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disinfected to the satisfaction of the Engineer before being returned to service. All disinfection procedures shall be executed as determined by the Engineer

If in the opinion of the Engineer, an urgent disinfection is necessary due to reckless, incompetent or unclean construction practices on the behalf of the Contractor, the actual cost of said urgent chlorination plus standard overhead may be deducted from payments due to the Contractor from the District. No compensation of any kind shall be provided to the Contractor by the District for construction delays due to urgent disinfection. The Contractor shall not base any compensation claims, damage claims or time extension requests on any delays due to urgent disinfection.

1.10.4 Disinfection Testing

Following disinfection of the main, SVWD shall secure samples of the water from the water main for laboratory examination in accordance with AWWA Standard C651, and these specifications. Two sets of samples shall be collected, 24 hours apart.

Samples shall be taken from blow-offs or fire hydrants installed on the water main. Two samples for bacteriological (Bacti) testing and one sample for general physical (GP) testing shall be taken from each sampling point by SVWD. The sampling line may remain in place until testing produces satisfactory results or may be removed between samplings. If the sample pipe is left in place, the end of the pipe should be capped to prevent the entrance of dust or other contamination.

SVWD will notify Contractor of the results of the tests. Should either of the initial Bacti test samples indicate the presence of coliform bacteria or should any of the GP tests fail, flushing and sampling (both bacteriological and GP) shall be repeated once. If isolated sample points indicate coliform bacteria, flushing and re-sampling of only those points may be approved by SVWD. If satisfactory results are unachievable, the main must be re-chlorinated and re-sampled. After re-chlorination, if satisfactory results are still unachievable, the Contractor shall locate and remove the source of contamination. All remedial work shall be executed in accordance with the pertinent sections of these specifications.

If in the opinion of the Engineer, additional chlorination, flushing and testing is necessary due to reckless, incompetent or unclean construction practices on the behalf of the Contractor, the actual cost of said additional chlorination or flushing plus standard overhead may be deducted from payments due to the Contractor from the District or the cost may to charged to the Owner. No compensation of any kind shall be provided to the Contractor by the District for construction delays due to these requirements. The Contractor shall not base any damage claims or time extension requests on any delays due to these requirements.

After the disinfection produces satisfactory results, all temporary taps shall be securely closed and all sampling pipes removed. See Section 12.3 of these Specifications.

1.10.4.1 Special Additional Testing Requirements

If trench water enters the pipe during construction, or if in the opinion of the Engineer, the interior of the pipe is contaminated or excessively dirty, the Special Testing Procedures described in this section shall be followed.

The new main shall have been chlorinated and flushed by SVWD in accordance with these specifications. After final flushing and sampling, water shall be allowed to stand in the pipe for not less than 16 hours. After 16 hours have elapsed, samples of the water which stood in the pipe shall be taken at 200’ intervals. The water main shall not be flushed out prior to this special sampling. Samples may be taken by attaching a meter to the outlet blow off, and taking one GP and two Bacti samples at each volume increment corresponding to 200’ of pipe length.

If in the opinion of the Engineer, said Special Testing Procedures are required due to reckless, incompetent or unclean construction practices of the Contractor, the actual cost of said special testing plus standard overhead may be deducted from payments due to the Contractor from the District. No compensation of any kind shall be provided to the Contractor by the District for construction delays due to these special testing requirements. The Contractor shall not base any damage claims or time extension requests on any delays due to these requirements.

1.10.5 Contractor's Responsibility for Disinfection and Testing

Notwithstanding anything contained herein, it shall be the sole responsibility of Contractor to construct a water main capable of passing the pressure and leakage tests. The fact that SVWD provides inspection during the construction and pressure testing, and performs laboratory testing of the water mains shall not abrogate Contractor's responsibility in this regard.

It shall also be the responsibility of the Contractor to prevent the consumption of unsafe water by any person from a main which has not been determined to be safe by SVWD through disinfection and testing in accordance with these specifications. The Contractor shall indemnify and hold SVWD harmless from any suits, claims, or actions brought by any person or persons for or on account of any sickness or death sustained or arising from the consumption of water from any such main.

1.11 Work on the Existing System

1.11.1 Advance Notice of Shut Down

The Contractor shall request a system shut down at least 5 working days prior to the proposed commencement of any work which requires that the existing system be shut down. The Engineer shall determine the date, time and duration of the shutdown. If indicated by the Engineer, the Contractor shall hang SVWD-provided notification tags on the front door of each affected dwelling or place of business 3 working days in advance of the shut down. In general, shutdowns will be kept as short as possible and shall be made at times when there will be the least interference to the customers.

1.11.2 Operation of the Existing System

SVWD personnel shall close all valves in making a shutdown, open all valves in restoring pressure, and otherwise operate the existing system exclusively. The Contractor shall not operate any part of the existing system.

In the event that the Contractor operates the existing system and either directly damages the system, or in the opinion of the Engineer, causes indirect damage to the system, public or private property by causing the system to operate incorrectly, the costs for all repairs shall be borne by the Contractor. The Contractor shall pay the actual cost of repairs plus standard overhead. Such costs may be deducted by the District from any monies due or to become due to the Contractor under the Contract. No compensation of any kind shall be provided to the Contractor by the District for construction delays due to repair of the existing system by District forces. The Contractor shall not base any damage claims or time extension requests on any delays due to these requirements.

Any claims against the District and any fines levied to the District as a result improper system operation caused by the Contractor shall be borne by the Contractor. Such costs may be deducted by the District from any monies due or that will become due to the Contractor under the Contract.

1.11.3 Preparation

When work requires a system shut down, the Contractor shall prepare for such work as much as possible in advance. This preparation shall include but not be limited to potholing to determine the exact diameter and location of existing facilities, and having on site all parts and equipment necessary to complete the work. The system will be shut down only when the Contractor has made such preparations to the satisfaction of the Engineer.

1.11.4 Dewatering Operations

Prior to opening existing mains to make connections or repairs, mains shall be allowed to drain as much as possible through nearby hydrants or blow offs. The Contractor shall excavate a sump sufficiently deep to receive the residual water in the mains per Detail 17. Water shall be pumped out of the sump hole at a rate sufficient to prevent trench water from entering the mains. The Contractor shall ensure that pumps for trench dewatering are operational, primed, and otherwise properly set up and ready to begin pumping immediately at the moment of the main opening.

Water within the sump shall not be allowed to backflow into the water mains after it comes into contact with the trench. Should contaminated water flow into the system, the system shall be flushed and chlorinated as deemed necessary by the Engineer and in accordance with the pertinent sections of these specifications.

The Contractor shall prevent sediment laden trench water from being transported to storm drains or water bodies in accordance with the pertinent sections of these specifications. When practical, the Contractor

may prevent the water flowing into the trench from coming in contact with the earth in the trench. This may be achieved by placing a bucket underneath the draining water main and pumping out of the bucket. Water which is isolated from the trench in this manner may be dechlorinated and discharged directly to gutters or storm drains.

1.11.5 Leakage Inspection

Connections to the existing system and existing system repairs where proper pressure and leakage tests are not practical, shall be visually inspected by the Engineer for leakage while under pressure prior to being fully backfilled. Where conditions make such visual inspection unsafe, the Contractor shall install a temporary metallic pipe or conduit from all fittings to the ground surface to facilitate listening for leakage. Such temporary pipe shall be completely removed and the backfill recompacted prior to compaction testing and final paving

1.11.6 Tie-Ins

Upon passing the Bacti and GP tests, the Contractor shall make permanent connections between the new main and the existing system at the locations indicated by the Contract Documents or the Engineer. Advance notice shall be given to all customers affected, the system shall be shut down, drained, and connections made in accordance with the pertinent sections of these specifications.

In general, connections between new and existing mains will be made while the system has been shut down in accordance with the pertinent sections of these specifications, unless the Contract Documents call for a hot tap connection.

1.11.6.1 Connection Procedure

Where existing mains have been provided with fittings for the purpose of connecting to the new main, the Contractor shall remove any plugs or bulkheads, clean the ends, prepare them for connection to the new main and make the new joint in accordance with the pertinent sections of these specifications. Connections to existing mains shall be a minimum of 24 inches from other taps or fittings, as measured from outside edges.

All joints and fittings used in the connection shall be restrained in accordance with pertinent sections of these specifications, and Details 17 and 18. Flex couplings shall only be used in situations where restrained fittings cannot be used.

The Contractor shall install thrust blocks at all fittings used in the connection in accordance with pertinent sections of these specifications and Detail 19.

All pipe and fittings used to make the connection shall be cleaned and disinfected with a swab saturated with hypochlorite solution or by another means approved by the Engineer.

If possible, after the connection is complete and before backfilling, the connection shall be pressurized and the Engineer shall inspect all joints made during the system connection for leaks. If any leaks are found, they shall be repaired in accordance with pertinent sections of these specifications.

Section 2 Material Specifications

2.1 General

2.1.1 Scope

The purpose of Part II Material Specifications is to set forth the materials to be used in the construction of facilities which will become the property of SVWD. Any deviation from these standards must be approved by the Engineer.

All Materials in contact with potable water shall conform to the applicable AWWA Standard, and shall be certified by a ANSI accredited organization to be in compliance with NSF/ANSI 61.

2.1.2 General

All Materials shall be new and unused. Contractor shall install all materials as indicated on the drawings and specifications and consistent with the project material submittals. All materials delivered to the job site shall be adequately housed and protected to ensure the quality of the project.

The Contractor shall furnish, at the request of the Engineer, without additional cost to the District, such quantities of construction materials required for test purposes.

The SVWD reserves the right to direct or deny use of certain types of materials in specific circumstances.

2.1.3 Pre Approved Products

Some sections of these specifications list *Pre Approved Products*. These products are listed to provide an example of a material or part which SVWD has found to meet the requirements of these specifications. No preference toward a particular brand, series or model is implied by the *Pre Approved Product* listing.

2.2 Pipe

2.2.1 Brass Pipe

Brass pipe and nipples shall conform to AWWA C800 and these specifications and shall be certified by an ANSI accredited organization to be in compliance with NSF/ANSI 61. Brass parts shall consist of brass alloy having a lead content not more than 0.25 percent by weight. Brass shall meet the composition, chemical and mechanical requirements of C89520 or C89833 alloys as specified by the Copper Development Association, Inc.

Brass pipe shall be suitable for use at pressures not less than 150 psi.

2.2.1.1 Joints

Joints between brass pipe and adjacent fittings shall be iron pipe threaded. Soldered joints are prohibited.

2.2.2 Copper Pipe

All below-ground copper pipe shall be type K annealed (soft) seamless copper tubing conforming to ANSI/ASTM B88M and AWWA C800. Copper pipe that is kinked or has walls which have buckled shall be rejected and removed from the site.

Copper pipe used for aboveground piping such as risers for backflow prevention devices shall be type K drawn (hard) seamless copper tubing.

2.2.2.1 Joints

Joints in copper pipe shall be made with brass CTS grip joint fittings conforming to pertinent sections of these specifications. Soldered or flare joints are prohibited.

2.2.3 Ductile Iron Pipe

Ductile iron pipe shall conform to AWWA C151. The wall thickness of the ductile iron pipe shall be designed in accordance with AWWA C150. The class or nominal thickness, net weight without lining, and casting period shall be clearly marked on each length of pipe. Sticks of ductile iron pipe shall have standard lengths of either 18 feet or 20 feet. Random lengths are not acceptable.

2.2.3.1 Interior Lining

The interior of ductile iron pipe shall be cement mortar lined and bituminous seal coated in accordance with AWWA C104.

2.2.3.2 Exterior Coating

The exterior of ductile iron pipe shall have an asphaltic coating conforming to AWWA C151.

2.2.3.3 Polyethylene Encasement

Polyethylene Encasement for wrapping DI pipe shall conform to AWWA C105. Polyethylene wrap shall be clearly marked ANSI A21.5 / AWWA C105. Polyethylene wrap shall be 10-mil thick and provided from the factory in tube form. Sheets may be allowed at the discretion of the Engineer for encasing appurtenances.

2.2.3.4 Joints

Joints in DI pipe shall be push-on, mechanical, or flanged rubber gasket joints conforming to AWWA C111. Rubber gaskets and gasket lubricant shall be certified by an ANSI accredited organization to be in compliance with NSF/ANSI 61, and shall not impart taste or odor to water.

Push-on rubber gasket joints shall use the gasket provided by the factory for that particular joint. Swapping gaskets is not allowed.

Mechanical joint glands shall consist of ductile iron conforming to ASTM A536 and shall be protected from corrosion by a quality factory-applied coating. Nuts and bolts for mechanical joints and flanged joints shall either be stainless steel or protected against corrosion by a field-applied bitumastic coating approved by the Engineer.

Pre Approved Products:

Tyton Joint Pipe as manufactured by U.S. Pipe

Mechanical Joint Pipe as manufactured by U.S. Pipe

2.2.4 Polyvinyl Chloride Pipe

PVC pipe 4 to 12 inches in diameter shall conform to AWWA C900, be rated for a working pressure of 305 psi, and shall have an outside diameter to wall thickness dimension ratio of 14.

PVC pipe 14 to 48 inches in diameter shall conform to AWWA C905, be rated for a working pressure of 235 psi, and shall have an outside diameter to wall thickness dimension ratio of 18.

Each length of pipe shall be clearly marked with the applicable AWWA Standard, Pressure class, and dimension ratio. Sticks of PVC pipe shall have standard lengths of 20 feet. Random lengths are not acceptable.

Pipe which appears discolored or oxidized, or has gouges deeper than 10% of the wall thickness shall be rejected and removed from the job site.

2.2.4.1 Joints

Joints in PVC pipe shall be push-on rubber gasket joints conforming to AWWA C900 or C905 as applicable. Rubber gaskets and gasket lubricant shall be certified by an ANSI accredited organization to be in compliance with NSF/ANSI 61, and shall not impart taste or odor to water.

Push-on rubber gasket joints shall use the gasket provided by the factory for that particular type of joint. Swapping gaskets is not allowed.

Pre Approved Products:

Vinytlech AWWA C900and C905 as Manufactured by Vinyltech Corporation

AWWA C-900 and C-905 Municipal Water Pipe as Manufactured by North American Pipe Corporation

Diamond C900 and C905 As Manufactured by Diamond Plastics Company

2.2.5 Welded Steel Pipe

Welded steel pipe shall conform to AWWA C200. Ends of sections of welded steel pipe shall be prepared for the type of joint set forth in the Contract Documents.

2.2.5.1 Interior Lining

The Interior of welded steel pipe shall be protected from corrosion with factory applied cement mortar lining in accordance with AWWA C205, liquid epoxy conforming to AWWA C210 or fusion bonded epoxy conforming to AWWA C213.

2.2.5.2 Exterior Coating

The exterior of welded steel pipe shall be protected from corrosion with hot-applied coal tar enamel and tape conforming to AWWA C203, or spiral wire reinforced cement mortar coating conforming to AWWA C205.

2.2.5.3 Joints

For flexible coupled field joints, ends of pipe shall be plain. Welded beads on the outside of the pipe shall be trimmed down so that the weld metal does not project above the surface of the adjacent metal for a distance back from the ends of the pipe of 6 inches, or as otherwise specified in the project specifications. Bolted, sleeve-type couplings for plain-end pipe shall conform to AWWA C219.

For Lap-Welded field joints, at least one end of each section shall be belled to provide a tight-fitting socket, which will allow a lap when the joint is assembled of at least 1 inch with the adjacent plain end of the next section of pipe.

For rubber-gasketed joints, the spigot ends shall have a groove to accommodate a round rubber gasket of the proper diameter and cross-section. The bell end shall be so shaped that, upon the insertion of a spigot into the bell, the gasket becomes deformed and completely fills the groove and, as the joint is closed, the gasket becomes completely enclosed by steel. The gasket shall be furnished with the pipe and shall provide the sole means of making the joint watertight.

For flanged joints, a steel slip-on weld flange of the specified size shall be welded to the end of the bare pipe before any coatings are applied.

2.3 Fittings

2.3.1 Bolted Sleeve Couplings (Flex Couplings)

Bolted sleeve couplings (flex couplings) shall conform to AWWA C219 and these specifications. Flex couplings shall consist of a carbon steel or stainless steel sleeve conforming to the material requirements of AWWA C200 or C220, respectively. The sealing mechanism at each end of the sleeve shall consist of a rubber gasket certified by an ANSI accredited organization to be in compliance with NSF/ANSI 61 and compressed by a stainless or carbon steel compression ring. The Compression ring shall be tensioned by a single nut and bolt which acts perpendicular to the pipe centerline. Sleeves larger than 12 inches may use two nuts and bolts to provide tension. All fasteners and washers shall consist of stainless steel.

Flex couplings shall provide for a minimum of 8 degrees of pipe deflection. Flex couplings shall have a working pressure of not less than 200 psi.

2.3.1.1 Interior/Exterior Coating

All non-stainless steel components of flex couplings shall be protected from corrosion by a fusion-bonded epoxy coating conforming to AWWA C213, or another quality factory-applied coating approved by the Engineer.

Pre Approved Products:

Hymax Couplings as manufactured by Total Piping Solutions, Inc.

2.3.2 Brass Fittings

Brass fittings shall conform to AWWA C800 and these specifications. Brass fittings shall consist of brass alloy having a lead content not more than 0.25 percent by weight. Brass shall meet the composition, chemical and mechanical requirements of C89520 or C89833 alloys as specified by the Copper Development Association, Inc.

Brass fittings shall be suitable for use at pressures not less than 150 psi.

2.3.2.1 Joints

Joints between brass fittings and copper pipe shall be made with iron pipe thread to CTS grip joint adapters. Joints between brass fittings and brass pipe shall be iron pipe threaded. Soldered joints or flare fittings are prohibited.

Pre Approved Products:

Low-lead brass fittings as manufactured by James Jones Company marked “EBII” or “FD”

No-lead brass fittings as manufactured by The Ford Meter Box Company, marked “NL”

2.3.3 Ductile Iron Fittings

Ductile iron fittings shall conform to AWWA C110 or C153, in material, body thickness and radii of curvature with the exception of laying lengths.

2.3.3.1 Interior Lining

Ductile iron fittings shall be lined with a bituminous seal-coated cement mortar lining conforming to AWWA C104.

2.3.3.2 Exterior Coating

Ductile iron fittings shall be coated with an asphaltic coating conforming to AWWA C110, or with fusion bonded epoxy conforming to AWWA C116.

2.3.3.3 Joints

Joints in DI fittings shall be push-on, mechanical or flanged rubber gasket joints conforming to AWWA C111. Rubber gaskets and gasket lubricant shall be certified by an ANSI accredited organization to be in compliance with NSF/ANSI 61 and shall not impart taste or odor to water.

Push-on rubber gasket joints shall use the gasket provided by the factory for that particular joint. Swapping gaskets is not allowed.

DI fitting joints shall include joint restraints conforming to the applicable sections of these specifications.

2.3.4 Welded Steel Fittings

Dimensions of welded steel fittings shall conform to AWWA C208.

Materials, linings, coatings and joint types of welded steel fittings shall be the same types as the welded steel pipe to which the fitting is to be attached and shall conform to the applicable sections of these specifications.

2.4 Joint Restraints

2.4.1 Joint Restraints for DI Push-On Joints

Joint restraints for DI pipe push-on joints shall consist of bell restraint harnesses and/or rubber gaskets with embedded locking elements. Joint restraints shall be capable of restraining the thrust force created at two times the rated working pressure of the pipe or fitting to which they are attached.

Bell restraint harnesses for DI push-on joints shall consist of two split-ring harnesses manufactured from ductile iron conforming to ASTM A536. One split-ring harness shall bear upon the back of the pipe bell. The other split-ring harness shall grip the spigot end of the adjacent pipe with individual bolt-tightened wedges. The wedges shall have a Brinell hardness number not less than 370. Wedge-tightening bolts shall be provided from the factory with heads which break away when proper torque is reached. The split-ring harnesses shall be connected and tensioned by threaded rods and nuts. The split-ring harnesses shall be protected against corrosion with a high quality factory-applied coating. Nuts, bolts, and threaded rods shall be either stainless steel or protected against corrosion with a field-applied bitumastic coating approved by the Engineer.

Locking gaskets shall consist of a rubber gasket conforming to AWWA C111 embedded with stainless steel toothed gripping elements.

Pre Approved Products:

Series 1700 or 1100HD Bell Restraint Harness as manufactured by EBAA Iron, Inc.

Field Lok 350 gaskets as manufactured by U.S. Pipe

2.4.2 Joint Restraints for Mechanical Joints with DI Pipe

Joint restraints for DI Mechanical Joints with DI pipe shall be capable of restraining the thrust force created at two times the rated working pressure of the pipe or fitting to which they are attached.

Joint restraints for mechanical joints shall consist of a ductile iron mechanical joint gland conforming to ASTM A536. The gland shall conform to AWWA C111 and shall grip the spigot end of the pipe with individual bolt-tightened wedges. The wedges shall have a Brinell hardness number not less than 370. Wedge-tightening bolts shall be factory provided with heads which break away when proper torque is reached. The DI gland shall be protected against corrosion with a high quality factory applied coating. Nuts and bolts shall be either stainless steel or protected against corrosion with a field-applied bitumastic coating approved by the Engineer.

Pre Approved Products:

Megalug Series 1100 or 1100SD as manufactured by EBAA Iron, Inc.

2.4.3 Joint Restraints for Mechanical Joints with PVC Pipe

Joint restraints for DI Mechanical joints with PVC pipe shall meet or exceed the requirements of ASTM F1674.

The gland shall consist of ductile iron conforming to ASTM A536 and shall conform to AWWA C111. Restraint shall be provided by individual bolt-tightened wedges which grip the spigot end of the adjacent pipe. Wedge-tightening bolts shall be factory provided with heads which break away when proper torque is reached. The spacing and number of bolt tightened wedges shall be designed by the manufacturer specifically for type of pipe they will grip. The DI gland shall be protected against corrosion with a high

quality factory applied coating. Nuts and bolts shall be either stainless steel or protected against corrosion with a field-applied bitumastic coating approved by the Engineer.

Pre Approved Products:

Megalug Series 1100 or 1100SD as manufactured by EBAA Iron, Inc.

2.4.4 Joint Restraints for PVC Push-On Joints

Joint restraints for PVC pipe push-on joints shall meet or exceed the requirements of ASTM F1674.

Joint restraints for PVC pipe push-on joints shall consist of bell restraint harnesses. Bell restraint harnesses for PVC pipe shall consist of two serrated split-ring, harnesses manufactured from ductile iron conforming to ASTM A536. One serrated split-ring harness shall grip the bell end of the pipe behind the bell. The other serrated split-ring harness shall grip the spigot end of the adjacent pipe. The serrated spilt-ring harnesses shall be tightened onto the pipe barrel with a bolt on either side. The two pipe gripping harnesses shall be connected by threaded rods and nuts. The ductile iron serrated split-ring harnesses shall be protected against corrosion with a quality factory-applied coating. Nuts, bolts and threaded rods shall be either stainless steel or protected against corrosion with a field applied bitumastic coating approved by the Engineer.

Pre Approved Products:

Series 1500 Bell Restraint Harness as manufactured by EBAA Iron, Inc.

2.5 Valves

2.5.1 Air Valves

Air Valves shall conform to AWWA C512. The interior linkage parts and fasteners shall consist of brass or stainless steel. Floats shall be plastic or stainless steel. The interior surfaces of air valves shall be coated in conformance with AWWA C550. Air valves shall be watertight.

2.5.1.1 Vacuum Relief Valve

Air/vacuum valves shall permit large volumes of air to exit or enter the pipe while the pipe is not under pressure.

Pre Approved Products:

S-1500 series Vacuum Relief Valve as manufactured by Apco Williamette Valve and Primer Corporation.

2.5.1.2 Air Release Valves

Air release valves shall permit release of small amounts of entrained air from the pipe, while the pipe is operating under pressure.

Pre Approved Products:

S-50 series or S-200A series Air Release Valve as manufactured by Apco Williamette Valve and Primer Corporation.

2.5.1.3 Combination Air Valves

Combination air valves shall perform the functions of both air/vacuum valves and air release valves. Valves smaller than 4” shall be self-contained in one unit, not a combination of two valves.

Pre Approved Products:

S-140c series As manufactured by Apco Williamette Valve and Primer Corporation.

AL series Air and Vacuum Valve As manufactured by Crispin Valve.

2.5.2 Backflow Prevention Assemblies

Only assemblies that appear on the list of approved devices maintained by SVWD are permitted for use. The Contractor shall verify that the device to be installed appears on the most recent SVWD list of approved devices.

Assemblies shall be shipped from the manufacturers in the fully assembled configuration. This includes bypass arrangements and shutoff valves. Assemblies received for installation not completely assembled are not approved. Field conversions of double check assemblies to a detector assembly, or vice versa, are not permitted.

2.5.3 Brass Valves

Brass valves shall conform to AWWA C800 and these specifications. Brass valves shall be certified by an ANSI accredited organization to be in compliance with NSF/ANSI 61. Brass valves shall consist of brass alloy having a lead content not more than 0.25 percent by weight. Brass shall meet the

composition, chemical and mechanical requirements of C89520 or C89833 alloys as specified by the Copper Development Association, Inc. Brass valves shall bear a mark from the manufacturer indicating that the fitting is composed of a no-lead or low-lead alloy.

Brass valves shall be suitable for use at pressures not less than 150 psi.

2.5.3.1 2 Inch Fire Service Gate Valves

2-inch gate valves shall be of all bronze construction (including valve stem and handle), female iron pipe thread by female iron pipe thread , wheel handle valves.

Pre Approved Products:

J-372 as manufactured by James Jones Company

2.5.3.2 Angle Meter Stops

Angle meter stops shall be equipped with heads which allow the angle meter stop to be locked in the off position.

Pre Approved Products:

Low-lead angle meter stops as manufactured by James Jones Company marked "EBII" or "FD"

No-lead angle meter stops as manufactured by The Ford Meter Box Company, marked "NL"

2.5.3.3 Corporation Stops

Corporation stops shall be male iron pipe thread by male iron pipe thread. Connection to copper service line shall be made with an iron pipe thread to CTS grip joint adapter

Pre Approved Products:

Low-lead brass corporation stops as manufactured by James Jones Company marked "EBII" or "FD"

No-lead brass corporation stops as manufactured by The Ford Meter Box Company, marked "NL"

2.5.4 Check Valves

2.5.4.1 Meter Check Valve

Meter check valves for use with 5/8-inch bypass meters shall consist of low-lead brass, shall be female iron pipe threaded on both ends, and shall be suitable for use at pressures not less than 150 psi.

Pre Approved Products: HS11-333NL as manufactured by The Ford Meter Box Company, marked "NL"

2.5.4.2 Backflow Devices

See "Backflow Prevention Assemblies"

2.5.5 Fire Hydrants

Fire hydrants shall include a hydrant head, hydrant bury and break-away features conforming to AWWA C503 and these specifications.

2.5.5.1 Hydrant Head

Hydrant heads shall be all 6-inch diameter wet-barrel units. Hydrant heads shall be of the "steamer" variety, having two 2 ½-inch outlets and one 4 ½-inch outlet.

Hydrant outlets shall have National Standard hose threads. Hydrant outlet valves shall be operable by a pentagon shaped nut. Outlets shall be capped. Caps shall consist of either bronze or plastic and shall contain a rubber gasket. Hydrant caps shall not have chains attached. All hydrants and caps shall be painted with "post international yellow" enamel.

Pre Approved Products:

860 Wet Barrel Hydrant as manufactured by the Clow Valve Company.

2.5.5.2 Hydrant Bury

The hydrant bury shall consist of ductile iron. The hydrant bury shall be sized so that the face of the flange is 2-4 inches above finished grade. The buried end of the hydrant bury shall be a mechanical joint conforming to AWWA C111. The interior and exterior of the hydrant bury shall be coated with fusion bonded epoxy which conforms to AWWA C116 and is certified by an ANSI accredited organization to be in compliance with NSF/ANSI 61.

Pre Approved Products:

Ductile Iron Hydrant Bury as manufactured by the Clow Valve Company

2.5.5.3 Break Away Features

The hydrant head shall be attached to the bury with a break away spool and stainless steel bolts and nuts.

One set of flange bolts shall be hollow break away bolts, having a combined ultimate strength less than the yield strength of the hydrant head or bury.

The break away spool shall consist of ductile iron and shall have an ultimate strength less than the yield strength of the hydrant head or bury. The interior of the break away spool shall be coated with fusion bonded epoxy coating which conforms to AWWA C116 and is certified by an ANSI accredited organization to be in compliance with NSF/ANSI 61. The exterior shall be primed and painted with "post international yellow" enamel to match the hydrant.

2.5.6 Main Line Valves

Underground main line valves and service valves 4 inches and larger in diameter shall be iron body, resilient seated gate valves conforming to AWWA C509 or C515.

The wedge or "gate" of the valve shall consist of bronze or ductile iron completely encapsulated with sealing rubber. The sealing rubber shall be permanently bonded to the wedge. The waterway of the valve shall have a diameter equal to the nominal diameter of the valve and be smooth, unobstructed, and free of surface irregularities.

The stem stuffing box shall be serviceable with valve fully open and subjected to full rated working pressure.

Valves shall be equipped with a 2-inch square ductile iron operating nut, and the valve shall open when turned to the left (counter-clockwise). Valve stems shall not rise out of the body when the valve is operated. The operating nut shall be securely keyed into the stem at the factory, and shall be capable of withstanding repeated operation to the satisfaction of the Engineer.

All bolts on the valve shall consist of stainless steel. Valves shall be equipped with o-ring seals at all pressure retaining joints.

2.5.6.1 Interior/Exterior Coating

All iron parts except the operating nut shall be coated with fusion bonded epoxy, conforming to AWWA C550 and certified by an ANSI accredited organization to be in compliance with NSF/ANSI 61.

2.5.6.2 Joints

Valve ends shall be either flanged or restrained mechanical joints conforming to AWWA C111, and pertinent sections of these specifications.

Pre Approved Products:

Resilient Seated Gate Valve as manufactured by the Clow Valve Company

2.6 Appurtenances

2.6.1 Boxes and Lids

2.6.1.1 Non Traffic Rated Meter Boxes

Meter boxes which will not be subjected to vehicle loading shall consist of precast reinforced concrete. Lids shall be solid reinforced concrete. “reading lids” are not allowed. Lids shall be imprinted with the applicable markings at the factory. Meter box and lid dimensions shall be identical to those of the pre approved products listed below.

Pre Approved Products:

B16BOX (box) and – B16P-corner(lid) as manufactured by Christy Concrete Products, Inc.

B36BOX (box) and B36FL-P-corner (lid) as manufactured by Christy Concrete Products, Inc.

2.6.1.2 Traffic Rated Meter Boxes

Meter boxes which may be subjected to vehicle loads shall consist of precast reinforced concrete boxes with steel rims. Traffic rated meter boxes shall be capable of withstanding AASHTO H20 wheel loading. Box dimensions shall be identical to those of the pre approved products listed below. Lids shall consist of a single continuous piece of steel tread plate, with reinforcements on the underside. “Reading lids” are not allowed. Lids shall be bolted to the box with stainless steel bolts. Lids shall be welded with markings per the applicable SVWD Detail.

Pre Approved Products:

B1017BOX (box) and B1017-61JH-P (lid) as manufactured by Christy Concrete Products, Inc.

B1730BOX (box) and B1730-51JH-P (lid) as manufactured by Christy Concrete Products, Inc.

B3048BOX (box) and B3048-53JH-P (lid) as manufactured by Christy Concrete Products, Inc.

2.6.1.3 Valve Boxes

Valve boxes shall be precast reinforced concrete, with cast iron rims. Valve boxes shall be capable of withstanding H/20 vehicle loading. Valve box lids shall be cast iron, and shall be marked in accordance with Detail 12. Valve box lids shall be properly fitting and shall not rattle when driven over by a vehicle.

Valve box and lid dimensions shall be identical to those of the pre approved products listed below.

Pre Approved Products:

G05BOX (box) and G05C (lid) as manufactured by Christy Concrete Products, Inc.

2.6.2 Aboveground Enclosures

2.6.2.1 Air Valve Enclosures

Enclosures for aboveground air valve installations shall be cylindrical, and consist of steel solid sheet metal no thinner than 16-gauge. The size of the enclosure shall be as indicated by the Contract Documents, or approved in advance by the Engineer. Enclosures shall be protected from corrosion

by a high quality factory applied coating, and shall be repainted with “hunter green” enamel. If required by the Engineer, the enclosure shall consist of stainless steel. Enclosures shall provide for an SVWD pad lock in a manner acceptable to the Engineer.

Pre Approved Products:

Steel Air Valve Enclosure as manufactured by Pipeline Products, Inc.

2.6.2.2 Aboveground Meter Enclosures

Enclosures for aboveground meter installations shall consist of solid steel sheet metal. Enclosures shall be protected from corrosion by a high quality factory applied coating approved by the Engineer, but may be repainted by the customer or property owner. For larger installations, the Engineer may approve the use of expanded sheet metal. If required by the Engineer, the enclosure shall consist of stainless steel. Enclosures shall provide for both a water-customer-supplied padlock and an SVWD padlock to be attached and operated without interfering with the operation of the other, in a manner acceptable to the Engineer.

Pre Approved Products:

E1A Backflow Enclosure as manufactured by Placer Waterworks, Inc.

2.6.3 Radio Read Conduit

Radio read conduit shall consist of flexible corrugated non-metallic direct bury conduit. Size of conduit shall be as specified on Detail 2.

2.6.4 Repair Clamps

Repair clamps shall consist of a stainless steel band tensioned with stainless steel nuts and bolts. A water tight seal shall be provided by a waffled mat-type gasket certified by an ANSI accredited organization to be in compliance with NSF/ANSI 61.

Pre Approved Products:

EZ-MAX Repair Clamp as manufactured by Total Piping Solutions, Inc.

SS1 – Stainless Seal as manufactured by Romac Industries, Inc.

2.6.5 Tapping Saddles and Tapping Sleeves

Tapping saddles and sleeves shall conform to AWWA C800 and these specifications.

The subsections below are arranged in hierarchal order. Any tapping saddle or sleeve specified for a particular water main type may also be used on the water main types listed in the sections below it.

2.6.5.1 Tapping Sleeves for Steel Water Mains

Tapping sleeves used to tap steel water mains shall consist entirely of stainless steel, and utilize all stainless steel hardware. Tapping sleeves for services smaller than 4 inches shall have female iron pipe threads. Sleeves for services 4 inches and larger shall be flanged in accordance with AWWA C111. A water tight seal against the main shall be provided by a waffled mat-type gasket certified by an ANSI accredited organization to be in compliance with NSF/ANSI 61.

Pre Approved Products:

SST, SSTIII Stainless Steel Tapping Sleeve as manufactured by Romac Industries, Inc.

EZ-Tap Plus as manufactured by Total Piping Solutions, Inc.

FAST Tapping Sleeve as manufactured by The Ford Meter Box Company, Inc.

2.6.5.2 Tapping Saddles for PVC Water Mains

Tapping saddles used to tap PVC water mains shall consist entirely of brass or bronze, and utilize all brass or bronze hardware. Tapping saddles shall have female iron pipe threads of the appropriate size. Tapping saddles shall be equipped with a single, wide strap which fully encircles the main. The strap shall not be hinged to the tapping saddle, but shall attach with bolts on both sides. Watertight seal against the main shall be provided by a rubber gasket certified by an ANSI accredited organization to be in compliance with NSF/ANSI 61.

Pre Approved Products:

S91, Design B as manufactured by *The Ford Meter Box Company, Inc.*

2.6.5.3 Tapping Saddles for A-C and CI Water Mains

Tapping saddles used to tap A-C and CI water mains shall consist entirely of brass or bronze, and utilize all brass or bronze hardware. Tapping saddles shall have female iron pipe threads of the appropriate size. Tapping saddles shall have dual straps which connect to the saddle on both sides with bolts, and fully encircle the main. Watertight seal against the main shall be provided by a rubber gasket certified by an ANSI accredited organization to be in compliance with NSF/ANSI 61.

Pre Approved Products:

202B as manufactured by *The Ford Meter Box Company, Inc.*

2.6.5.4 Tapping Saddles for DI Mains

Tapping saddles used to tap DI mains shall consist entirely of brass or bronze, and utilize all brass or bronze hardware. Tapping saddles shall have female iron pipe threads of the appropriate size. Straps shall not be hinged to the tapping saddle, but shall attach to the saddle on both sides with bolts, and fully encircle the main. Watertight seal against the main shall be provided by a rubber gasket certified by an ANSI accredited organization to be in compliance with NSF/ANSI 61.

Pre Approved Products:

101B as manufactured by *The Ford Meter Box Company, Inc.*

2.6.6 Wrapping Tape

Pipe wrapping tape shall be 2” wide 10-mil polyvinyl tape.

Pre Approved Products:

Polyvinyl pipe tape as manufactured by Calpico, Inc.

2.6.7 Wood Blocking & Posts

Wood shall be redwood or pressure treated fir.

2.7 Backfill & Pavement

2.7.1 Backfill Material

Backfill material shall conform to the requirements of the applicable public works agency. If that agency has no published or readily available standards, backfill material shall conform to the requirements listed in the following sections.

2.7.1.1 Sand

Sand shall be clean, free of clay, debris, and organic or deleterious material. Sand shall conform to the following grading requirements.

100% passing the No. 4 sieve.

80-95% passing the No. 8 sieve.

Not more than 5% passing the No. 200 sieve.

2.7.1.2 Aggregate Base

Aggregate base shall be clean, free of clay, debris, organic and deleterious material.

Aggregate base shall be Class 2 Aggregate Base, ¾" maximum conforming to Section 26 of the CalTrans Standard Specifications. Aggregate base shall conform to the following grading requirements.

100% passing the 1" sieve.

90-100% passing the ¾" sieve.

35-60% passing the No. 4 sieve.

10-30% passing the No. 30 sieve.

2-9% passing the No. 200 sieve.

2.7.1.3 CLSM

Controlled low strength material (CLSM) shall be 1-sack cement sand slurry with a slump of 7 to 9 inches and a 28 day unconfined compressive strength of 50 to 150 psi. CLSM shall be mixed in a transit mixer. Certification tickets shall be submitted at the request of the Engineer. Where CLSM2 is called for by Detail or the Engineer, a 2-sack cement sand slurry shall be provided by the Contractor.

2.7.2 Pavement

Pavement shall conform to the requirements of the applicable public works agency. If that agency has no published or readily available standards, pavement shall conform to the requirements listed in the following sections.

2.7.2.1 Asphalt Concrete

Asphaltic concrete shall be Type B, or better, conforming to Section 39 of the CalTrans Standard Specifications. Type A asphaltic concrete may be substituted for Type B if it is required by another

agency, design engineer or is delivered to site instead of Type B. Gradations shall be per the specifications of the appropriate public works agency.

2.7.2.2 Portland Cement Concrete

All concrete shall be Portland cement concrete and shall be composed of Type II or Type V portland cement conforming to ASTM C150, fine and coarse aggregates, water and admixtures. Portland cement concrete shall be proportioned and mixed as required to produce a smooth, workable mixture. It shall have a minimum ultimate compressive strength of 3,000 psi as determined by ASTM C873. The maximum size of aggregate shall be that which passes a 1" mesh screen. Concrete shall not contain less than 6 sacks (565 lbs) of cement per cubic yard.

2.7.2.3 Concrete Reinforcement

Reinforcing bars shall conform to ASTM A615. All bars shall be deformed.

Welded wire mesh reinforcement may be plain or deformed. Plain wire shall conform to ASTM A185. Deformed wire shall conform to ASTM A497.

2.8 Miscellaneous

2.8.1 Disinfection Materials

Chlorine (bleach) used for disinfection may be either liquid chlorine or sodium hypochlorite solution. Calcium hypochlorite shall not be used unless approved in advance by the Engineer. Chlorine shall be certified by an ANSI accredited organization to be in compliance with NSF/ANSI 60.

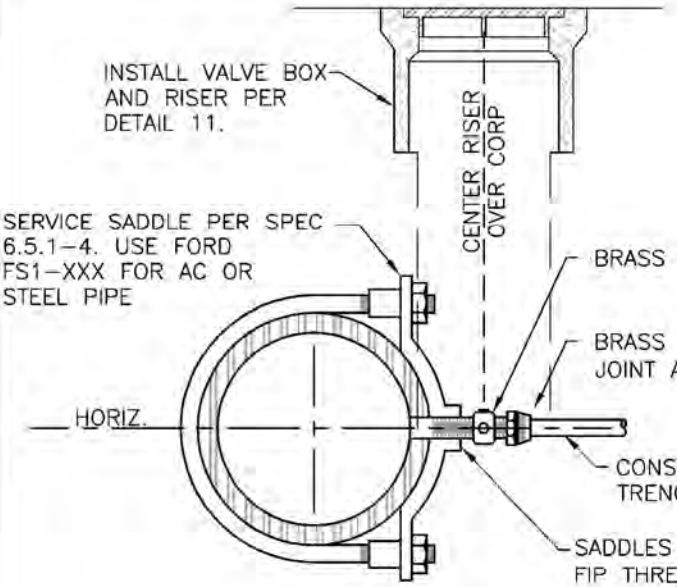
All materials used for disinfection of water mains such as jumper hoses and fittings shall be certified by an ANSI accredited organization to be in compliance with NSF/ANSI 61.

Chlorine neutralizing material shall consist of ascorbic acid.

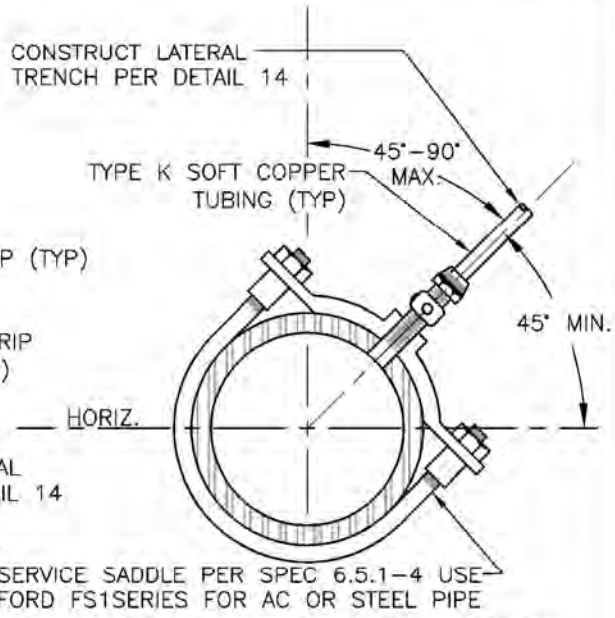
2.8.2 Temporary Materials

Materials used for temporary facilities shall consist of materials which will safely perform their intended purpose for the duration of their intended life. Temporary materials are subject to the approval of the Engineer. Temporary materials which will contact potable water shall be certified by an ANSI accredited organization to be in compliance with NSF/ANSI 61.

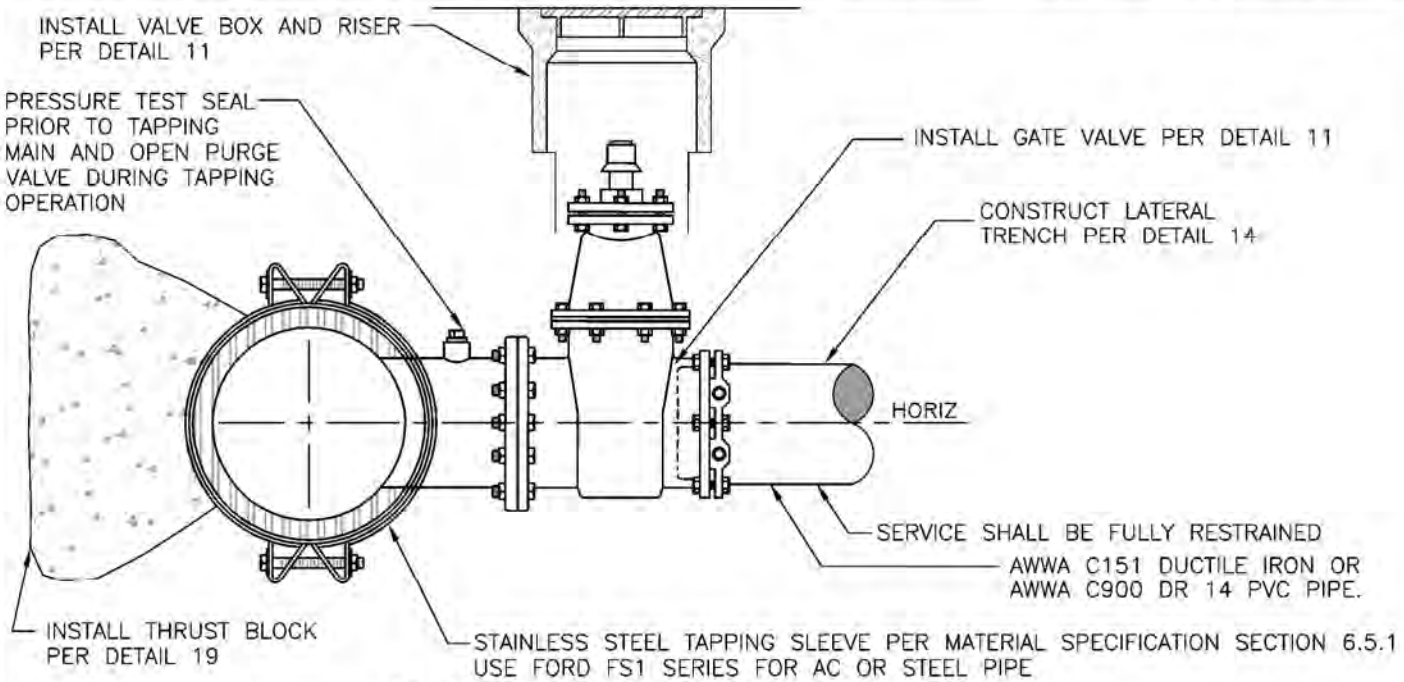
Section 3 Standard Details



2" CONNECTION



SMALLER THAN 2" CONNECTION



4" AND LARGER CONNECTION

NOTES

1. ALL HOT TAP CONNECTIONS SHALL BE MADE IN THE PRESENCE OF THE ENGINEER.
2. ALL HOT TAP CONNECTIONS SHALL BE AT LEAST 24" AWAY FROM ANY JOINT OR FITTING AND 18" AWAY FROM ANY OTHER TAP.
3. CONTRACTOR SHALL OPEN PURGE VALVE DURING TAPPING OPERATION.
4. SERVICE PIPING AND FITTING DIAMETERS SHALL MEET OR EXCEED THE SERVICE SIZE DESIGNATED BY THE ENGINEER.
5. TAPPING BIT SHALL BE OF THE HOLE-SAW OR SHELL TYPE.
6. COUPON OR "COOKIE" SHALL BE SUBMITTED TO THE ENGINEER UPON REQUEST.
7. IF COUPON IS LOST, CONTRACTOR SHALL FULLY OPEN SERVICE IN THE PRESENCE OF THE ENGINEER TO VERIFY FLOW.
8. CONTRACTOR SHALL COAT TAPPING SADDLE, ALL FASTENERS AND SERVICE LINE WITH BITUMASTIC AND/OR ENCASE IN POLYETHYLENE IF DIRECTED BY THE ENGINEER.
9. CONNECTIONS TO MAINS SMALLER THAN 4" SHALL BE SPECIFIED ON A CASE BY CASE BASIS.
10. SERVICE SHALL BE DISINFECTED IF REQUIRED BY THE ENGINEER.

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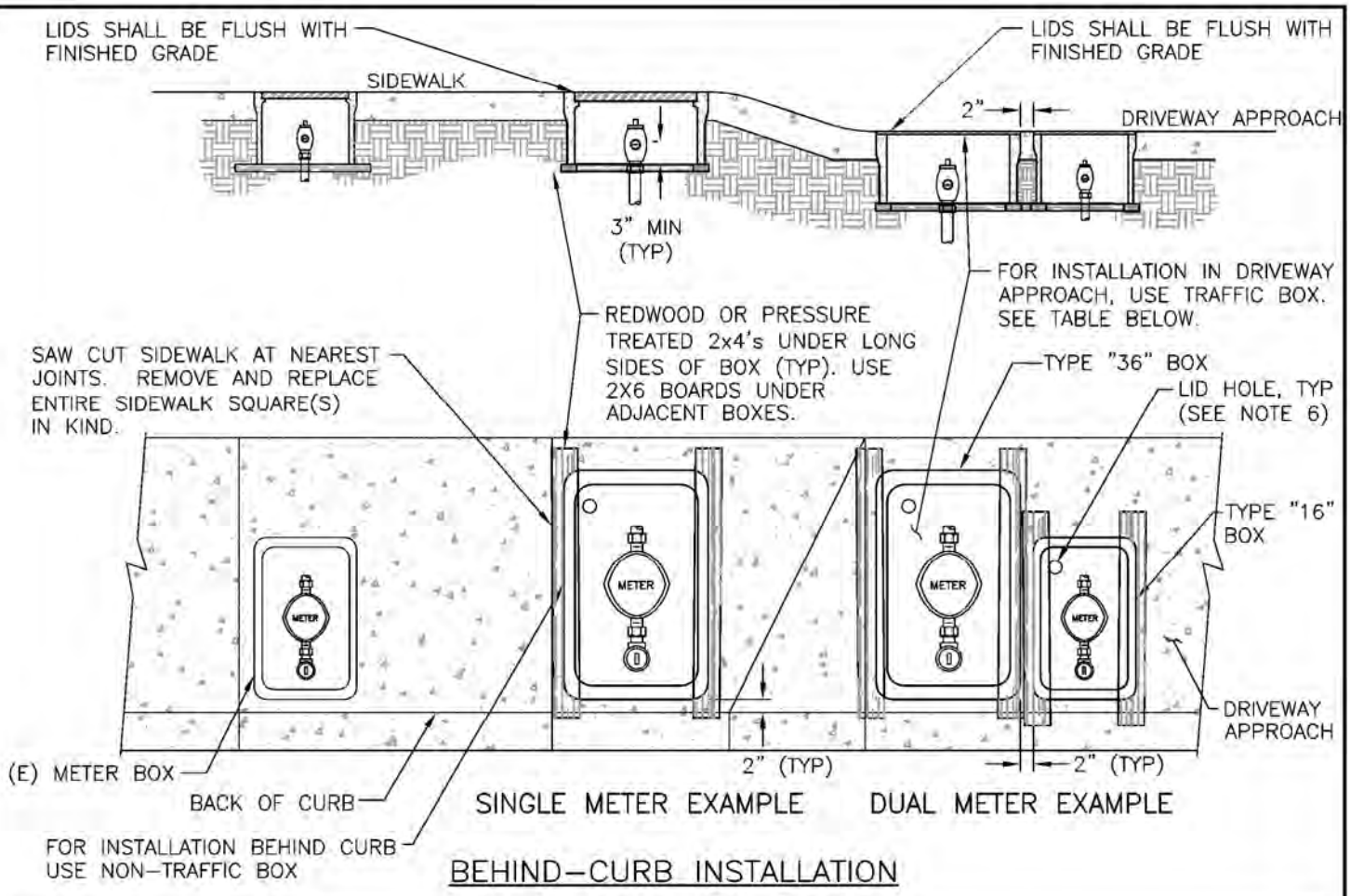
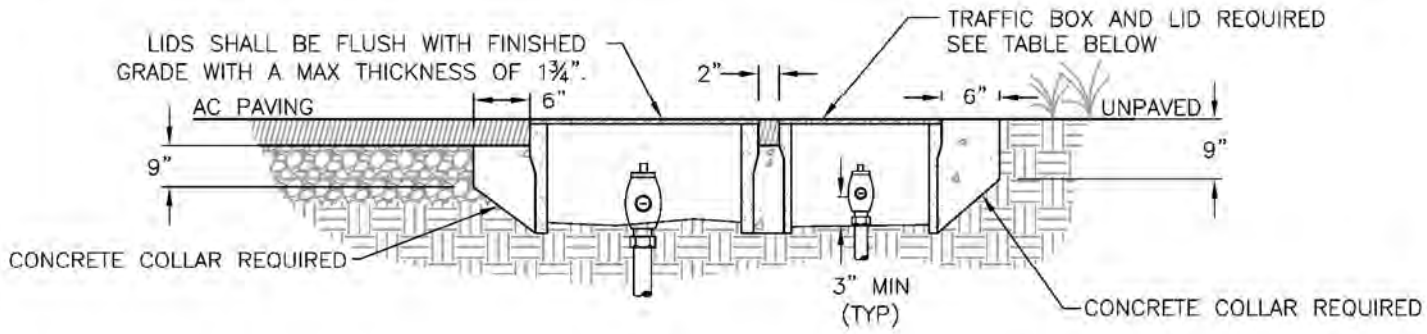
DETAIL 1

SERVICE CONNECTION

NOT TO SCALE



BEHIND-CURB INSTALLATION



INSTALLATION IN AREAS WITHOUT CURB

BOX TYPE	NON-TRAFFIC	TRAFFIC
TYPE "16"	CHRISTY B16 BOX W/ B16P[6] LID OR EQUAL	CHRISTY B1017 BOX W/ B1017-JH LID OR EQUAL
TYPE "36"	CHRISTY B36 BOX W/ B36P[6] LID OR EQUAL	CHRISTY B1730 BOX W/ B1730-51JH LID OR EQUAL
TYPE "36"	" FL36T BOX W/ FL36P[6] LID OR EQUAL	

NOTES
1. LIDS TO BE PURCHASED FROM SVWD

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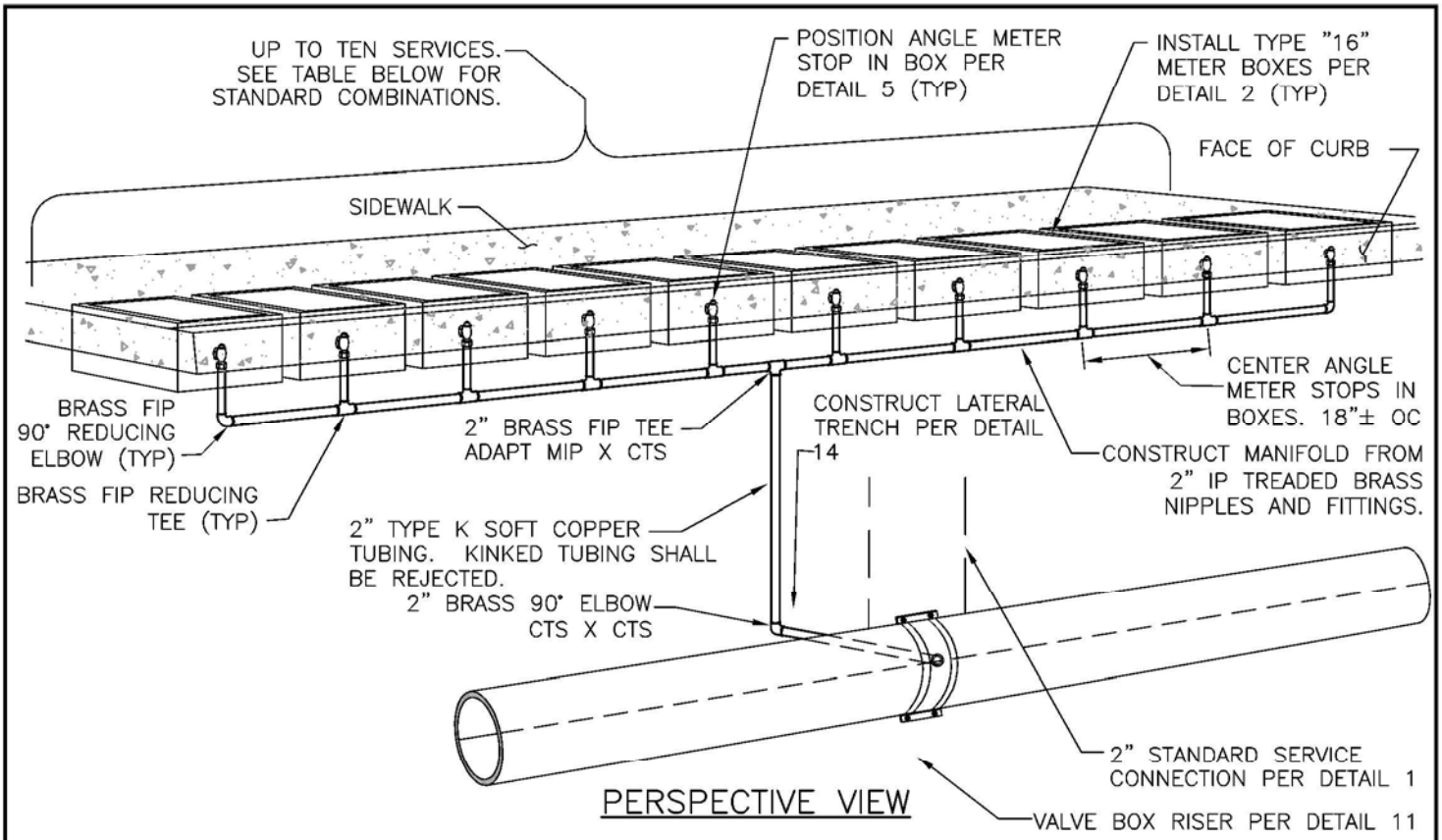
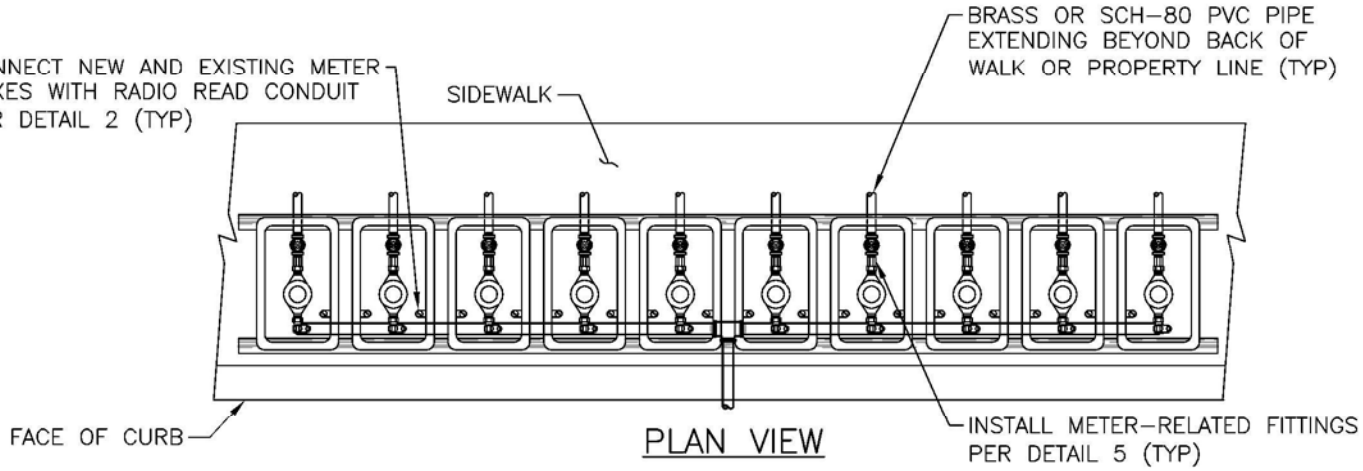
DETAIL 2

METER BOX INSTALLATION

NOT TO SCALE



PERSPECTIVE VIEW



PLAN VIEW

NUMBER OF 1-INCH SERVICES	0	1	2	3	4
MAXIMUM NUMBER OF ¾-INCH SERVICES	10	7	5	2	0
MAXIMUM COMBINED TOTAL SERVICES	10	8	7	5	4

NOTES

1. BRASS FITTINGS, VALVES AND PIPE SHALL CONSIST OF LOW-LEAD BRASS ALLOY AND SHALL HAVE A MINIMUM WORKING PRESSURE OF 150 PSI.
2. FIRE SERVICES SHALL NOT BE COMBINED WITH OTHER SERVICES IN THIS MANNER.
3. PERMISSION TO INSTALL SERVICES IN OTHER CONFIGURATIONS NOT SHOWN HERE MAY BE GRANTED BY THE ENGINEER. IN THIS CASE, THE DEVELOPER SHALL SUBMIT CALCULATIONS WHICH DEMONSTRATE TO THE SATISFACTION OF THE ENGINEER THAT THE RESIDUAL PRESSURE IS GREATER THAN A SINGLE SERVICE WHEN ALL SERVICES ARE FULLY OPEN.

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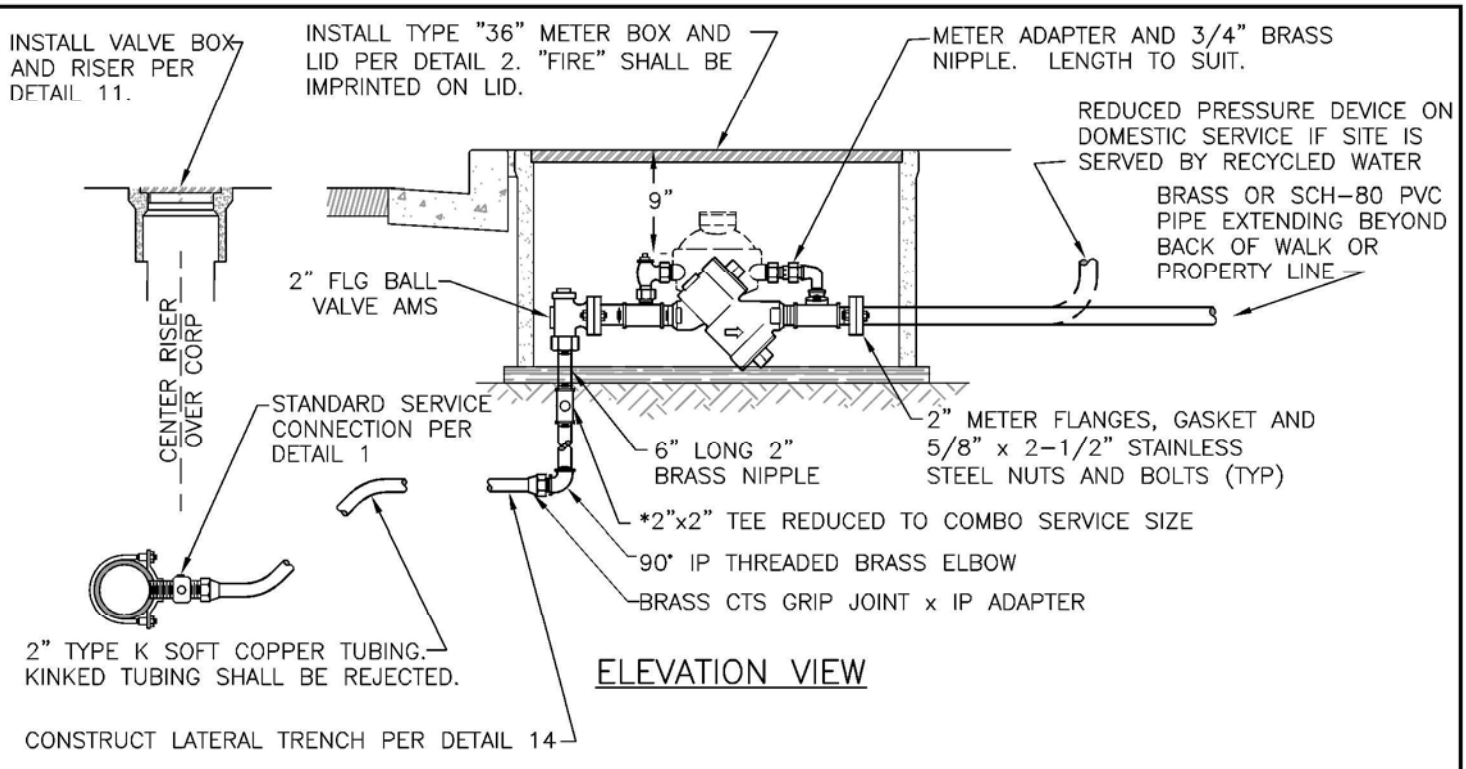
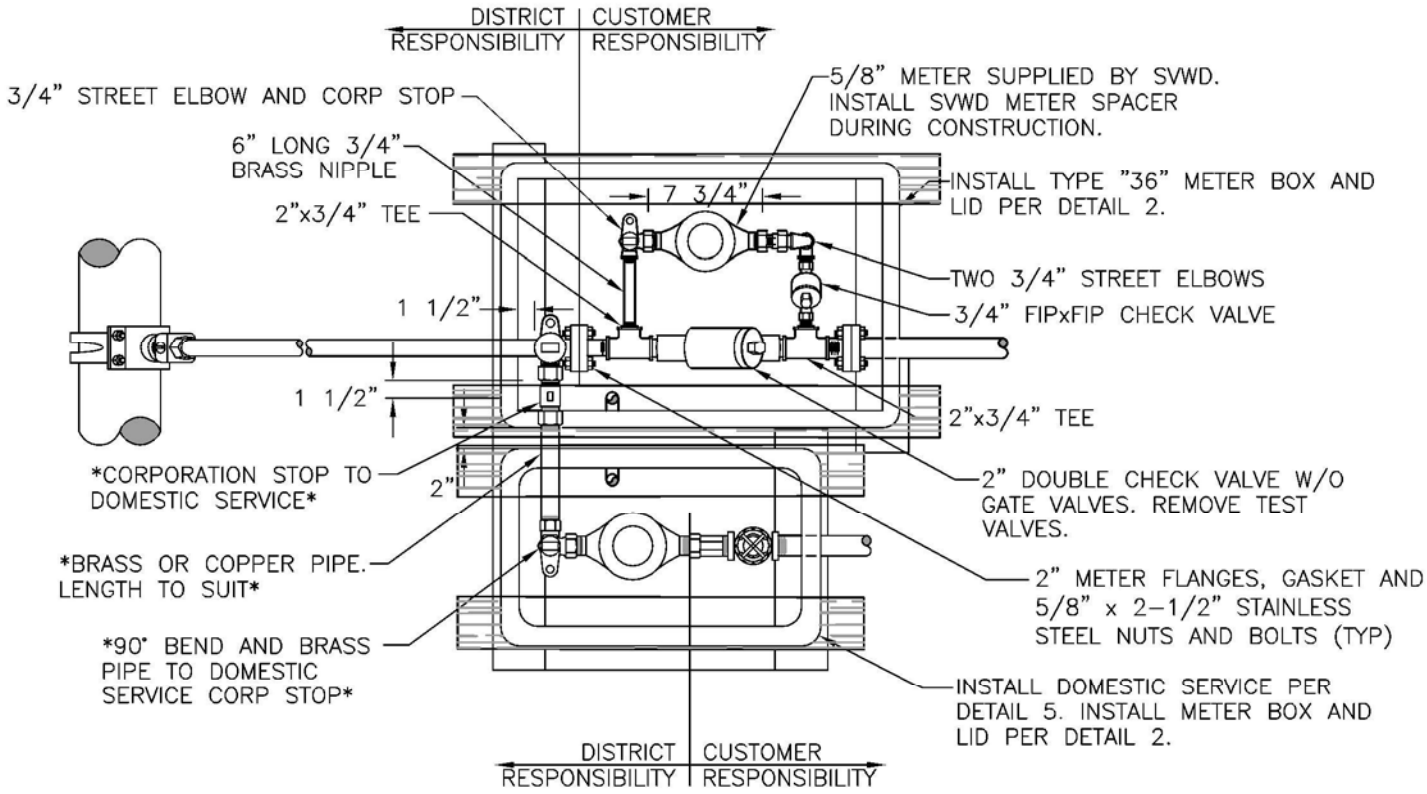
DETAIL 3

1-INCH AND SMALLER MULTIPLE BRANCHED SERVICE INSTALLATION

NOT TO SCALE



ELEVATION VIEW



PLAN VIEW

NOTES

* REQUIRED ONLY FOR COMBO SERVICE INSTALLATIONS.

1. BRASS FITTINGS, VALVES AND PIPE SHALL CONSIST OF LOW-LEAD BRASS ALLOY AND SHALL HAVE A MINIMUM WORKING PRESSURE OF 150 PSI.
2. FIRE SERVICE LINE SHALL BE TESTED FOR LEAKS PRIOR TO BACKFILLING.
3. CUSTOMER SIDE FIRE SERVICE PIPE TYPE AND CONNECTION SHALL MEET LOCAL FIRE AGENCY REQUIREMENTS.
4. PURCHASE LIDS FROM SVWD

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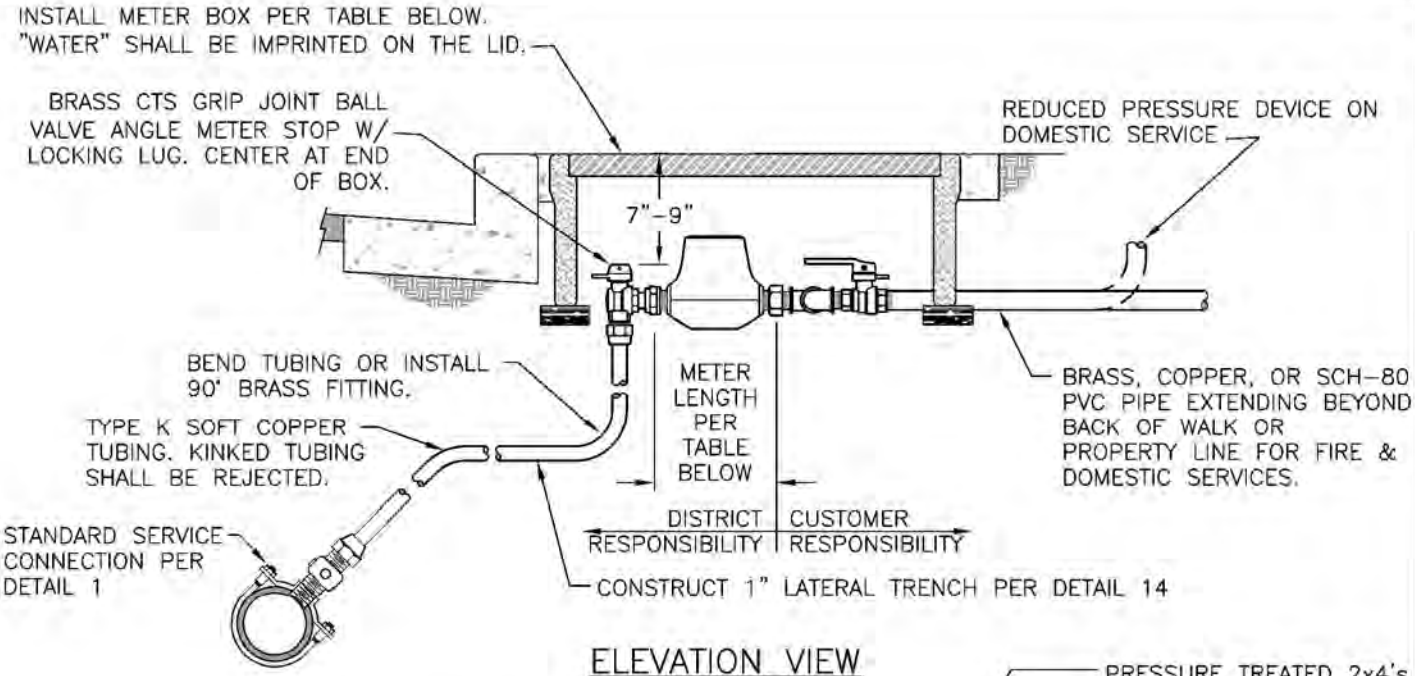
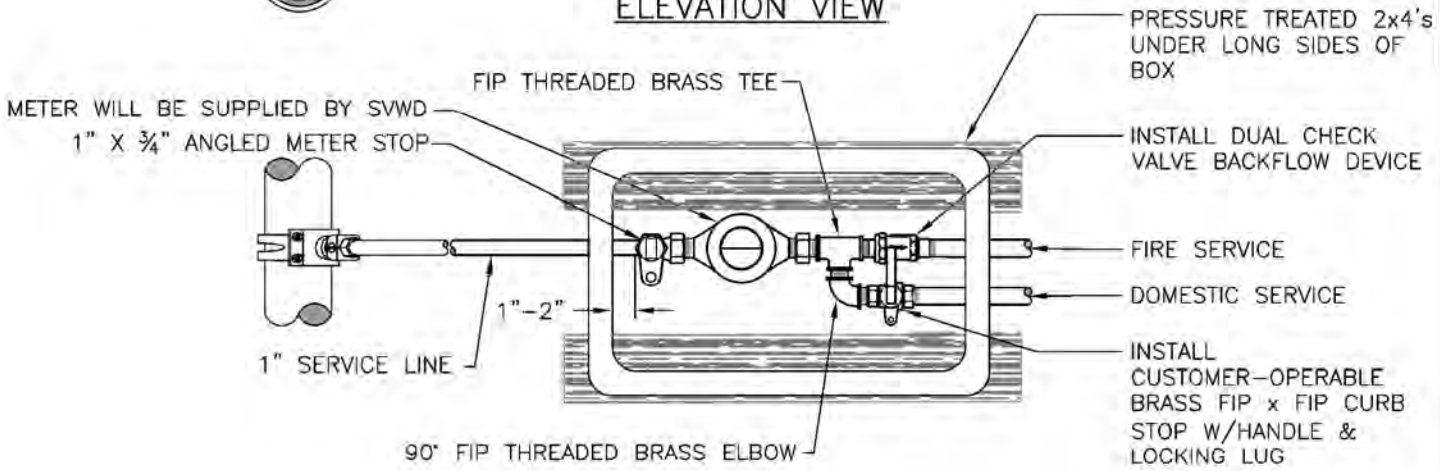
DETAIL 4

COMBINATION 2-INCH FIRE AND DOMESTIC SERVICE INSTALLATION

NOT TO SCALE



ELEVATION VIEW



PLAN VIEW

METER	BOX TYPE	METER LENGTH
¾" THREADED	"16"	7¾"

MAX SPRINKLER DEMAND
30 GPM W/ ¾" SERVICE

BOX TYPE	NON-TRAFFIC	TRAFFIC
TYPE "16"	CHRISTY B16 BOX W/ N16R LID OR EQUAL	CHRISTY B1324 BOX W/ B1324-51JH LID OR EQUAL

PERMITTED USES

A. HIGH-DENSITY DEVELOPMENTS (APARTMENTS, CONDOMINIUMS, MULTI-FAMILY, ETC.). SERVED BY RECYCLED WATER.
B. SINGLE FAMILY RESIDENCES THAT ARE REQUIRED TO INSTALL A ¾" METER TO MEET FIXTURE COUNT (HOUSEHOLD) DEMAND.

DETAIL NOTES

1. ANGLE METER STOP TO BE 1" X ¾" GRIP JOINT
2. BRASS FITTINGS, VALVES AND PIPE SHALL CONSIST OF LOW-LEAD BRASS ALLOY AND SHALL HAVE A MINIMUM WORKING PRESSURE OF 150 PSI.
3. FIRE SERVICE LINE SHALL BE TESTED FOR LEAKS PRIOR TO BACKFILLING.
4. CUSTOMER SIDE FIRE SERVICE PIPE TYPE AND CONNECTION SHALL MEET FIRE DISTRICT REQUIREMENTS.

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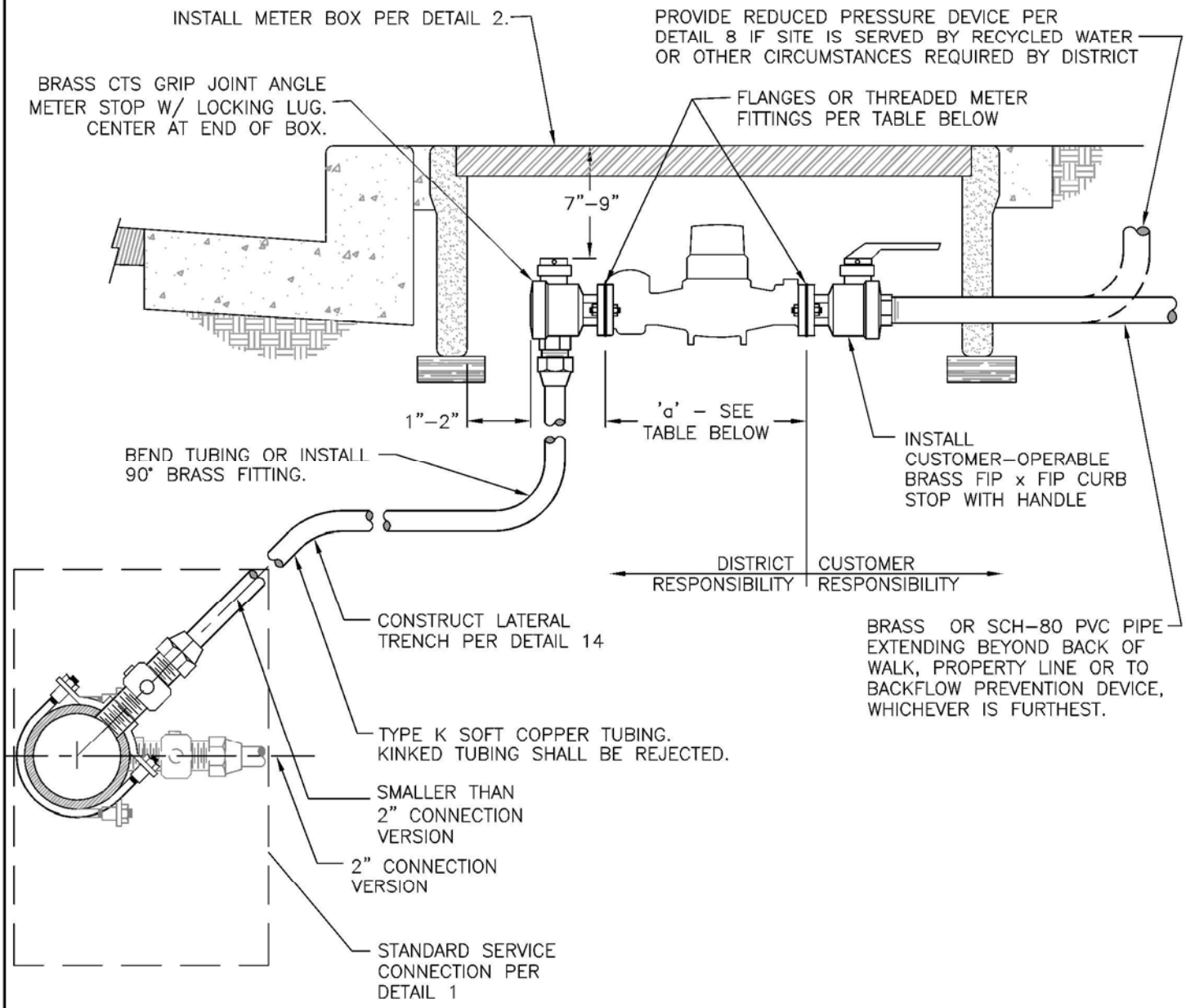
DETAIL 4A

COMBINATION 3/4-INCH FIRE AND DOMESTIC SERVICE INSTALLATION

NOT TO SCALE



METER SIZE AND TYPE (ASSIGNED BY SVWD)	BOX TYPE (SEE DETAIL 2)	METER LENGTH, a
5/8" THREADED	"16"	7¾"
¾" THREADED	"16"	7¾"
1" THREADED	"16"	11"
1½" FLANGED	"36"	13"
2" FLANGED	"36"	15¼"

NOTES

1. BRASS FITTINGS, VALVES AND PIPE SHALL CONSIST OF LOW–LEAD BRASS ALLOY AND SHALL HAVE A MINIMUM WORKING PRESSURE OF 150 PSI.
2. METER WILL BE FURNISHED AND INSTALLED BY DISTRICT
3. A BACKFLOW PREVENTION ASSEMBLY SHALL BE INSTALLED PER DETAIL 8 IF REQUIRED BY THE ENGINEER.

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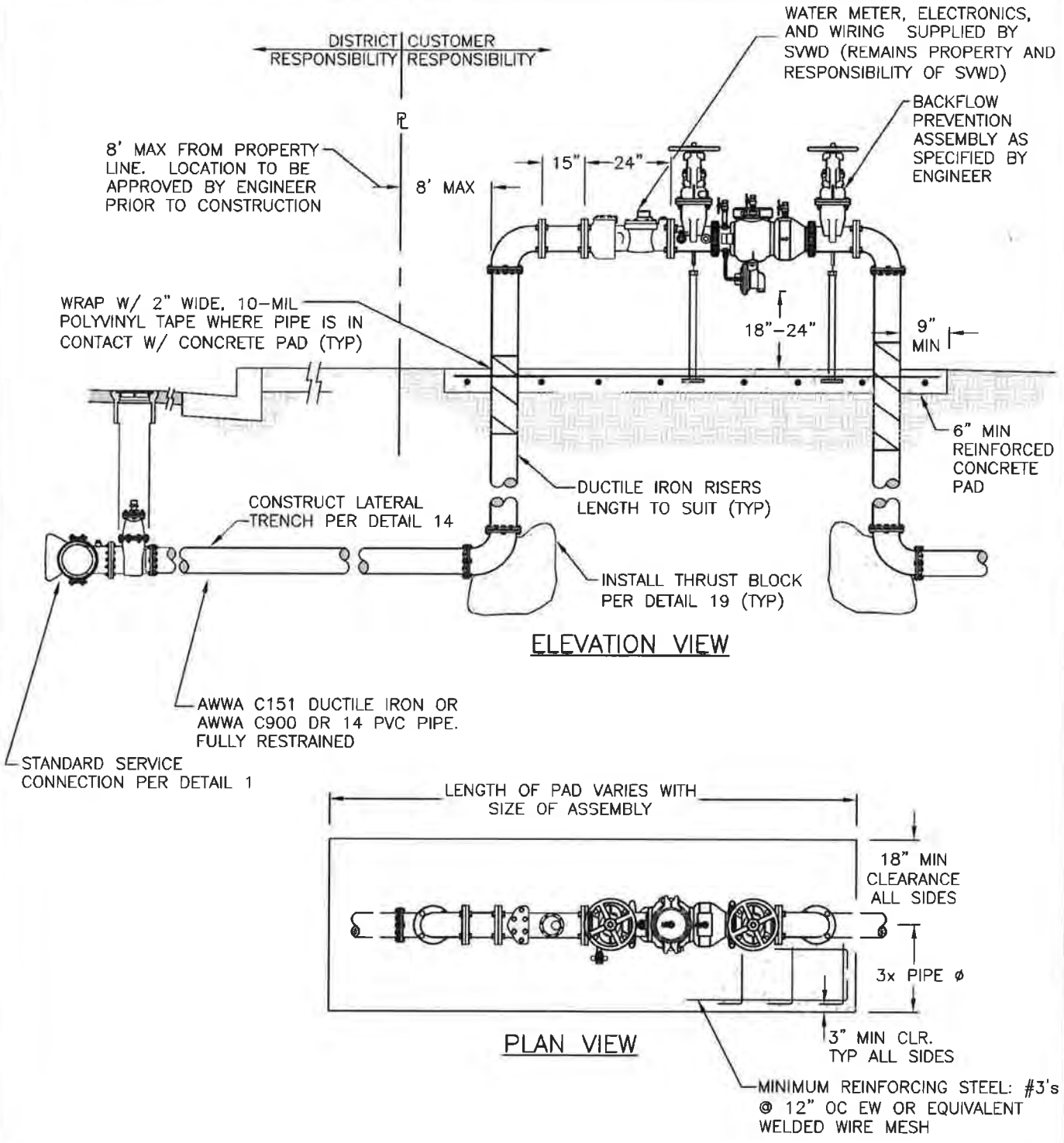
DETAIL 5

2–INCH AND SMALLER SERVICE INSTALLATION

NOT TO SCALE



NOTES

1. LOCATION OF ASSEMBLY SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION
2. INSTALL TRAFFIC BOLLARD(S) PER DETAIL 20 IF REQUIRED BY ENGINEER

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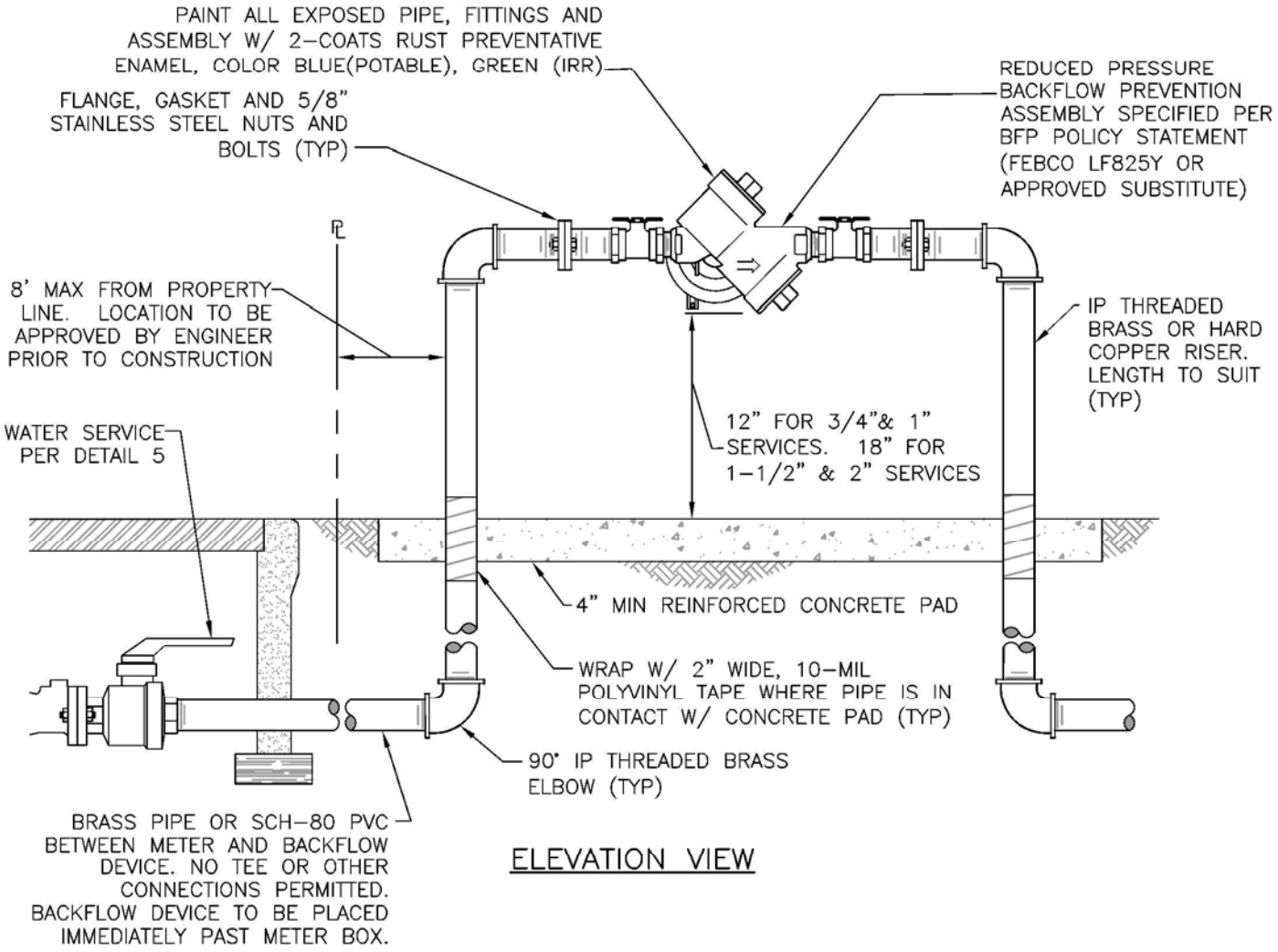
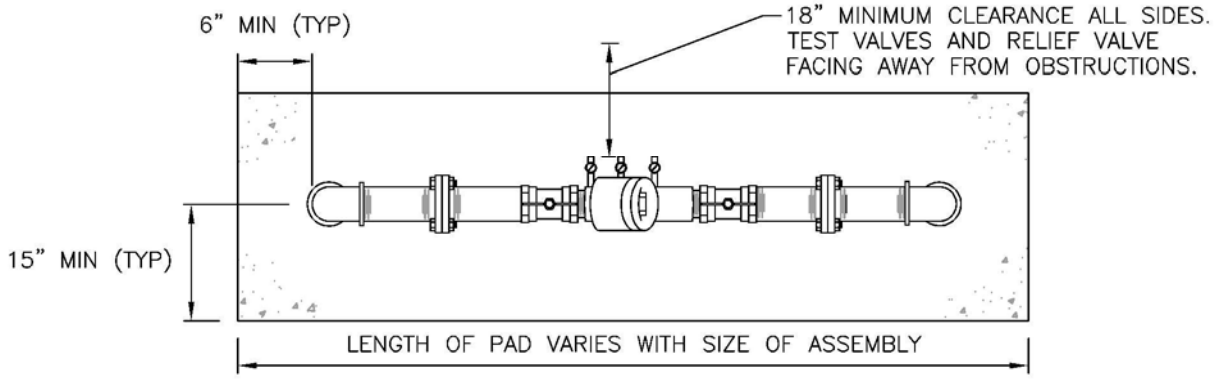
DETAIL 6

3-INCH AND LARGER SERVICE INSTALLATION

NOT TO SCALE



ELEVATION VIEW



PLAN VIEW

NOTES

1. APPROVED BACKFLOW ASSEMBLY SHALL BE INSTALLED SUCH THAT IT IS ABOVE GROUND AND READILY ACCESSIBLE FOR REPAIR AND INSPECTION.
2. BRASS FITTINGS, VALVES AND PIPE SHALL CONSIST OF LOW-LEAD BRASS ALLOY AND SHALL HAVE A MINIMUM WORKING PRESSURE OF 150 PSI.
3. BRASS OR PLASTIC PLUGS SHALL BE INSTALLED ON ALL TEST PORTS.
4. ALL ABOVE GROUND PIPE, FITTINGS AND ASSEMBLY SHOULD BE PAINTED WITH TWO COATS OF ENAMEL.
5. AN ENCLOSURE OR CAGE MAY BE INSTALLED AT THE OPTION OF THE PROPERTY OWNER.

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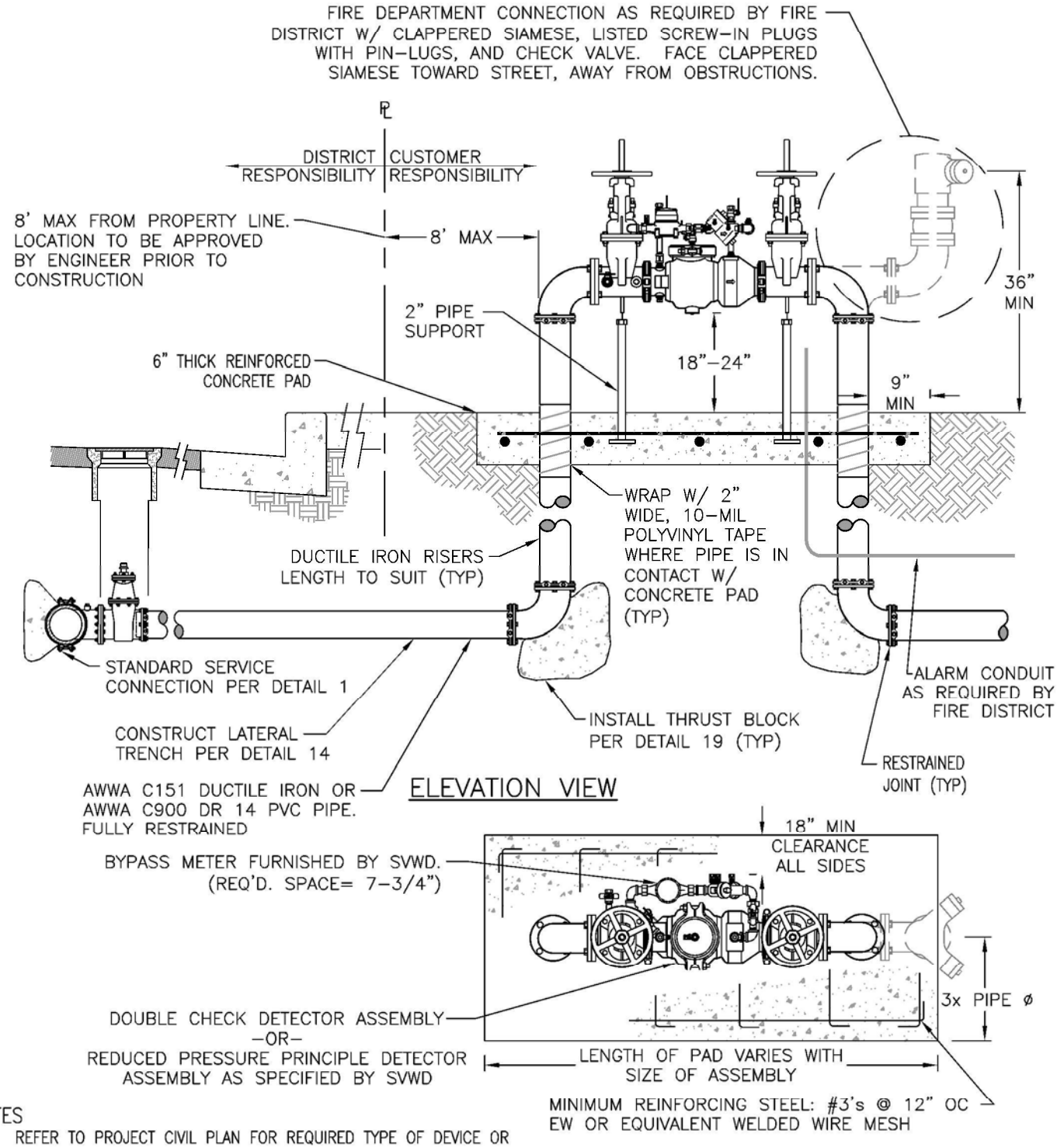
DETAIL 8

2-INCH AND SMALLER BACKFLOW PREVENTION ASSEMBLY INSTALLATION

NOT TO SCALE



NOTES

1. REFER TO PROJECT CIVIL PLAN FOR REQUIRED TYPE OF DEVICE OR CONTACT ENGINEER FOR SPECIFIED TYPE PRIOR TO SCHEDULING INSTALLATION.
2. O.S. AND Y. VALVES SHALL BE EQUIPPED WITH TAMPER PROOF ALARM DEVICES. VALVES ARE TO BE CHAINED TOGETHER IN THE OPEN POSITION WITH A BREAK-AWAY CHAIN OR AS REQUIRED BY FIRE DISTRICT.
3. ASSEMBLY TO BE PAINTED RED OR OTHER COLOR AS SPECIFIED BY FIRE DISTRICT.
4. DEVICE MUST BE INSTALLED SO THAT IT IS READILY ACCESSIBLE FOR TESTING AND MAINTENANCE.
5. LOCATIONS MUST BE APPROVED BY SVWD PRIOR TO INSTALLATION.
6. INSTALL TRAFFIC BOLLARDS (2 MIN) PER DETAIL 20 WHEN EDGE OF VEHICULAR TRAFFIC IS LESS THAN 36" FROM ASSEMBLY.
7. BRASS OR PLASTIC PLUGS SHALL BE INSTALLED ON ALL TEST PORTS.

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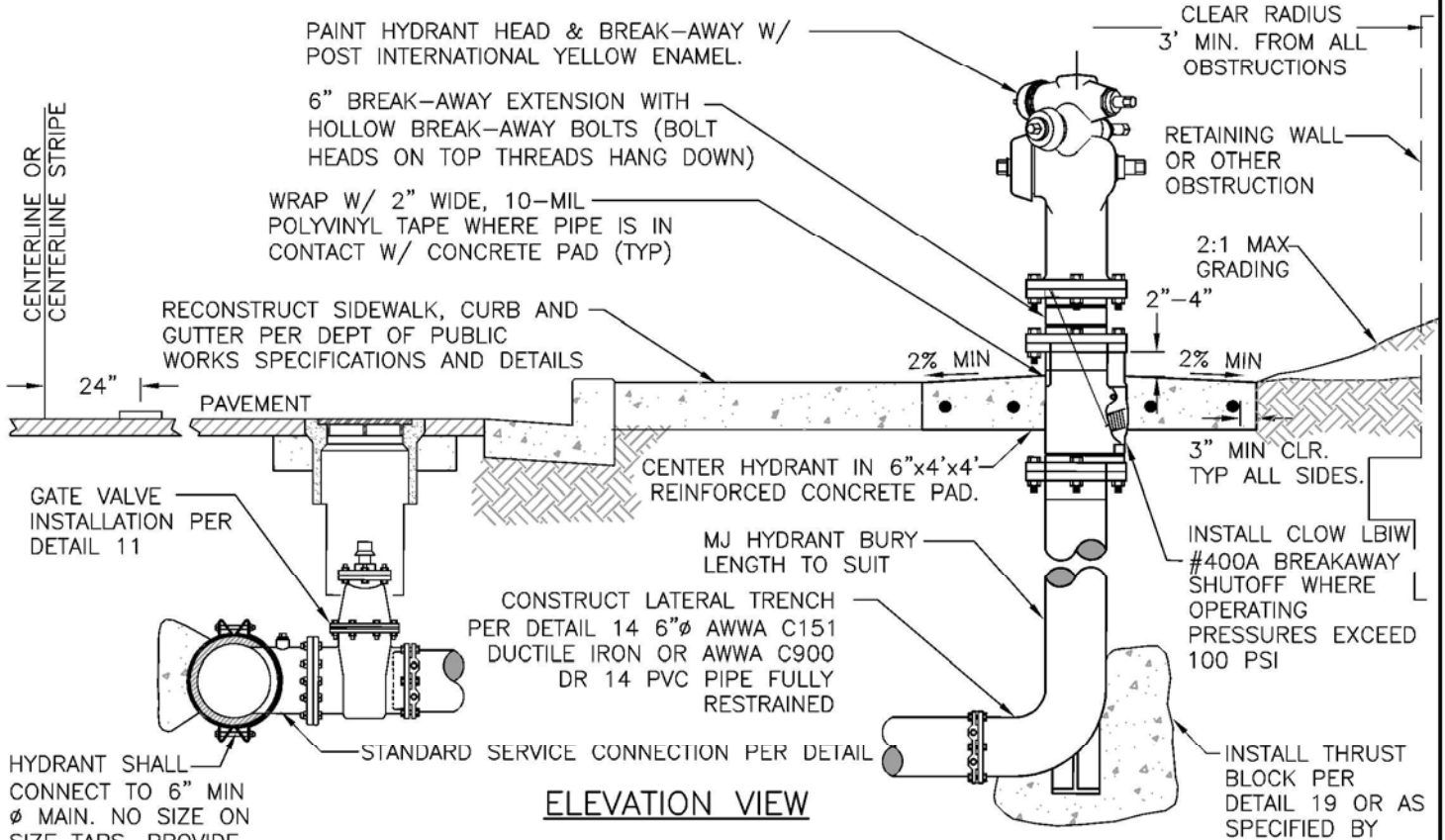
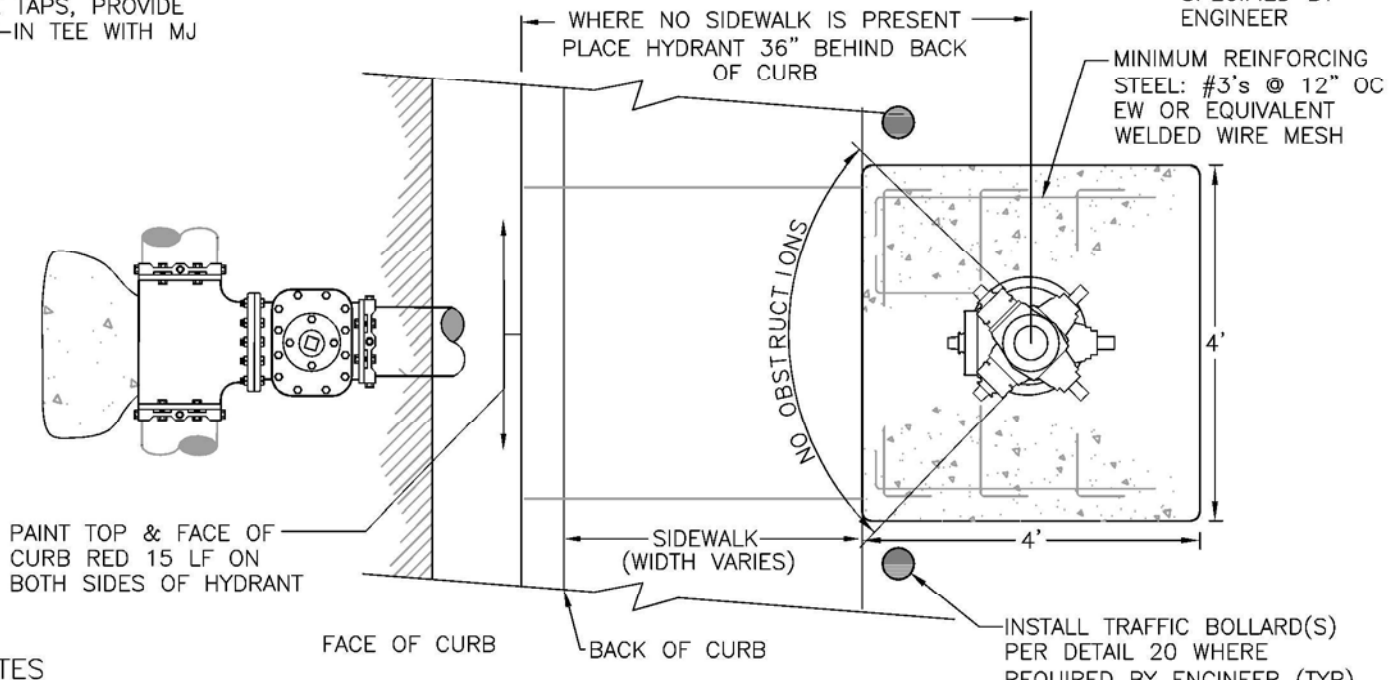
DETAIL 9

STANDARD 4-INCH AND LARGER FIRE SERVICE INSTALLATION

NOT TO SCALE



ELEVATION VIEW



PLAN VIEW

NOTES

1. HYDRANT SHALL BE 6" "STEAMER" TYPE; CLOW MODEL 860, OR APPROVED EQUAL.
2. REMOVE HYDRANT OUTLET CAP CHAINS PERMANENTLY.
3. HYDRANT SHALL BE COVERED WITH BURLAP SACK OR APPROVED ORANGE BAG WHEN NOT IN SERVICE.
4. FIRE HYDRANT LOCATION SHALL BE APPROVED ON A CASE BY CASE BASIS PRIOR TO CONSTRUCTION AND SHALL INCLUDE FIRE AGENCY APPROVED PLANS, CITY OR COUNTY ENCROACHMENT PERMIT, AND FIELD VERIFICATION BY THE APPROPRIATE FIRE AGENCY, CITY OR COUNTY PUBLIC WORKS DEPARTMENT AND SVWD, PER SVWD HYDRANT INSTALLATION PERMIT REQUIREMENTS PRIOR TO CONSTRUCTION.
5. SEE APPENDIX 1 FOR FURTHER HYDRANT INSTALLATION REQUIREMENTS.

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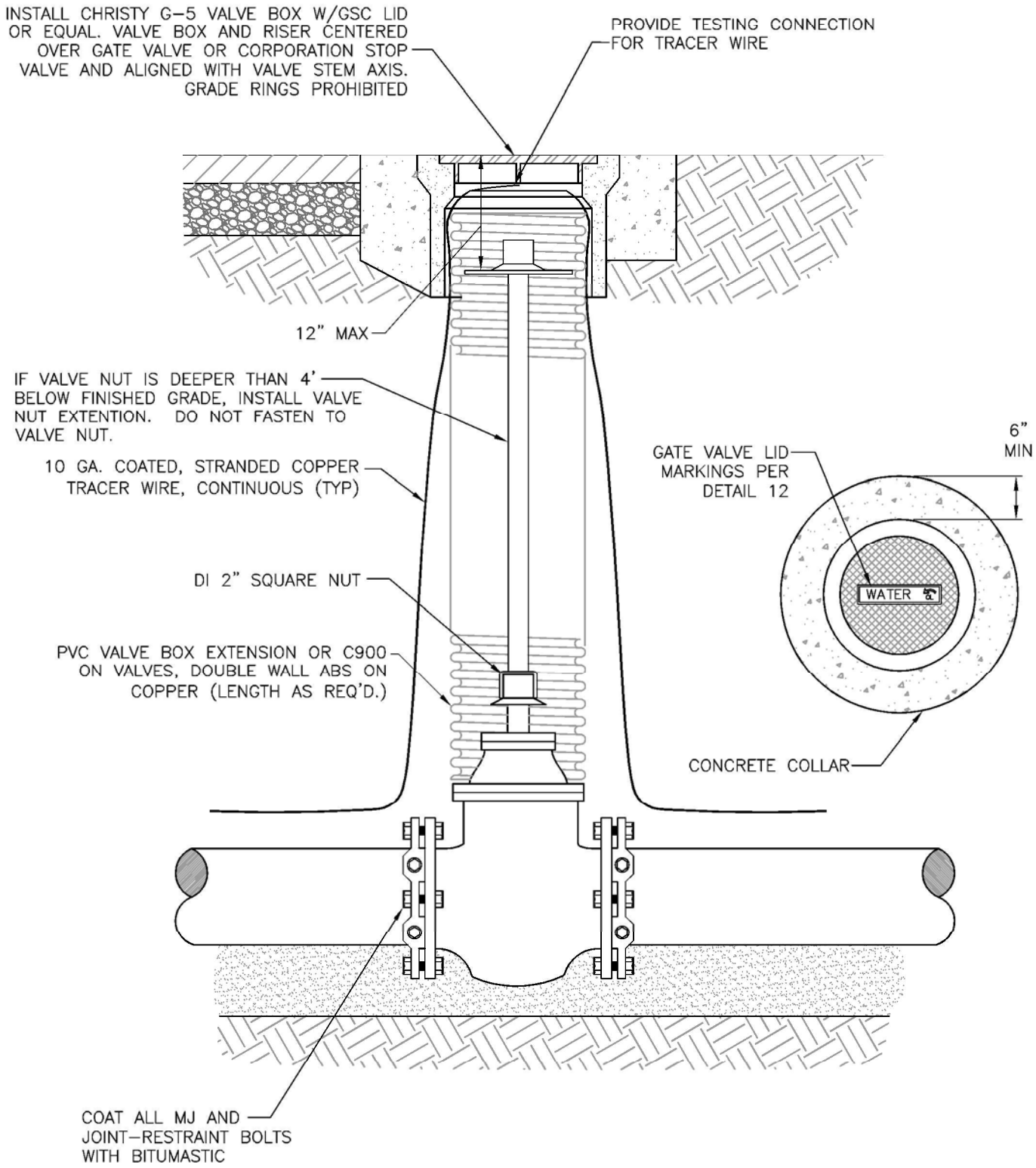
DETAIL 10

FIRE HYDRANT INSTALLATION

NOT TO SCALE



NOTES

1. INSTALL BLOCKING UNDER VALVE IF REQUIRED.
2. RISER TERMINATION FOR GATE VALVE SHALL OCCUR AT VALVE FLANGE.
3. RISER TERMINATION FOR SERVICE CONNECTION (2" & SMALLER) SHALL OCCUR 1" BELOW CORP STOP.
4. VALVE BOX LID SHALL BE OILED PRIOR TO PAVING OR CLEANING TO ENSURE THAT LID MARKINGS ARE LEGIBLE.
5. INSTALL VALVE BOX LID FLUSH WITH FINAL PAVING OR GROUND SURFACE.

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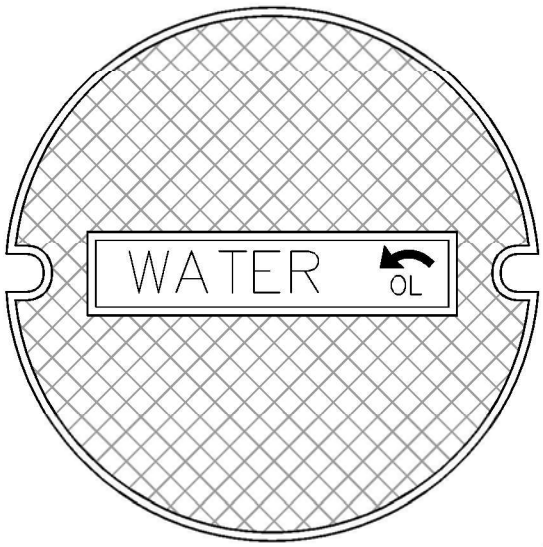
DETAIL 11

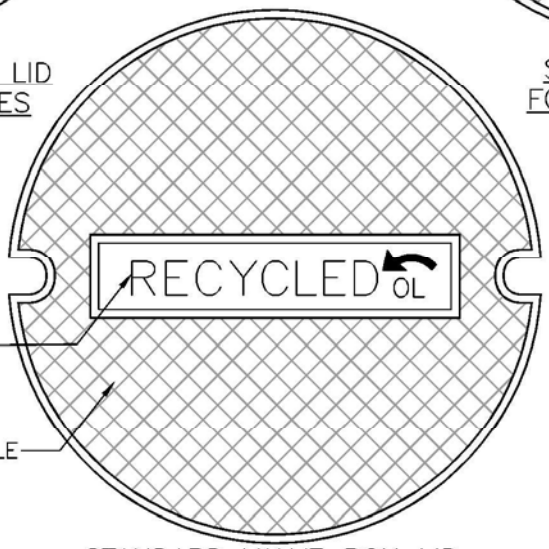
GATE VALVE INSTALLATION

NOT TO SCALE

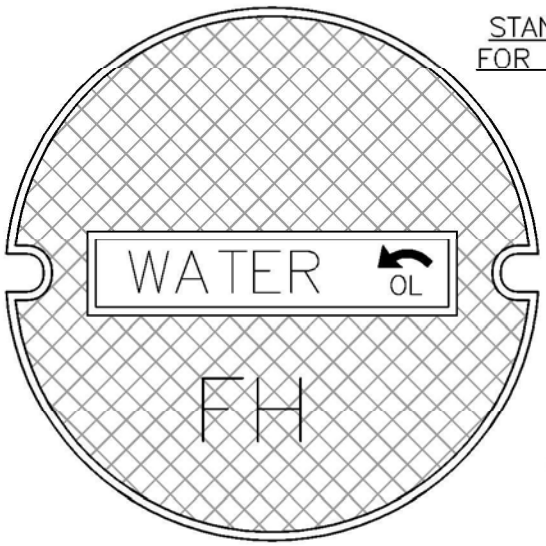


STANDARD VALVE BOX LID
FOR MAIN LINE VALVES

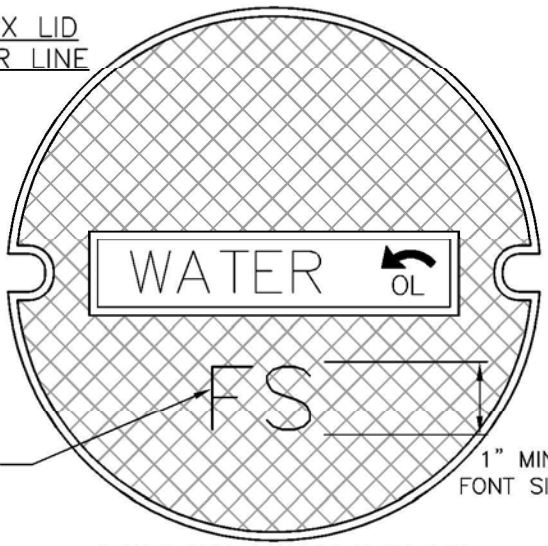
STANDARD VALVE BOX LID
FOR ALL NORMALLY CLOSED
ZONE VALVES



STANDARD VALVE BOX LID
FOR RECYCLED WATER LINE
VALVES



STANDARD VALVE BOX LID FOR
ALL FIRE HYDRANT VALVES



STANDARD VALVE BOX LID
FOR ALL FIRE SERVICES

LABELING OPTIONS	LABEL	LID COLOR
BUTTERFLY VALVE	BFV	BLUE
BLOW OFF VALVE	BO	BLUE
TEST STATION	TS	BLUE
ZONE VALVE	ZV	BLUE
FIRE SERVICE	FS	BLUE
FIRE HYDRANT	FH	YELLOW
RAW WATER	RAW	TAN
RECYCLED WATER	REC	PURPLE

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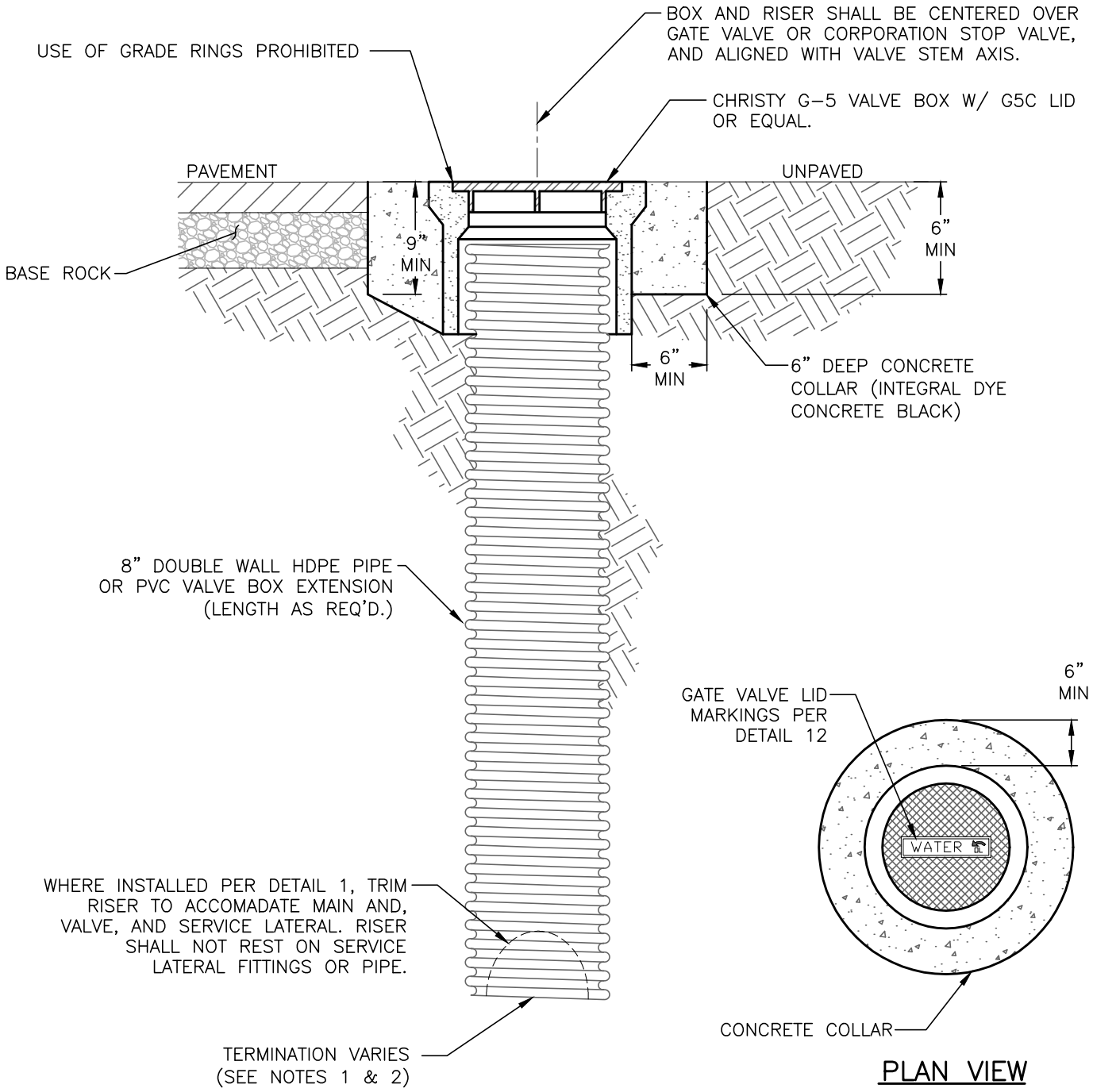
DETAIL 12

VALVE BOX LID MARKINGS

NOT TO SCALE



NOTES

1. RISER TERMINATION FOR GATE VALVE INSTALLATION SHALL OCCUR AT VALVE FLANGE (SEE DETAIL 11).
2. RISER TERMINATION FOR SERVICE CONNECTION (2" & SMALLER) SHALL OCCUR 1" BELOW CORP STOP.
3. VALVE BOX LID SHALL BE OILED PRIOR TO PAVING OR CLEANING TO ENSURE THAT LID MARKINGS ARE LEGIBLE.
4. INSTALL VALVE BOX LID FLUSH WITH FINAL PAVING OR GROUND SURFACE.

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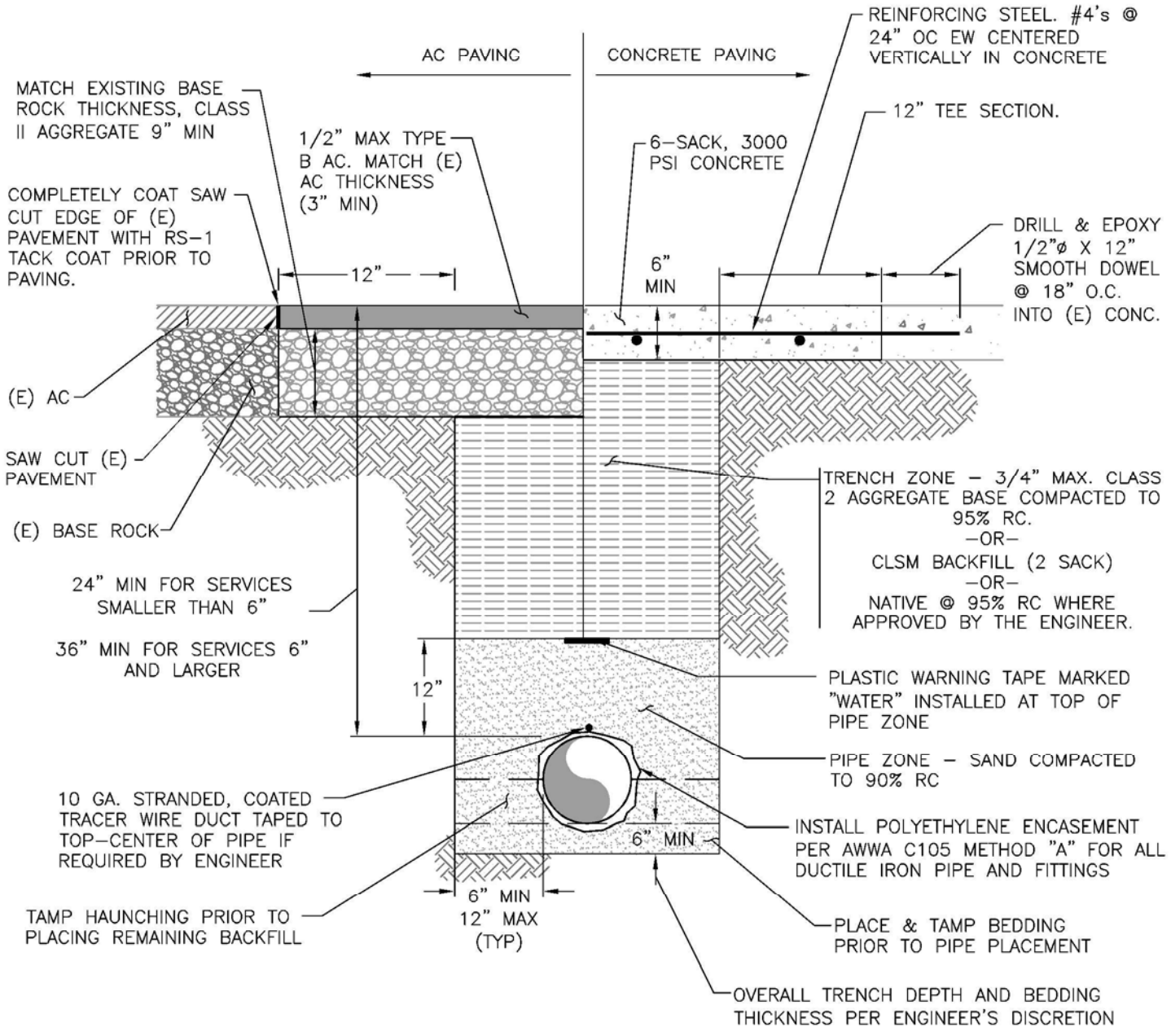
DETAIL 13

VALVE BOX INSTALLATION

NOT TO SCALE



STANDARD SERVICE LATERAL TRENCH

NOTES

1. IF ANY PORTION OF (E) PAVEMENT WITHIN SAWCUT LIMITS IS CONCRETE AT THE SURFACE, ENTIRE TRENCH SHALL BE RE-PAVED WITH CONCRETE AS SHOWN.
2. WHERE WATER SERVICES 6" AND LARGER CANNOT MEET MINIMUM COVER REQUIREMENTS, THE ENGINEER MAY APPROVE ALTERNATE INSTALLATION PER DETAIL 16.
3. ALL JOINTS ON SERVICE LATERALS SHALL BE RESTRAINED.

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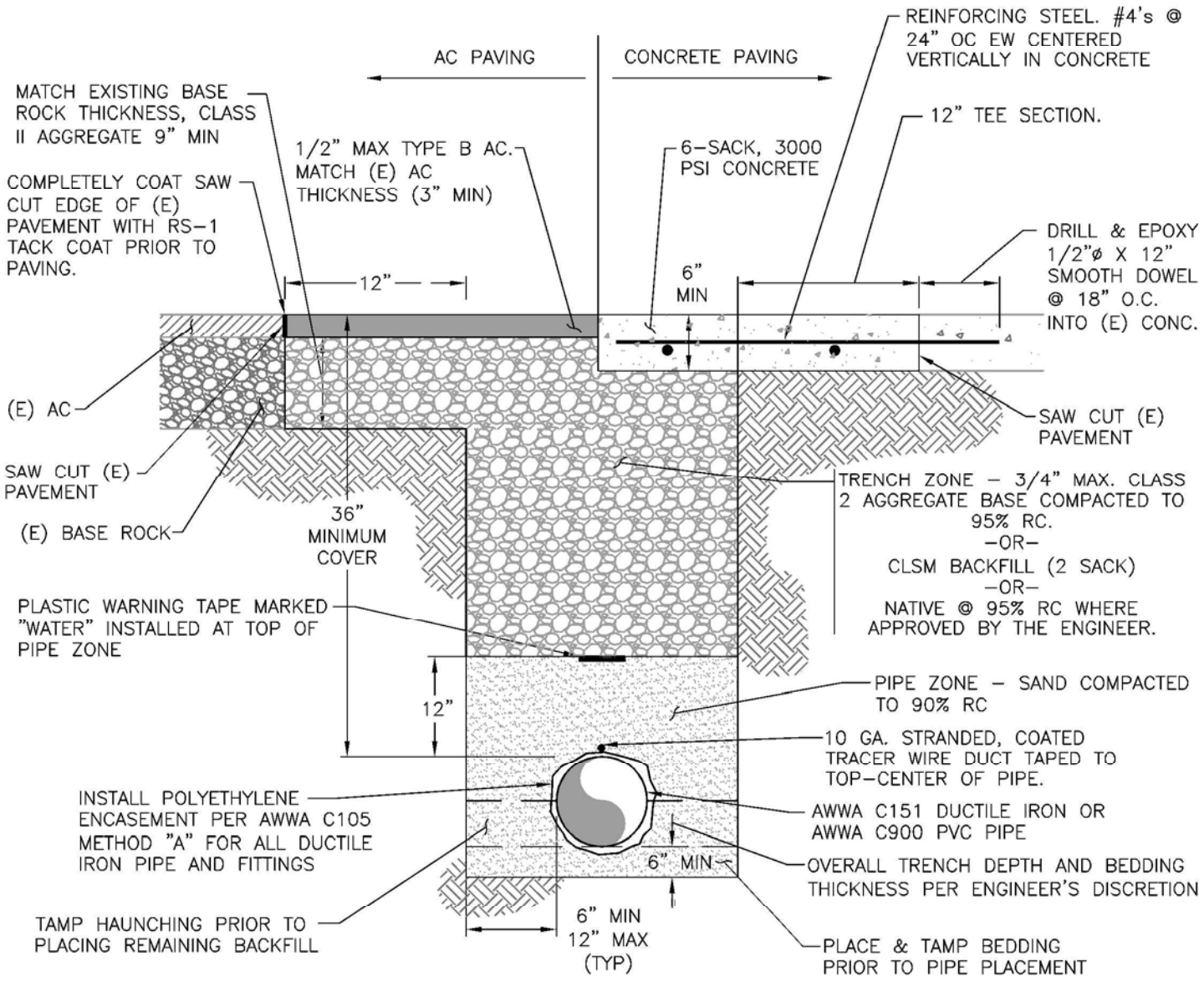
DETAIL 14

STANDARD SERVICE LATERAL TRENCH

NOT TO SCALE



STANDARD WATER MAIN TRENCH

NOTES

1. IF ANY PORTION OF (E) PAVEMENT WITHIN SAWCUT LIMITS IS CONCRETE AT THE SURFACE, ENTIRE TRENCH SHALL BE RE-PAVED WITH CONCRETE AS SHOWN.
2. WHERE WATER MAIN INSTALLATION CANNOT MEET MINIMUM COVER REQUIREMENTS, THE ENGINEER MAY APPROVE ALTERNATE INSTALLATION PER DETAIL 16.
3. REFER TO SVWD TECHNICAL SPECIFICATIONS FOR COMPACTION TESTING REQUIREMENTS.
4. FOR SERVICE LATERALS, REFER TO DETAIL 14.

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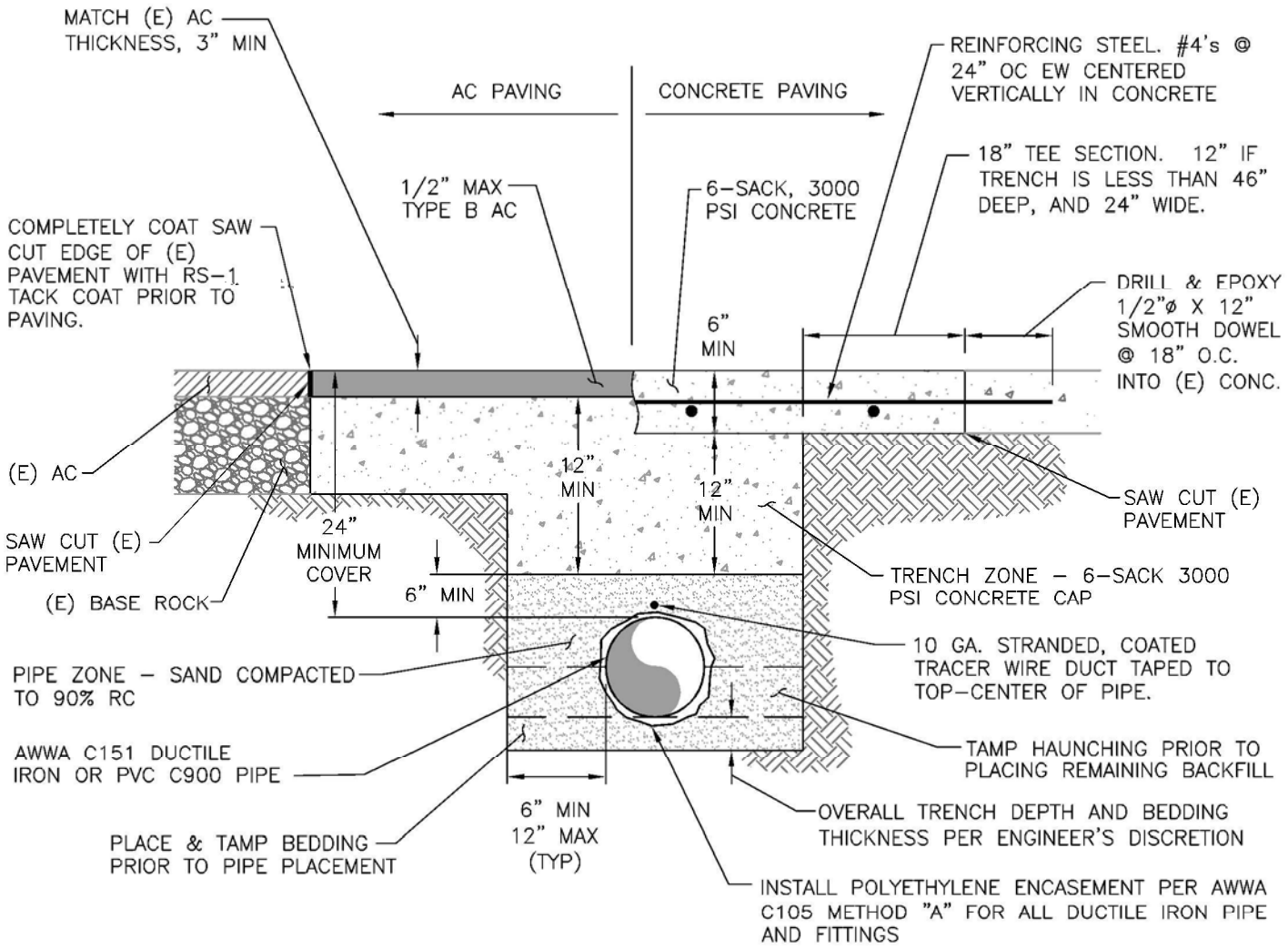
DETAIL 15

STANDARD WATER MAIN TRENCH

NOT TO SCALE



WATER MAIN TRENCH

FOR MAINS INSTALLED AT SUB-STANDARD DEPTH

NOTES

1. USE OF THIS DETAIL REQUIRES PRIOR APPROVAL OF THE ENGINEER. REFER TO DETAIL 15 FOR STANDARD TRENCH
2. IF ANY PORTION OF (E) PAVEMENT WITHIN SAWCUT LIMITS IS CONCRETE AT THE SURFACE, ENTIRE TRENCH SHALL BE RE-PAVED WITH CONCRETE AS SHOWN,
3. REFER TO SVWD TECHNICAL SPECIFICATIONS FOR COMPACTION TESTING REQUIREMENTS.
4. FOR SERVICE LATERALS REFER TO DETAIL 14.

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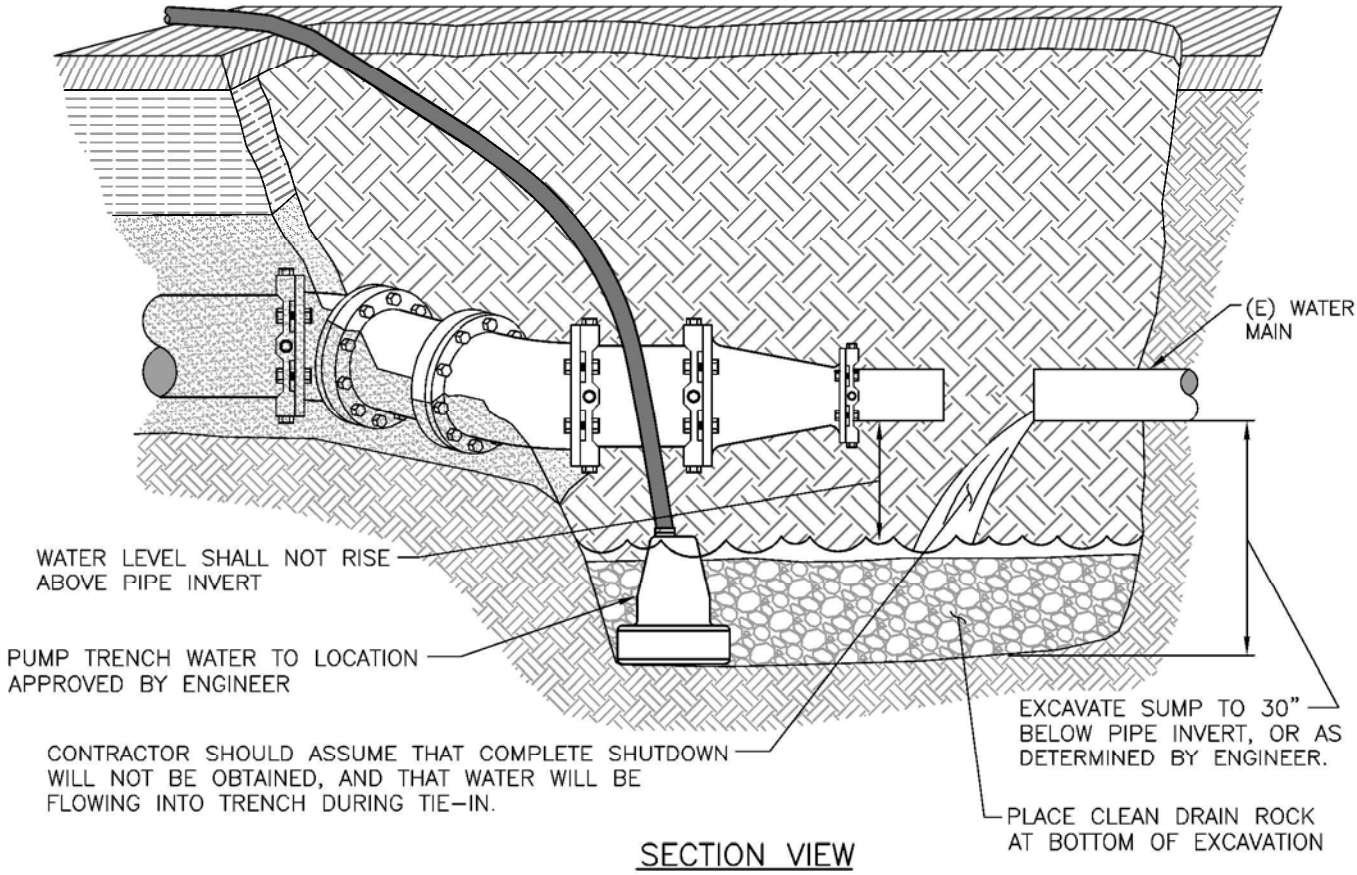
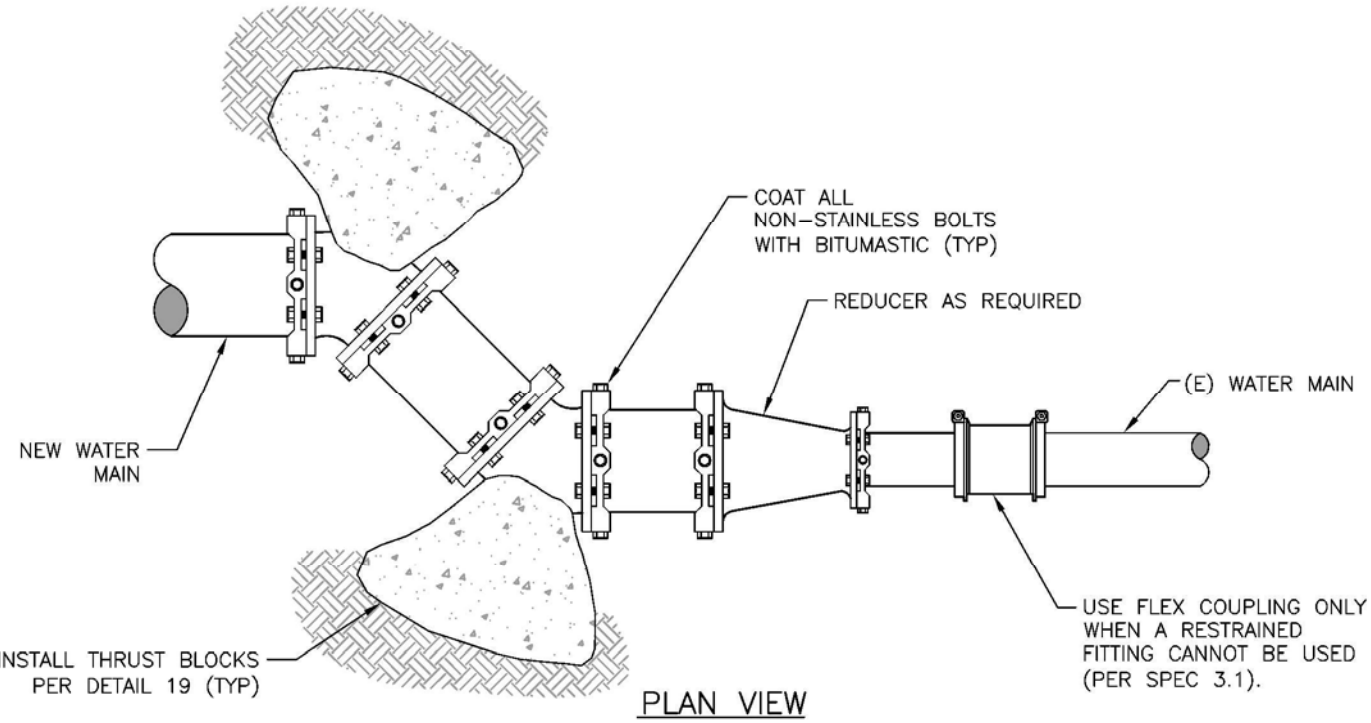
DETAIL 16

SUB-STANDARD WATER MAIN TRENCH

NOT TO SCALE



SECTION VIEW



PLAN VIEW

NOTES

1. CONTRACTOR SHALL VERIFY (E) MAIN DIAMETER PRIOR TO SCHEDULING SYSTEM SHUT DOWN.
2. ELBOWS SHARPER THAN 45° ARE NOT ALLOWED.
3. PIPE AND FITTING SIZES & MATERIAL SHALL BE SPECIFIED BY ENGINEER.
4. JOINT RESTRAINTS AND THRUST BLOCKING PER DETAILS 19 AND 20 ARE REQUIRED.
5. TEMPORARY THRUST BLOCKING MAY BE REQUIRED WHILE CONCRETE CURES.

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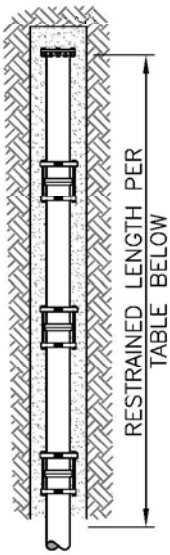
DETAIL 17

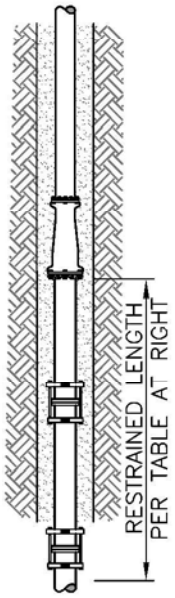
SYSTEM CONNECTION (TIE IN)

NOT TO SCALE



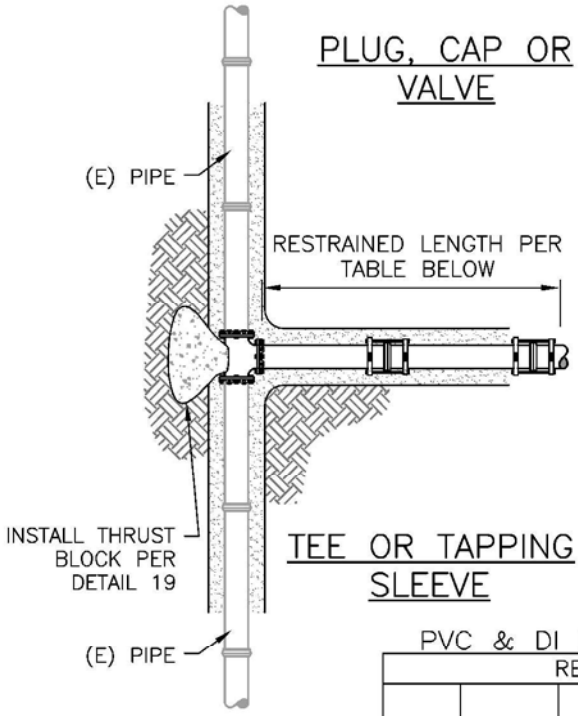
DIFFERENCE IN PIPE DIAMETER	REQUIRED RESTRAINT LENGTH (FT)
4"	35'
6"	45'
8"	60'
10"	75'
12"	90'

PLUG, CAP OR VALVE

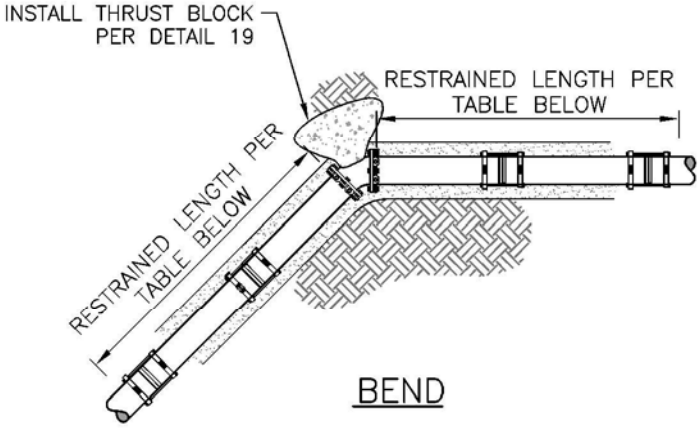


DIFFERENCE IN PIPE DIAMETER	REQUIRED RESTRAINT LENGTH (FT)
4"	25'
6"	50'
8"	65'
10"	80'
12"	100'

REDUCER



TEE OR TAPPING SLEEVE



BEND

PVC & DI PIPE JOINT RESTRAINT SIZING TABLE

REQUIRED RESTRAINT DISTANCE (FT.)								
PIPE DIA.	TEE BRANCH	VERTICAL BEND			HORIZONTAL BEND			
		11 1/4°	22 1/2°	45°	11 1/4°	22 1/2°	45°	90°
4	20	20	20	40	20	20	20	20
6	20	20	20	40	20	20	20	20
8	20	20	20	40	20	20	20	40
10	20	20	20	40	20	20	20	60
12	20	20	20	40	20	20	20	60

NOTES
1. ALL UNCOATED JOINT RESTRAINT AND FITTING HARDWARE SHALL BE COATED WITH BITUMASTIC.
2. THRUST BLOCKING PER DETAIL 19 IS REQUIRED.
3. SERVICE LATERALS SHALL BE FULLY RESTRAINED.

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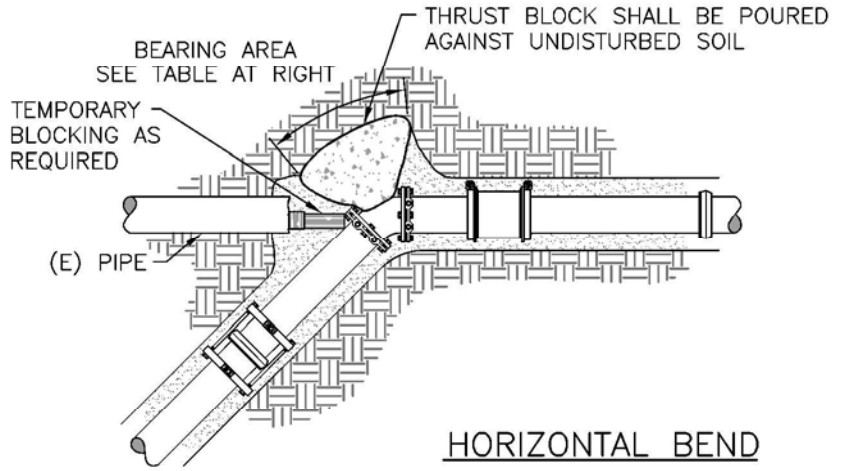
DETAIL 18

JOINT RESTRAINT INSTALLATION

NOT TO SCALE

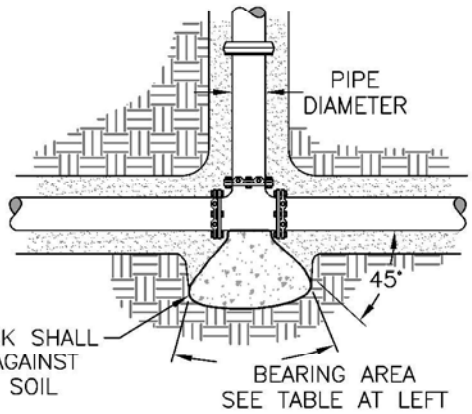


HORIZONTAL BEND

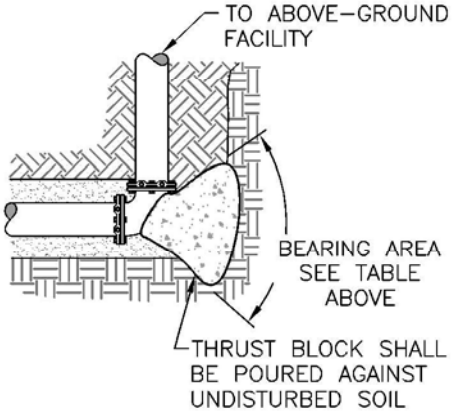
THRUST BLOCK BEARING AREA (SQUARE FEET)

PIPE DIAMETER	FITTING DEFLECTION			
	$11\frac{1}{4}°$	$22\frac{1}{2}°$	45°	90°
4"	1	1	2	2
6"	1	1	2	4
8"	1	2	4	7
10"	2	3	6	11
12"	3	5	9	17

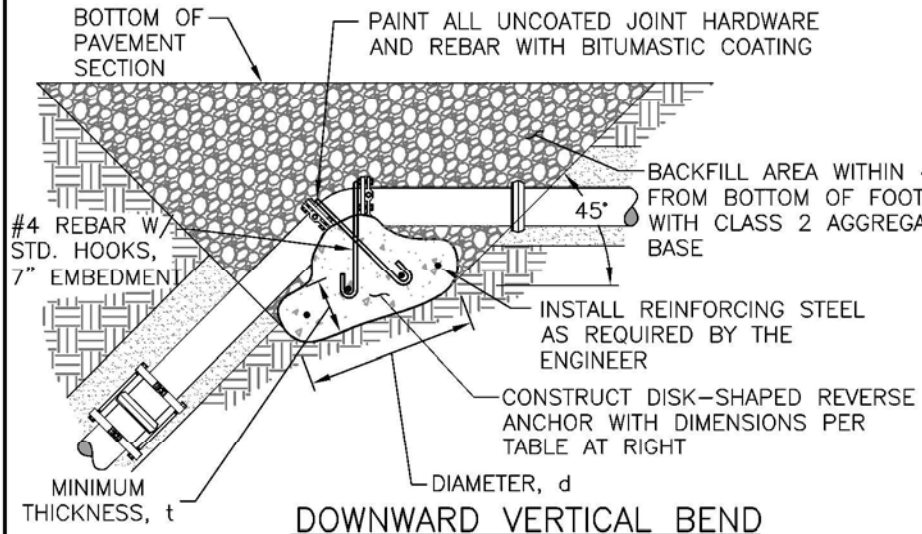
PIPE DIAMETER	BEARING AREA (SQUARE FEET)
4"	2
6"	3
8"	5
10"	9
12"	12



TEE



UPWARD VERTICAL BEND



DOWNWARD VERTICAL BEND

MINIMUM REVERSE ANCHOR DIMENSIONS (FEET)

PIPE DIAMETER	d / t	FITTING DEFLECTION	
		$22\frac{1}{2}°$	45°
6"		2 / 0.5	3 / 0.5
8"		3 / 0.5	4 / 0.8
10"		3 / 0.5	5.5 / 2
12"		4 / 0.5	9 / 2

NOTES

1. CONCRETE THRUST BLOCKS SHALL BE INSTALLED WHEN INDICATED BY THE CONTRACT DOCUMENTS OR AT THE DISCRETION OF THE ENGINEER.
2. THRUST BLOCKING IS REQUIRED WHERE IT IS UNKNOWN IF PIPE IS RESTRAINED, SUCH AS AT A CONNECTION TO EXISTING PIPE.
3. ALL CONCRETE SHALL BE 3000 PSI MINIMUM 28 DAYS COMPRESSIVE STRENGTH.
4. FOR PIPELINES LARGER THAN 10" IN DIAMETER, PIPELINES INSTALLED AT DEPTHS LESS THAN 36 INCHES, OR IN POOR SOILS, THRUST BLOCK DESIGN SHALL BE APPROVED BY THE ENGINEER ON A CASE BY CASE BASIS.

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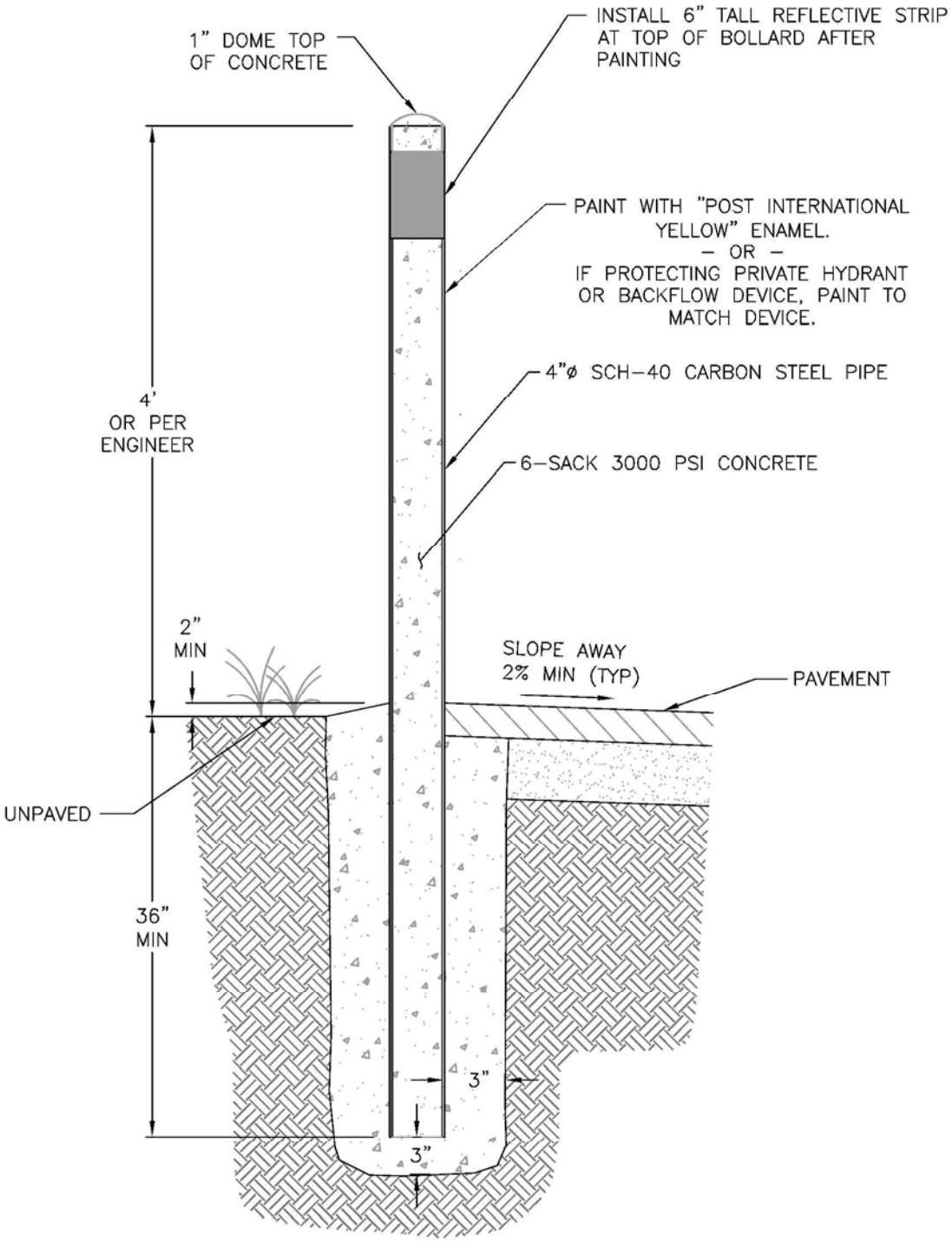
DETAIL 19

THRUST BLOCK INSTALLATION

NOT TO SCALE



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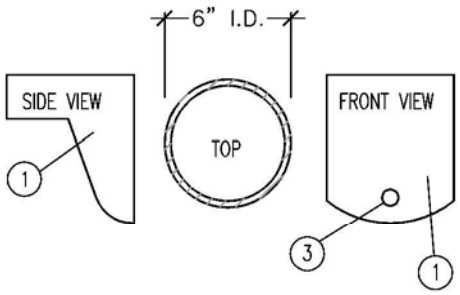
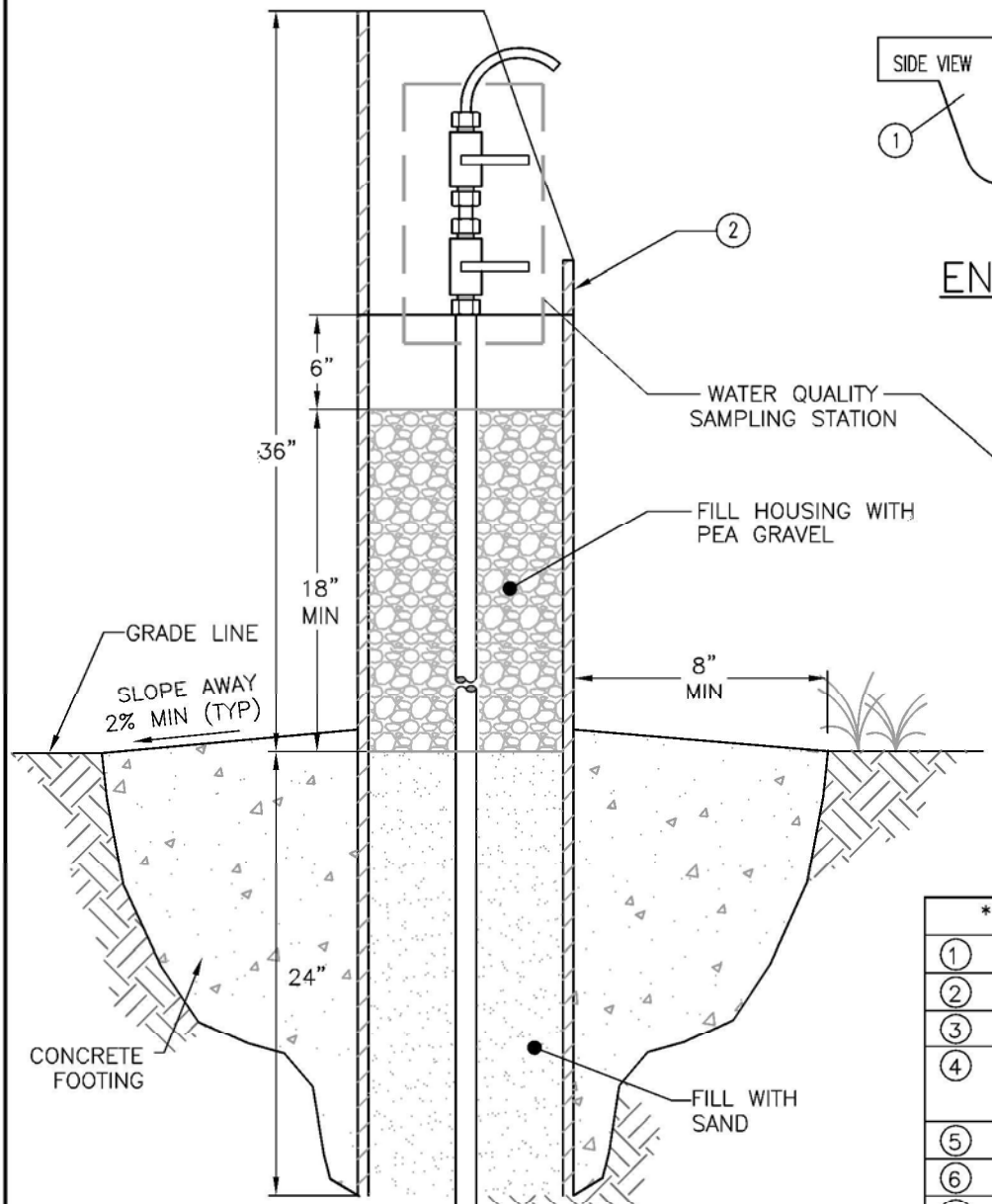
DETAIL 20

TRAFFIC BOLLARD INSTALLATION

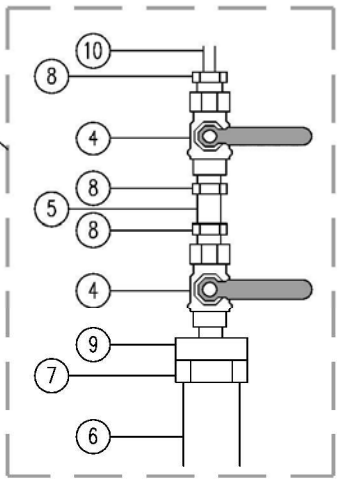
NOT TO SCALE



ENCLOSURE LID



ENCLOSURE



*WATER QUALITY SAMPLING STATION	
1	ALUMINUM LID
2	ALUMINUM HOUSING – 6"ø (O.D.)
3	FLUSH MOUNTED LOCK
4	1/4" BALL VALVE (CHROME BALL, TEFLON SEATS, STEEL HANDLE)
5	2" OF 1/4" COPPER TUBING
6	3/4" COPPER TUBING
7	3/4" COMPRESSION FITTING
8	1/4" COMPRESSION FITTING
9	3/4" x 1/4" REDUCER
10	1/4" SPIGOT

NOTES

1. BRASS FITTINGS, VALVES AND PIPE SHALL CONSIST OF LOW–LEAD BRASS ALLOY AND SHALL HAVE A MINIMUM WORKING PRESSURE OF 150 PSI.
2. INSTALL TRAFFIC BOLLARD(S) PER DETAIL 20 WHERE REQUIRED BY THE ENGINEER.

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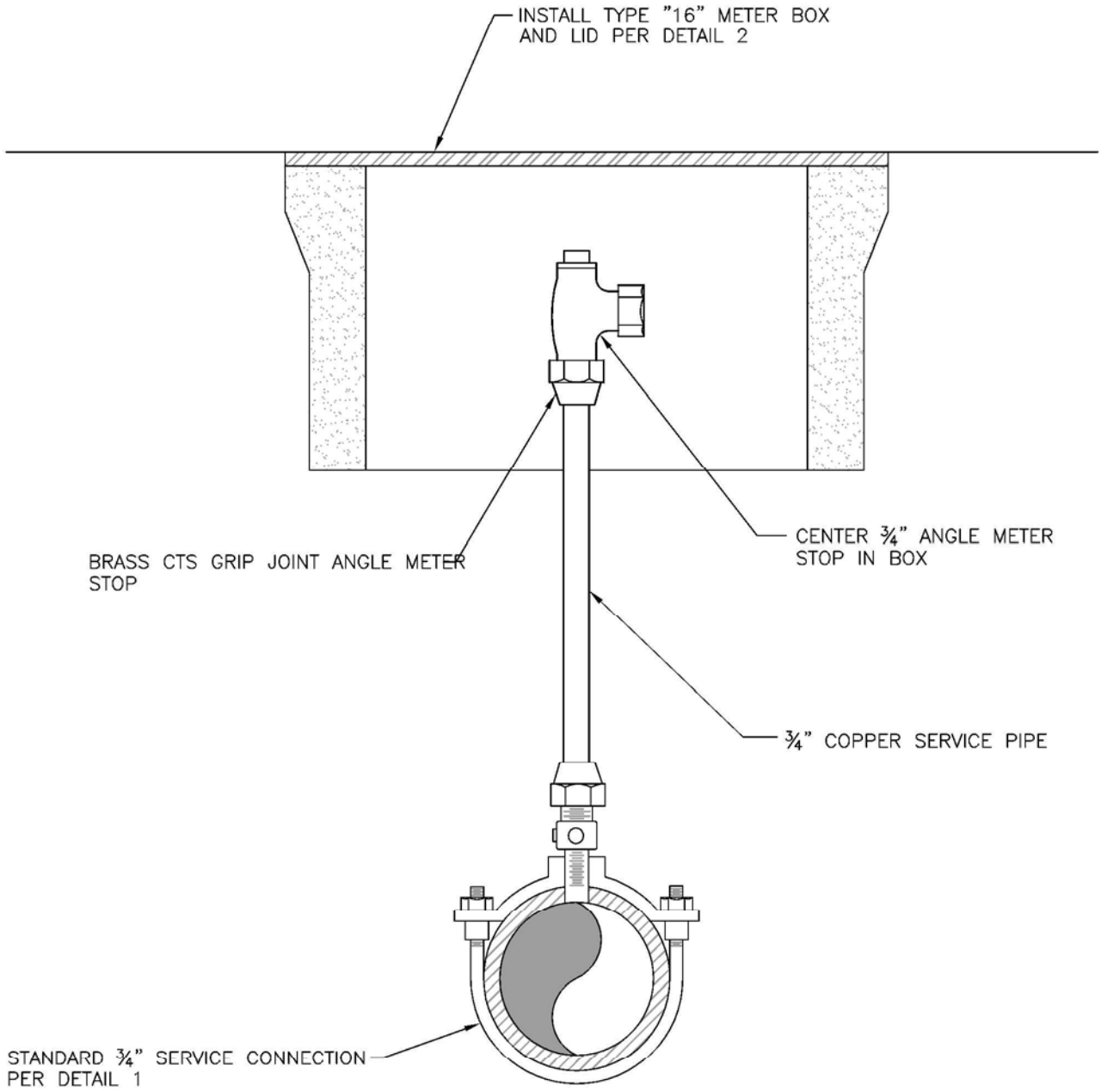
DETAIL 21

SAMPLE STATION INSTALLATION

NOT TO SCALE



NOTES

1. BRASS FITTINGS, VALVES AND PIPE SHALL CONSIST OF LOW-LEAD BRASS ALLOY AND SHALL HAVE A MINIMUM WORKING PRESSURE OF 150 PSI.
2. CHLORINATION TAPS SHALL NOT BE LOCATED FURTHER THAN 10 FEET DOWNSTREAM OF THE BEGINNING OF THE NEW MAIN.
3. BOX SHALL BE LOCATED AS INDICATED BY CONTRACT DOCUMENTS OR THE ENGINEER.
4. AFTER DISINFECTION, CLOSE AND CAP CORPORATION STOP AND REMOVE ALL COMPONENTS.

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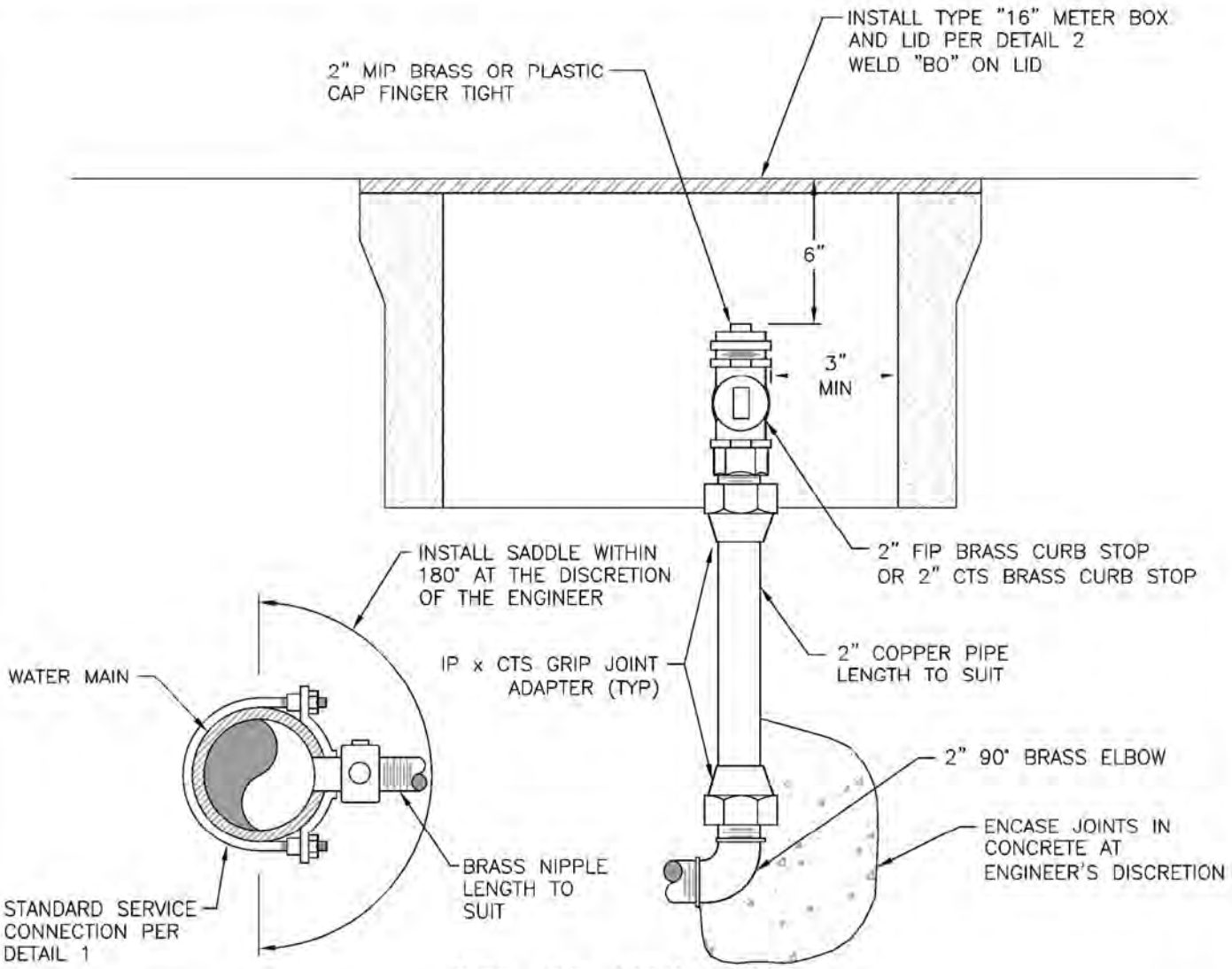
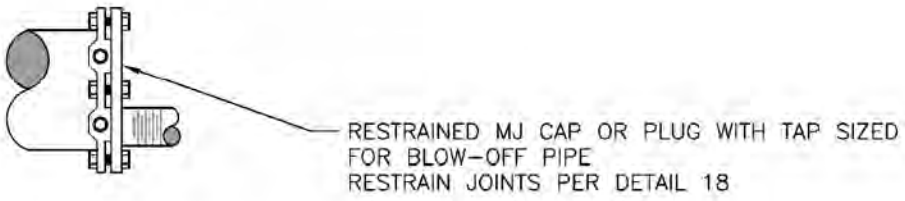
DETAIL 22

CHLORINATION TAP INSTALLATION

NOT TO SCALE



OFF OF MAIN TAP



END OF MAIN TAP

NOTES

1. BLOW-OFF ASSEMBLY MUST BE RESTRAINED, INCLUDING TEMPORARY INSTALLATIONS.
2. MODIFICATIONS MAY BE PERMITTED AT THE DISCRETION OF THE ENGINEER FOR TEMPORARY INSTALLATIONS.
3. BRASS FITTINGS, VALVES AND PIPE SHALL CONSIST OF LOW-LEAD BRASS ALLOY AND SHALL HAVE A MINIMUM WORKING PRESSURE OF 150 PSI.
4. WRAP ALL FITTINGS & PIPE W/ 2" WIDE, 10-MIL PIPE TAPE WHERE IN CONTACT W/ CONC. THRUST BLOCK

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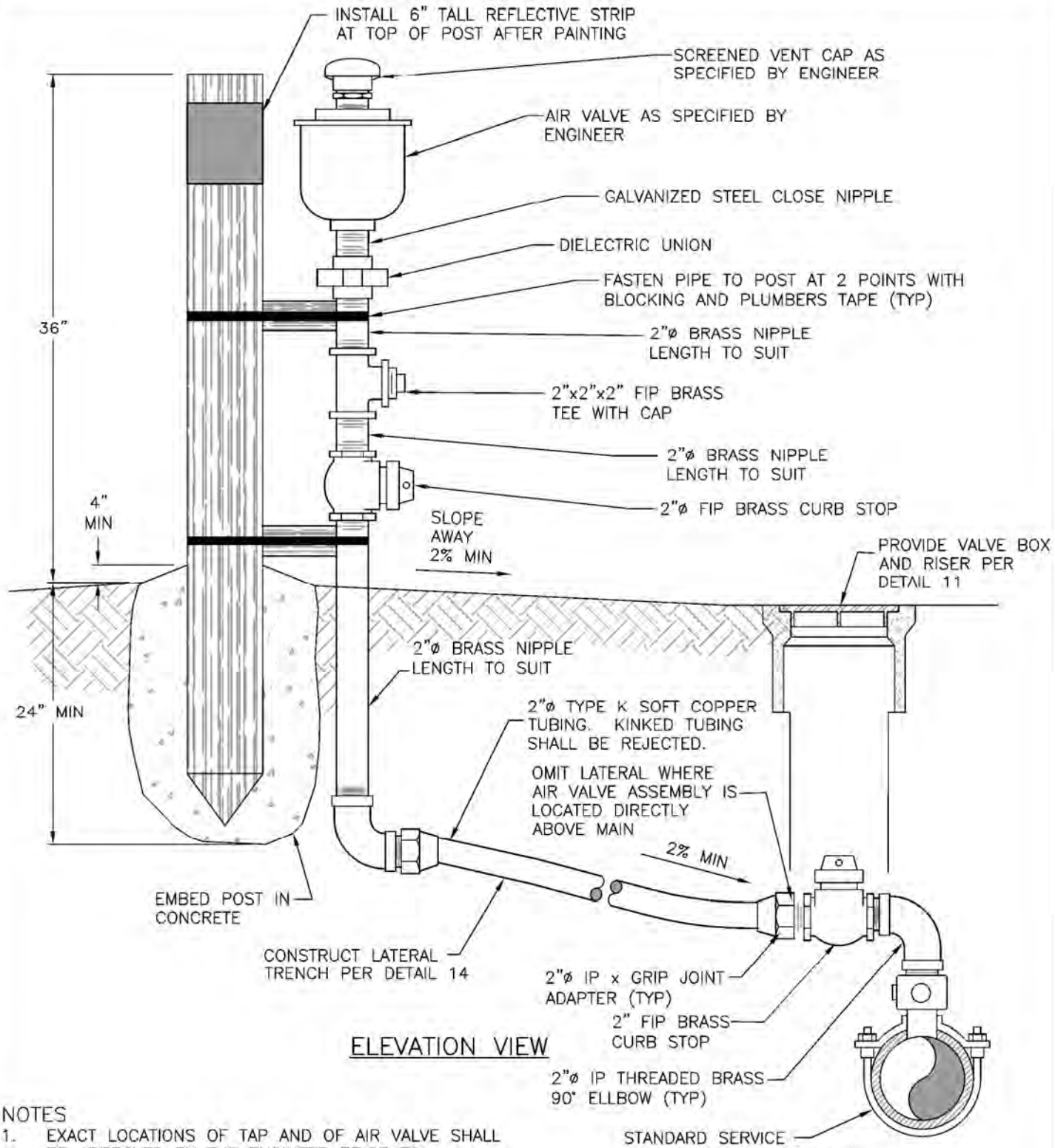
DETAIL 23

BLOW OFF INSTALLATION

NOT TO SCALE



ELEVATION VIEW

NOTES

1. EXACT LOCATIONS OF TAP AND OF AIR VALVE SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
2. BRASS FITTINGS, VALVES AND PIPE SHALL CONSIST OF LOW-LEAD BRASS ALLOY AND SHALL HAVE A MINIMUM WORKING PRESSURE OF 150 PSI.
3. AT THE DISCRETION OF THE ENGINEER, A GATE VALVE AND BOX SHALL BE INSTALLED NEAR THE CONNECTION AT THE MAIN PER DETAIL 11.
4. INSTALL LOCKING STEEL ENCLOSURE AND CONCRETE PAD IF REQUIRED BY THE ENGINEER.
5. ABOVE GROUND PIPING, FITTINGS AND ENCLOSURE SHALL BE PAINTED W/ TWO COATS OF RUST PREVENTATIVE ENAMEL.
6. INSTALL TRAFFIC BOLLARD(S) PER DETAIL 20 WHERE REQUIRED BY THE ENGINEER.

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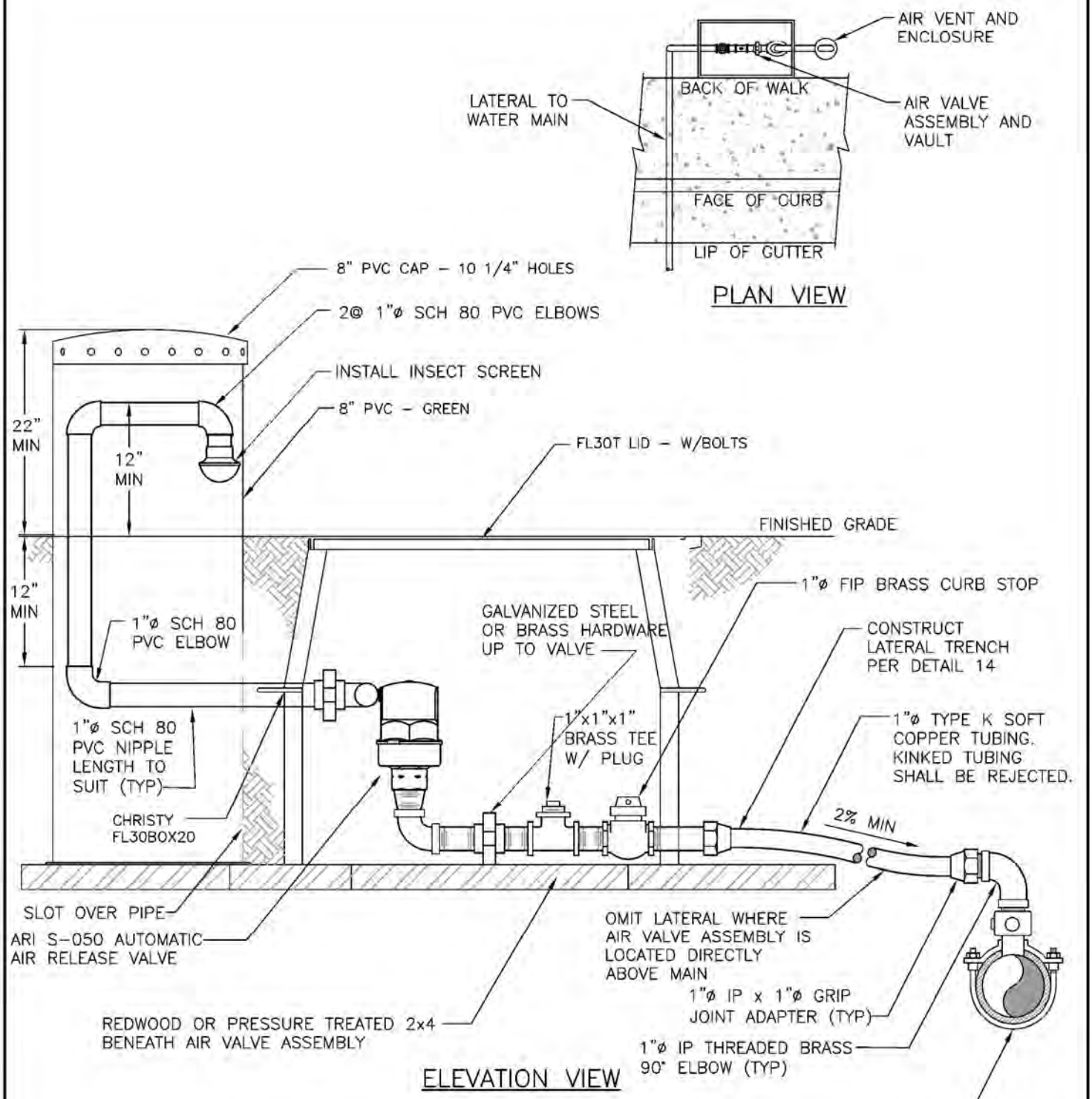
DETAIL 24

ABOVE GRADE AIR VALVE INSTALLATION

NOT TO SCALE



NOTES

1. EXACT LOCATIONS OF TAP AND OF AIR VALVE SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
2. BRASS FITTINGS, VALVES AND PIPE SHALL CONSIST OF LOW-LEAD BRASS ALLOY AND SHALL HAVE A MINIMUM WORKING PRESSURE OF 150 PSI.
3. ABOVE GROUND PIPING, FITTINGS AND ENCLOSURE SHALL BE PAINTED W/ TWO COATS OF RUST PREVENTATIVE ENAMEL.
4. AT THE DISCRETION OF THE ENGINEER, A GATE VALVE AND BOX SHALL BE INSTALLED NEAR THE CONNECTION AT THE MAIN PER DETAIL 11.

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DETAIL 25

BELOW GRADE AIR VALVE INSTALLATION

NOT TO SCALE

APPENDIX 1

Hydrant Installation Permit Requirements

In addition to complying with the Scotts Valley Water District Standard Specifications, latest revision, regarding the construction of fire hydrants, applicant must receive approval of fire hydrant location prior to beginning construction. Approval is on a case by case basis and shall include District-approved plans, Scotts Valley Fire approved plans, City and/or County encroachment (street opening) permits, and field verification by the Scotts Valley Fire Protection District and SVWD.

In general, the following criteria shall be met:

1. General Location Requirements:
    a. Hydrant lateral length shall be minimized by locating on the short side of the water main.
    b. Hydrant head shall not be allowed within a curb-line projection to avoid conflicts should the curb be extended in the future.
    c. Where hydrant will be located behind the sidewalk or outside of concrete area, hydrant shall be positioned at the center of a minimum 36”x36”x4” concrete pad with 6”x6”-W4xW4 reinforcement.
    d. Location shall have minimal impact on neighborhood parking sites.
    e. When permissible, mid-block locations shall be placed at property lines. When this is not possible, property owners shall be notified to establish public relations and acceptance of hydrant location.
    f. Hydrant should not be located below power lines.
    g. Where possible, hydrants should be placed behind the back of walk.
2. Setbacks/Offsets/Clearances:
    a. For sidewalks wider than 6’, center hydrant 9” behind back of curb. For sidewalks less than 6’, hydrant position must be approved by the appropriate agencies including SVWD, City or County Public Works Department, and Scotts Valley Fire Protection District.
    b. For all installations, a minimum of 3’ radius around all sides of hydrant shall be clear of private property lines, walls, poles, or any other vertical obstructions to facilitate fire agency hookup. Plans shall show relevant parcel boundaries, public or private right of ways and easements.
    c. If an easement is required for the hydrant location and clearances, the applicant shall prepare the easement using the District’s format and language and obtain any necessary survey information. The District shall review and approve the easement before it is finalized.
    d. For all installations in sidewalks, a minimum of 4’ clear sidewalk width around one side of the hydrant shall be maintained for A.D.A. compliance.
    e. Center hydrant head a minimum of 10’ from driveway pans.
    f. Location shall be outside the drip line of existing mature trees, consider proximity of young trees. Location shall be set back 4’ minimum from mature shrubs, consider proximity of young shrubs.