APPENDICES

APPENDIX A
WATER DISTRICT 19
DEVELOPER STANDARDS AND STANDARD DETAILS

WATER SYSTEMS - GENERAL STANDARDS:

1. OBJECTIVE:

This section is intended to present information and provide an outline of the minimum general standards required by King County Water District #19 for Developer constructed water main extensions and improvements which are to be acquired and operated by the District.

2. GENERAL NOTES:

Detailed plans shall be submitted for the District's review which provide the locations, size, and type of the proposed water system and points of connection. These plans shall be separate from Sewer Plans.

Project plans shall have a horizontal scale of not more than 50 feet to the inch. Plans shall show:

- Locations of streets, right-of-ways, existing utilities and water system facilities.
- Ground surface, pipe type and size, and water valves and hydrants stationing.
- All known existing structures, both above and below ground, which might interfere with the proposed construction, particularly sewer lines, gas mains, storm drains, overhead and underground power lines, and telephone lines and television cables.
- All utility easements.
- General Notes (First water plan sheet).
- District Approval Block.

Computations and other data used for design of the water system shall be submitted to the District for approval.

The water system facilities shall be constructed in conformance with the current WSDOT Standard Specifications for Road, Bridge, & Municipal Construction and amendments thereto, revised as to form to make reference to Local Governments and as modified by the District's requirements and standards.

Material and installation specifications shall contain appropriate requirements that have been established by the industry in its technical publications, such as ASTM, AWWA, WEF, and APWA standards. Requirements shall be set forth in the specifications for the pipe and methods of bedding and backfilling so as not to damage the pipe or its joints.

Except as otherwise noted herein, all work shall be accomplished as recommended in applicable American Water Works Association (AWWA) Standards, and according to the recommendations of the manufacturer of the material or equipment concerned.

All piping and plumbing installed providing water for human consumption which is connected to the District's water system shall be lead free.

The location of the water mains, valves, hydrants, and principal fittings including modifications shall be staked by the Developer. No deviation shall be made from the required line or grade. The Developer shall verify and protect all underground and surface utilities encountered during the progress of this work.

Prior to final inspection, all pipelines shall be tested and disinfected.

Before acceptance of the water system by the District, all pipes, assemblies, and other appurtenances shall be cleaned of all debris and foreign material. After all other work is completed and before final acceptance, the entire roadway, including the roadbed, planting, sidewalk areas, shoulders, driveways, alley and side street approaches, slopes, ditches, utility trenches, and construction areas shall be neatly finished to the lines, grades and cross sections for a new roadway consistent with the original section.

3. GENERAL REQUIREMENTS:

1. Work shall be performed only by contractors experienced in installing public water mains.

2. Prior to any work being performed, the Developer shall contact the District's Operations Manager to set forth his proposed work schedule.

3. Developer shall obtain approval of materials to be used from the District prior to ordering of materials.

4. Water mains shall be laid only in dedicated streets or in easements which have been granted to the District. A street is normally not considered dedicated until the plat which created it has been filed with the County Auditor.

5. All water main construction shall have minimum 3'-6" cover from finished grade. The maximum shall be 5'-0" cover unless approved by the District. Mains shall generally be located parallel to and ten feet northerly or easterly of street centerline.

6. Valves shall be installed at intervals not to exceed 1,000 feet. Valves shall be installed at each end of easements.

7. Fire hydrants are required approximately every 600 feet in residential areas. Fire hydrants are required every 300 feet in commercial areas, or as required by the Fire Marshall.

8. Fire hydrants on dead end streets and roads shall be located within approximately 350 feet from the frontage center of the farthest lot. Distances required herein shall be measured linearly along street or road.

9. Pipes connecting hydrants to mains shall be at least 6 inch in diameter and not longer than 50 feet.

10. Dead end lines are not permitted except where the Developer can demonstrate to the District's satisfaction that it would be impractical to

extend the line at a future date. Water mains on platted cul-de-sacs shall extend to the plat line beyond the cul-de-sac to neighboring property for a convenient future connection, and a two (2) inch blow off assembly shall be provided.

11. All materials shall be new and undamaged.

12. Provide bends in field to suit construction and in accordance with pipe manufacturer's recommendations so as not to exceed allowable deflection at pipe joints.

13. Provide thrust blocking or restrained joints at all fittings and bends in accordance with the District standards and conditions.

14. Provide anchor blocking at all up-thrust vertical bends in accordance with District standards.

15. All valve markers shall be installed and marked with the distance to valve being referenced.

16. Water services shall be Type "K" continuous copper pipe from water main to meter (no joints).

17. Minimum size service lines between the water main and the water meter shall be 3/4 inch unless otherwise specified. All service lines shall be the minimum size by the County Plumbing Code in accordance with fixture units, unless otherwise specified.

18. Meter services and meter boxes shall be set to final grade and all adjustments shall be made prior to final pressure testing of the system, centerline of service inlets shall be located to match bottom elevation of meter box in such a manner that meter inlet and outlet will be the same elevation as bottom of meter box. District shall furnish neoprene gaskets for outlet connections to meter at the District offices for each service installed. Service inlet shall be centered at inlet end of box and faced toward outlet end of box parallel with long sides.

19. All water services shall end within road right-of-way or easements.

20. All 3/4" and 1" meters shall be installed by the District, and the property owner shall pay the current meter installation charge. The Developer shall furnish all meters larger than 1" in size.

21. All new buildings and residences shall include in their water service a suitable pressure reducing valve to protect the plumbing from excessive pressures, unless waived on the application form of the District.

22. All new construction shall comply with the current "Accepted procedure and practice in Cross Connection Control Manual" as published by the Pacific Northwest Section of the American Water Works Committee". A copy of such is available for review at the District office.

23. Cut in connections and wet taps shall not be made on Fridays, holidays or weekends (or as otherwise approved by the District.)

24. All tapping sleeves and tapping valves shall be pressure tested prior to making connection to existing mains.

25. Developer shall notify the District and obtain approval prior to any water shut-off or turn-on, affecting the water system, a minimum of 48 hours in advance.

26. Road restoration shall be per ~~Snohomish~~ King County, City and/or State design and construction standards. Developer shall become familiar with all County, City and State conditions of required permits, and shall adhere to all conditions and requirements.

4. MATERIALS:

WATER MAINS & FITTINGS:

Water mains to be installed shall be ductile iron pipe for all sizes unless specifically noted otherwise.

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Ductile iron pipe for water mains shall conform to AWWA C151 Standards, and current amendments thereto, except the ductile iron pipe shall be thickness Class 53 for 6" pipe, Class 52 for 8", 10" and 12" pipe and Class 50 for larger than 12" pipe. Grade of iron shall be a minimum of 60-42-10. The pipe shall be cement lined to a minimum thickness of 1/16" meeting NSF standards for potable water and the exterior shall be coated with an asphaltic coating.

Each length shall be plainly marked with the manufacturer's identification, year case, thickness, class of pipe and weight. The pipe shall be furnished with mechanical joint or push-on type, employing a single gasket, such as "Tyton", except where otherwise calling for flanged ends. Bolts furnished for mechanical joint pipe and fittings shall be high strength ductile iron, with a minimum tensile strength of 50,000 psi.

Restrained joint pipe shall be push-on joint pipe with "Field Lok" gaskets as furnished by U.S. Pipe or equal for 24" diameter and smaller pipe and "TR FLEX" as furnished by U.S. Pipe or equal for larger diameter pipes. The restrained joint pipe shall meet all other requirements of the non-restrained pipe.

All pipe shall be jointed by the manufacturer's standard coupling, be all of one manufacturer, and be carefully installed in complete compliance with the manufacturer's recommendations.

Joints shall be "made up" in accordance with the manufacturer's recommendations, Standard joint materials, including rubber ring gaskets, shall be furnished with the pipe. Material shall be suitable for the specified pipe size and pressures.

Al fittings shall be short-bodied, ductile iron complying with applicable AWWA C110 or C153 Standards for 350 psi pressure rating for mechanical joint fittings

and 250 psi pressure rating for flanged fittings. All fittings shall be cement lined and either mechanical joint or flanged.

Fittings in areas requiring restrained joints shall be mechanical joint fittings with a mechanical joint restraint device. The mechanical joint restraint device shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1 and shall be EBAA Iron, Inc., MEGALUG, or approved equal.

All couplings shall be ductile iron mechanical joint sleeves.

The pipe and fittings shall be inspected for defects before installation. All lumps, blisters and excess coal tar coating shall be removed from the bell and spigot end of each pipe, and the outside of the spigot and the inside of the bell shall be wire-brushed and wiped clean and dry, and free from oil and grease before the pipe is laid.

Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the line. After placing a length of pipe in the trench, the spigot end shall be centered in the bell and pipe forced home and brought to correct line and grade. The pipe shall be secured in place with select backfill tamped under it. Precaution shall be taken to prevent dirt from entering the joint space. At times when pipe laying is not in progress, the open ends of pipe shall be closed by a water-tight plug. If water is in the trench when work resumes, the seal shall remain in place until the trench is pumped completely dry. No pipe shall be laid in water or when trench conditions are unsuitable.

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

Pipe shall be laid with bell ends facing in the direction of the laying, unless approved otherwise by the District. Wherever it is necessary to deflect pipe from a straight line, the amount of deflection allowed shall not exceed pipe manufacturer's recommendations.

For connection of mechanical joints, the socket, plain end of each pipe and gasket shall be cleaned of dirt before jointing, and shall be jointed according to

manufacturer's directions. Bolts shall be tightened alternately at top, bottom and sides, so pressure on gasket is even.

For connection of "Tyton" joints, the jointing shall be done according to manufacturer's recommendations, with special care used in cleaning gasket seat to prevent any dirt or sand from getting between the gasket and pipe. Lubricant to be used on the gasket shall be non-toxic and free from contamination. When a pipe length is cut, the outer edge of the cut shall be beveled with a file to prevent injury to the gasket during jointing.

Valves, fittings, plugs and caps shall be set and jointed to pipe in the manner as required. All dead ends on new mains shall be closed with dead end M.J. caps.

Fittings shall be "blocked" with poured-in-place concrete, with a firm minimum bearing against an undisturbed earth wall. Timber blocking will not be permitted. Thrust blocks shall be poured as soon as possible after setting the fittings in place to allow the concrete to "set" before applying the pressure test. The concrete thrust blocks shall be in place before beginning the pressure test. Anchor blocks shall be allowed to set sufficiently to develop the necessary bond strength between the reinforcing rods and the concrete anchor before beginning the pressure test. A visqueen barrier shall be provided to protect glands, bolts and other miscellaneous materials required for this type of connection from the connector.

Fittings that cannot be blocked against an undisturbed earth wall shall be restrained with restrained joint pipe and fittings.

All of the new piping, valves and blocking shall have been installed, disinfected and tested up to the point of cutting into existing lines before the crossover is made. The crossover to the existing system shall be in full readiness, including the cut and sized specials. Forty-eight (48) hour notice shall be given the District in advance of the planned "cut-ins". All sleeves shall be ductile iron.

All backfill in roadway sections shall be placed and compacted in accordance with King County, City and/or State requirements and copies of the compaction results shall be provided to the District.

All backfill in easements shall be placed and compacted to 90% of modified proctor dry maximum density per ASTM D1557.

VALVES:

All valves 14" and larger shall be butterfly valves. All valves 12" and smaller shall be resilient seat gate valves.

Resilient-Seated Gate Valves

The gate valves shall be ductile iron body valves, iron disk completely encapsulated with polyurethane rubber and bronze, non-rising stem with "O" ring seals conforming to AWWA C509 Standards. The valves shall open counter-clockwise and be furnished with 2-inch square operating nuts except valves in vaults shall be furnished with handwheels. All surfaces, interior and exterior shall be fusion bonded epoxy coated, acceptable for potable water.

For applications with working pressure above 175 psi, a valve rated as 250 psi or higher shall be used.

Valves shall be Clow, M&H, U.S. Pipe, Mueller American Flow Control, or approved equal.

Butterfly Valves

Butterfly valves shall be ductile iron body of the tight closing rubber seat type with rubber seat either bonded to the body or mechanically retained in the body with no fasteners or retaining hardware in the flowstream. The valves shall meet the full requirements of AWWA C504, Class 150B except the valves shall be able to withstand 200 psi differential pressure without leakage. The valves may have rubber seats mechanically affixed to the valve vane. Where threaded fasteners are used, the fasteners shall be retained with a locking wire or equivalent provision to prevent loosening. Rubber seats attached to the valve vane shall be equipped with

stainless steel seat ring integral with the body, and the body internal surfaces shall be epoxy coated to prevent tuberculations buildup which might damage the disc-mounted rubber seat.

No metal-to-metal sealing surfaces shall be permitted. The valves shall be bubble-tight at rated pressures with flow in either direction, and shall be satisfactory for applications involving valve operations after long periods of inactivity. Valve discs shall rotate ninety (90) degrees from the full open position to the tight shut position.

Valves shall be Henry Pratt Company *"Groundhog"*, Dresser *"450"* or Mueller *"Lineseal I"*.

Tapping Sleeves & Tapping Valves

The tapping sleeves shall be rated for a working pressure of 200 psi minimum and furnished complete with joint accessories. Tapping sleeves shall be constructed in two sections for ease of installation and shall be assembled around the main without interrupting service.

Mechanical joint style sleeves shall be ductile iron or fabricated steel style sleeves. Ductile iron mechanical joint style sleeves are required for all size-on-size connections. Mechanical joint sleeves shall be cast by Clow, Dresser, Mueller, Tyler, U.S. Pipe or approved equal.

Fabricated steel style sleeves shall be fusion bonded epoxy-coated, acceptable for potable water. Fabricated steel style sleeves will not be allowed for size-on-size connections.

Tapping valves shall be provided with a standard mechanical joint outlet for use with ductile iron pipe and shall have oversized seat rings to permit entry of the tapping machine cutters. In all other respects, the tapping valves shall conform to the resilient seat gate valves herein specified with regards to operation and materials.

The installation of the tapping sleeves and valves shall be performed by Spear Tap, U.S. Filter, or Western Utility Supply Co.

All Valves

The valves shall be set with stems vertical. The axis of the valve box shall be common with the axis projected off the valve stem. The tops of the adjustable valve boxes shall be set to the existing or established grade, whichever is applicable.

All valves with operating nuts located more than 42" below finished grade shall be equipped with extension stems to bring the operating nut to within 18" of the finished grade.

At the top of the extension stem, there shall be a two-inch (2") standard operating nut, complete with a centering flange that closely fits the five-inch (5") pipe encasement of the extension stem. The valve box shall be set in a telescoping fashion around the five-inch (5") pipe cut to the correct length to allow future adjustment up or down.

Each valve shall be provided with an adjustable two-piece cast iron valve box of five inches (5") minimum inside diameter. Valve boxes shall have a top section with an eighteen-inch (18") minimum length. The valve boxes and covers shall be Rich No. 940 or Sather Manufacturing.

Valve Markers

Provide a concrete valve marker post for each valve outside of asphalt.

Markers shall be placed at the edge of the right-of-way opposite the valve and set so as to leave 24" of the post exposed above grade. The marker posts shall be painted with two (2) coats of Preservative Brand No. 43-616 yellow enamel paint. The size of the valve and the distance in feet and inches to the valve shall be clearly stenciled on the side facing the valve in black numerals two inches (2") in height.

FIRE HYDRANTS:

All fire hydrants shall be approved by the National Board of Fire Underwriters

and conform to AWWA C502 Standards, break-away type, in which the valve will remain closed if the barrel is broken. The hydrant barrel shall have a diameter of not less than seven inches (7"), and the valve diameter shall be not less than five-and-one-quarter inches (5-1/4"). Each hydrant shall be equipped with two (2) two-and-one-half-inch (2-1/2") hose ports (National Standard Thread), and one (1) four-and-one-half-inch (4-1/2") pumper connection (National Standard Thread). A permanent anodized short profile style Storz hydrant adapter and anodized Storz blind flange shall be installed on the pumps port. The size of the adapter shall be four (4) inch in Fire District No. 7 and five (5) inch in Fire District No. 11. Each hydrant shall be equipped with a suitable positive acting drain valve and one-and-one-quarter-inch (1-1/4") pentagonal operating nut (counter-clockwise opening).

Fire hydrants shall be Mueller Centurion, Clow, or "M & H" Style 929.

The holding spools between the gate valve and fire hydrant shall be made from six-inch (6") Class 53 ductile iron pipe. The hydrant and gate valve shall be anchored in place using holding spools and mechanical joint restraint device. Holding spools with length in excess of seventeen feet (17') shall be supplied with an M. J. sleeve and mechanical joint restraint device.

The fire hydrants shall be painted with two (2) coats of Preservative Brand No. 43-616 yellow enamel paint. Distance to the hydrant valve shall be clearly stenciled in black numerals two inches (2") in height on the fire hydrant below the pumper port.

Between the time that the fire hydrant is installed and the completed facility is placed in operation, the fire hydrant shall at all times be wrapped in burlap, or covered in some other suitable manner to clearly indicate that the fire hydrant is not in service.

BLOW-OFFS & AIR RELIEF ASSEMBLIES:

A minimum size of two (2) inch blowoff assemblies shall be installed at the terminus of all dead end water mains. Blowoffs shall be sufficient size to obtain 2.5 feet per second velocity in the main.

Two (2) inch air and vacuum release valves shall be installed at principal high points in the system.

The installation of these items shall include connection piping, gate valve, valve box, and all accessories. Valve markers shall be optional with District.

SERVICE CONNECTIONS

Individual services to each property shall be installed and connected to the new water mains.

Upon completion of the installation of the water main (before testing and disinfection) services shall be installed by connecting to the water main and extending the service line to the property line as shown on the Standard Details or approved equal. Service lines for residential property shall be Type "K" 3/4"-inch (minimum size) copper service lines meeting the ASTM Specifications B-88-47. Larger service lines shall be of the type and style as designated in the Standard Details and shown on the Plans.

Commercial and multi-family projects that require larger than one (1) inch meters shall provide one and one-half (1-1/2)-inch or two (2) inch meter service installations per the District standards and shown on the Standard Details. Three (3) inch and larger meters fall into a different design criteria and will be specifically designated as needed.

Corporation stops and the single meter shut-off valves shall be "Muellér" and/or "Ford" of the type and style noted on the Standard Details or approved equal. Included as a part of the service connection shall be the furnishing and installation of the meter box complete with lid, set flush with the proposed finished grade of the lot in the designated location near the property line, all as shown on the Standard Details. The angle type of shut-off valve shall be set inside the meter

box in a proper position for installation of a future meter by the District. Upon completion of each service line as indicated herein, the Developer shall flush the service line to remove the debris that may interfere with the future meter installation, and further verify that the service line has full pressure and flow to the meter box. Meter boxes shall be marked with a painted two-by-four (2x4) stake as shown on the Standard Details.

Service lines between the main and the property line shall be placed at a trench depth sufficient to maintain a three (3) foot cover over the top of the service line for its full length, taking into consideration the final finished grade of the proposed street and the final finished grade of any storm ditches.

LARGE METER AND TESTS

If extensions require water meters three (3) inches or larger, then such entire meter installations, including valves, piping, vaults, drain lines and meters shall be installed by the Developer conforming to District standards. The Developer shall pay the meter test fee established by the District and shall sign a District meter application form and pay all fees and charges due at that time.

5. WATER PIPE TESTING & DISINFECTING:

All pipelines shall be tested and disinfected prior to acceptance of work. A water hydrant meter shall be required and procured from the District for all water utilized for flushing pipelines. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished, installed and operated by the Developer. Feed for the pump shall be from a clean container within the actual amount of "makeup" water, so that it can be measured periodically during the test period.

The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place and time allowed for the concrete to cure before testing. Where permanent blocking is not required, the Developer shall furnish and install temporary blocking.

As soon as pipe is secured against movement under pressure, it may be filled with water. Satisfactory performance of air valves shall be checked while the line is

filling. A temporary air vent will be required if the fill point is higher than the line being filled.

The Developer shall preflush all water mains after water has remained in the main for 24 hours and before pressure testing the main.

After the pipe is filled and all air expelled, it shall be pumped to a test pressure of 250 psi, and this pressure shall be maintained for a period of not less than thirty (30) minutes to insure the integrity of the thrust and anchor blocks. All tests shall be made with the hydrant auxiliary gate valves open and pressure against the hydrant valve. Hydrostatic tests shall be performed on every complete section of water main between two valves, and each valve shall withstand the same test pressure as the pipe with no pressure active in the section of pipe beyond the closed valve. The Developer shall provide an oil-filled pressure gauge with a range of 0-300 psi.

In addition to the hydrostatic pressure test, a leakage test shall be conducted on the pipeline. The leakage test shall be conducted at 200 psi for a period of not less than one (1) hour. The allowable leakage rate per thousand feet of each size pipeline is as follows:

	Allowable Leakage
Pipe Size	Gal per Hour per 1,000 Ft. @ 200 psi
6"	0.64
8"	0.85
10"	1.06
12"	1.28
16"	1.70

Defective materials or workmanship, discovered as a result of the tests, shall be replaced by the Developer at the his expense. Whenever it is necessary to replace defective material or correct the workmanship, the tests shall be re-run at the Developer's expense until a satisfactory test is obtained.

As sections of pipe are constructed and before pipelines are placed in service, they

shall be sterilized in conformance with the requirements of the State of Washington Department of Health Services.

The Developer shall be responsible for flushing all water mains prior to water samples being acquired under direction and supervision of the District. The water mains shall be flushed at a rate to provide a minimum 2.5 feet per second velocity in the main.

In all disinfection processes, the Developer shall take particular care in flushing and wasting the chlorinated water from the mains to assure that the flushed and chlorinated water does no physical or environmental damage to property, streams, storm sewers or any waterways. The Developer shall chemically or otherwise treat the chlorinated water prior to discharge to prevent damage to the affected environment, particularly aquatic and fish life of receiving streams.

Chlorine shall be applied in one of the following manners, listed in order of preference, to secure a concentration in the pipe of at least 50 ppm.

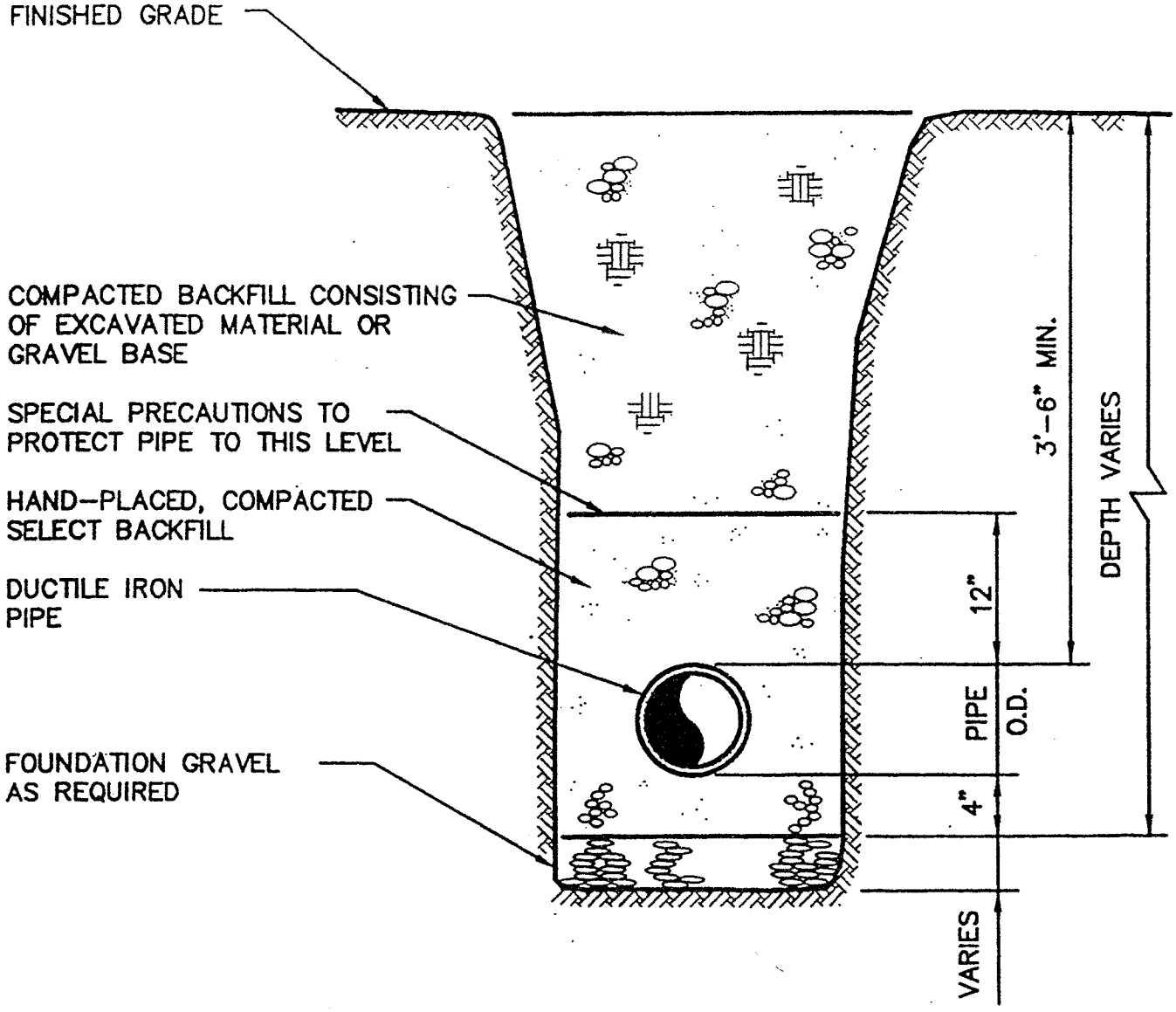
1) Injection of chlorine-water mixture from chlorinating apparatus through corporation cock at beginning of section after pipe has been filled, and with water exhausting at end of section at a rate controlled to produce the desired chlorine concentration;

2) Injection similarly of a hypochlorite solution;

3) Placement of dry chlorinated lime throughout pipeline, as constructed, in proper quantities to produce the desired dosage. Filling of pipeline with this method should be at a very slow rate. Pipeline should be filled within two (2) days of placing sterilizing agent.

After the desired chlorine concentration has been obtained throughout the section of line, the water in the line shall be left standing for a period of twenty-four (24) hours. Following this, the line shall be thoroughly flushed and a water sample collected. The line shall not be placed in service until a satisfactory bacteriological report has been received.

District forces only will be allowed to operate existing and new tie-in valves. The Developer's forces are expressly forbidden to operate any valve on any section of line which has been accepted by the District.

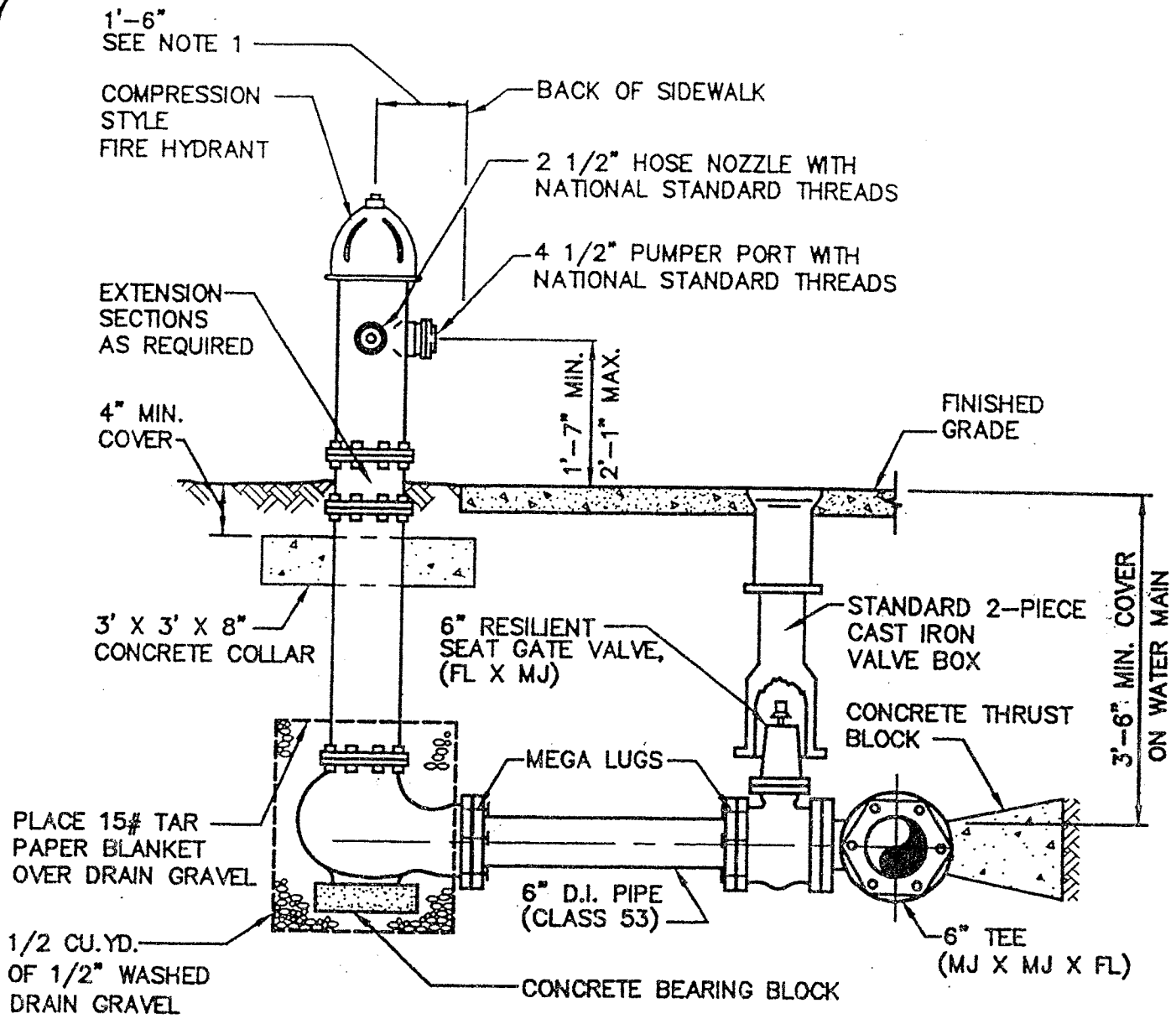


NOTE:

BACKFILL MATERIAL AND COMPACTION SHALL BE IN CONFORMANCE WITH KCWD19 STANDARDS AND\OR THE KING COUNTY AND WA. STATE PERMIT REQUIREMENTS

WATER MAIN TRENCH SECTION

King County Water District #19
STANDARD DETAILS



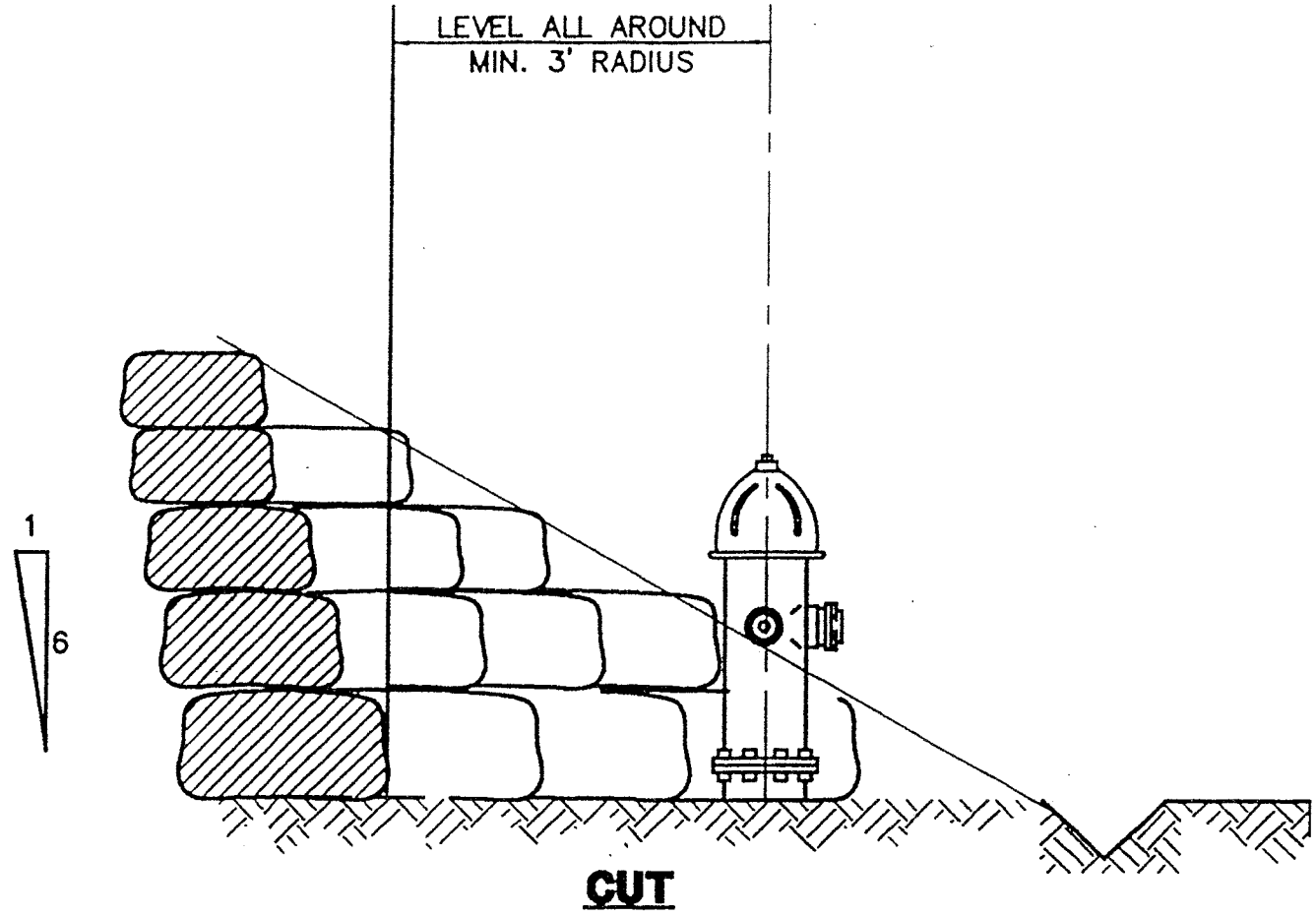
NOTES:

1. OR 3' FROM BACK OF CURB
2. PROVIDE 8' OF 12" MINIMUM OR EQUAL IN SIZE TO ANY ADJACENT DITCH PIPE TO COUNTY, STATE OR CITY STANDARDS IF APPLICABLE.
3. PROVIDE MIN. 3'-0" CLEARANCE AND LEVEL AREA AROUND HYDRANT
4. PAINT FIRE HYDRANT WITH TWO COATS PRESERVATIVE BRAND No.43-616 YELLOW
5. STENCIL FOOTAGE TO VALVE ON FIRE HYDRANT FOOTAGE UNDER PORT
6. REMOVE ALL CHAINS FOR FIRE HYDRANT CAPS

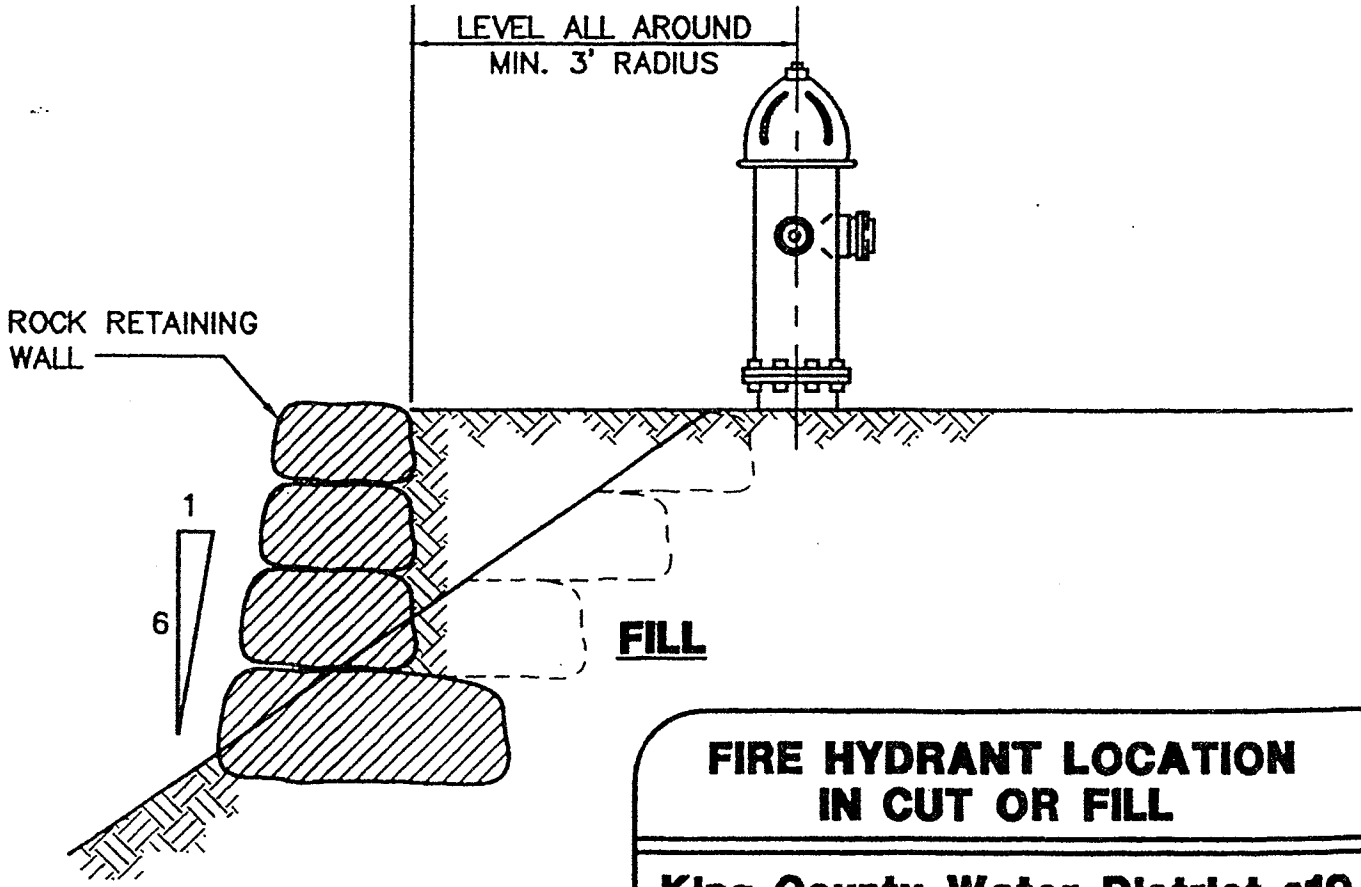
FIRE HYDRANT ASSEMBLY

King County Water District #19
STANDARD DETAILS

8/98



CUT



FILL

FIRE HYDRANT LOCATION IN CUT OR FILL

King County Water District #19
STANDARD DETAILS

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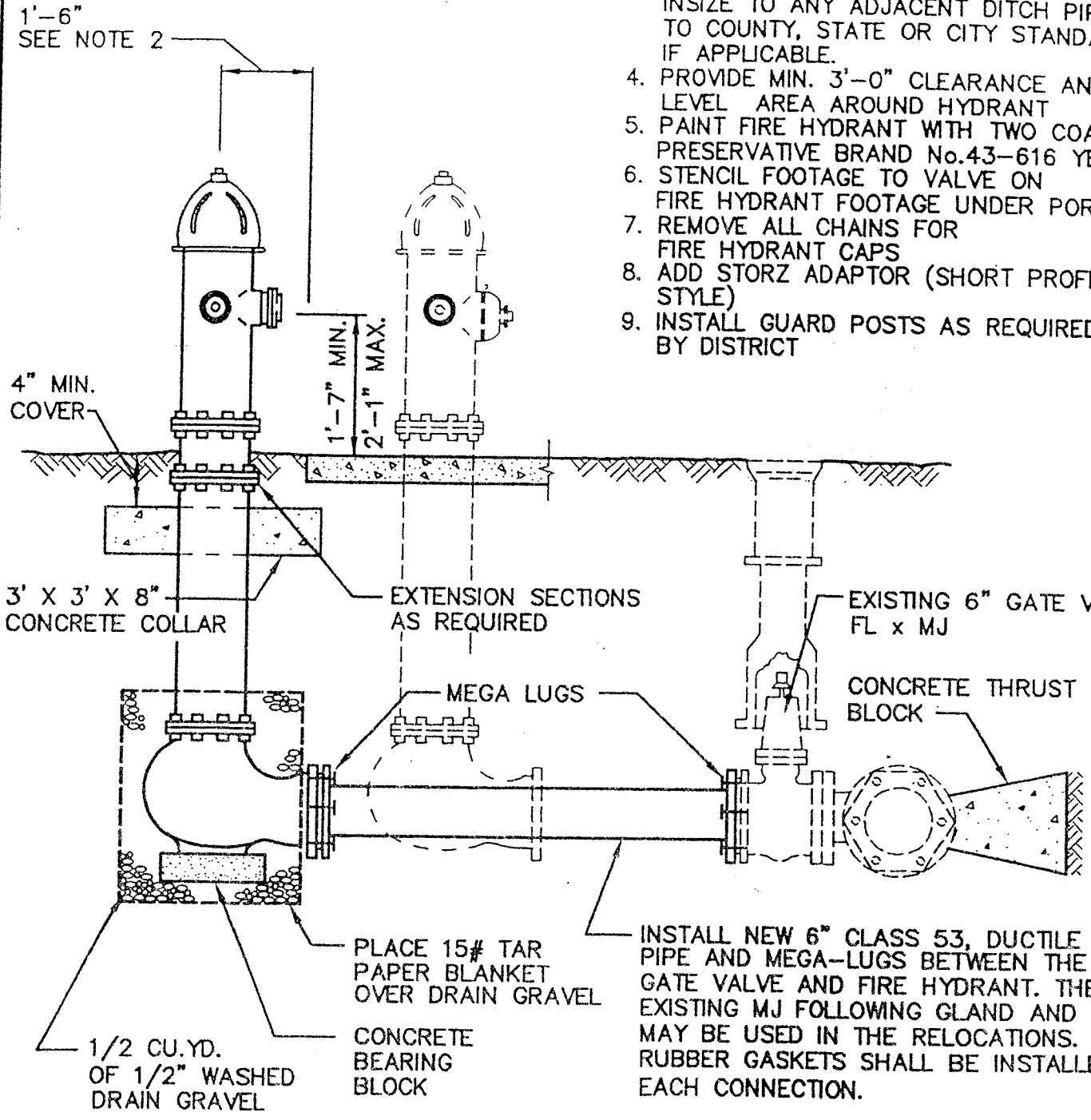
W-3

NOTES:

1. FIRE HYDRANT MUST MEET S.L.W.D. REQUIREMENTS OR REPLACED WITH NEW FIRE HYDRANTS.
2. OR 3' FROM BACK OF CURB
3. PROVIDE 8' OF 12" MINIMUM OR EQUAL INSIZE TO ANY ADJACENT DITCH PIPE TO COUNTY, STATE OR CITY STANDARDS IF APPLICABLE.
4. PROVIDE MIN. 3'–0" CLEARANCE AND LEVEL AREA AROUND HYDRANT
5. PAINT FIRE HYDRANT WITH TWO COATS PRESERVATIVE BRAND No.43–616 YELLOW
6. STENCIL FOOTAGE TO VALVE ON FIRE HYDRANT FOOTAGE UNDER PORT
7. REMOVE ALL CHAINS FOR FIRE HYDRANT CAPS
8. ADD STORZ ADAPTOR (SHORT PROFILE STYLE)
9. INSTALL GUARD POSTS AS REQUIRED BY DISTRICT



RELOCATE FIRE HYDRANT ASSEMBLY

King County Water District #19
STANDARD DETAILS

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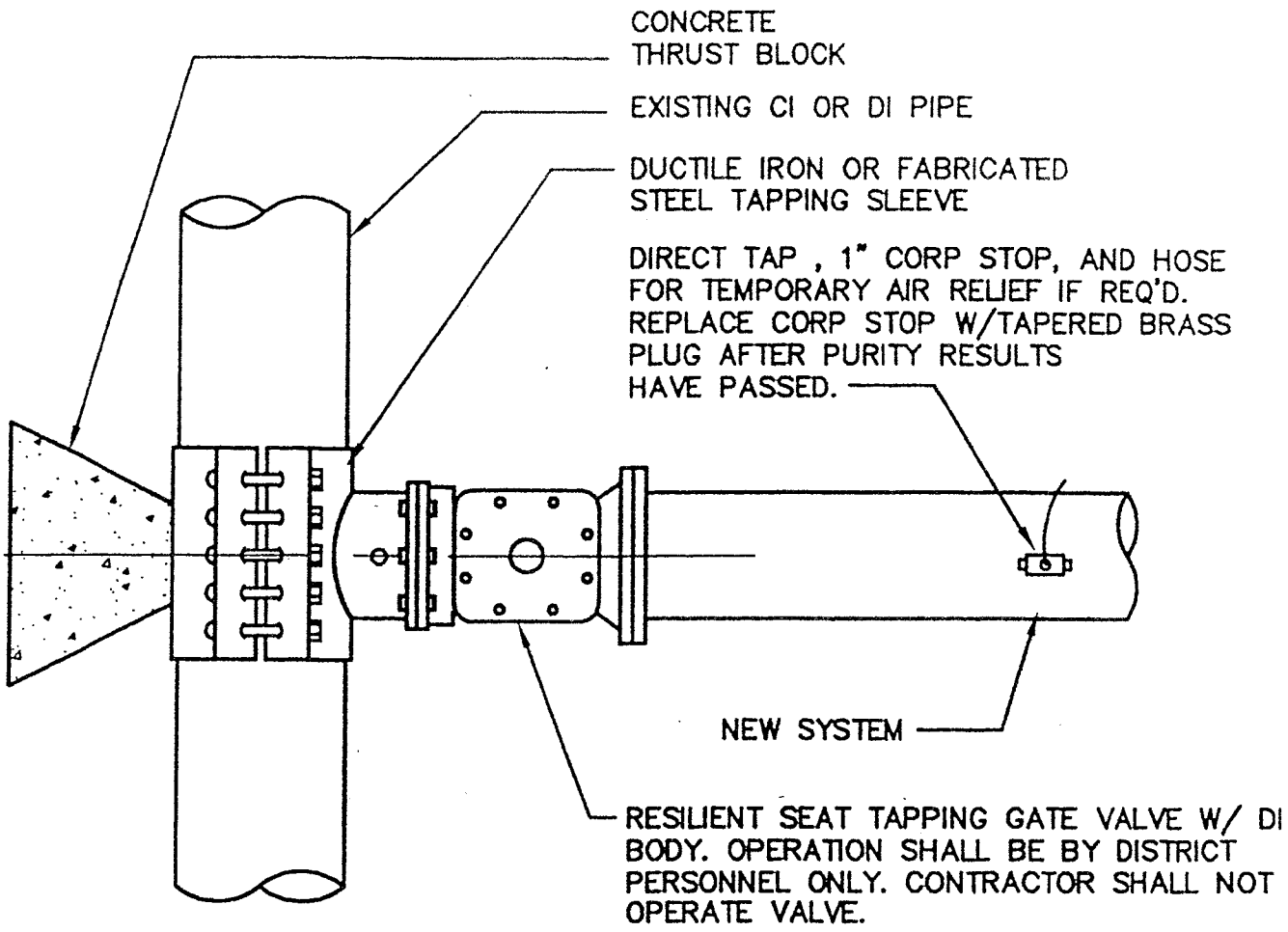
W-4



NOTES:

① SIZE–ON–SIZE TAPPING TEES SHALL BE DUCTILE IRON MECHANICAL SLEEVE.

② STEEL TAPPING TEES SHALL BE AT LEAST 2" SMALLER IN DIAMETER THAN THE EXISTING WATER MAIN AND SHALL BE EPOXY COATED.

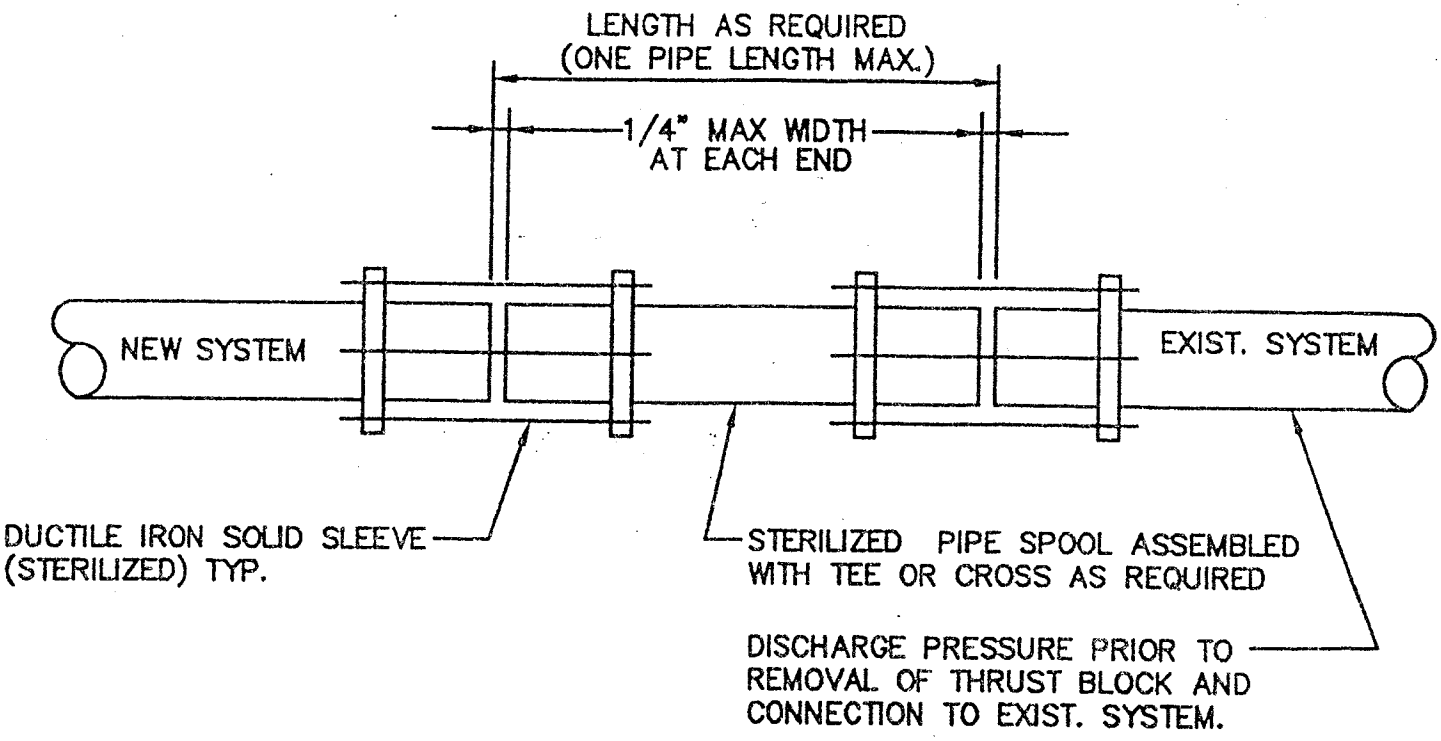
③ TAPPING TEES SHALL BE PRESSURE TESTED TO 200 PSI

④ PLACE 2" PVC PIPE IN VALVE BOX TO INDICATE USE BY SLWD PERSONNEL ONLY

⑤ CONNECTIONS NOT ALLOWED ON FRIDAYS, HOLIDAYS, OR WEEKENDS.

WET TAP CONNECTION

King County Water District #19
STANDARD DETAILS



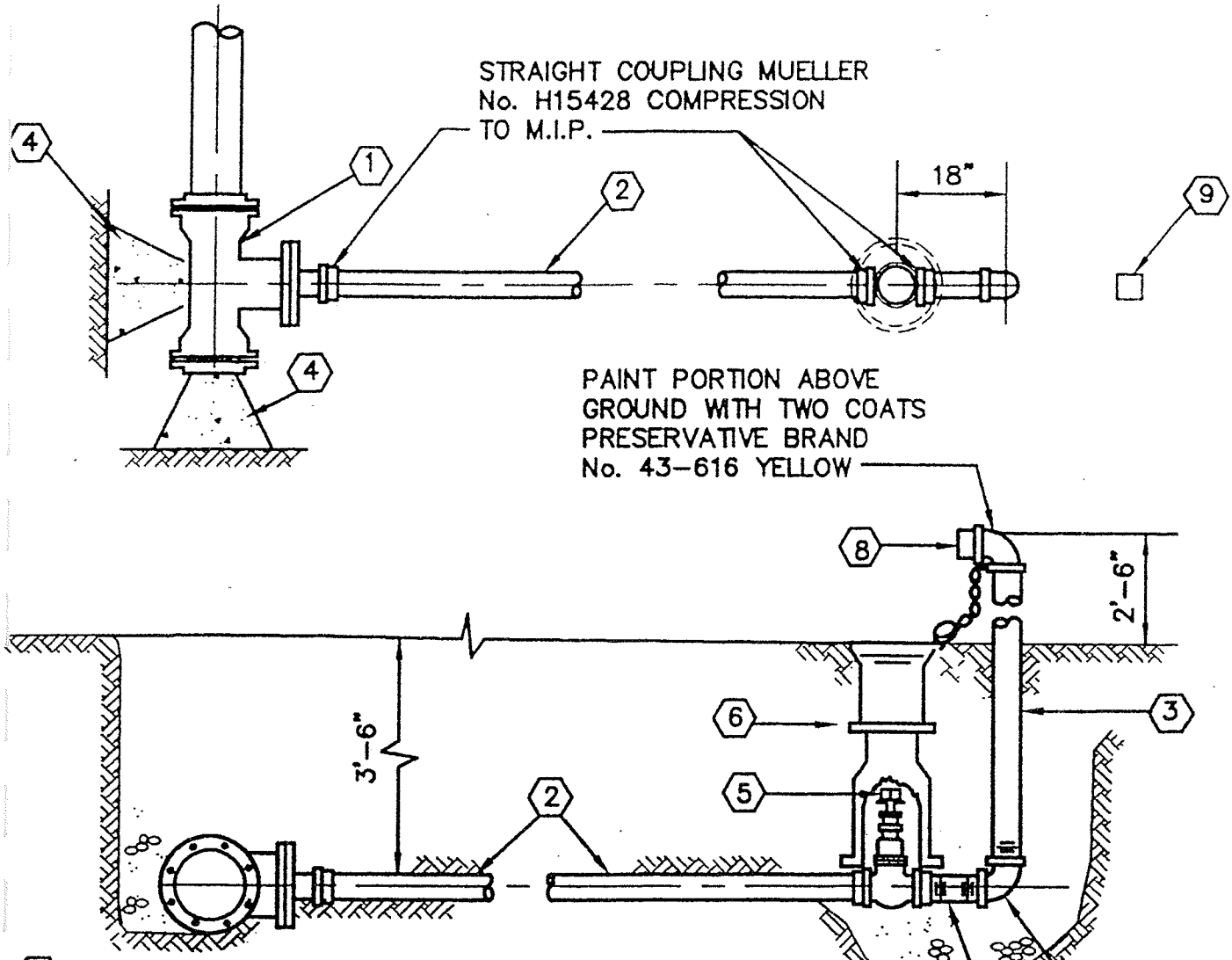
NOTES:

① NO DEFLECTION SHALL BE ALLOWED AT EITHER COUPLING

② IN-LINE VALVE(S) IN EXISTING SYSTEM MAY BE REQUIRED AT THE SOLE DISCRETION OF THE DISTRECT AT ALL NEW INTERTIE LOCATIONS. VALVE(S) ARE NOT SHOWN ABOVE FOR CLARITY

CUT IN CONNECTION

King County Water District #19
STANDARD DETAILS



1. MJ X MJ X 6" FL D.I. TEE WITH REDUCING FLANGE TAPPED 2" AND MJ PLUG.
2. 2" TYPE "K" COPPER PIPE.
3. 2" GALVANIZED IRON PIPE.
4. CONCRETE THRUST BLOCK.
5. 2" AWWA RESILIENT SEAT GATE VALVE, THD X THD, WITH OPERATING NUT.
6. CAST IRON VALVE BOX
7. 1/4 CUBIC YARD WASHED GRAVEL POCKET.
8. 2" x 2-1/2" HOSE THREADS BRASS INSERT WITH CAP AND CHAIN
9. VALVE MARKER POST

OTES

1. TURN NOZZEL TOWARDS ROADSIDE DITCH
2. INSTALL DIELECTRIC COUPLINGS AT DISSIMILAR METALS.
3. TEMPORARY BLOWOFFS INSTALLED FOR FLUSHING WATERMAIN SHALL BE SIZED TO PROVIDE 2.5fps VELOCITY IN MAIN LINE.

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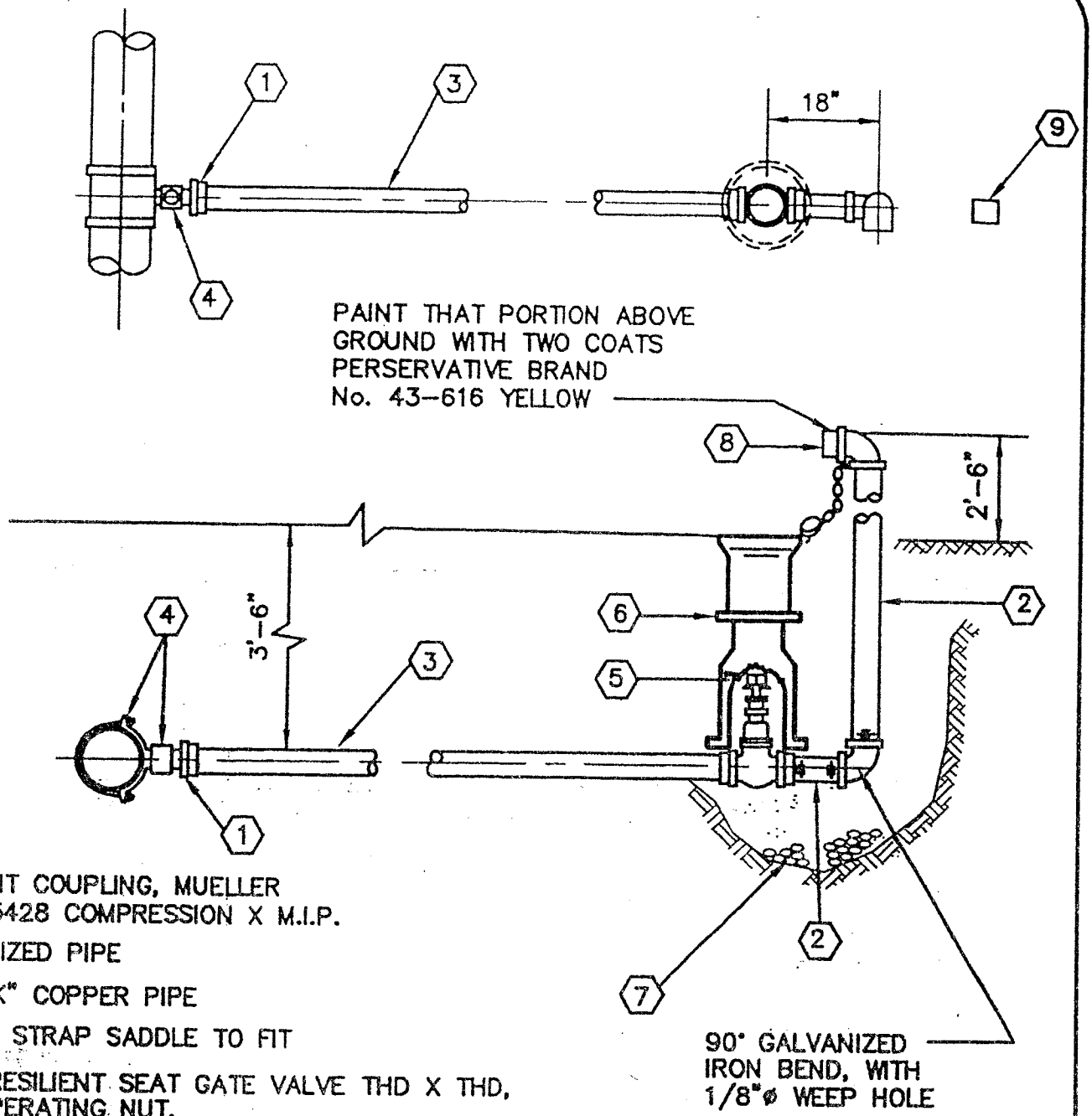
PERMANENT END-LINE BLOW OFF ASSEMBLY

King County Water District #19

STANDARD DETAILS



1. STRAIGHT COUPLING, MUELLER No. H15428 COMPRESSION X M.I.P.
2. GALVANIZED PIPE
3. TYPE "K" COPPER PIPE
4. DOUBLE STRAP SADDLE TO FIT
5. AWWA RESILIENT SEAT GATE VALVE THD X THD, WITH OPERATING NUT.
6. CAST IRON VALVE BOX
7. 1/4 CUBIC YARD WASHED GRAVEL POCKET.
8. 2–1/2" HOSE THREADS BRASS INSERT WITH CAP AND CHAIN
9. VALVE MARKER POST

NOTES:

1. TURN NOZZEL TOWARDS ROADSIDE DITCH
2. INSTALL DIELECTRIC COUPLINGS AT DISSIMILAR METALS.
3. BLOWOFFS SHALL BE SIZED TO PROVIDE 2.5fps VELOCITY IN MAIN LINE (2" MINIMUM).

IN-LINE BLOW OFF ASSEMBLY

King County Water District #19
STANDARD DETAILS

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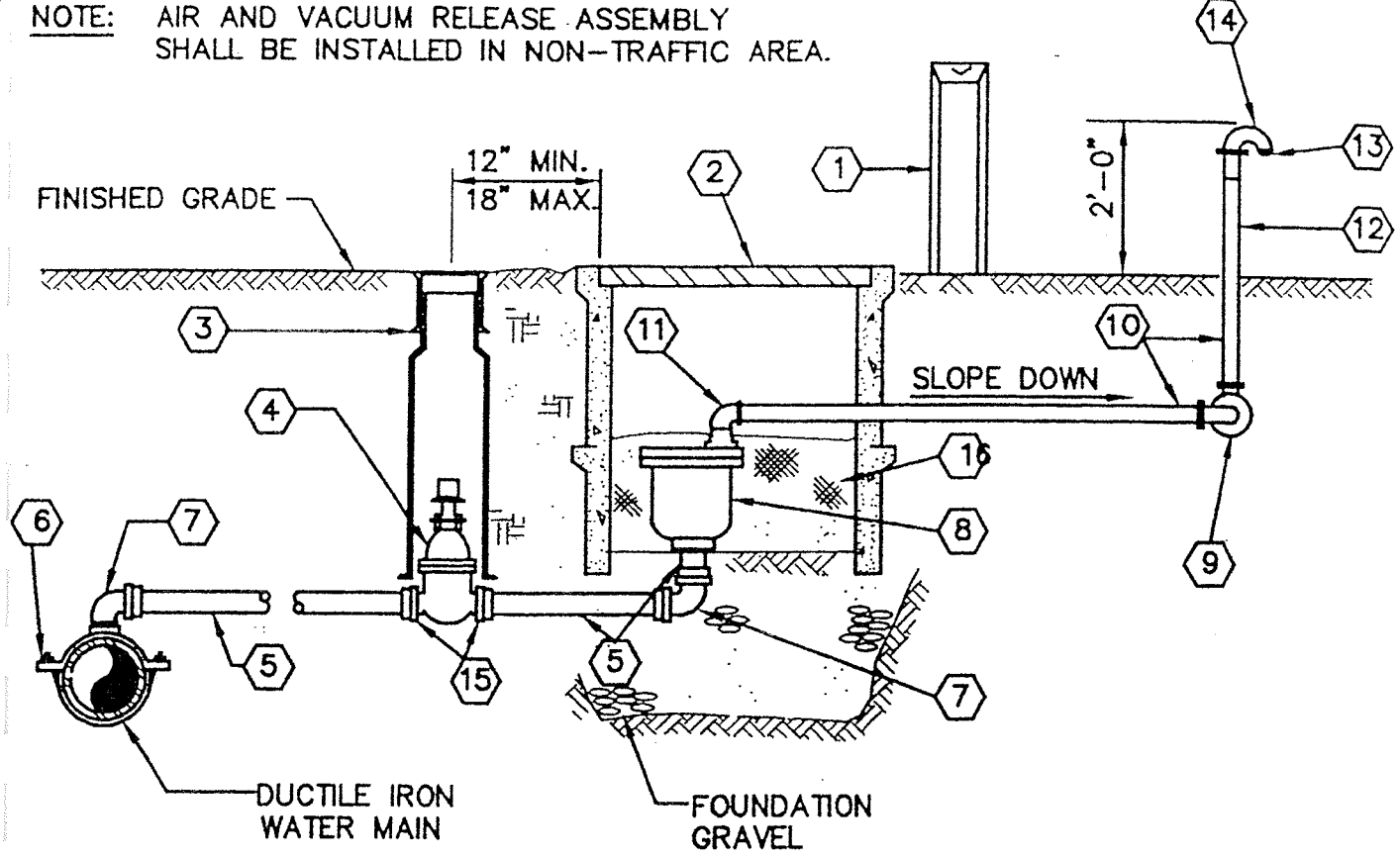
NOTE: AIR AND VACUUM RELEASE ASSEMBLY SHALL BE INSTALLED IN NON-TRAFFIC AREA.



1. VALVE MARKER POST PAINTED YELLOW WITH BLACK STENCILED DISTANCE & DIRECTION TO VALVE.
2. 17"X28" CONC. METER BOX WITH 3/8" STEEL DIAMOND PLATE COVER, FOG-TITE METER SEAL CO. NO.2
3. CAST IRON VALVE BOX
4. 2" AWWA RESILIENT SEAT GATE VALVE THD X THD, WITH OPERATING NUT
5. 2" TYPE "K" COPPER PIPE
6. DOUBLE STRAP SERVICE CLAMP
7. 90° BEND MUELLER No. H-15526 COMPRESSION X COMPRESSION
8. 2" COMBINATION AIR & VACUUM RELEASE ASSEMBLY; A. APCO MODEL 144. B. CRISPIN MODEL CRAL 2. C. VALMATIC
9. 2, 2"X90° ELL, GALV. WITH WEEP HOLE IN VERTICAL BEND
10. 2" GALV. IRON PIPE (FIELD LOCATE NEXT TO EXISTING PROPERTY LINE).
11. 2"X90° ELL (GALV.)
12. PAINT PORTION ABOVE GROUND WITH TWO COATS OF PRESERVATIVE BRAND No. 43-616 YELLOW PAINT
13. 2" BEEHIVE STRAINER
14. 2" OPEN PATTERN RETURN BEND
15. STRAIGHT COUPLING, MUELLER No. H-15428 COMPRESSION X COMPRESSION
16. SAWDUST OR VERMICULITE

NOTES:

1. ALL PIPING BETWEEN DOUBLE STRAP SADDLE AND INLET SIDE OF COMBINATION AIR AND VACUUM ASSEMBLY SHALL BE COPPER
2. TAP WATER MAIN AT HIGH POINT, LOCATION TO BE DETERMIND BY THE DISTRICT

COMBINATION AIR AND VACUUM RELEASE ASSEMBLY

King County Water District #19
STANDARD DETAILS

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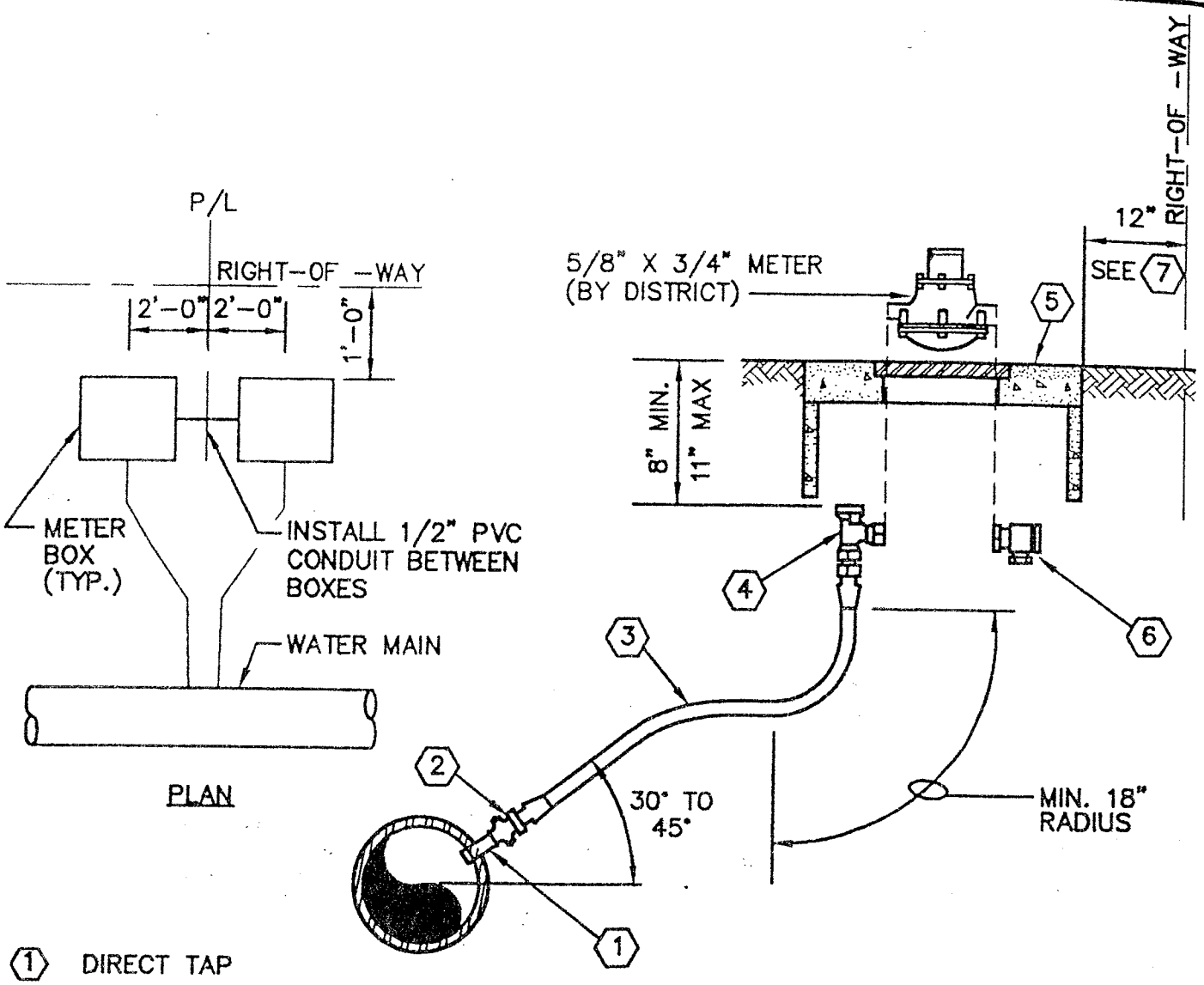
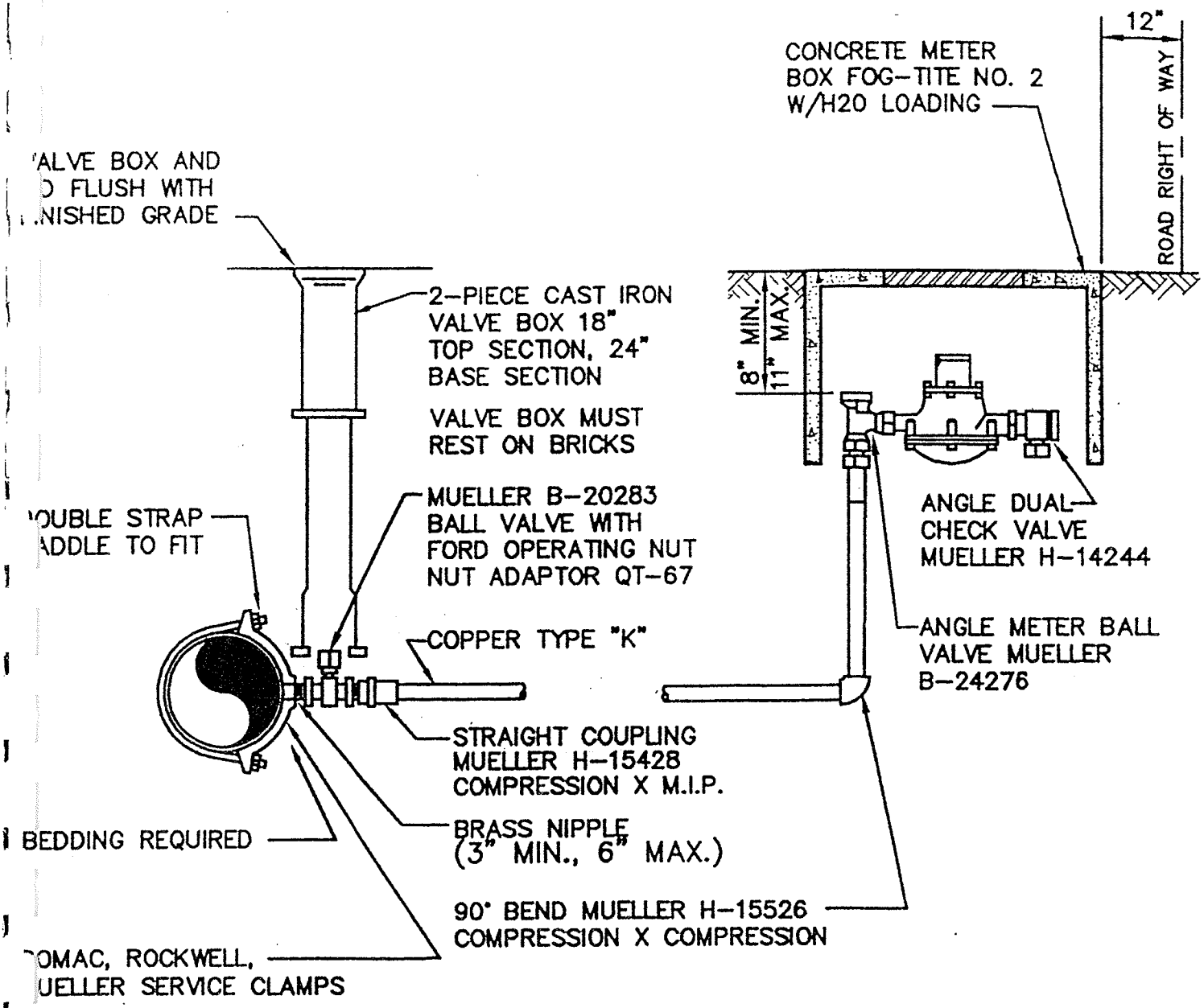


1. DIRECT TAP
2. CORPORATION STOP MUELLER H-15008.
3. TYPE K COPPER SERVICE PIPE – LENGTH AS REQUIRED
4. WATER METER STOP MUELLER H-14258 OR EQUAL
5. CONCRETE METER BOX FOG-TITE No. 1 WITH H20 LOADING
6. ANGLE DUAL CHECK VALVE, MUELLER No. H-14244
7. OR IN PLANTER, IF BACK OF SIDEWALK IS AT RIGHT OF WAY

NOTES:
1. SERVICE FROM METER BOX TO HOUSE BY PROPERTY OWNER.
2. DIRECT TAPPING OF PIPE ALLOWED ON NEW D.I. MAINS.
3. INDIVIDUAL SERVICES REQUIRED FOR EACH LOT.
4. METER BOXES TO BE LOCATED 2'-0" FROM PROPERTY CORNER.
5. METER TO BE INSTALLED BY THE DISTRICT AT OWNER'S EXPENSE.
6. COMPARABLE "FORD" FITTINGS MAY BE USED IN LIEU OF "MUELLER".

3/4" & 1" WATER SERVICE

King County Water District #19
STANDARD DETAILS

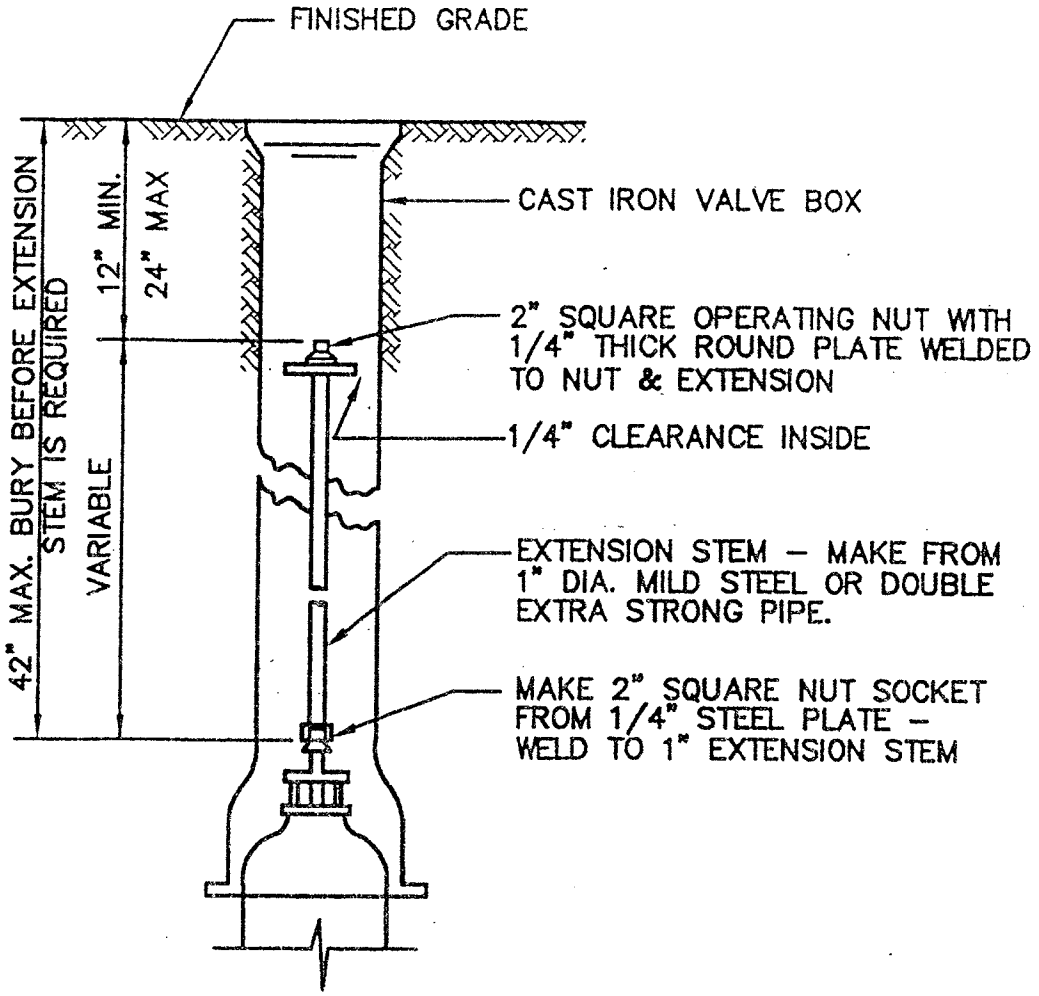


NOTES:

1. SERVICE FROM METER BOX TO HOUSE BY PROPERTY OWNER
2. INDIVIDUAL SERVICES REQUIRED FOR EACH PROPERTY
3. NEPTUNE METERS WITH PRO READ PAD SHALL BE FURNISHED BY THE CONTRACTOR
4. COMPARABLE "FORD" FITTINGS MAY BE USED IN LIEU OF "MUELLER"

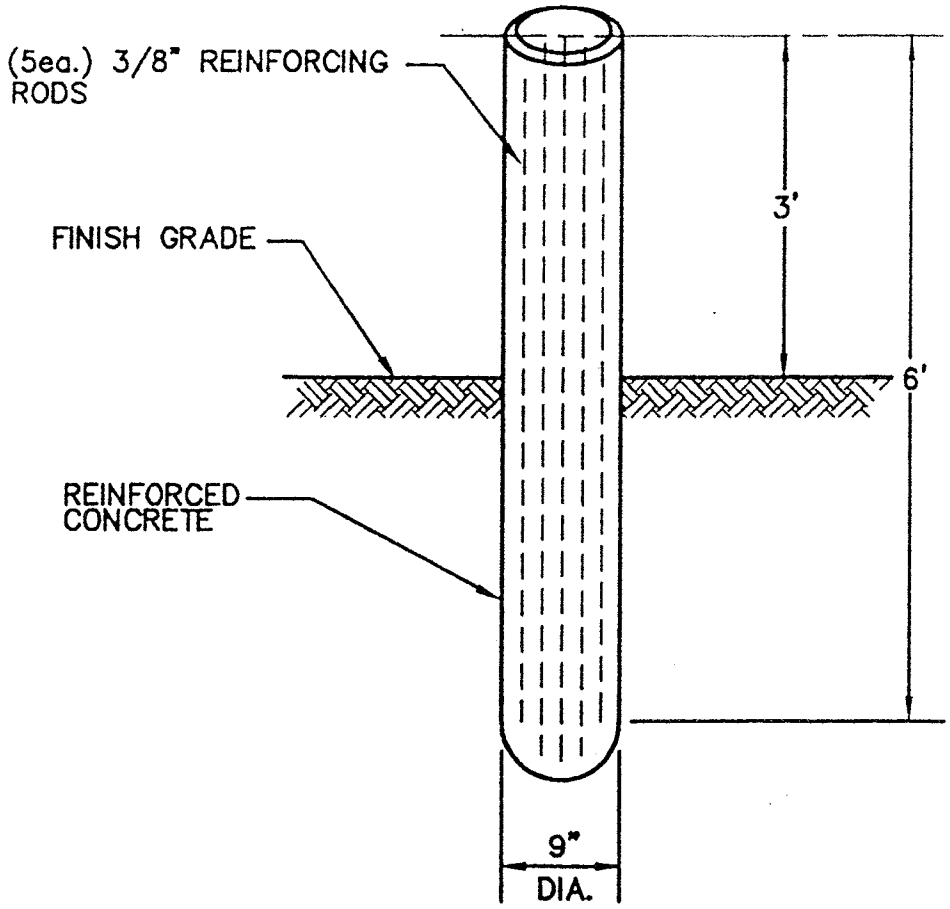
1-1/2" & 2" WATER SERVICE

King County Water District #19
STANDARD DETAILS



VALVE EXTENSION STEM

King County Water District #19
STANDARD DETAILS



NOTES

1. GUARD POSTS SHALL CONSIST OF REINFORCED 9" DIA. PRECAST UNIT.
2. THE NUMBER AND CONFIGURATION OF THE GUARD POSTS MAY BE 2, 3, OR 4 AND SHALL BE DETERMINED BY THE DISTRICT BASED ON FIELD CONDITIONS.
3. GUARD POSTS SHALL BE PAINTED WITH TWO (2) COATS OF PRESERVATIVE PAINT CO. LUX–LIGHT CATERPILLAR YELLOW #43–616 PAINT.

GUARD POST

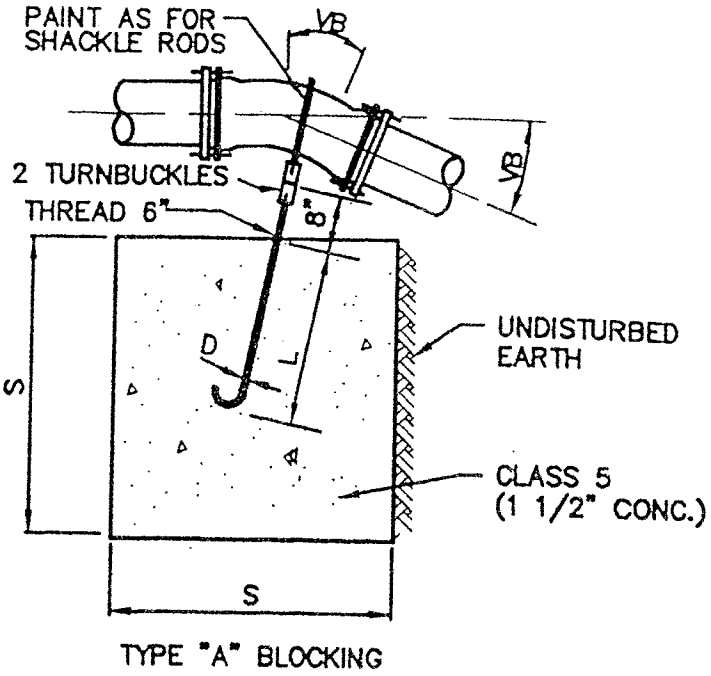
King County Water District #19
STANDARD DETAILS

TYPE "A" BLOCKING
FOR 11 1/4°–22 1/2°–30° VERTICAL BENDS

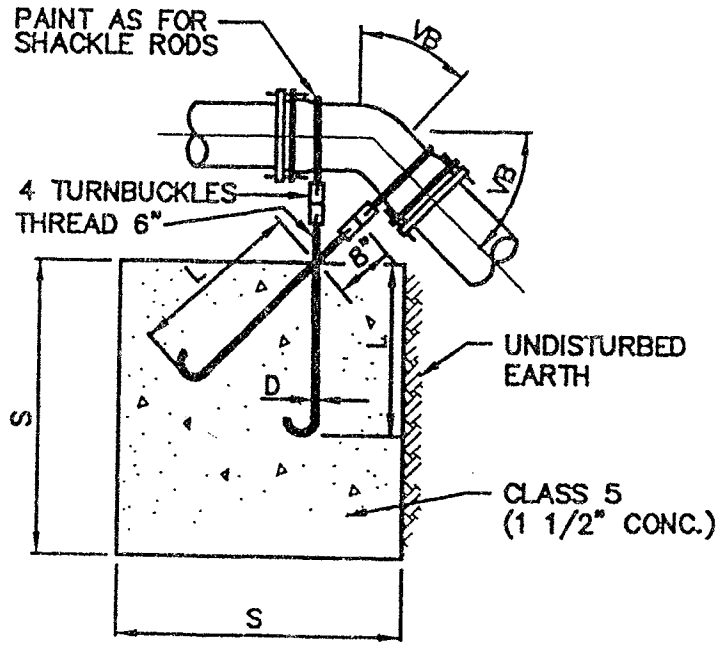
PIPE SIZE NOMINAL DIAMETER– INCHES	TEST PRESSURE PSI	VB VERTICAL BEND DEGREES	No. OF CU. FT. OF CONC. BLOCKING	S SIDE OF CUBE LIN. FT.	D DIAM. OF SHACKLE RODS (2) INCHES	L DEPTH OF RODS IN CONCRETE LIN. FT.
4"	300	11 1/4	8	2	5/8"	1.5
		22 1/2	11	2.2		2.0
		30	17	2.6		
6"	300	11 1/4	11	2.2	5/8"	2.0
		22 1/2	25	2.9		
		30	41	3.5		
8"	300	11 1/4	16	2.5	5/8"	2.0
		22 1/2	47	3.6		
		30	70	4.1	3/4"	2.5
12"	250	11 1/4	32	3.2	5/8"	2.0
		22 1/2	88	4.5	7/8"	3.0
		30	132	5.1		
16"	225	11 1/4	70	4.1	7/8"	3.0
		22 1/2	184	5.7	1 1/8"	4.0
		30	275	6.5	1 1/4"	
20"	200	11 1/4	91	4.5	7/8"	3.0
		22 1/2	225	6.1	1 1/4"	4.0
		30	330	6.9	1 3/8"	4.5
24"	200	11 1/4	128	5.0	1"	3.5
		22 1/2	320	6.8	1 3/8"	4.5
		30	480	7.9	1 7/8"	5.5

TYPE "B" BLOCKING
FOR – 45° VERTICAL BENDS

		VB		S	D	L
4"	300	45	30	3.1	5/8"	2.0
6"			68	4.1		
8"			123	5.0		
12"	250		232	6.1	3/4"	2.5
16"	225		478	7.8	1 1/8"	4.0
20"	200		560	8.2	1 1/4"	
24"			820	9.4	1 3/8"	4.5



TYPE "A" BLOCKING



TYPE "B" BLOCKING

VERTICAL ANCHOR BLOCK

King County Water District #19
STANDARD DETAILS

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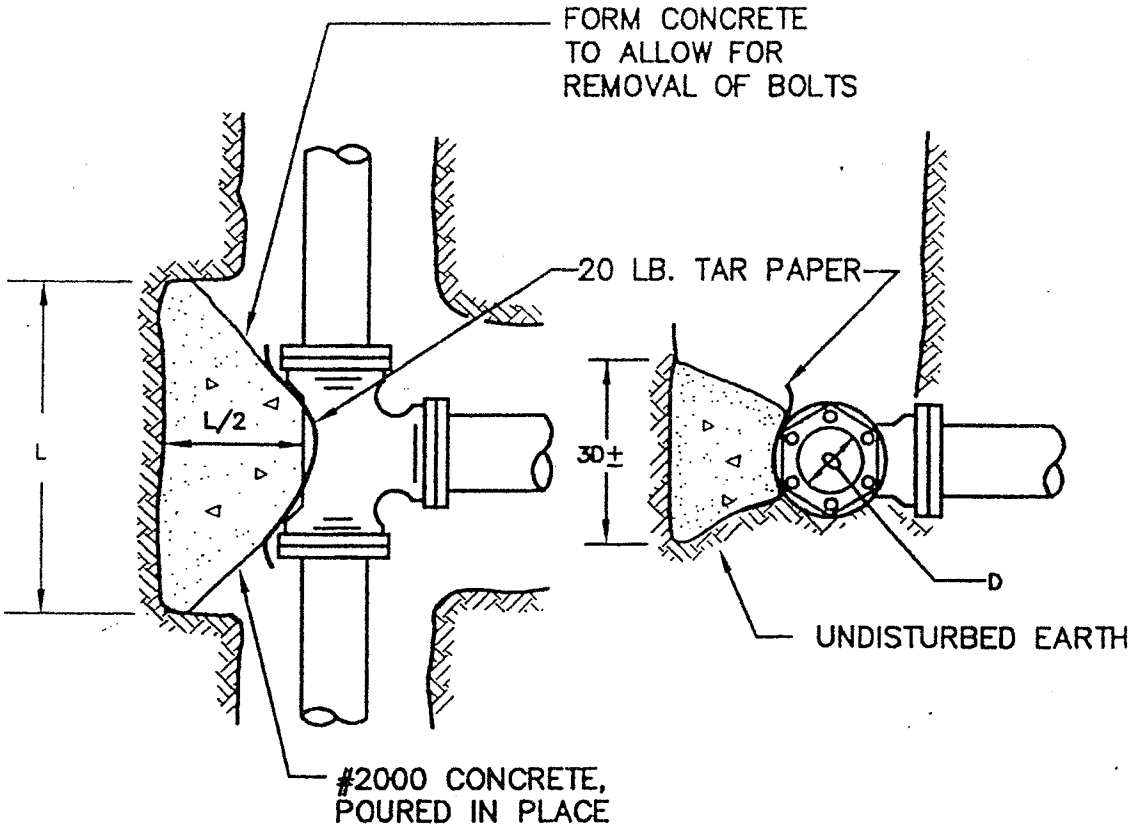
MINIMUM BEARING AREA TABLE					
FITTING D	TEE	90°	45°	22 1/2°	11 1/4°
6"	4 SQ.FT.	6 SQ.FT.	3 SQ.FT.	2 SQ.FT.	2 SQ.FT.
8"	7 SQ.FT.	10 SQ.FT.	6 SQ.FT.	3 SQ.FT.	2 SQ.FT.
10"	10 SQ.FT.	15 SQ.FT.	9 SQ.FT.	5 SQ.FT.	3 SQ.FT.
12"	14 SQ.FT.	22 SQ.FT.	12 SQ.FT.	6 SQ.FT.	4 SQ.FT.
16"	25 SQ.FT.	38 SQ.FT.	21 SQ.FT.	11 SQ.FT.	7 SQ.FT.
18"	32 SQ.FT.	48 SQ.FT.	27 SQ.FT.	14 SQ.FT.	8 SQ.FT.



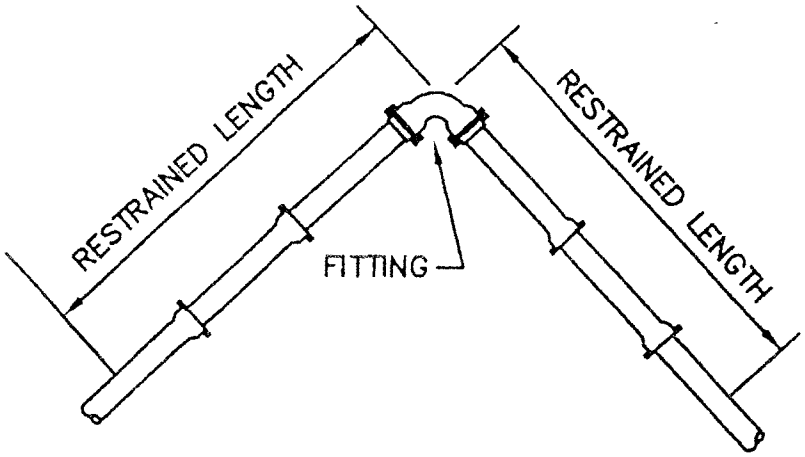
PLAN **ELEVATION**

TES:

- BEARING AREA TABLE BASED ON 250 PSI PRESSURE AND 2000 PSF SOIL BEARING. IF PRESSURE IS GREATER OR SOIL BEARING IS LESS, THE THRUST BLOCK SIZE SHALL BE INCREASED.
- THIS TABLE REPRESENTS THE "MINIMUM" CONSTRUCTION STANDARDS. THE DEVELOPER'S ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING THE APPROPRIATE SIZE OF ALL THRUST BLOCKS BASED ON EXISTING AND LOCAL CONDITIONS.

THRUST BLOCKS (FOR WATER MAINS)

King County Water District #19
STANDARD DETAILS



PIPE SIZE	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND	TEE OR DEAD END CAP
	RESTRAINED LENGTH IN FEET				
4"	40	17	8	4	30
6"	55	23	11	6	39
8"	73	31	15	8	53
10"	88	37	18	9	67
12"	103	43	21	10	82
16"	133	55	27	13	110
18"	145	60	29	15	124

NOTES:

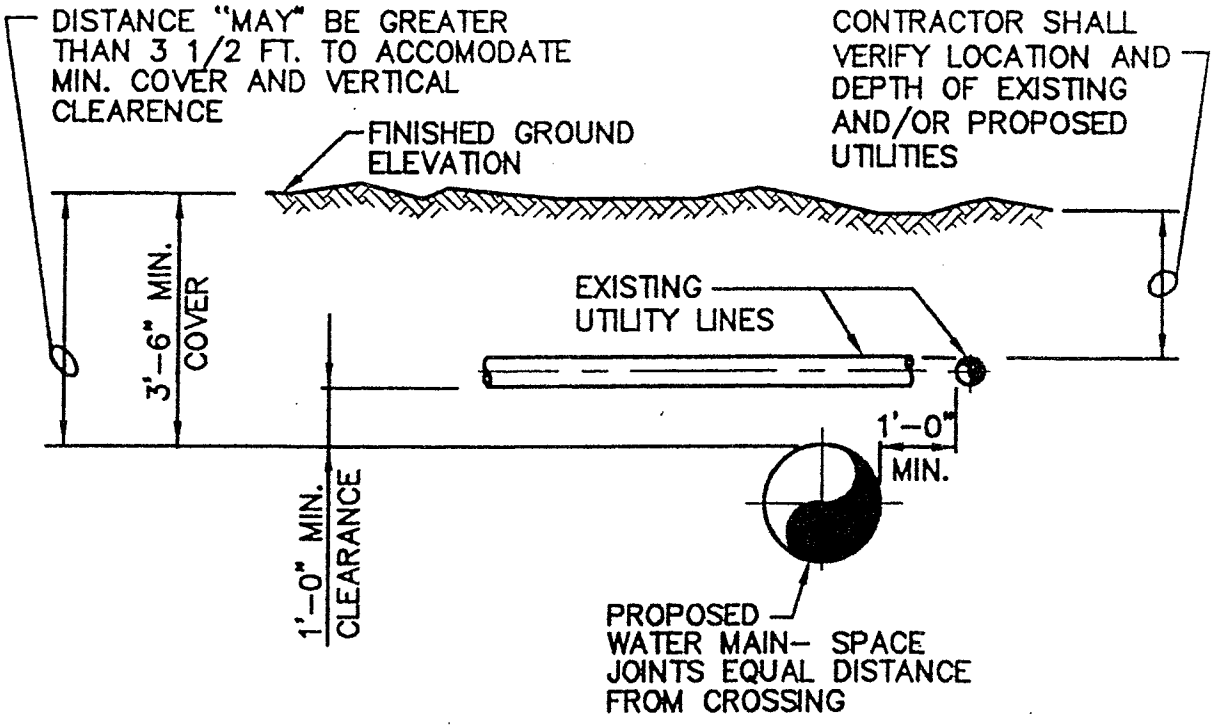
① RESTRAINED LENGTHS SHOWN ARE MINIMUM AND FOR LINEAL FEET REQUIRED ON EACH SIDE OF FITTING INDICATED.

② FOOTAGES ARE BASED ON 250 PSI PRESSURE AND 42 INCHES COVER. IF PRESSURE IS GREATER OR COVER IS LESS, THE RESTRAINED LENGTH SHALL BE INCREASED.

③ THIS TABLE REPRESENTS THE "MINIMUM" CONSTRUCTION STANDARDS. THE DEVELOPER'S ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING THE APPROPRIATE SIZE OF ALL THRUST BLOCKS BASED ON EXISTING AND LOCAL CONDITIONS.

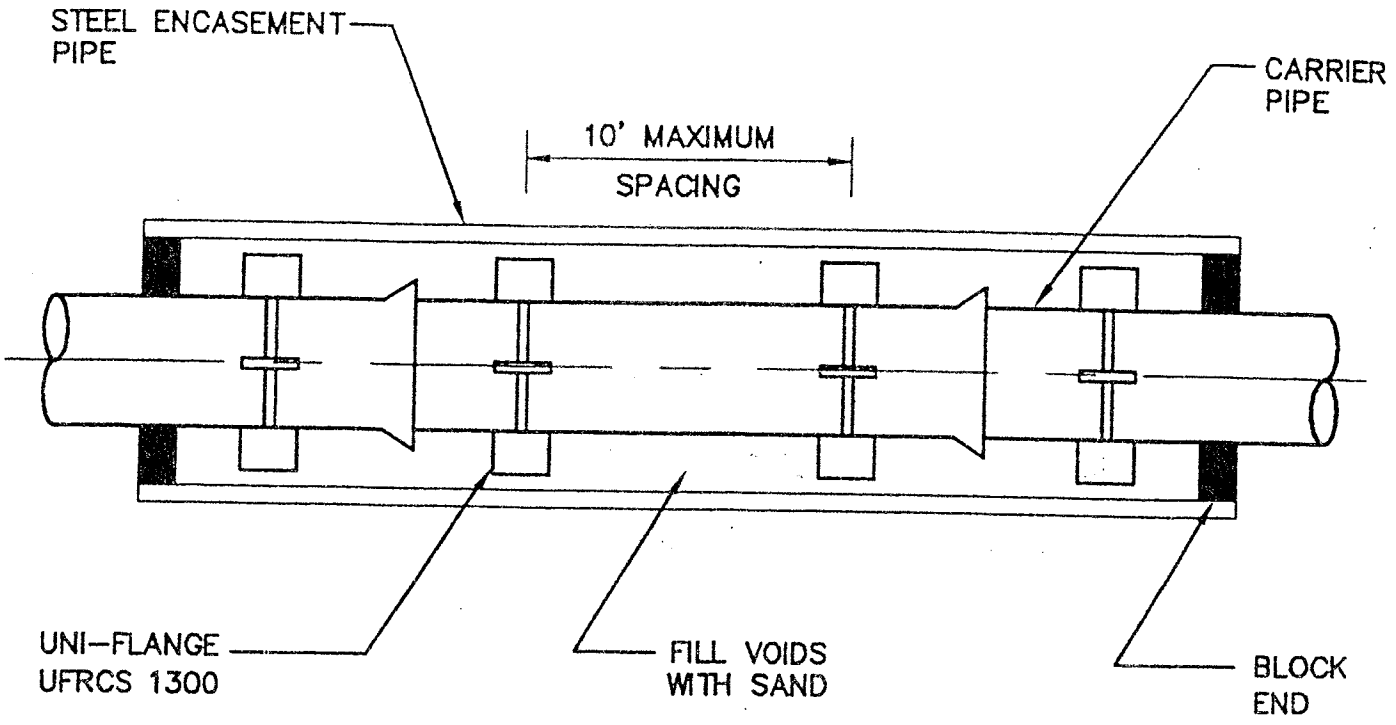
THRUST RESTRAINT FOR DUCTILE IRON PIPE

King County Water District #19
STANDARD DETAILS



TYPICAL UTILITY CROSSING

King County Water District #19
STANDARD DETAILS



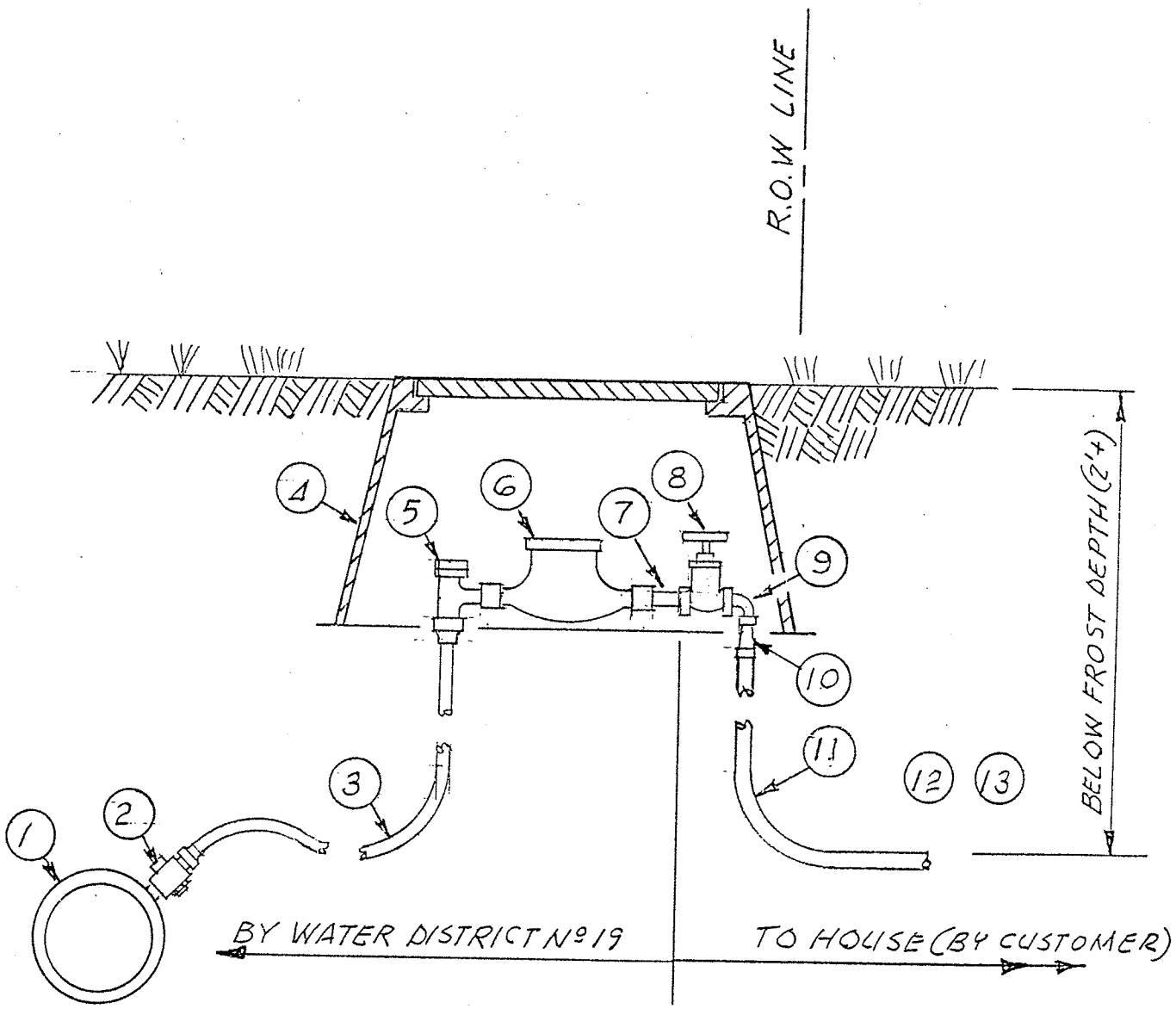
NOTES:

1. CARRIER PIPE SHALL BE PRESSURE TESTED AND VIDEO TAPED (SEWER ONLY) PRIOR TO FILLING VOIDS WITH SAND.
2. CARRIER PIPE WITHIN THE LENGTH OF THE ENCASEMENT PIPE SHALL HAVE RESTRAINED JOINTS.

BORE CASING

King County Water District #19
STANDARD DETAILS

DES. BY RLW	SCALE 1½"=1'-0	KING COUNTY WATER DISTRICT Nº 19
DATE 6-85		TYPICAL WATER METER INSTALLATION



BY WATER DIST.

1. WATER MAIN
2. CORPORATION STOP
3. ¾ COPPER PIPE
4. METER BOX
5. ANGLE METER VALVE
6. 5/8" x ¾" WATER METER
7. TAIL PIECE

BY CUSTOMER

8. ¾" GATE VALVE
9. 90° STREET EL
10. ADAPTOR
11. SERVICE PIPE (TO MEET KING COUNTY PLUMBING SPECS)
12. PRESSURE RED. VALVE (AS REQ'D)
13. BACKFLOW PREVENTOR (AS REQ'D)

APPENDIX B
TRAFFIC CONTROL PLANS