESILIENT SEAT GATE VALVE, FLxFL
23. 8" SPOOL, FLxPE
    NOTE: NIPPLE LENGTH TO BE DETERMINED ONSITE TO ALLOW FOR COMPLETE REMOVAL AND INSTALLATION OF ALL PARTS.
24. MJ COUPLING

PRV VAULT NOTES

1. PROVIDE RECESSED DOOR HANDLE BOX IN ACCESS HATCH FOR PADLOCK W/ BOLT DOWN COVER OVER LOCK, BOX LARGE ENOUGH FOR "MASTER LOCK".
2. EXTERIOR OF VAULT TO BE COATED WITH 2 COATS OF BLACK BITUMASTIC SOLUTION. VAULT SHALL BE DRY PRIOR TO APPLICATION.
3. WHEN REQUIRED BY THE DISTRICT THE VAULT INTERIOR WALLS AND CEILINGS SHALL BE PAINTED WITH SHERWIN WILLIAMS SHER-CRYL WHITE HIGH PERFORMANCE ACRYLIC B66-300 SERIES.

VAULT SUMP PUMP

1. SUMP PUMP MAY BE SUBSTITUTED FOR FLOOR DRAIN IF DRAIN LINE CANNOT BE DAYLIGHTED. (DETERMINATION TO BE MADE BY DISTRICT).
2. INSTALL 10-GAUGE SOLID COPPER TRACER WIRE TO SUMP PUMP DISCHARGE PIPE. TRACER WIRE SHALL EXTEND FROM PUMP OUTLET A MINIMUM OF 24" INTO VAULT THROUGH LINK SEAL.
3. CASE BY CASE ONLY (DETERMINATION TO BE MADE BY DISTRICT): INSTALL GROUND FAULT INTERRUPTER (GFI) OUTLET NO MORE THAN 12" BELOW TOP OF VAULT IN VICINITY OF ACCESS HATCH. POWER SUPPLY FOR SUMP PUMP TO BE VIA GFI OUTLET. POWER SUPPLY SHALL NOT BE HARD WIRED DIRECTLY TO PUMP.
4. ELECTRICAL SUMP PUMP MAY BE SUBSTITUTED WITH SIPHON PUMP ASSEMBLY IF POWER IS NOT FEASIBLE (DETERMINATION MADE BY DISTRICT). SEE STANDARD WATER DETAIL NO. 23 FOR SUMP DRAIN ASSEMBLY.



DETAIL
NTS

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PRESSURE REDUCING VALVE VAULT

Water Construction Standard Plan No. 13
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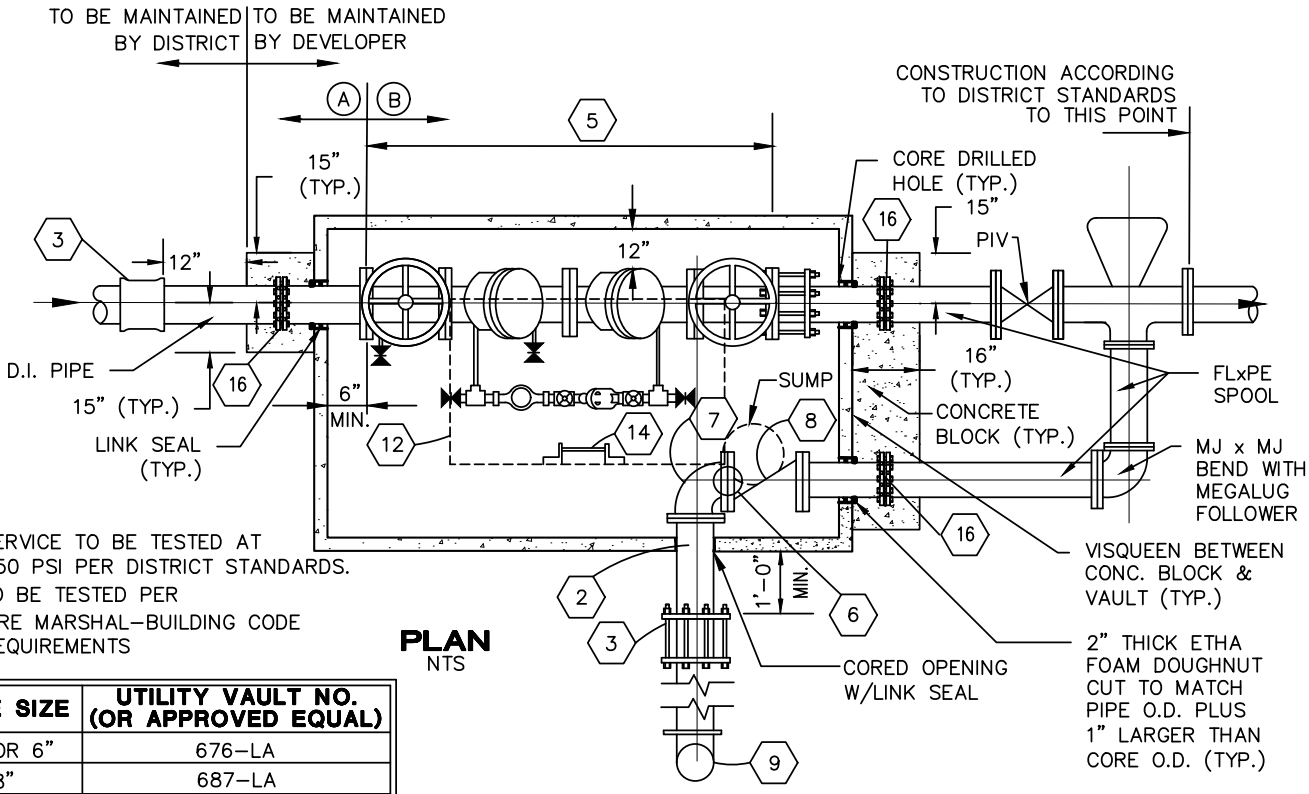
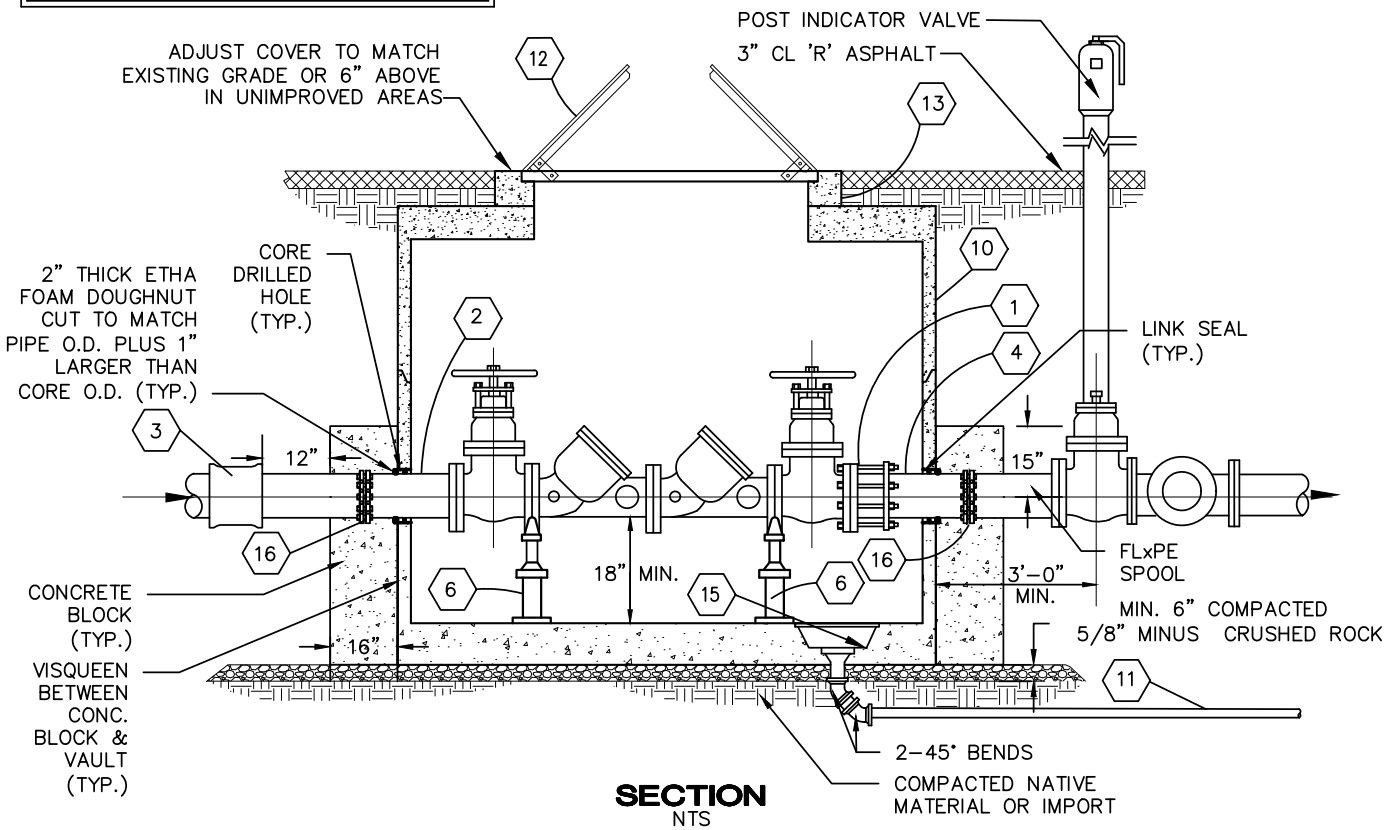
CEDARRIVER
WATER & SEWER DISTRICT



PLAN
NTS

PIPE SIZE	UTILITY VAULT NO. (OR APPROVED EQUAL)
4" OR 6"	676–LA
8"	687–LA
10"	5106–LA
NOTE: VAULTS TO BE SOLID WALL–NO KNOCKOUTS	



SECTION
NTS

DEC 2012

PACE
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DOUBLE DETECTOR CHECK ASSEMBLY

Water Construction Standard Plan No. 14

Page 1 of 2

CEDARRIVER
WATER & SEWER DISTRICT

DDCA PARTS LIST

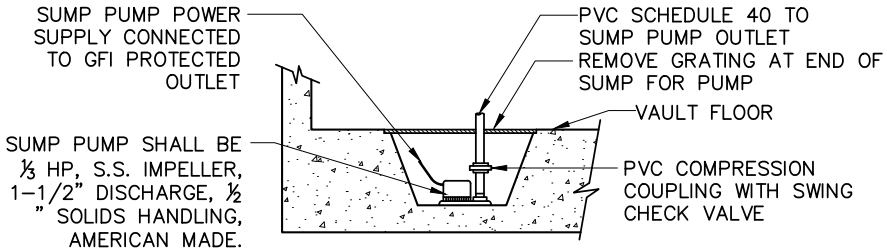
1. FL COUPLING ADAPTER
2. FL X PE SPOOL
3. MJ COUPLING
4. FLxPE SPOOL
5. U.L. & WA STATE APPROVED DOUBLE DETECTOR CHECK VALVE ASSEMBLY
6. ADJUSTABLE PIPE SUPPORT, GRINNEL NO. 264 OR APPROVED EQUAL
7. FL 90° BEND
8. FL CHECK VALVE
9. FIRE DEPARTMENT CONNECTION – SPECIFICATIONS & LOCATION PER APPLICABLE FIRE DISTRICT (VARIES) REQUIREMENTS
10. PRE–CAST VAULT, SEE UTILITY VAULT SIZE CALLOUT
11. 4" D.I. DRAIN PIPE TO DAYLIGHT. PROVIDE RODENT–PROOF SCREEN AT DAYLIGHT OR CONNECT TO STRUCTURE
12. 4' X 6' ALUMINUM HATCH, LW PRODUCTS COMPANY, RATED FOR H–20 LOADING
13. 8" CONC. RISER
14. ALUMINUM LADDER W/"LADDER UP" EXTENSION. ATTACH TO SIDE OF HATCH AND FLOOR
15. 9" FLOOR DRAIN, ZURN NO. 551 W/GRATING ON INLET
16. UNI–FLANGE SERIES 400 WITH UNITORQUE SET SCREWS CENTERED IN CONCRETE BLOCK

DDCA VAULT NOTES

1. PROVIDE RECESSED DOOR HANDLE BOX IN ACCESS HATCH FOR PADLOCK W/ BOLT DOWN COVER OVER LOCK, BOX LARGE ENOUGH FOR "MASTER LOCK".
2. EXTERIOR OF VAULT TO BE COATED WITH 2 COATS OF BLACK BITUMASTIC SOLUTION. VAULT SHALL BE DRY PRIOR TO APPLICATION.

VAULT SUMP PUMP

1. SUMP PUMP MAY BE SUBSTITUTED FOR FLOOR DRAIN IF DRAIN LINE CANNOT BE DAYLIGHTED. (DETERMINATION TO BE MADE BY DISTRICT)
2. INSTALL 10–GAUGE SOLID COPPER TRACER WIRE TO SUMP PUMP DISCHARGE PIPE. TRACER WIRE SHALL EXTEND FROM PUMP OUTLET A MINIMUM OF 24" INTO VAULT THROUGH LINK SEAL.
3. CASE BY CASE ONLY (DETERMINATION TO BE MADE BY DISTRICT): INSTALL GROUND FAULT INTERRUPTER (GFI) OUTLET NO MORE THAN 12" BELOW TOP OF VAULT IN VICINITY OF ACCESS HATCH. POWER SUPPLY FOR SUMP PUMP TO BE VIA GFI OUTLET. POWER SUPPLY SHALL NOT BE HARD WIRED DIRECTLY TO PUMP.



DETAIL
NTS

DEC 2012

PACE
An Engineering Services Company

DOUBLE DETECTOR CHECK ASSEMBLY

Water Construction Standard Plan No. 14
Page 2 of 2

CEDARRIVER
WATER & SEWER DISTRICT

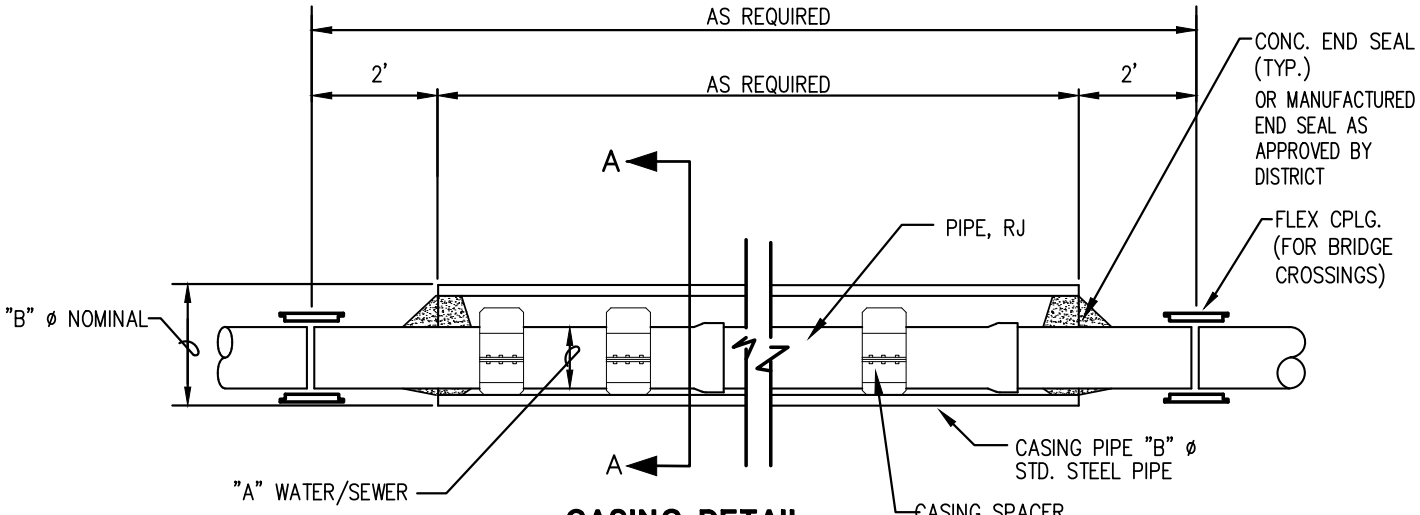
NOTE: ALL CASINGS TO BE MINIMUM CL. 52 D.I.

"A" PIPE SIZES	"B" CASING SIZES	CASING WALL THICKNESS
6"	12"	1/4"
8"	16"	1/4"
10"	20"	3/8"
12"	24"	3/8"
14"	28"	3/8"
16"	32"	3/8"

WATER PIPE SCHEDULE

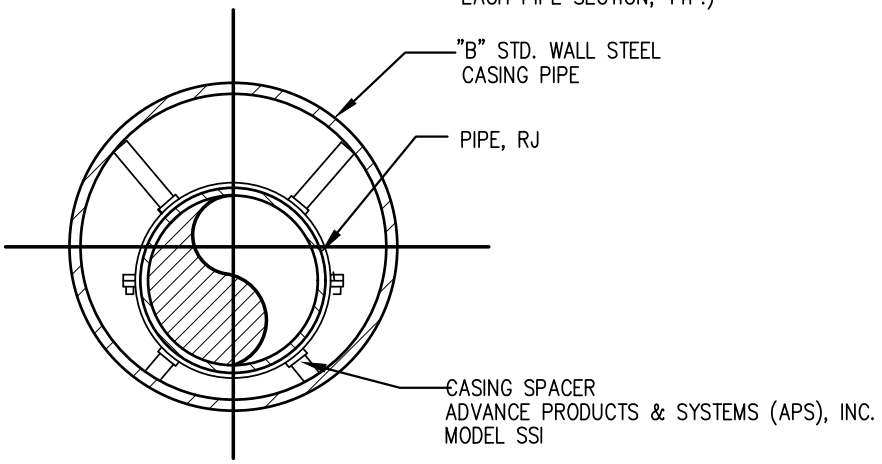
"A" PIPE SIZES	"B" CASING SIZES	CASING WALL THICKNESS
6"	12"	1/4"
8"	16"	1/4"
10"	18"	1/4"
12"	20"	3/8"
15"	24"	3/8"

SEWER PIPE SCHEDULE



CASING DETAIL

NTS



SECTION A-A

NTS

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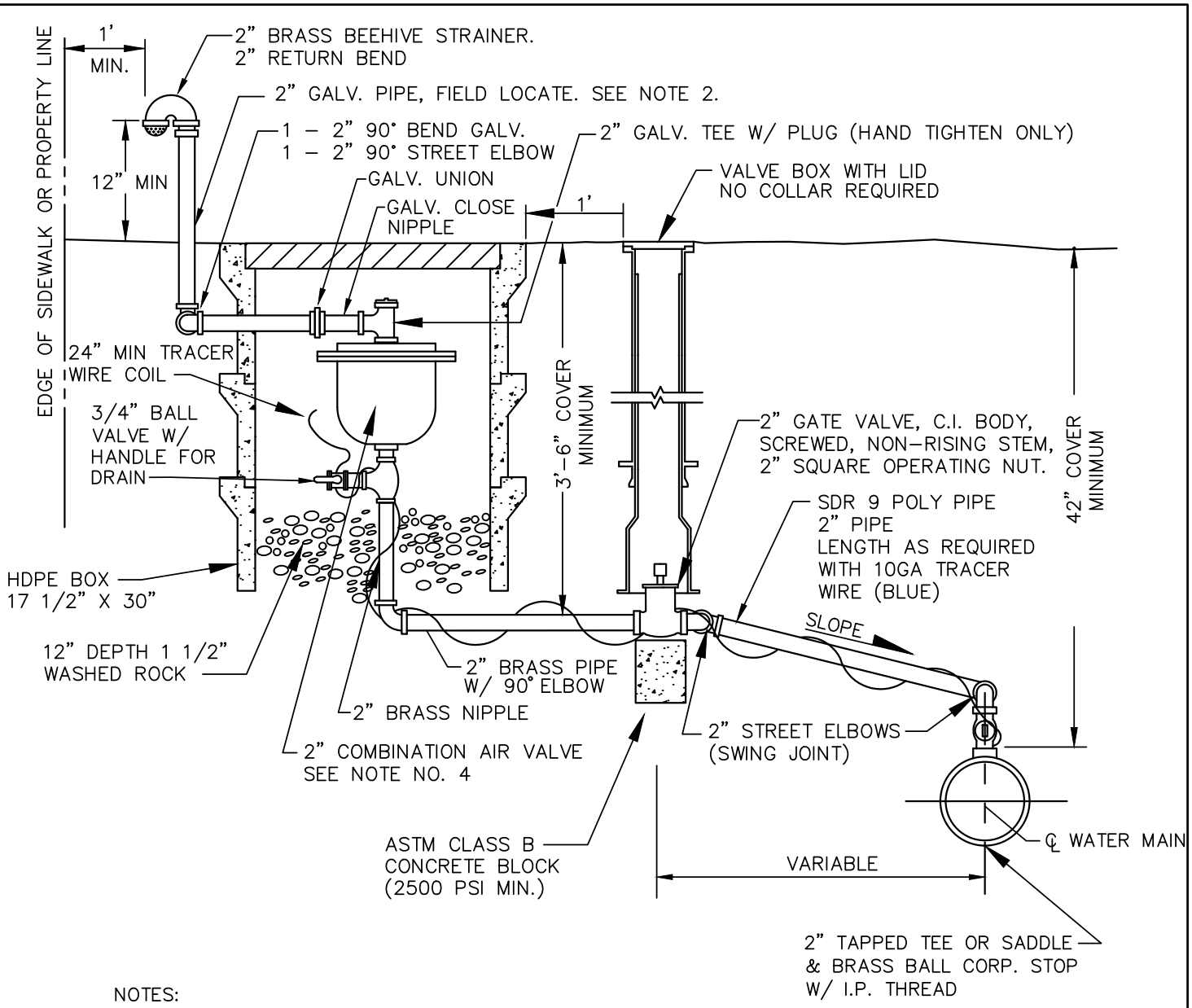
STANDARD CASING

Water Construction Standard Plan No. 15

CEDARRIVER
WATER & SEWER DISTRICT



NOTES:

1. ALL PIPE AND FITTINGS FROM THE MAIN TO THE COMBINATION AIR VALVE SHALL BE BRASS OR POLY PIPE WITH TRACER WIRE AS INDICATED.
2. PAINT RISER WITH 2 COATS OF BLUE PAINT. SEE APPROVED MATERIALS LIST.
3. COMBINATION AIR VALVE ASSEMBLY MUST BE INSTALLED AT HIGHEST POINT IN LINE. IF HIGH POINT FALLS IN LOCATION WHERE ASSEMBLY CANNOT BE INSTALLED, PROVIDE ADDITIONAL DEPTH OF PIPE LINE TO CREATE HIGH POINT AT A LOCATION WHERE ASSEMBLY CAN BE INSTALLED.
4. COMBINATION AIR VALVE ASSEMBLY SHALL BE AS INDICATED ON THE APPROVED MATERIAL LIST OF THESE SPECIFICATIONS.
5. USE BOX SIZED APPROPRIATELY FOR VALVE SIZE WITH TRAFFIC COVER. SEE APPROVED MATERIAL LIST OF THESE SPECIFICATIONS.
6. INSTALL BOX PERPENDICULAR TO CURB OR EDGE OF PAVEMENT.
7. DESIGN ENGINEER SHALL VERIFY VALVE SIZE APPROPRIATE FOR THE APPLICATION AND SIZE THE BOX ACCORDINGLY.

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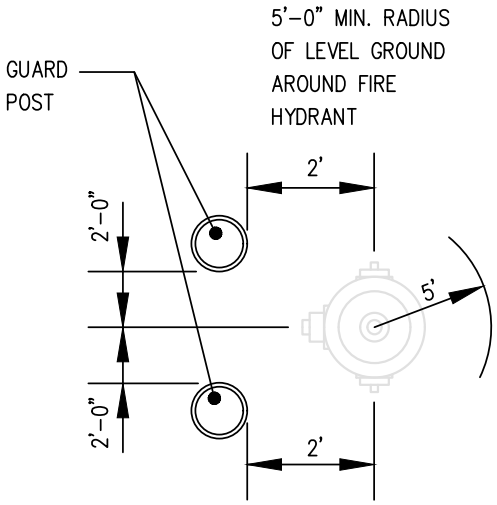
2" AIR AND VACUUM RELIEF VALVE

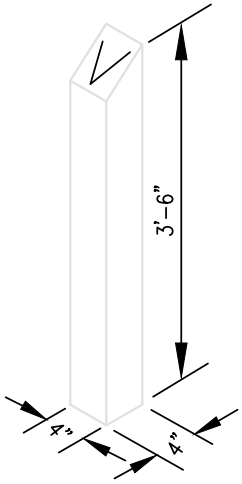
Water Construction Standard Plan No. 16

CEDARRIVER
WATER & SEWER DISTRICT



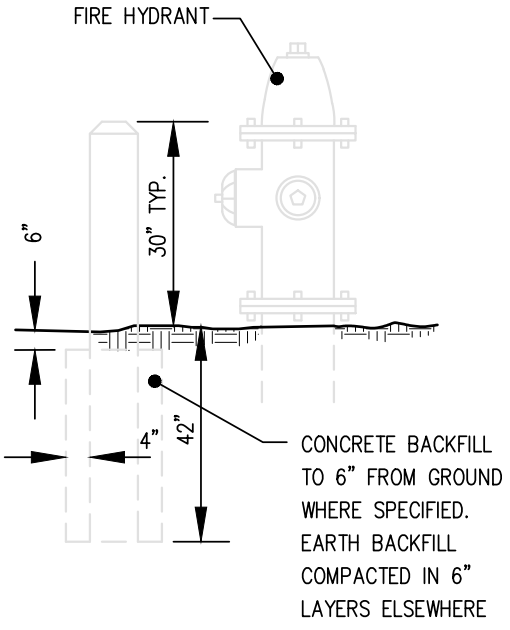
PLAN
FIRE HYDRANT GUARD POST

GUARD POST WILL NOT BE ALLOWED IN THE STREET CLEAR ZONE AS PER KING COUNTY REQUIREMENTS



VALVE
MARKER POST

STENCIL ON FACE OF MARKER POST (18" DEEP BURY) WITH 2" CONTRASTING LETTERS, THE DISTANCE FROM THE POST TO THE GATE VALVE IN FEET AND INCHES.



ELEVATION

NOTES:

1. GUARD POST SHALL BE 8" DIAMETER X 6' LONG PRECAST CONCRETE POSTS AS PER TECHNICAL SPECIFICATIONS. PAINT WITH 1 COAT PRIMER, FORMULA H-1-83, AND TWO (2) COATS OF ACID AND OIL RESISTANT ENAMEL, COLOR WHITE.
2. VALVE MARKER POST AS SPECIFIED. PAINT AS SPECIFIED FOR HYDRANT GUARD POST. STENCIL ON FACE OF HYDRANT BARREL WITH 2" CONTRASTING LETTERS, THE DISTANCE FROM THE HYDRANT TO THE GATE VALVE IN FEET AND INCHES.

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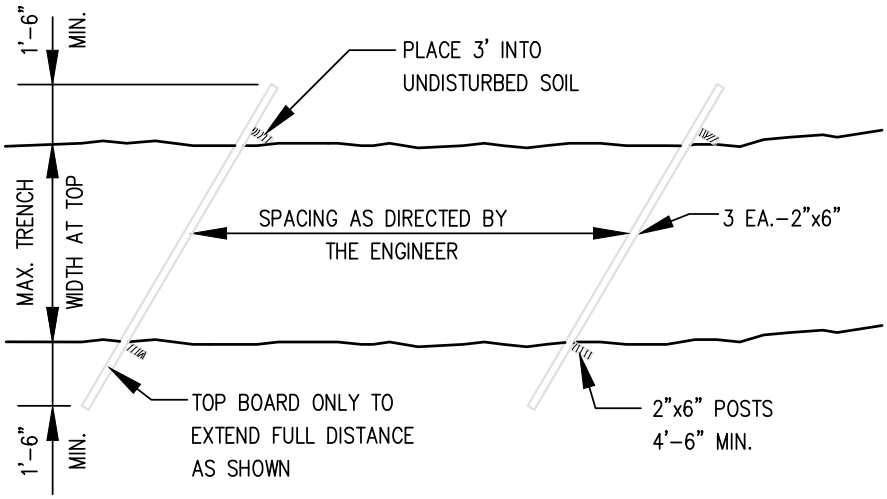
GUARD AND MARKER POSTS

Water Construction Standard Plan No. 17

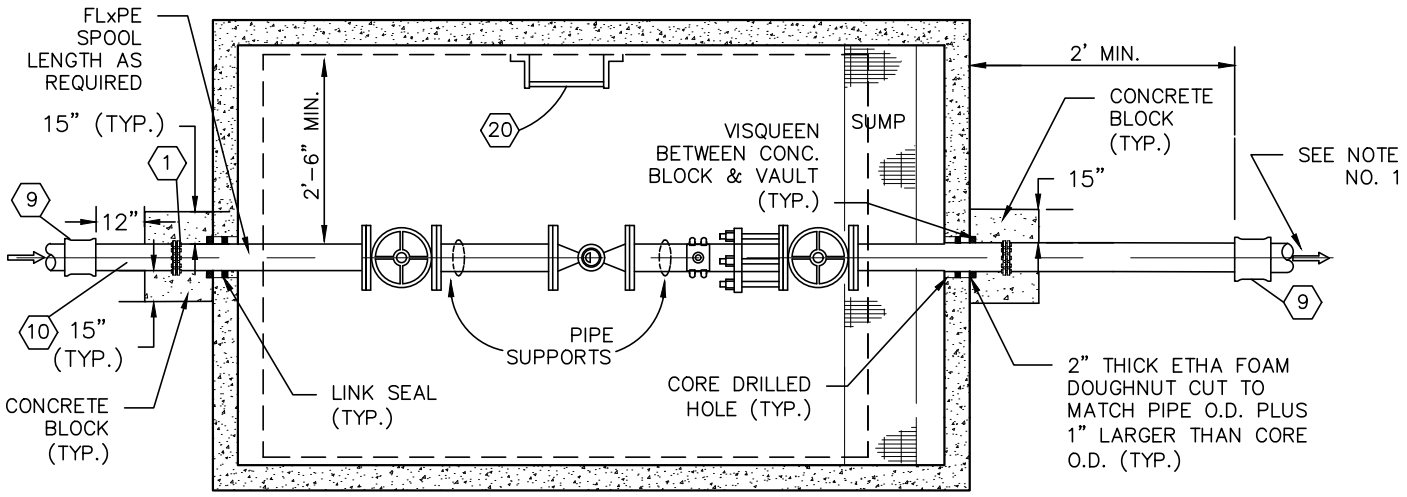
CEDARRIVER
WATER & SEWER DISTRICT

Notes:

1. Timber baffles to be installed where directed by the Engineer or District Inspector.
2. All backfill shall be seeded.



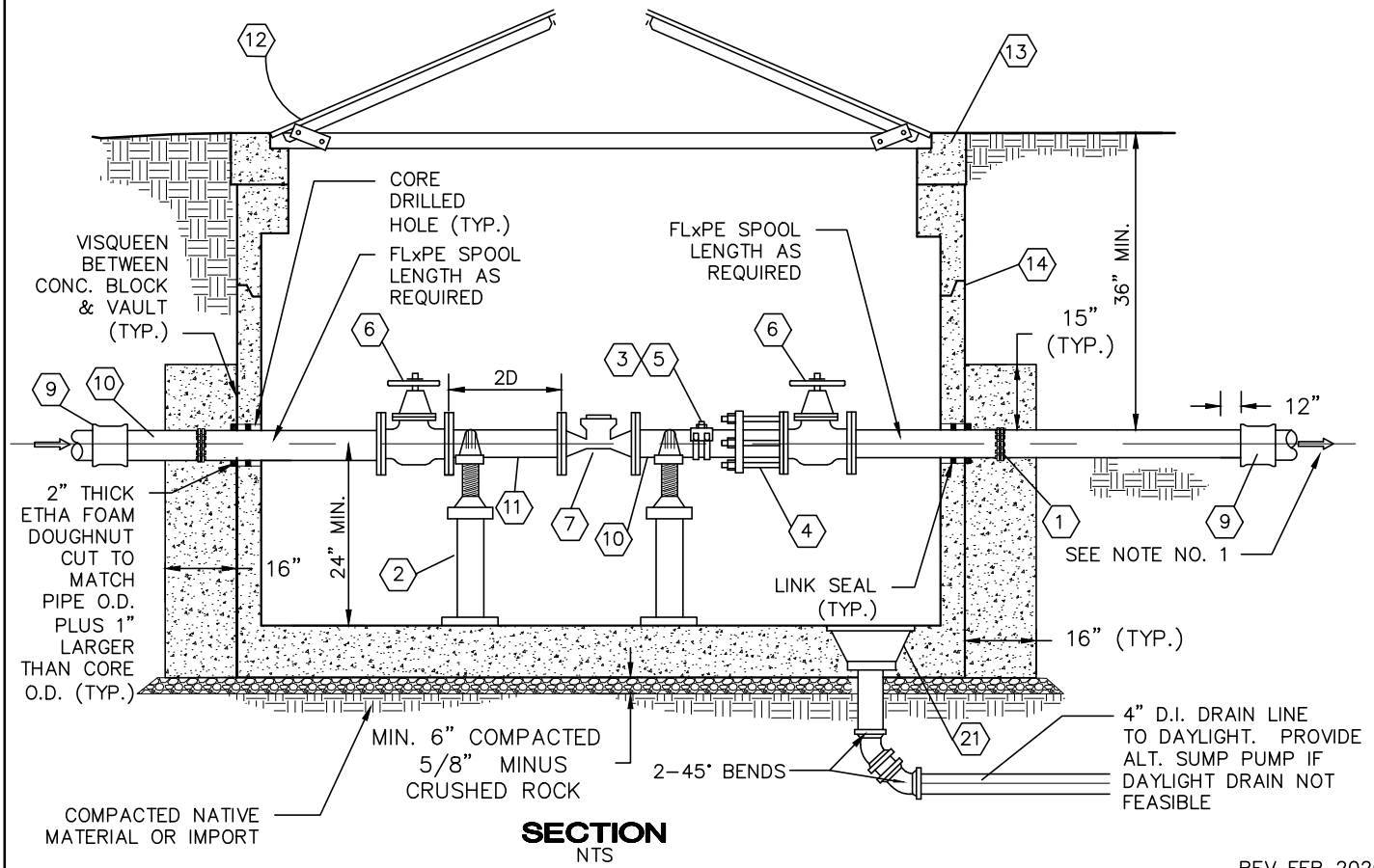
HILL HOLDER



PLAN
NTS

METER VAULT REQUIREMENTS				
METER SIZE	MAINLINE	BY-PASS	UTILITY VAULT, INC. (OR APPROVED EQUAL)	METER TYPE
3"	3" D.I.	2"	676-LA	OCTAVE W/GEN. REMOTE
4"	4" D.I.	2"	676-LA	OCTAVE W/GEN. REMOTE
6"	6" D.I.	3"	687-LA	OCTAVE W/GEN. REMOTE

NOTE: ALL VAULTS SHALL BE SOLID WALL (NO KNOCKOUTS)



SECTION
NTS

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3", 4" AND 6" METERS

Water Construction Standard Plan No. 19
Page 1 of 2

CEDARRIVER
WATER & SEWER DISTRICT

METER PARTS LIST

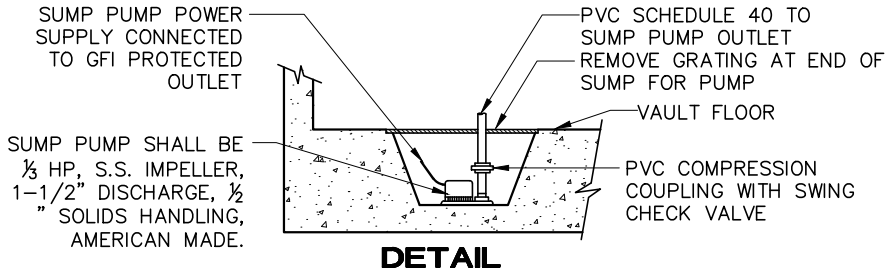
1. UNI–FLANGE SERIES 400 WITH UNITORQUE SET SCREWS CENTERED IN CONCRETE BLOCK
2. ADJUSTABLE PIPE SUPPORTS, GRINNEL #264 OR APPROVED EQUAL
3. DOUBLE–STRAP SADDLE, FORD 202 OR EQUIVALENT. 2" IPS TAP
4. FLANGE COUPLING ADAPTOR, ROMAC FCA501 OR APPROVED EQUAL
5. BRASS PLUG 2" IPS RAISED HEAD, DOMESTIC, NO LEAD
6. R.S. GATE VAVLE, FLxFL W/ HANDWHEEL
7. WATER METER PURCHASED FROM CEDAR RIVER WATER & SEWER DISTRICT
8. NOT USED
9. MJ COUPLING
10. FLxPE SPOOL MINIMUM LENGTH 18" (3" PIPE), 19" (4" PIPE) AND 23" (6" PIPE)
11. FLxFL SPOOL MINIMUM LENGTH 2 PIPE DIAMETERS
12. 4' X 6' ALUMINUM HATCH, LW PRODUCTS COMPANY, RATED FOR H–20 LOADING
13. 8" EXTENSION RING
14. PRECAST UTILITY VAULT, UTILITY VAULT CO. (SEE PAGE 1 OF 2 FOR CALL–OUTS)
15. NOT USED
16. NOT USED
17. NOT USED
18. NOT USED
19. NOT USED
20. FREE STANDING ALUMINUM LADDER WITH LADDER–UP ACCESSORY ATTACHED TO SIDE OF HATCH AND FLOOR
21. 9" FLOOR DRAIN, ZURN NO. 551 W/GRATING ON INLET
22. NOT USED

VAULT NOTES

1. FOR PREMISE ISOLATION, INSTALL AN APPROVED BACKFLOW PREVENTION DEVICE IN ACCORDANCE WITH DISTRICT CROSS CONNECTION SPECIFICATIONS.
2. ALL PIPE AND FITTINGS TO BE DUCTILE OR CAST IRON.
3. ALL VAULT PENETRATIONS SHALL BE CORED, WITH LINK–SEAL OR APPROVED EQUAL INSTALLED AROUND PIPE.
4. EXTERIOR VAULT TO BE COATED WITH 2 COATS OF BLACK BITUMASTIC SOLUTION. VAULT TO BE DRY PRIOR TO APPLICATION.
5. WHEN REQUIRED BY THE DISTRICT VAULT INTERIOR WALLS AND CEILINGS SHALL BE PAINTED WITH SHERWIN WILLIAMS SHER–CRYL WHITE HIGH PERFORMANCE ACRYCLIC B66–300 SERIES.
6. VAULTS TO BE SOLID WALL WITH NO KNOCKOUTS.
7. IF SUMP PUMP IS REQUIRED, DEVELOPER SHALL SUPPLY POWER TO THE VAULT IN CONFORMANCE WITH ALL LOCAL AND STATE CODES.
8. ALL CONSTRUCTION SHALL CONFORM TO THE CEDAR RIVER WATER AND SEWER DISTRICT STANDARD SPECIFICATIONS.
9. METER AND METER PERMIT SHALL BE PURCHASED AND OBTAINED FROM CEDAR RIVER WATER AND SEWER DISTRICT.
10. PROVIDE RECESSED DOOR HANDLE BOX IN ACCESS HATCH FOR PADLOCK W/ BOLT DOWN COVER OVER LOCK, BOX LARGE ENOUGH FOR "MASTER LOCK".

VAULT SUMP PUMP

1. SUMP PUMP MAY BE SUBSTITUTED FOR FLOOR DRAIN IF DRAIN LINE CANNOT BE DAYLIGHTED. (DETERMINATION TO BE MADE BY DISTRICT).
2. INSTALL 10–GAUGE SOLID COPPER TRACER WIRE TO SUMP PUMP DISCHARGE PIPE. TRACER WIRE SHALL EXTEND FROM PUMP OUTLET A MINIMUM OF 24" INTO VAULT THROUGH LINK SEAL.
3. CASE BY CASE ONLY (DETERMINATION TO BE MADE BY DISTRICT): INSTALL GROUND FAULT INTERRUPTER (GFI) OUTLET NO MORE THAN 12" BELOW TOP OF VAULT IN VICINITY OF ACCESS HATCH. POWER SUPPLY FOR SUMP PUMP TO BE VIA GFI OUTLET. POWER SUPPLY SHALL NOT BE HARD WIRED DIRECTLY TO PUMP.
4. ELECTRICAL SUMP PUMP MAY BE SUBSTITUTED WITH SIPHON PUMP ASSEMBLY IF POWER IS NOT FEASIBLE (DETERMINATION MADE BY DISTRICT). SEE STANDARD WATER DETAIL NO. 23 FOR SUMP DRAIN ASSEMBLY.



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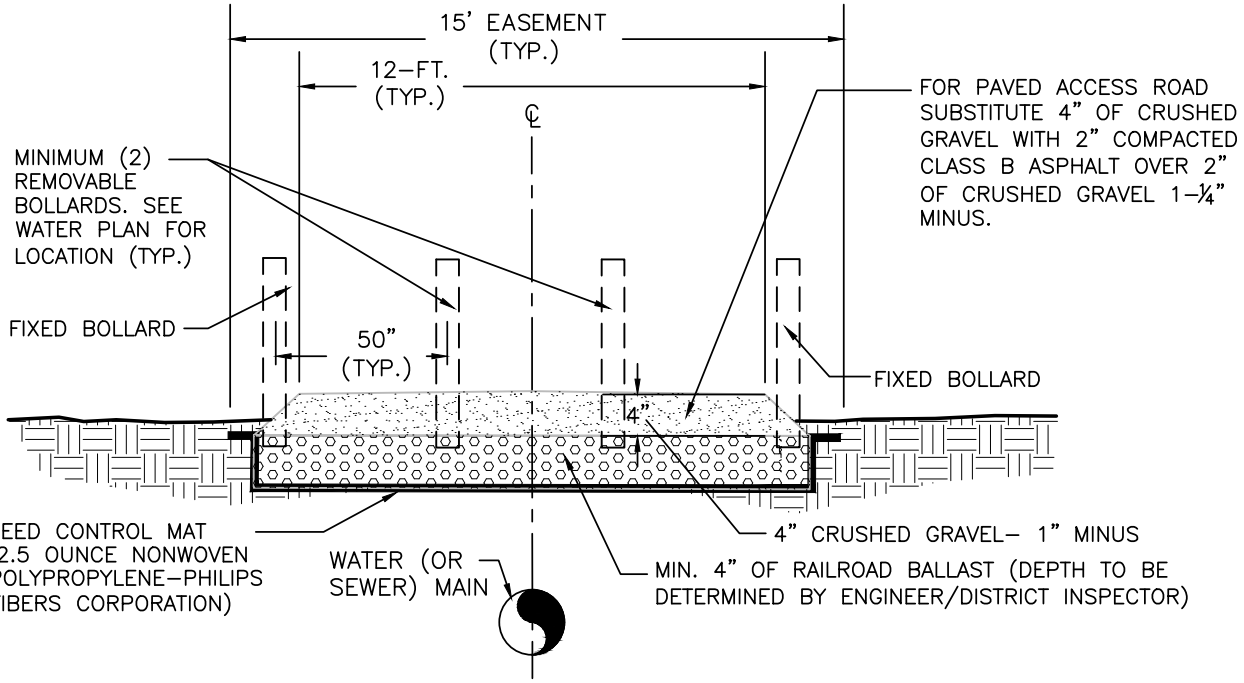
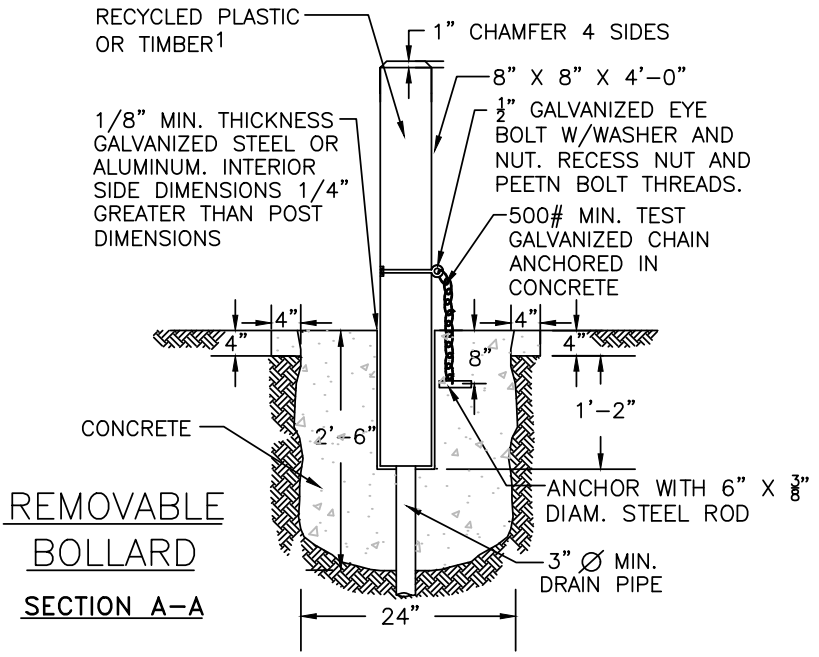
3", 4" AND 6" METERS

Water Construction Standard Plan No. 19
Page 2 of 2

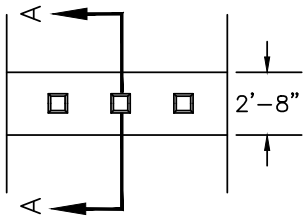
CEDARRIVER
WATER & SEWER DISTRICT





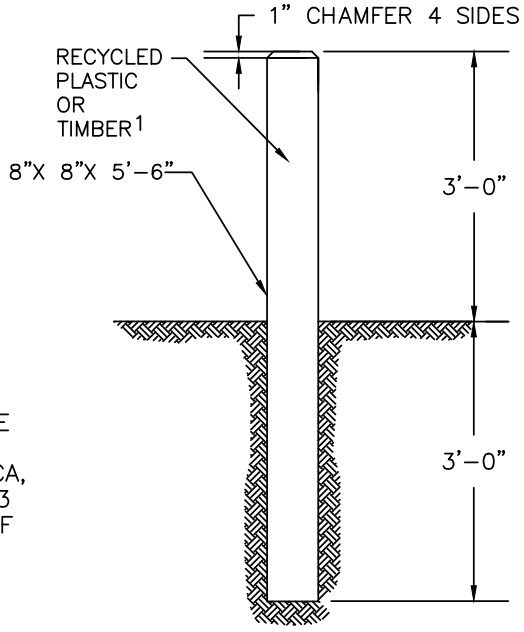
REMOVABLE BOLLARD

SECTION A-A



REMOVABLE BOLLARD

PLAN



FIXED BOLLARD

NOTES:

1. RECYCLED PLASTIC BOLLARD SHALL BE WHITE. TIMBER SHALL BE DOUGLAS FIR, DENSE CONSTRUCTION GRADE, AND SHALL BE PRESSURE TREATED WITH A WATERBORNE PRESERVATIVE (ACA, CCA, ACZA) IN ACCORDANCE WITH THE REQUIREMENTS OF SEC. 9-09.3 (4) OF THE WSDOT/APWA STANDARD SPECIFICATIONS. TOP 5" OF TIMBER SHALL BE PAINTED WHITE.
2. STEEL TUBE SHALL CONFORM TO ASTM A53 GRADE A.
3. NUTS, BOLTS, & WASHERS SHALL CONFORM TO ASTM A307.
4. ALL STEEL PARTS SHALL BE GALVANIZED.
5. CONCRETE SHALL BE CLASS 3000.

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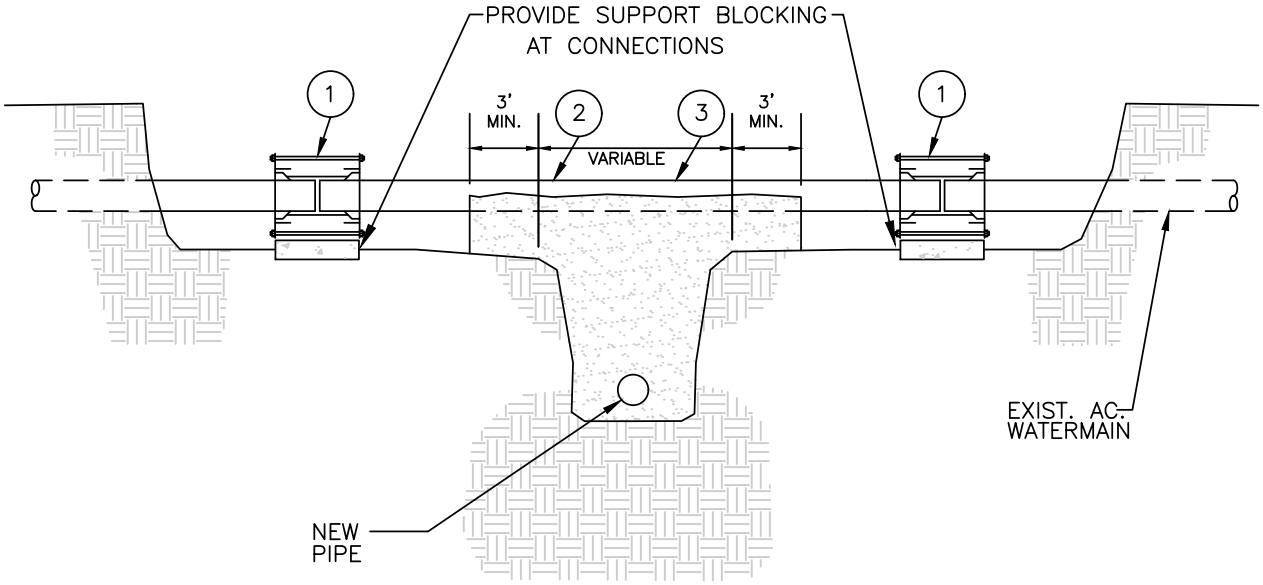
GRAVEL ACCESS ROAD

Water/Sewer Construction Standard Plan No. 20

CEDARRIVER
WATER & SEWER DISTRICT



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100% CLASS C CDF BACKFILL REQUIRED FROM TRENCH BOTTOM TO CENTER OF EX. WATERMAIN.

NOTES:

1. COUPLING: ASBESTOS–CEMENT (A/C) BY DUCTILE IRON (ROMAC STYLE 501 LONG BARREL, EQUIVALENT). DO NOT ENCASE COUPLINGS WITH CDF.
2. DUCTILE IRON PIPE, 18 LF IN LENGTH, CL. 52.
3. D.I. PIPE TO BE CENTERED AT POINT OF CROSSING.
4. A/C DISPOSAL PER WAC173–400–075, WAC 295–65, PUGET SOUND AIR POLLUTION CONTROL AGENCY REQUIREMENTS, AND DISTRICT STANDARDS.
5. REPLACEMENT ONLY AT CROSSINGS DESIGNATED BY CRWSD.

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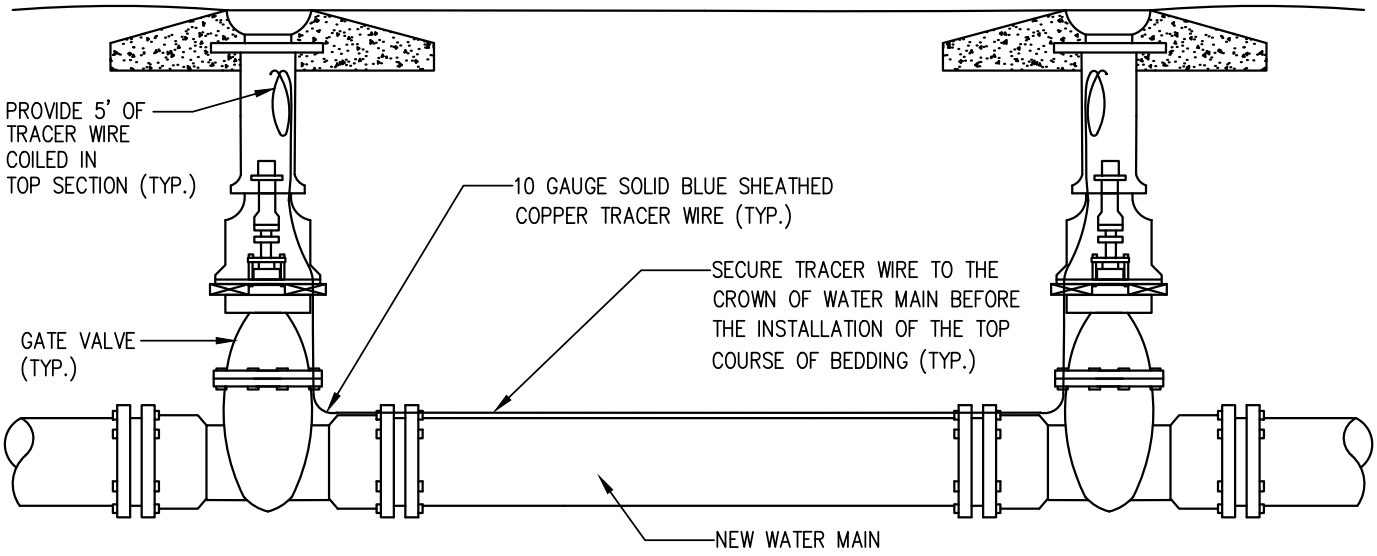
A.C. WATER MAIN CROSSING

Water Construction Standard Plan No. 21

CEDARRIVER
WATER & SEWER DISTRICT



TRACER WIRE INSTALLATION IN EASEMENTS

NOTES:

1. REFER TO STANDARD DETAIL NO. 10 FOR VALVE BOX ASSEMBLY SETTING AND INSTALLATION.

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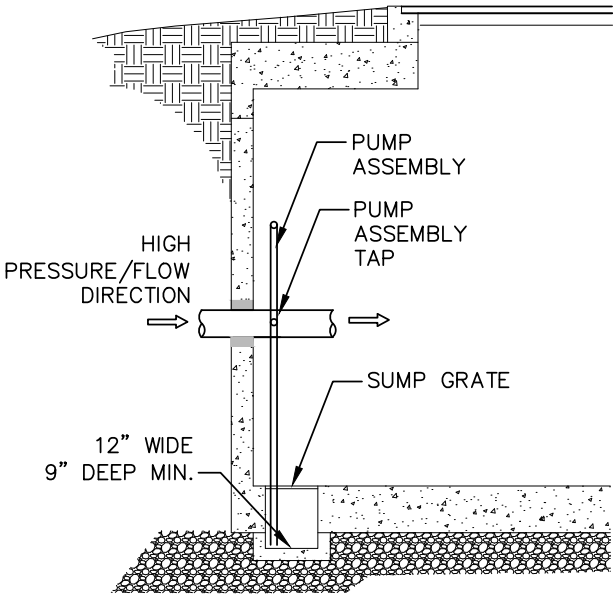
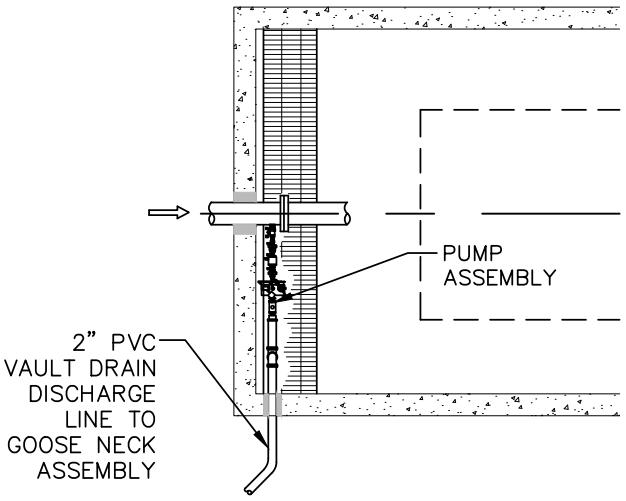
WATER MAIN TRACER WIRE

Water Construction Standard Plan No. 22

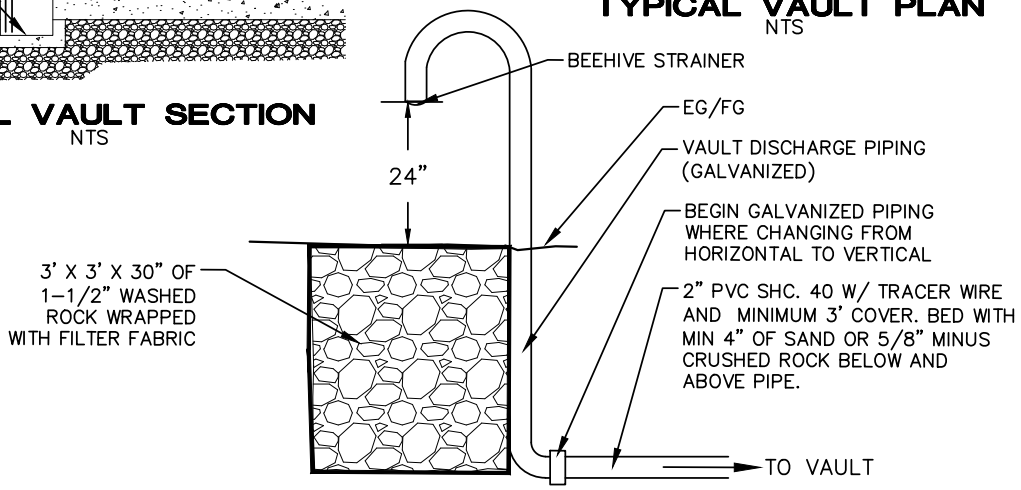
CEDARRIVER
WATER & SEWER DISTRICT



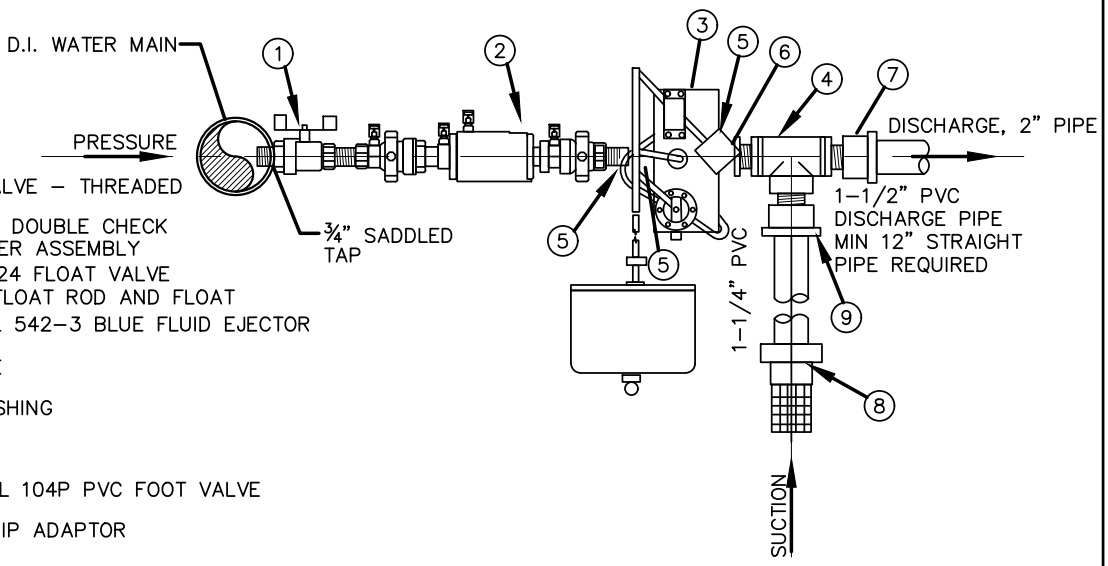
TYPICAL VAULT SECTION
NTS



TYPICAL VAULT PLAN
NTS



GOOSE NECK ASSEMBLY DETAIL
NTS



1	1	3/4" MAS B-3 BALL VALVE – THREADED
2	1	3/4" FEBCC MODEL 850 DOUBLE CHECK BACKFLOW PREVENTER ASSEMBLY
3	1	3/4" CLA VAL MODEL 124 FLOAT VALVE C/W 2' LONG PVC FLOAT ROD AND FLOAT
4	1	1" AQUAMATIC MODEL 542-3 BLUE FLUID EJECTOR
5	3	BRASS CLOSS NIPPLE
6	1	BRASS REDUCING BUSHING
7	1	PVC MPT X 2" GLUE
8	1	1-1/4" FLOMATIC MODEL 104P PVC FOOT VALVE
9	1	1-1/4" PVC GLUED x MIP ADAPTOR

SUMP PUMP ASSEMBLY DETAIL
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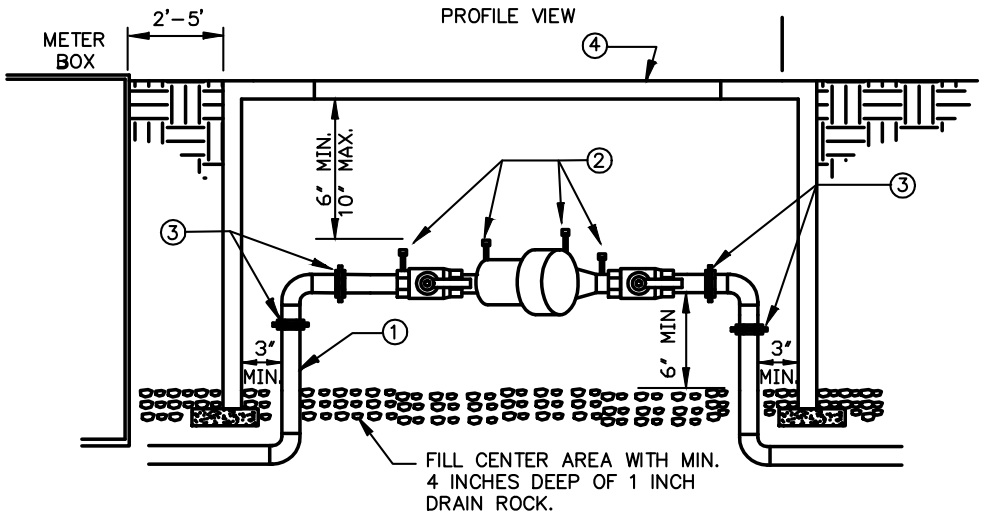
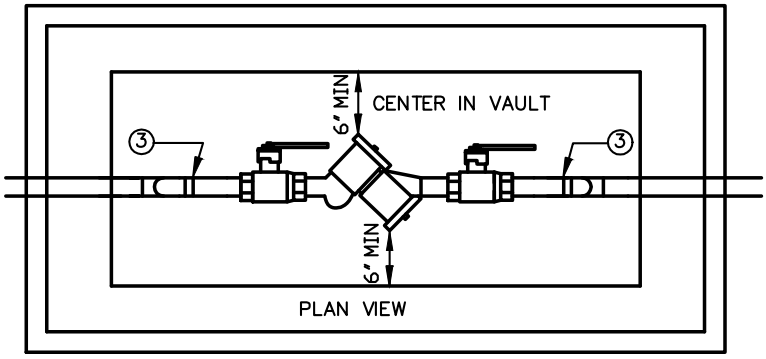
SIPHON PUMP ASSEMBLY DETAIL

Water Construction Standard Plan No. 23

CEDARRIVER
WATER & SEWER DISTRICT





* DCVA-BOX SHALL BE LOCATED IMMEDIATELY DOWNSTREAM OF WATER METER BOX PRIOR TO ANY BRANCH CONNECTIONS, WITH NO MORE THAN 2'-5' BETWEEN BOXES.

* DCVA MUST BE PURCHASED AND INSTALLED AS A UNIT. NO MODIFICATIONS TO ANY PART OF THE ASSEMBLY ARE ALLOWED.

* FREEZE PROTECTION IS THE RESPONSIBILITY OF THE OWNER AND SHALL NOT INTERFERE WITH OPERATION OR TESTING OF THE ASSEMBLY.

NOTES:

1. PIPING FROM SERVICE LINE TO DCVA MUST BE COPPER OR BRASS.
2. TEST COCKS MUST BE POINTED UP AND PLUGGED OR CAPPED.
3. UNIONS MUST BE INSTALL VERTICALLY OR HORIZONTALLY TO ACCOMMODATE REMOVAL.
4. DCVA MUST BE INSTALLED BELOW GROUND WITH LID ADJUSTED TO FINISH GRADE AND IN A BOX LARGE ENOUGH TO ACCOMMODATE BACKFLOW INSTALLATION AS ILLUSTRATED.

DOUBLE CHECK VALVE ASSEMBLY (3/4" - 2" ASSEMBLIES)

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DOUBLE CHECK VALVE ASSEMBLY (3/4" - 2" ASSEMBLIES)

Water Construction Standard Plan No. 24

CEDARRIVER
WATER & SEWER DISTRICT

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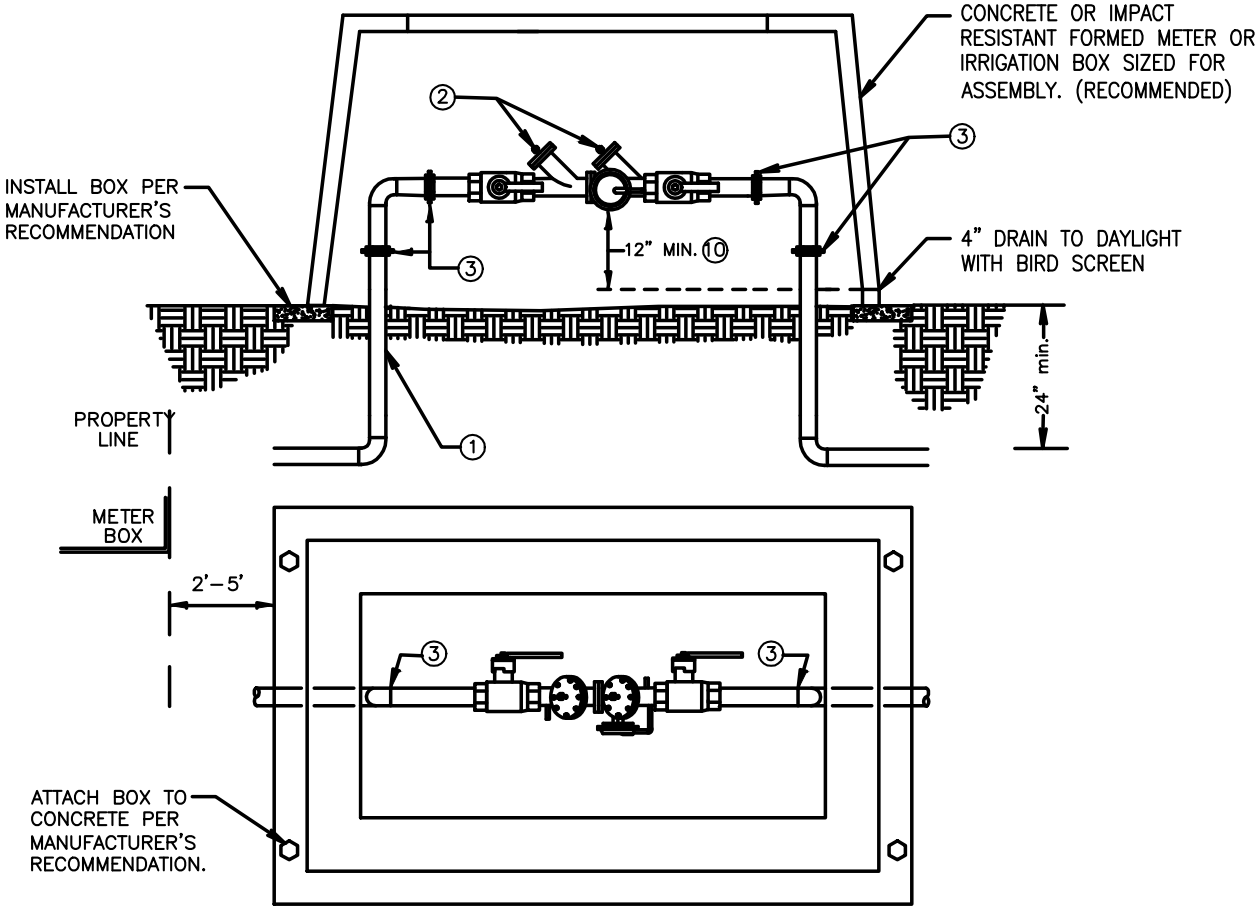

RPBA ABOVE GROUND INSTALLATION

* RPBA-BOX SHALL BE LOCATED IMMEDIATELY DOWNSTREAM OF WATER METER BOX PRIOR TO ANY BRANCH CONNECTIONS, WITH NO MORE THAN 2'-5' BETWEEN BOXES.

* RPBA MUST BE PURCHASED AND INSTALLED AS A UNIT. NO MODIFICATIONS TO ANY PART OF THE ASSEMBLY ARE ALLOWED.

* FREEZE PROTECTION IS THE RESPONSIBILITY OF THE OWNER AND SHALL NOT INTERFERE WITH OPERATION OR TESTING OF THE ASSEMBLY.

NOTES:

1. PIPING FROM SERVICE LINE TO RPBA MUST BE COPPER OR BRASS.
2. TEST COCKS MUST BE PLUGGED OR CAPPED.
3. UNIONS MUST BE INSTALL VERTICALLY OR HORIZONTALLY TO ACCOMMODATE REMOVAL.
4. AFTER INSTALLATION OF BACKFLOW ASSEMBLY, THE CONTRACTOR OR INSTALLER WILL CALL THE DISTRICT FOR AN INSPECTION BY A DISTRICT CROSS-CONNECTION CONTROL SPECIALIST.
5. MINIMUM 12" GAP FROM BOTTOM OF RELIEF PORT TO TOP OF DAYLIGHT DRAIN.

REDUCED PRESSURE BACKFLOW ASSEMBLY (3/4" - 2" ASSEMBLIES)

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REDUCED PRESSURE BACKFLOW ASSEMBLY (3/4" - 2" ASSEMBLIES)

Water Construction Standard Plan No. 25

CEDARRIVER
WATER & SEWER DISTRICT

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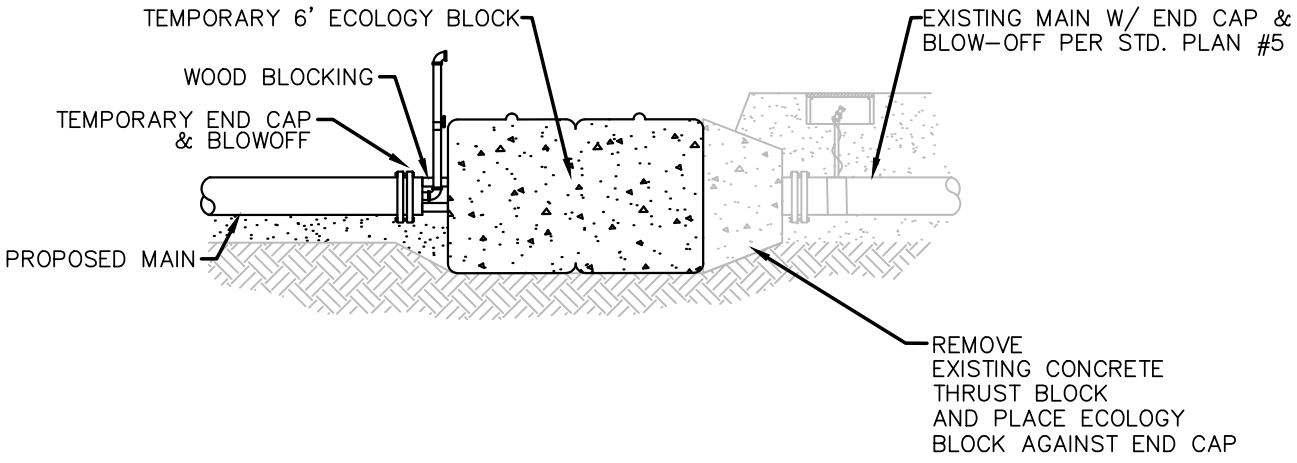
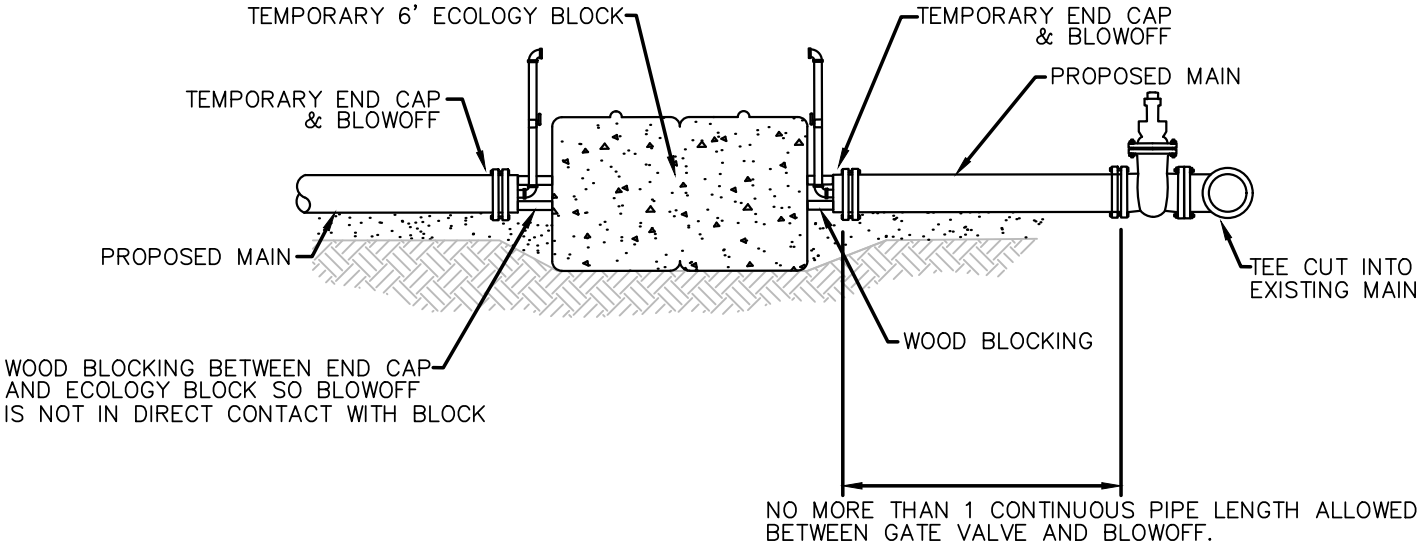


PHYSICAL SEPARATION FOR DEAD END MAIN



PHYSICAL SEPARATION FOR TEE CUT IN

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WATERMAIN PHYSICAL SEPARATION

Water Construction Standard Plan No. 26

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WATER & SEWER DISTRICT