

Standards for

CONSTRUCTION OF WATER MAINS



July 2010

Standards for
CONSTRUCTION OF WATER MAINS

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V. STANDARD DETAILS

Standards for
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I. GENERAL

A. Work to Be Done Within the Mission Hills Community Services District

All labor, equipment, appliances and material, and performance of all operations in connection with construction of water mains, including all valves, fittings, fire hydrants and assemblies, and service connections to each lot and all other necessary appurtenances, within the District shall be in strict accordance with these Standards.

B. Plans and Specifications

Projects shall be constructed as shown on the Plans and shall conform to these Standard Requirements and the "Greenbook" as defined below. The "Greenbook" shall not govern over the Plans and these Standard Requirements.

C. Definitions and Terms

In these Specifications, or the "Greenbook", the intent and meaning of the terms that are used shall be as defined in Part 1 of the "Greenbook", except as herein below specifically noted, revised, or added.

Agency - The Mission Hills Community Services District, State of California.

District - The District is the entity identified as such in the Agreement between the District and the Developer, or Contractor, and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term District means the Mission Hills Community Services District or its authorized representative.

Engineer - The District Manager or designated engineer for the Mission Hills Community Services District, State of California, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.

"Greenbook" - The latest edition of the Standard Specifications for Public Works Construction, including all supplementary pamphlets, published by Building News, Inc.

The Standard Specifications control the general provisions, construction materials, and construction methods for this contract except as amended by the Plans, Special Provisions, or other Contract Documents.

Laboratory - Shall mean any testing agency or testing firm, which has been licensed by the State of California to act in such capacity, and meeting the requirements of the Engineer.

Specifications - The directions, guidelines, provisions and requirements herein pertaining to the materials to be furnished, and to the method and manner of performing the work, including and addenda and approved revisions by the District. Whenever the terms "Specifications" or "these Specifications" are used herein, it means the provisions set forth in these District Standards.

D. Alterations

These Standard Specifications and Standard Details have been adopted by the Mission Hills Community Services District Board of Directors. The District reserves the right to make updates, amendments, and modifications from time to time, following adoption of this document.

Changes or modifications to approved plans and/or specifications shall be by mutual agreement in writing and signed by the parties involved, then, and only then, may alterations or deviations, increases additions, or omissions in the approved plans or Standards be made.

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It shall be the responsibility of the Contractor to locate any and all utility lines prior to excavation. The Contractor shall be held responsible for any damage to utility lines during the progress of construction, and if damage should occur, he shall repair the same at his own expense.

The Contractor shall notify the Engineer and the appropriate regional notification center for operations of subsurface installations at least two working days prior to performing any excavation or other work close to any underground pipeline, conduit, duct, wire or other structure. Regional notification centers include, but are not limited to, the following:

Underground Service Alert, Southern California (USA)

Telephone: 811

No excavation shall commence unless the Contractor has obtained the Inquiry Identification Number and so notified the Engineer.

E. Modifications to the Standard Specifications

The following are adjustments to the Standard Specification ("Greenbook"):

Record Drawings

Contractor shall maintain a complete and accurate record of all changes of construction from that shown in the approved plans and specifications for the purpose of providing a basis for construction record drawings. No changes shall be made without prior written approval of the Engineer.

Monuments

Existing survey monuments shall be protected from damage. All survey monuments damaged or displaced by the Contractor shall be replaced in accordance with the provisions of the Land Surveyor's Act, Code of the State of California, at the Contractor's expense.

Accuracy of Utilities Information

The locations of existing major utilities, whether above ground or underground, may be represented in District documents. The Owner does not guarantee the accuracy or completeness of this information and it is to be understood that other above ground and underground facilities may be encountered during the course of the work.

During construction, in advance of any work performed by the pipe installation crew, the Contractor shall excavate and pothole existing utility facilities to verify locations, and allow alignment and grade revisions if necessary. Such revisions in alignment and grade shall be approved by the Engineer.

F. Shut Down of Existing Water Mains

District personnel will operate all gate valves necessary for shut down of existing water mains for all tie-ins. The District makes no guarantee for watertight shutdown. The Contractor shall notify the District 48 hours prior to a required shut down. Public Notice, by the Contractor, of periodic water service interruption shall be coordinated with District water personnel.

II. MATERIALS

A. General

All materials shall be new and of the type described in these Standards or shown on District approved plans. The Contractor shall furnish all materials. Whenever the following Standards specify by name or number any material or article or the maker or distributor thereof, this is done so only for the purpose of more clearly defining the kind and quality desired, and it is to be understood that the written approval of the Engineer will permit an equivalent which will be equally acceptable.

All materials shall be those as hereinafter specified and approved and shall never be less than those as approved by AWWA, ASA, and ASTM as last revised.

B. Pipe Certification and Tests

When required by the Engineer, the Contractor shall, at his own expense, furnish documentary evidence, or when specifically requested, certified test results which indicate that the pipe furnished meets all of the requirements of these Standards. Documentary evidence will be considered sufficient when the pipe manufacturer furnishes a notarized certificate indicating that the pipe has been sampled, tested and inspected in accordance with the provisions of all AWWA specifications.

C. Asbestos-Cement Water Distribution Pipe

No new asbestos-cement pipe installation is permitted.

D. PVC Water Distribution Pipe (Polyvinyl Chloride)

When applicable, PVC pipe installation shall conform to AWWA Standard C900 or C909. The proposed new standard is C909, Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe, 4-12 inches, for Water Distribution in pressure classes 165, 235, and 305. All PVC water distribution pipe within the District shall be pressure class 235 unless otherwise approved by the District Engineer. The standard covers pressure pipe manufactured from starting stock of ASTM 1784 cell class 12454-B materials. The starting stock is then oriented through circumferential expansion. The end result is PVCO pipe with a hydrostatic design basis of 7,100 psi.

PVC pipe shall conform to the quality and strength requirements of AWWA C900 which covers PVC pipe in sizes 4-12 inches. Each standard or random length of pipe shall be clearly marked with the Nominal size and O.D. base, Material Code, Dimensional ratio, AWWA pressure class, AWWA designation, manufacturer's trade name and production record code and seal of testing agency.

The standard laying length shall be 20 feet + 1 inch in all classes and sizes. A maximum of 15 percent may be furnished in random lengths of not less than 10 feet each. AWWA C900 pipe has the same outside diameter (O.D.) as that of cast iron pipe (C.I.P.O.D.) in the sizes furnished.

One gasket shall be furnished with each length of elastomeric-gasket bell end pipe and two gaskets shall be furnished with each coupling where couplings are used.

Pipe surfaces shall be free from nicks, scratches and other blemishes. The joining surfaces of pipe spigots and of integral bell and sleeve reinforced bell sockets shall be free from gouges or other imperfections that might cause leakage.

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Three trade names which have been approved by the District are Certainteed's "Vinyl Iron Pipe," John Mansville's "Blue Brute Pipe," and UPONOR ETI "Ultra Blue." Equivalents must be reviewed and approved by the Engineer.

The joints shall be one of the following:

- (1) Integral wall – thickened bell end (bell and spigot with rubber gasket).
- (2) Integral sleeve reinforced bell end.
- (3) Elastomeric gasket coupling.

PVC solvent cement joints, although allowed by AWWA C900, are not approved.

Where couplings are used, they shall be Ductile Iron and meet requirements of AWWA C110, C153 and C104. Couplings shall be as furnished by the manufacturer.

Tapping in PVC pipe shall be saddle taps. No direct taps are allowed. Tap not closer than 2 feet from the end of the pipe or from an existing service tap. Use combination core drill and taps. Do not use twist drills designed for tapping hard-wall pipes.

Ductile Iron fittings must be used with PVC pipe.

E. Ductile Iron Water Distribution Pipe

The pipe shall be cement-lined Ductile Iron Pipe and shall conform to AWWA C111, C104, C105, C150 and C151 for both quality and strength. Each pipe shall include the letters "D.I." or word "DUCTILE" to indicate the pipe material.

Joints shall be push-on joint or of the Mechanical Joint type conforming to the requirements of AWWA C111.

F. Main Line Fittings and Accessories

- (1) General - All Ductile Iron Fittings shall be lined with cement mortar lining in accordance with AWWA C104 and C 110. All fittings whose lining or outside coating that does not bond firmly or that shows voids or "holidays" upon inspection shall be rejected.
- (2) Ductile Iron Fittings -
 - a) Fitting types include:

90° bend, 45° bend, 22½° bend, Tees and Crosses, Reducers, Caps and Plugs, Connection Pieces, Flanged Bends, Flanged Tees and Crosses, Flanged Reducers.
 - b) Ductile Iron Water Distribution Pipe shall have fittings in accordance with AWWA C110, C153 and C104.
 - c) The interior and exterior of all fittings shall be coated with a petroleum asphaltic material applied in compliance with AWWA Specification C110, Section 10-9 and/or C153, Section 53-10. Care shall be taken in handling so as not to injure the coating.
 - d) Ductile Iron Adapters shall be provided as recommended by the pipe manufacturer for making the connection between Ductile Iron Fittings, Ductile Iron Pipe, and PVC Pipe.

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- e) PVC Water Distribution Pipe shall have fittings in accordance with AWWA C153 and C104 specifications.

- f) Mechanical Joints:

This is a bolted joint of the stuffing box type. Each joint has a bell provided with an exterior flange having bolt holes and slots, and a socket with gaskets to receive the plain end of the pipe or fitting. The joint also has a sealing gasket, follower gland with bolt holes and tee head bolts with hexagonal nuts. Approved steel tee-bolts and nuts for mechanical joint glands are Cor-ten Series 1290N (NAPPCO).

Mechanical joints shall be used with Ductile Iron Pipe and shall be in accordance with AWWA C 111. Mechanical joints used with PVC pipe shall be in accordance with AWWA C153. The mentioned AWWA Standards for mechanical fittings covers the joint as well as the gaskets and bolts. M.J. Restraints will be used on all mechanical joints.

- g) Mechanical Joint Restraints for PVC and DIP:

These shall be such that they can be used with the standardized mechanical joint bell and tee-head bolts conforming to ANSI/AWWA A21.11 and ANSI/AWWA C153/A21.53. Glands shall be manufactured of ductile iron conforming to ASTM A 536-80 and shall include a restraining mechanism which, when actuated, imparts multiple wedging action against the pipe, increasing its resistance as the pressure increases. The device shall have a working pressure of at least 250 psi. Approved is the EBAA Iron, Inc., Megalug 1100 series for ductile iron pipe/Megalug 1100 PV series for C900 pipe.

- h) Push-On Joints:

This is a single rubber-gasket joint in accordance with AWWA C111. Push-On Joints shall be used with asbestos cement pipe and can be used with PVC pipe in place of mechanical joints.

- i) Flanges-Bolts and Gaskets:

T-Bolts used on mechanical joints shall be of domestic origin, high strength, low alloy steel bolts only, meeting the current provisions of American National Standard ANSI/AWWA C111/A21.1-90 for rubber gasket joints for cast iron or ductile iron pipe and fittings. Bolt manufacturer's certification of compliance must accompany each shipment.

For underground service stainless steel or cadmium nuts and bolts, type 316 shall be used.

Gaskets shall be ring or full-face type, 1/8 inch thick.

The inherent problem with flanges is that they are rigid and do not provide flexibility. Two keys to their installation are (1) uniform tightening of the bolts, and (2) prevention of bending or torsional strains. Proper anchorage is important to meet the latter objective.

The following couplings and adapters in 3, 4, and 5, shall be used to install or make repairs on the existing piping system. Couplings and adapters shall conform to AWWA C213 requirement fusion bonded epoxy fittings with 316SS bolts and nuts.

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- (3) Flexible Couplings - These are designed to connect plain end pipes with mechanical compression joint to provide a stress relieving, flexible, leak proof joint. They can be ordered in A.C. pipe or cast iron pipe sizes (NOTE: C900 PVC pipe has the same O.D. as cast iron).
- (4) Transition Couplings - These are used to connect pipes of the same nominal size but different materials with different outside diameter. AC, CI and PVC pipes can be connected to one another.
- (5) Flanged Coupling Adapters - These are used to connect plain end pipe to flanged valves, pumps, meters, etc. They eliminate the need for both a flanged spool and couplings. Generally, they are available in sizes through 12 inches.

a) DIP Adapter Flange:

Joins plain end Ductile Iron pipe to fittings with flange ends. Flanges must meet the test requirement of ANSI B16.1-125 lb. and 250 lb. Flange material manufacture from ductile iron ASTM A536 Grade 65-45-12. Drilling to ANSI B16.1- 125 lb. and 250 lb. Set screw material ANSI4140 Steel, Tensile 190,000 psi minimum.

Heat-treated and zinc plated with calibrated head that shear off at the precise torque required for proper installation. The flange adapter shall be designed to handle working pressures to 250 psi. Approved are the Uni-Flange 400 Series and the Meg-a-Flange/EBAA-IRON.

b) PVC Adapter Flange:

Joins plain end PVC pipe to a rigid flange connection. Flanges must meet all test requirements of AWWA C900, ASTM D2241, ASTM D1599, ASTM D2992. Approved is the Ford Uni-Flange 900-C Series.

G. Service Line Materials and Fittings

The materials covered in this section include the service line pipe, corporation stop and saddles as well as the meter box and valves inside the meter box. All service lines shall be backfilled per Section 1 of these Standards with screen sand one foot below and one foot above the pipe.

(1) Service Piping -

Service sizes ¾" and 1" shall be type K soft annealed copper tubing, in conformance with ANSI/AWWA C800 as designated, shall be manufactured in the United States, and shall be in coils of 60 feet each in conformance with ASTM B88 Type K. Shipping boxes or affidavit must state that the manufacturer meets this requirement. No Sweat Joints allowed on Type K Copper.

Copper service lines must be sleeved with a plastic sleeve to minimize corrosion.

All water connections shall have an accessible valve at the water main, except for 1" and ¾" connections. 1½" and 2" horizontal service runs can be either schedule 80 PVC in conformance with AWWA C800/ASTM D1785-Specifications for PVC Plastic Pipe or Brass in conformance with AWWA C800/ASTM B43. **NO GLUEING IS ALLOWED.** Pack-joint adapter/coupling shall be used when installing Schedule 80 PVC.

When boring is necessary or called out on plans to install 1½" - 2" service lines across streets or highways the following will apply. 1½" and 2" horizontal service runs shall be HDPE in conformance with ANSI/AWWA C901 current revision. Polyethylene tubing

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shall be color coded (blue) and be compatible with current fitting and connectors made for HDPE water tubing. The pipe shall have a clear core of virgin natural HDPE providing visible proof of quality and assurance that no regrind material has been used. The pipe shall be CTS-ASTM D2737 standard outside diameter ratio (SODR)=9,200 PSI PE3408 with tracer wire.

3" Horizontal service shall be Class 350 Ductile Iron Pipe or class 235 PVC.

4", 6" and 8" Horizontal service runs shall be either:

- a) PVC C900 Class 235.
- b) Class 350 Ductile Iron Pipe in conformance with ANSI/AWWA C104 and ANSI/AWWA C110.

Vinyl coated solid copper tracing wire, 12 or 14 gauge, shall be used on all non-metallic pipe service runs and shall be stubbed up in the meter box for accessibility.

Copper shall have flare ends on all connectors or pack-joint fitting.

- (2) Corporation Stops - These shall be bronze with a corporation thread on the inlet side. Corporation stops shall be of the ball valve type. The outlet for the pipes shown below shall be as follows:

<u>Service Pipe</u>	<u>Corporation Stop Outlet</u>	<u>Corporation Stop</u>
¾"	CC x Grip Joint - Type	Ford Ball Corp, FB1000-3G
1"	CC x Grip Joint - Type	Ford Ball Corp, FB1000-4G
1½"	IP x IP Thread	Ford FB 500-6-TA
2"	IP x IP Thread	Ford FB 500-7-TA

- (3) Service Saddles / Clamps - Clamps shall support 360 degrees of pipe and shall be designed not to deform pipe by over tightening. The saddle/clamps shall be cast from 85-5-5 waterworks bronze in accordance with AWWA C-800.

Approved for PVC pipe are: Ford 202BS or equal (stainless steel & brass) Double Band Saddles for ¾" to 2" taps, CC-taps ¾" & 1", IP-taps 1½" & 2".

Approved for DIP and A.C. pipe are: Ford 101B (all brass) or equal single strap Brass ¾" - 1" with CC corp taps. Ford 202B (all brass) 1½" & 2" with IP corp stops.

- (4) Tapping Saddles - 3", 4", 6" and 8" Hot Taps are allowed on various applications as approved by the District. Approved is the Romac All Stainless SST or Ford All Stainless Fast tapping sleeve see Section 4.IV.M. "Hot Tapping" of these Standards, for construction methods.

- (5) Meter yokes will conform to:

Ford VBHC73-83W-41-33	- For ¾" Service Pipe
Ford VBHC74-84W-41-44	- For 1" Service Pipe

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- (6) The Meter Boxes for ¾", 1", 1½" and 2" meters shall be polymer concrete with rectangular concrete cover with a hinged reading lid manufactured by Brooks.

<u>Meter Size</u>	<u>Box Inside Dimensions</u>	<u>Model Numbers</u>
¾" or 1"	12" x 20" x 12" (#37) Meter Box	A6000485
	12" x 20" (#37) Cover w/Hinged Read	A6000484R
1½"	24" x 36" x 18" (#67) Meter Box with 2-piece Steel Traffic Lid. Reading Lid to be custom field cut and welded in field.	A6001974PC-18
2"	30" x 48" x 18" with 2-piece steel Traffic Lid. Reading lid to be custom field cut over meter and welded in field.	A6001430PCX18
3"	3'0" x 6'0" x 24"	A6001491A
4" – 6"	by Special Design And as Approved by The Engineer	

Traffic lids are not generally approved since the meter boxes should be placed outside the traveled right-of-way, including driveways. Where no other alternative is available and the meter box will be in the traveled right-of-way, then an approved traffic lid shall be used.

H. Copper Setter

Copper setter for 1½" and 2" Flange Meters shall have High By-Pass option and an in line Check Valve. Inlet Flange angle Ball valve with lock wing outlet flanged angle ball valve.

Ford copper setter	1½"	VBB86-95322-07	custom setter
Ford copper setter	2"	VBB87-95322-08	custom setter
Mueller C.S.	1½"	098B2427----00	
Mueller C.S.	2"	106B2427----00	

Or equal. Confirm with distributor before ordering.

Contractor shall install meter service yoke copper setters according to District Specifications and provide meter boxes for protection before meters are set.

One and one half (1½) inch meter services and larger shall have a service valve at the water main and shall be installed with by-pass assemblies according with District Standards. NOTE: Irrigation meter installations do not require bypass assemblies but do require a meter yoke.

I. Water Meters

All water meters shall be Hersey AMR meters and shall be of the following, or equal:

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- (1) VOGS19192 5/8 x 3/4, 430SI, IB, CF, TRL6, IHRHP, 9494790
- (2) VOGS19194 5/8 x 3/4, 430SI, IB, CF, TRL6, IHRHP, 9494790
- (3) VOKS19192 1", SI, CF, TLT6, HRHP, 3' 94947900
- (4) VOKS19194 1", SI, IB, CF, TLT6, HRHP, 3' 94947900

The location shall be determined by the Engineer or his authorized representative. All water meters will be furnished and installed by the District at the expense of the contractor, developer, or individual owner.

No connections are to be made between meter and back-flow assembly.

J. Water Main Gate Valves

All gate vales shall meet all requirements of AWWA C550 for "Protective Interior Coatings for Valves and Hydrants."

Gate Valves 3" through 20" shall meet all requirements of AWWA C550 and AWWA C509 for "Resilient-Wedge Gate Valves" and approved by the District.

All gate valves shall be ductile iron body, Resilient Wedge Gate Valves (RWGV) with a non-rising stem, a 2" operating nut that opens to the left and equal to American AVK and Mueller.

Valves shall be "O" Ring seal. Valve ends shall be Flg x M.J. or straight flanged faced and drilled, ASA 125. The ring groove shall be smooth and to the tolerances as specified by the pipe manufacturer and shall accommodate either the Ring-tite or Fluid-tite rubber ring gasket.

K. Water Main Gate Valve Boxes and Covers

Water main gate valve boxes and covers shall be No. 3-RT units as manufactured by Brooks Products, Inc. Valve box extension shall be minimum SDR 35 8" PVC pipe. Valve boxes and PVC Risers shall be installed as shown on the Standard Drawings. PVC risers shall be notch fitted as to not allow backfill material to enter the bottom of the riser and fill over the valve operating nut / key.

L. Angle Meter Stop

These shall be bronze Ball angle meter stops. In a 1½" or 2" size, they shall be a flanged angle meter stop when required.

<u>Service Line</u>	<u>Angle Ball Meter Stop</u>	<u>Inlet</u>	<u>Outlet</u>	<u>Type</u>
1½" & 2" Brass Riser	Meter Valve	FIP Thread	Meter Flange	Jones 1527 Ford BFA13-666W (1.5") Ford BFA13-777W (2")
1½" & 2" Brass Riser	By Pass	FIP Thread	FIP Thread	Jones J-1900W Ford B11-666SW (1.5") Ford B11-777SW (2")

For a 1½" displacement meter installation, use Ford ball angle meter stop BFA13-77W or equal.

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M. Water Main Cut-in

When making a cut-in on an existing water main, which incorporates the use of flex couplings, transition couplings, or flange coupling adapters, these fittings will conform to AWWA C213 requirement fusion bonded epoxy to entire fitting with 304 SS BTN's or coated with the thermoplastic polymer, rilisan nylon II.

These types of fittings will conform to AWWA C219-97. Center sleeves and end rings will conform to ASTM A536 Grade 65-45-12 for ductile iron. Steel bolts shall meet ASTM F738 for stainless steel. Nuts shall meet ASTM F8361F836M for stainless steel.

Approved manufacturer source for Fusion Bonded Epoxy Coated Fittings, Romac Industries, Inc.
Approved manufacturer source for Thermoplastic Polymer Rilisan Nylon II Coated Fittings, Viking Johnson/Mueller Company.

N. Fire Hydrants

All fire hydrants installed in the District will be of the Wet Barrel type. The hydrants will conform to AWWA C503 as last revised and equal in all respects to the Rich, Corona, #'s 550 and 560, the Mueller A-455, or the L.B.I.W. Lido #702. Hydrants will be all bronze construction and have a 6-hole bolt pattern, including hydrant spool extension and hydrant bury. (Hydrant Flange Burys or Spool Extensions will be 8 x 6 hole pattern when required). Hydrants will be painted safety yellow with urethane alkyl gloss enamel.

Steamer or special type fire hydrants may be required by the County Fire Department.

- (1) Valve & Stems - The end of the hydrant valve stem shall be protected against damage and excessive wear by a pentagon, "Dummy Nut" made of a ferrous type metal. Valves shall be of the quick opening type. A standard fire hydrant wrench shall be used to operate the hydrant.
- (2) Outlet Threads - The 2½" and 4" outlets shall be equipped with National Standard hose threads and properly capped. Barrel of the hydrant shall be 6" minimum I.D.
- (3) Main Line Valve -All hydrants shall have a gate valve installed on the tee at the main on the hydrant branch.
- (4) Hydrant Runs - Hydrant runs shall be C900 Class 235 or DIP CL 350 cement lined and shall be restrained at the valve and bury by a joint restraint as specified under "Mechanical Joint Restraints for PVC and DIP" of these Specifications or thrust blocks. See Section G, 6" Horizontal Service Runs.
- (5) Location of Hydrants - Fire hydrants shall be spaced and installed as shown on the Plans and/or as directed by the County Fire Department. In no case shall the distance be greater than specified by the Insurance Services Office, Table 5 (residential 500 feet). All hydrants shall be located a minimum of 18" behind the curb face.

O. Blowoff Assemblies

Blowoff assemblies are placed at low spots in the line to facilitate line draining and to allow the removal of sediments which accumulate in low areas of the pipeline. Also fire hydrants perform the same functions as blowoff and therefore can substitute for them, providing a bottom outlet tee used to connect to the main line. Design engineers are encouraged to avoid blowoffs by utilizing fire hydrants.

On dead end lines (i.e., cul-de-sacs) where there is not a fire hydrant at the end of the line the engineer should specify the construction of a blowoff valve to drain, and clear the line.

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- (1) Sizing - Blowoffs should be sized according to the following criteria:
- a) In general, a particular section of pipeline should be capable of being drained within 2-4 hours.
 - b) The blowoff should be capable of creating a velocity of not less than 2.5 fps in the pipeline for the removal of sediments. For typical pressures between 45 and 100 psi this velocity can be created by the following:

<u>Pipe Size</u>	<u>Blowoff Size</u>
6"	2"
8"	2" or 4"*
10"	4"
12"	4"
Above 12"	By special design

* 2" blowoff can be used unless the reach being drained is extensive where a 4" blowoff is desirable.

- (2) 2" Blowoff Assembly - Materials shall be as follows:
- a) Service Lines shall be Brass riser, T-head corporation stop and saddle at the main.
 - b) 2" Ball valve shall be James Jones 1900W or Ford B 11-777 with female iron pipe thread on each end and tee head.
 - c) Vault shall be the same as for a meter installation up to 1" (37-H Meter Box).
 - d) Plastic plug shall protect top of ball valve.
- (3) 4" Blowoff Assembly - Materials shall be as follows:
- a) Service line shall be 4" DIP or C-909 PVC. There shall be a bottom outlet tee on the main.
 - b) 4" Valve shall be Resilient Wedge Gate Valve.
 - c) Flanged Spool shall be ductile iron cement lined.
 - d) 4" Blind Flange.
 - e) Vault shall be a concrete box with cast iron cover. Approved is Brooks 38-T meter box.
 - f) Guard Posts are required where an above ground blowoff is located and subject to damage.
 - g) Tracer wire shall also be stubbed out inside the vault box.

P. Combination Air Release Valves

Per AWWA C-513.

Combination air release valves combine both the air release and air and vacuum valves of which is generally specified in the District System.

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- (1) Location - Combination air release valves shall be located at all significant high points along the pipeline as approved or required by the District Engineer.
- (2) Sizing - In order to simplify the selection of the combination air release valves, the following is provided as guidelines for determining the size:

- a) Determine the maximum rate of flow which can occur in the line -

Equation 1. Rate in CFS = $\frac{\text{GPM}}{7 \times 60}$ under filling conditions

Equation 2. Rate in CFS = $0.087(S \times D^5)^{1/2}$ under draining conditions

S = slope or gradient (ft. per foot)

D = diameter of pipe in inches

- b) Using the value in (1) above, the size should be:

<u>CFS Rate</u>	<u>Valve Size</u>
0-5	1"
5-15	2"

- c) For most installation involving 8" pipeline the valve will be 1 " size.

- (3) Mechanical Assembly - As discussed above, the combination air release assembly has both the features of an air release valve and an air vacuum valve. Both units shall be housed in cast iron body and all internal parts such as the float, bushings, level pins, seat and baffle shall be either stainless steel or brass as furnished by the manufacturer. All assemblies shall be Class 250 fittings.

Approved assemblies are as follows:

<u>Size</u>	<u>APCO Valve No.</u>	<u>Height</u>	<u>Clow Model Design</u>	<u>Crispen Model Design</u>
1"	143C	10"	A	U10
2"	145C	12"	B	U20
3"	147C	15"	C	U30
4"	149C	17"	D	U40

Used only where working pressure under 125 psi for 1" and 165 psi for large sizes.

- a) Housing shall be Armorcast #P6002001 (2") or P6002002 (1") and color shall be Sandstone.
- b) Service Lines shall be ¾ inch or 1 inch Type K soft copper. There shall be a corporation stop at the main. One and one half (1½) and Two (2) inch service lines shall be 2 inch brass T-head corporation stop and saddle at the main.
- c) Ball Valves shall be James Jones 1900 Ford B11-777 with a female iron pipe thread on each end and tee head.

Standards for
CONSTRUCTION OF WATER MAINS

Q. Tracer Wire

Vinyl coated solid copper tracer wire, 12 or 14 gauge, shall be used on the water distribution pipe and shall be stubbed up outside of pipe riser inside of valve boxes or where required for accessibility in accordance with District Standards.

R. Back Flow Assemblies

Ownership of the Backflow Assembly is that of the property owner that it serves from the property served to the shut-off valve in the street or easement and District ownership from the valve to the main.

Only approved Backflow Assemblies shall be installed in the District. All industrial buildings will require backflow assemblies at the meter. On detectors, check backflow assemblies. Water meters will read in cubic feet.

On premises where system backflow protection is required, the backflow assembly shall be installed on the property side of, and adjacent to, the meter to the specified point of use. On the service line there must be no outlet, tee, tap or connection of any sort to or from the supply pipeline between the meter and the prospective assemblies.

Facilities that require uninterrupted water service shall install R.P. Backflow assemblies in parallel. When applicable a Hot-Tap will be the method to install a Fireline to an existing water main. All pipe line material shall conform to AWWA current standards and District Standards.

Immediately after installation of the backflow prevention assemblies, it will be necessary for the Contractor/Owner to have assemblies tested by a certified tester.

Backflow prevention device enclosures such as GuardShackTM or approved equal shall be installed when required on the plans.

Under the cross-connection regulations of the State of California, the Owner of the premises is required to maintain these assemblies in a continuous state of good repair and to test the assemblies after all repairs and at intervals of one year, unless the condition of the assemblies indicates the necessity for more frequent tests and servicing. Test report forms will be mailed to the Owner 30 days in advance of the next periodic test date. It will be the responsibility of the Owner to have the assemblies tested by a certified Backflow Prevention Assembly Tester. A report form showing the condition of each assembly and repairs made, if any, shall be prepared and forwarded to the assigned Cross-Connection Control coordinator within the 30-day period.

- (1) Installation Requirements for DC (Double Check Valve Assembly) - A DC shall be located as close as practical to the user's point of connection and shall be installed in a manner where it is readily accessible for testing and maintenance. Shall be installed at least 12" and not more than 36" above grade (measured from the lowest point of the assembly), and must have adequate side and top clearance of 18" to allow access for testing and maintenance.

Firelines - DCDA (Double Check Detector Assembly) is subject to the same requirements as set forth above. Water meter must read in cubic feet.

Standards for
CONSTRUCTION OF WATER MAINS

- (2) Installation Requirements for RP (Reduced Pressure Principle Assembly) - An RP must be located as close as practical to the user's point of connection (meter). Must be installed at least 12" and not more than 30" above ground (measured from the lowest point of the assembly, (which is the Differential Pressure Relief Valve) and must have adequate side and top clearances to allow access for testing and maintenance.

If placed in an above grade enclosure, or in a building, there must be at least 24" of clearance between the side of the assembly with test cocks and the side wall of the enclosure or building wall and at least 12" clearance between the other side of the enclosure or building wall. Also, allow adequate clearance for valve operation.

Please note that an RP MAY NEVER BE INSTALLED IN AN UNDERGROUND VAULT as the RP requires adequate, fail safe drainage. It is important to ensure adequate drainage for all installations as large volumes of drain water may be encountered.

RPDA (Reduced Pressure Principle Detector Check Assembly) is subject to the same requirements as set forth above.

- (3) Information Relative to On-site Protection AVB (Atmospheric Vacuum Breaker) and PVB (Pressure Vacuum Breaker) - All proposals for on-site protection in lieu of service protection must be evaluated on a case by case basis. In evaluating each case the water purveyor must consider the complexity of the piping system within the user's premise, the degree of the cross connection hazard to be protected against, whether other hazards exist on the site and any other special circumstances which might preclude the use of onsite backflow protection. The final decision rests in the hands of the water purveyor.

A common application of on-site protection are AVB's and PVB's installed on landscape irrigation systems where injection of fertilizers or pesticides (chemigation) is not practiced. Proposals to use AVB'S or PVB'S within an irrigation system in lieu of providing protection at the user connection must be examined on a case by case basis.

In the installation of an AVB no shutoff valves may be located on the discharge side of the AVB. The AVB must be mounted at least 6" above the highest downstream outlet. It should be noted that the current edition of the Uniform Plumbing Code prohibits the installation of an AVB where it will be subject to continuous pressure for more than 12 hours at a time. An AVB will tend to freeze in the open position under these conditions.

A PVB must be mounted at least 12" above the highest downstream inlet. Shut-off valves, either manual or automatic, may be located downstream of the PVB.

No connections are to be made between Meter and Backflow Assembly.

S. Concrete Construction

Concrete construction shall conform to the provisions of Section 303-1, "Concrete and Masonry Construction" of the "Greenbook". Concrete shall be of the appropriate class in accordance with Table 201-1.1.2 (A) and shall conform to Section 201-1, "Portland Cement" of the "Greenbook".

T. Asphalt Concrete Replacement

Road compaction, base, asphalt concrete, and pavement markings shall be in accordance with the County of Santa Barbara transportation and engineering standard details and requirements.

III. PUBLICATIONS

The following publications as listed below, but referenced to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

A. American Standards Association

ASA 125 Drill Hole Spacing

B. American Standards Institute

USAS A 21.1 - 1967 USA Standard for Thickness, Design of Cast-Iron Pipe

C. American Society of Testing Materials

A-276 Stainless Steel

A-307

C-3 1-59 Compression and Flexure Test Specimens

D-2321 Recommended practice for installation of Flexible Thermoplastic Sewer Pipe

D. American Water Works Association Standards - Current Edition

B300 Hypochlorite

B30 1 Liquid Chlorine

C 100 Cast-Iron Pressure Fittings

C104 Cement Mortar Lining for Ductile-Iron and Gray-Iron Pipe and Fittings for Water

CI 10 Ductile-Iron and Gray-Iron Fittings, 3" through 48", for Water and other Liquids

C111 Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings.

CI51 Ductile-Iron Pipe for Water and other Liquids

CIS3 Ductile-Iron Compact Fittings, 3" through 12" for Water and other Liquids

C400 Asbestos-Cement Distribution Pipe, 4" through 12" NPS, for Water and other Liquids

C500 Gate Valves, 3" through 48" NPS, for Water and other Liquids

C503 Wet Barrel Fire Hydrants

C509 Resilient-Seated Gate Valves for Water and Sewage systems

C550 Protective Interior Coatings for Valves and Hydrants

C600 Installation of Ductile-Iron Water Mains and Appurtenances

C601 Disinfecting Water Mains

C603 Installation of Asbestos Cement Pressure Pipe

C800 Underground Service Line Valves and Fittings

C900 Polyvinyl Chloride (PVC) Pressure Pipe, 4" through 12", for Water and other Liquids

E. Federal Specifications

WW-P-421b, Cast-Iron, Pressure (for water and other liquid)

F. Installation Guides

J.M. Pipe Installation Guide (latest edition)

Certainited Installation guide (latest edition)

G. Separation Requirements

State of California, Department of Public Health - Required Separation Between Water Mains and Sanitary Sewers.

Standards for
CONSTRUCTION OF WATER MAINS

H. Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California (USC FCCCHR)

Most current edition of the USC FCCCHR manual.

Standards for
CONSTRUCTION OF WATER MAINS

IV. CONSTRUCTION METHODS

A. Paving

Road compaction, base, asphalt concrete, and pavement markings shall be constructed in accordance with the County of Santa Barbara transportation and engineering standard details and requirements.

B. Construction Excavation

- (1) Trenching - Attention is directed to Section 306-1, "Open Trench Operations," of the "Greenbook."

Trenching for all pipes shall be in open cut to provide a minimum cover of 36" below finish pavement surface or as established by the approved plans.

Where excavation for trenching is in a paved street or alley, or it is necessary to excavate in a paved area, the Contractor will mark out and saw the pavement in a straight line along the trench route to ensure a good and clean joint for patching, with the limits of paving cut to be 6" greater in width on each side of the proposed trench than the trench excavation. If the paving is broken to a ragged edge, the Contractor will be required to re-cut the paving before the paving patch is placed.

- (2) Disposal of Excess Material - Where material is excavated in excess of that required for the site, such excess materials shall be removed and disposed of by the Contractor as directed by the Engineer. All excess material shall be removed from the right-of-way and disposed of by the Contractor. The location of the disposal site shall be the responsibility of the Contractor and shall be subject to the approval of the Engineer - written approval by the disposal site owner and a grading permit issued by the affected public agency must be provided. Removal of excess material shall be done immediately following backfilling operations. Any spoils piles, bedding gravel, base material and the like shall be properly lighted and barricaded for traffic safety. In all cases, such piles shall be placed as far out of the traveled way as is possible.

All material disposed of at the City or County's Sanitary Landfills are subject to payment of current fees.

- (3) Removal of Water - The Contractor shall remove and dispose of all water entering the excavation. Disposal of water shall be done in such manner to prevent damage or nuisance to adjacent property. Sufficient pumping equipment shall be provided to maintain the trench in a dry condition during the bedding and initial backfilling of the pipe. The Contractor shall maintain all natural drainage and restore it to its former condition as soon as possible.
- (4) Backfill - No backfilling shall be done until the installation to be covered has been inspected and approved for covering. Backfilling shall be carried out in an orderly fashion and, in general, shall be done as soon as approval has been given to cover the pipe. **COMPACTION OF BACKFILL SHALL PROCEED SIMULTANEOUSLY WITH BACKFILLING OPERATIONS.**

Backfill material shall be in conformance with the Standard Specifications.

C. Removal or Abandonment of Existing Water Mains

Existing water mains which are being replaced shall be removed where necessary, or abandoned as indicated on the Plans or contract documents and as specified herein. The main to be abandoned or replaced shall be removed when any of the following conditions exist:

Standards for
CONSTRUCTION OF WATER MAINS

- (1) The alignment of the existing main falls within the trench excavation for the new main.
- (2) The alignment of the existing main is not more than 1-ft outside of the standard trench width for the new main.
- (3) When called out on the Plans or in the contract documents.
- (4) When required by the District.

When the existing main is shown on the Plans as located outside of the limits of conditions one and two above, but actually falls within these limits, the Contractor shall remove the main as if it were shown correctly. However, the Engineer may, but is not obligated to, change the new main alignment so that conditions one or two above does not exist.

Where portions of the old main and/or services are abandoned and left in place, either the exposed ends of the abandoned main and services shall be tightly plugged with concrete per Section II, Materials, S. Concrete Construction, of these Standards, 6" thick, or the abandoned main shall be blown full of concrete sand and the exposed ends and abandoned services shall be tightly plugged with concrete per Section 11, Materials, S. Concrete Construction, of these Standards 6" thick, as indicated on the Plans.

All salvaged material from any abandoned water main, its appurtenances and gate valves, shall remain the property of the District at the time of its removal from the trench, unless otherwise specified. Such material shall not be allowed to accumulate along the line of work but shall be removed from the area at the earliest practical time and shall be delivered by the contractor to a location within the District boundaries as directed by the Engineer.

D. PVC Pressure Water Distribution Pipe Installation

Contractor shall install pipe according to the current Installation Guide Booklet for C900/C-909 PVC class water pipe and in accordance with the requirements of ASTM Standard D-2321 and AWWA Standards.

E. Asbestos-cement Pressure Water Distribution Pipe Installation

Contractor shall install pipe in accordance with the requirements of AWWA Standard C603.

No power saw cutting or beveling of A.C. pipe and/or couplings shall be allowed. Snap cutting and/or use of flexible couplings is allowable.

F. Ductile-iron Water Distribution Pipe Installation

Contractor shall install pipe in accordance with the requirements of AWWA Standard C600.

G. Crossing Lines

In cases when crossing other utility lines, a 6-in minimum clearance is required. Required separation between water mains and sanitary sewers shall be 10-ft horizontal and 1-ft vertical, or in conformance with guidelines as established by the State of California Department of Health. Any deviation must have the approval of the Engineer.

Pipe Casing: Carrier pipes to be installed inside casing shall be installed with self-restraining casing spacers. Casing spacers shall provide axial thrust restraint to prevent pipe joint separation during and after installation.

Standards for
CONSTRUCTION OF WATER MAINS

Restrained casing spacers shall be manufactured of high strength ductile iron, ASTM A536, grade 65-45-12. Connecting rods shall be of high strength low alloy material meeting the requirements of ANSI/AWWA C111/A21.11 Casing runners shall be out of ultra high molecular weight polymer.

Restrained casing spacers shall be provided at all pipe bell joints. In addition casing spacers shall be installed each 10-ft of the pipeline to support the pipe barrel and the weight of its contents. Restrained casing spacers shall be Ford Uni-flange series or approved equal. Ends of carrier pipe shall have an end seal with stainless steel hose clamps that conforms to the carrier pipe and the casing.

H. Thrust Blocks

Concrete thrust blocks shall be poured in place in back of all fittings, fire hydrants, pipe ends and at all changes of directions. Blocks shall be such as to withstand the thrust of 150 psi working water pressure on the main, or as designated by the District, as outlined per J.M. Pipe. Installation Guide, latest edition, utilizing safe bearing load for undisturbed vertical and nearly vertical trench wall as approved by the Engineer.

I. Compaction

- (1) Pipe Bedding - per "Greenbook" Section 306-1.2.1, "Bedding"
- (2) Pipe Backfill - per "Greenbook" Section 306-1.3, "Backfill and Densification"
- (3) Compaction Tests - Compaction tests will be made in accordance with ASTM D2922/D3017 or D1557.

Compaction tests shall be furnished to the District by the Contractor and paid for by the Contractor. Such tests are to be made by a testing laboratory approved by the Engineer. The Contractor will furnish one (1) compaction test per each linear 200-ft of compacted backfill with samples taken at depths determined by the Engineer. In the case where trenching and backfilling is performed in a paved street or alley, one compaction test per two hundred (200) linear feet of the compacted subgrade and of the base material will also be furnished to the District by the Contractor, and any additional tests required by the Engineer to ensure uniform and required compaction over the entire project.

J. Project Site Maintenance

Project site maintenance shall conform to the provisions in Section 7-8, "Project Site Maintenance," of the "Greenbook" and these Standards.

Water needed during the construction phase can be made available through a hydrant meter or a house meter. The Contractor, developer, or individual owner will be responsible for meters to be kept clear of all debris, to ensure access to meter readers and for damage or replacement of meter boxes, meters, meter yokes and service lines during construction. Dwelling units that have meter installations that do not conform to installation specifications will not be signed off.

Water provided by the District approved fire hydrants shall be metered and paid for by the Contractor. Hydrant meters may be obtained through the Engineer. Monthly water service charges and water usage charges will commence upon installation. A service charge will apply for relocating the hydrant meter to another hydrant.

The Contractor shall provide for the application of water for the purpose of controlling dust caused by his operations or by public traffic.

Standards for
CONSTRUCTION OF WATER MAINS

K. Final Inspection and Tests

- (1) Hydrostatic Test. For Acceptance of AC and PVC Water Distribution Pipe - The water main system shall be hydrostatically tested by the Contractor in the presence of the Engineer after all pipe and appurtenances have been installed, and thrust blocks and encasements have been placed and have attained sufficient strength and the required backfill has been partially completed for a section. Joints shall be left uncovered for inspection during the test. Hydrostatic testing will be done according to AWWA Standards C-600 D.I.P., C-603 ACP, and C-605 PVC.

Care is to be used to see that all air is excluded from the pipeline during filling operations by means of an air relief from the highest point of the pipeline system.

If no blowoffs are available, it may be required that a tap be made in the line of sufficient size to exclude all air. After the line has been completely filled, it shall be allowed to stand under a slight pressure for a sufficient length of time to allow the escape of air from slight air pockets in the line and fittings. After completion of the testing, the taps shall be tightly plugged unless otherwise directed by the Engineer.

Pipelines shall be tested in sections not more than 1,500-ft in length using valves when available or by the Contractor placing temporary test ends in sections not more than 1,500-ft in length.

A test for water tightness shall be made after the pipe, at the lowest point, has been subjected to a normal operating pressure of 100 psi for 24 hours. In this test, the section of pipe shall be subjected to a constant pressure of 200 psi after all air is released from test section for not less than two hours. The Engineer may require up to a four-hour test period.

No pipe installation will be accepted until or unless the leakage for the section of line tested is less than the rate of leakage specified in Table I (for AC Pipe) or Table II (for PVC Pipe). In calculating leakage, the Engineer will allow for the number of joints added to the pipeline, owing to the use of pipe length smaller than 13-ft for which the data in Table I or II applies. If the test leakage in any section is greater than that permitted, the Contractor shall locate and repair the defective joints at his own expense until the leakage by test is within the permitted allowance. The Contractor shall supply all equipment necessary for making the pressure test and the leakage test and shall make said tests at this own expense.

- (2) Hydrostatic Test Acceptance of Ductile-Iron Water Distribution Pipe - Contractor shall perform hydrostatic testing in accordance with the requirements of AWWA Standard C600. "Installation of Ductile-Iron Water Mains and their appurtenances."
- (3) Disinfecting Water Mains - Contractor shall perform Disinfection in accordance with the requirements of AWWA C651-05.
- (4) Verification of Water Main Disinfection - Verification of Water Main Disinfection shall be in accordance with the requirements of AWWA C651-05.

L. Clean-up

The Contractor shall clean-up and dispose of all trash, broken pavement, debris and excess material and shall remove his equipment from the site of the work as soon as it is completed. Streets shall be swept and washed to remove dust and mud.

Standards for
CONSTRUCTION OF WATER MAINS

M. Hot Tapping

Per AWWA 605 Section 6.4.2.2. - The drilling machine shall operate with a cutting tool classified as a core-cutting tool of the shell design that retains the coupon cut while penetrating the pipe wall. Twist drill bits and auger bits are prohibited.

Corporation stops are to be located at least one foot from the pipe ends. If two insertions are made, one on each side of the main, they should be separated by at least 18 inches measured along the pipe length. Multiple insertions made on the same side of the main are to be staggered 30-in around the circumference as well and separated by at least 18 inches.

Hot tapping shall only be done in the presence of the Engineer or his representative. The tapping mechanism shall be of the self-purging type so that cutting chips, shavings and coupon are removed from the tapping machine and do not enter the pipeline.

Tapping sleeves shall be of high tensile cast iron construction specifically designed to withstand the strains and vibration of the tapping machine. The tapping sleeve must have gaskets at each end of the sleeves. Sleeves with only an o-ring around the tapped hole are not approved.

Approved tapping sleeves: Romac SST-304.55 or Ford Style Fast All S.S. or approved equal

Size: 3-12 inches

Tapping Valve: Resilient-Seated gate valve

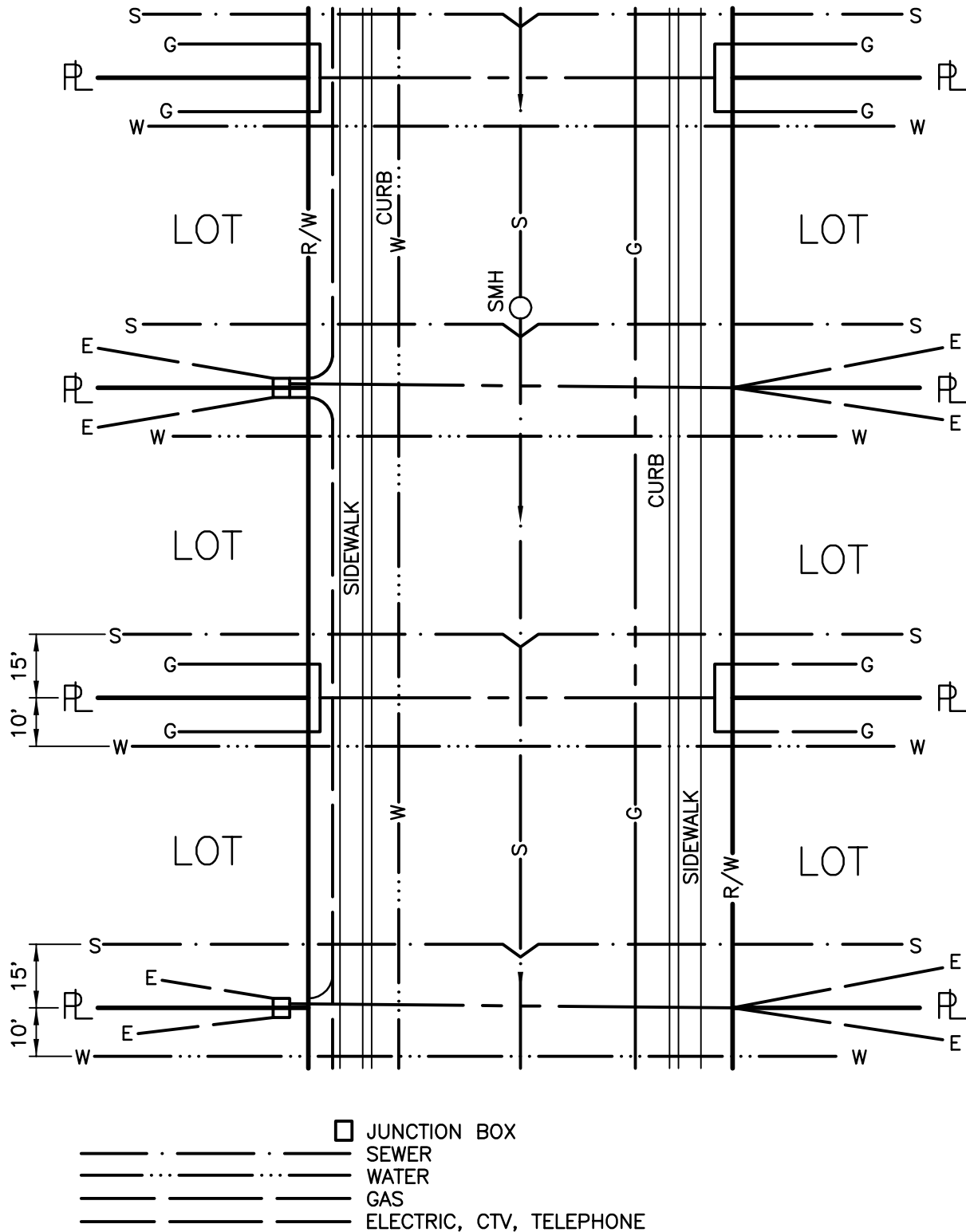
Note: Larger sizes require special approval.

Pressure Test @ 200 psi, 1-hour with water pressure new service lines must be sterilized in accordance with District Specifications. ¾-in and larger hot taps shall not be within 2-ft of center to center of another service taps. New service lines installed in the same trench shall have a 2-ft parallel separation.

Standards for
CONSTRUCTION OF WATER MAINS

V. STANDARD DETAILS

100	Utility Service Laterals, Symbols and Abbreviations
101	Modification of Sewer Lateral over Water Main
102	Cross with 4 Valves Flg. x Rt.
103	Tee with 3 Valves Flg. x Rt.
104	2"-6" Blowof Installation
105	Combination Air Release Valves
106	3"-12" Cross-Connection Control Wet Fire Sprinkler System with Fire Dept. Connection
107	Backflow Prevention Device Enclosure
108	4-8 Meter Manifold
109	1½" & 2" Service and Meter Installatio
110	¾" x ¾", 1" Water Service Connections
111	3" Meter with By-Pass
112	4"-6" Service Installation
113	Hydrant Installation
114	Concrete Anchor Blocks for Vertical Bends
115	Typical Casing Spacer Configuration
116	Water System Support Requirement for 16" Mains and Smaller
117	Separation Requirements for Sewer and Water Lines
118	3", 4" and 6" Connections on Existing Pipe
119	Water Line Invert
120	Installation of Water Sampling Station

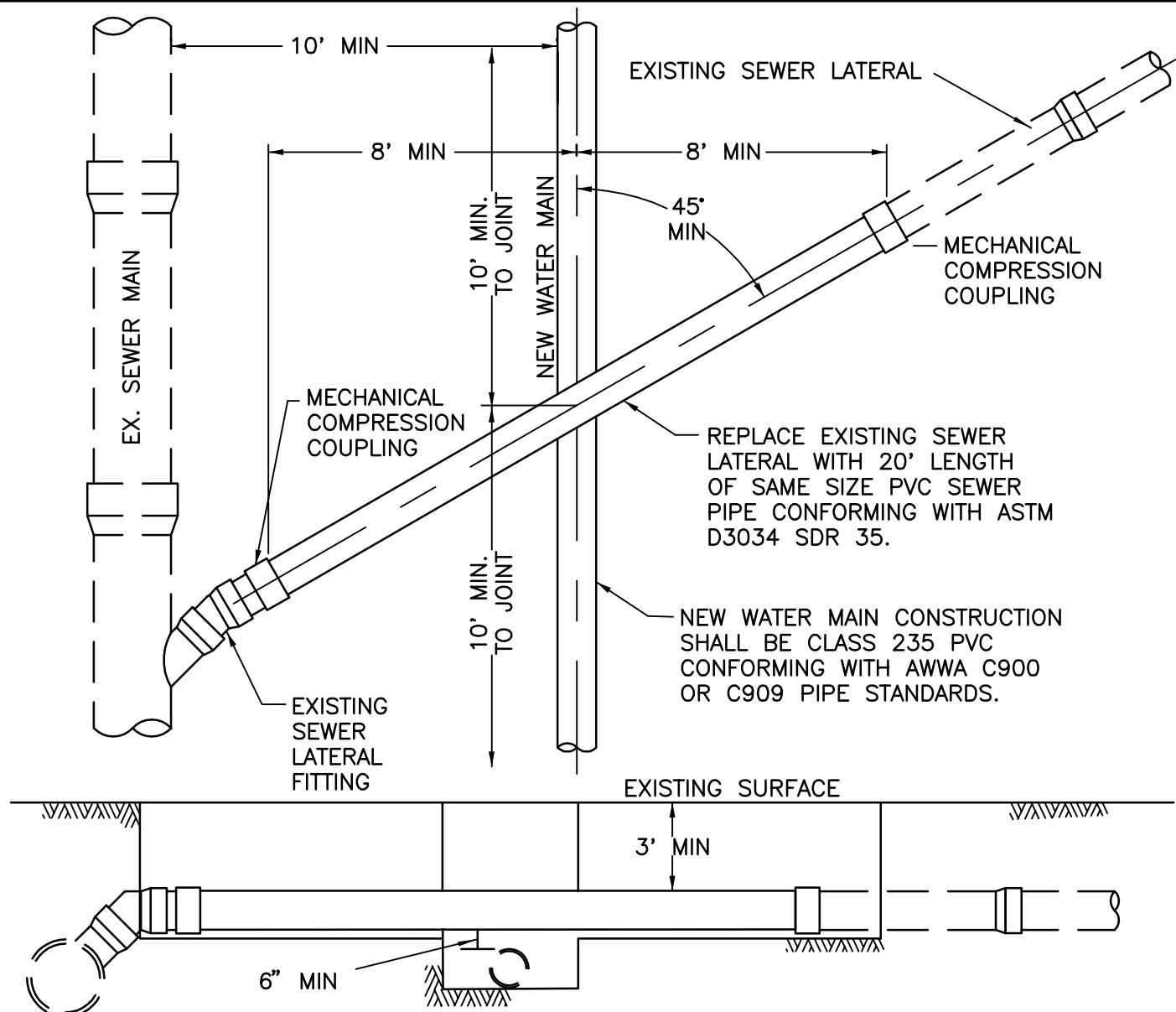


N.T.S.

Drawing No. 100

MISSION HILLS
COMMUNITY SERVICES DISTRICT

UTILITY SERVICE LATERALS
SYMBOLS & ABBREVIATIONS



NOTES:

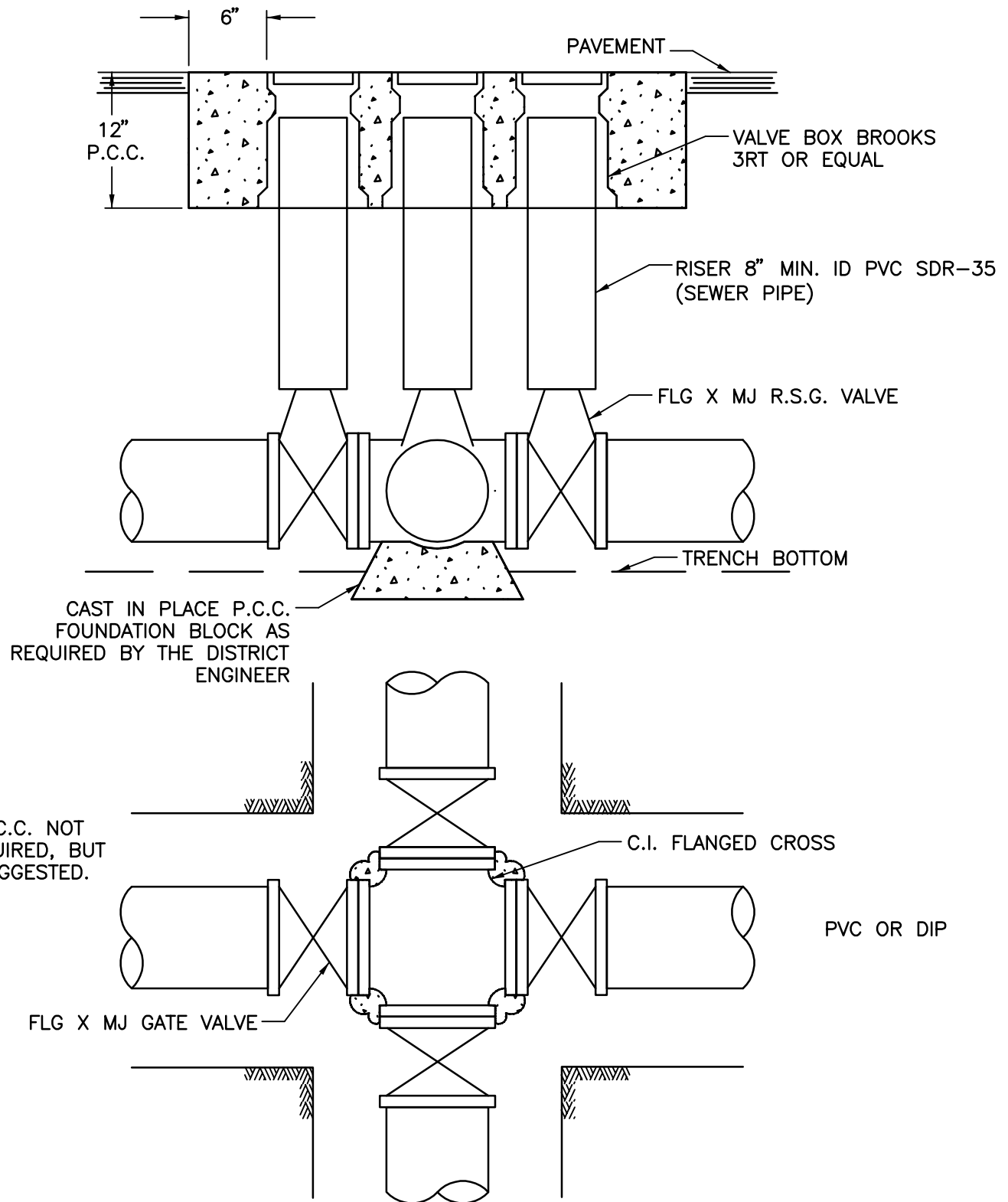
1. ANY VARIATION FROM THAT SHOWN SHALL BE APPROVED BY THE ENGINEER.
2. SEWER LATERAL SHALL MAINTAIN 2% SLOPE.
3. MECHANICAL COMPRESSION COUPLING SHALL BE CAULDER COUPLING OR APPROVED EQUAL.
4. CONSTRUCTION MUST CONFORM WITH THE GUIDELINES ESTABLISHED BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH.
5. BACKFILL SHALL BE PER "GREENBOOK" SECTION 306-1.3 "BACKFILL AND DENSIFICATION."

N.T.S.

Drawing No. 101

MISSION HILLS
COMMUNITY SERVICES DISTRICT

**MODIFICATION OF SEWER
LATERAL OVER WATER MAIN**

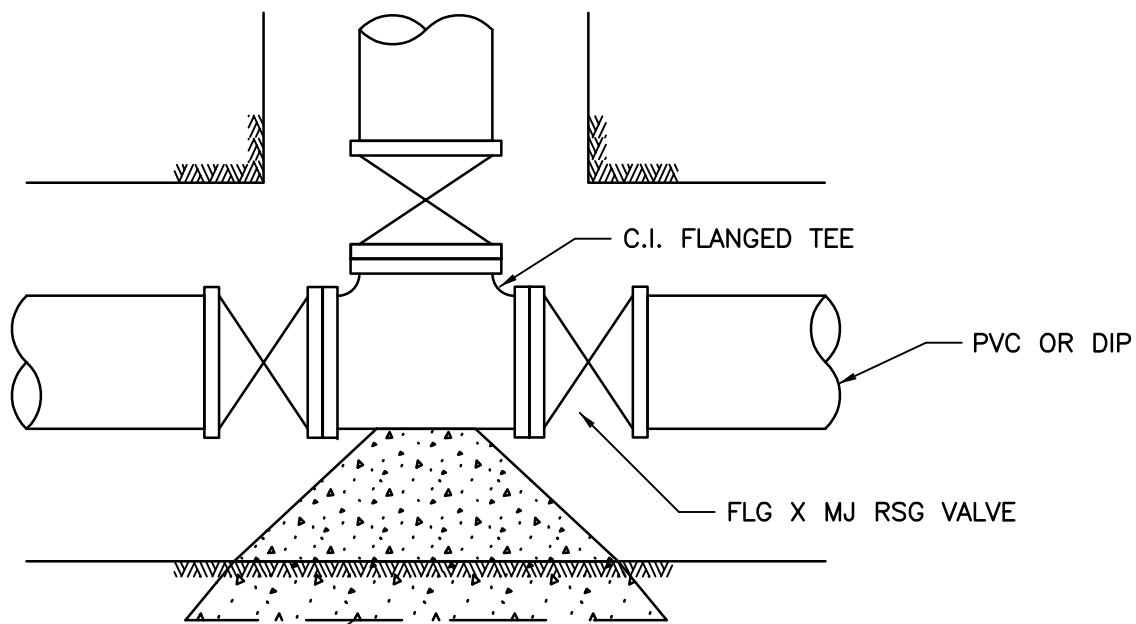
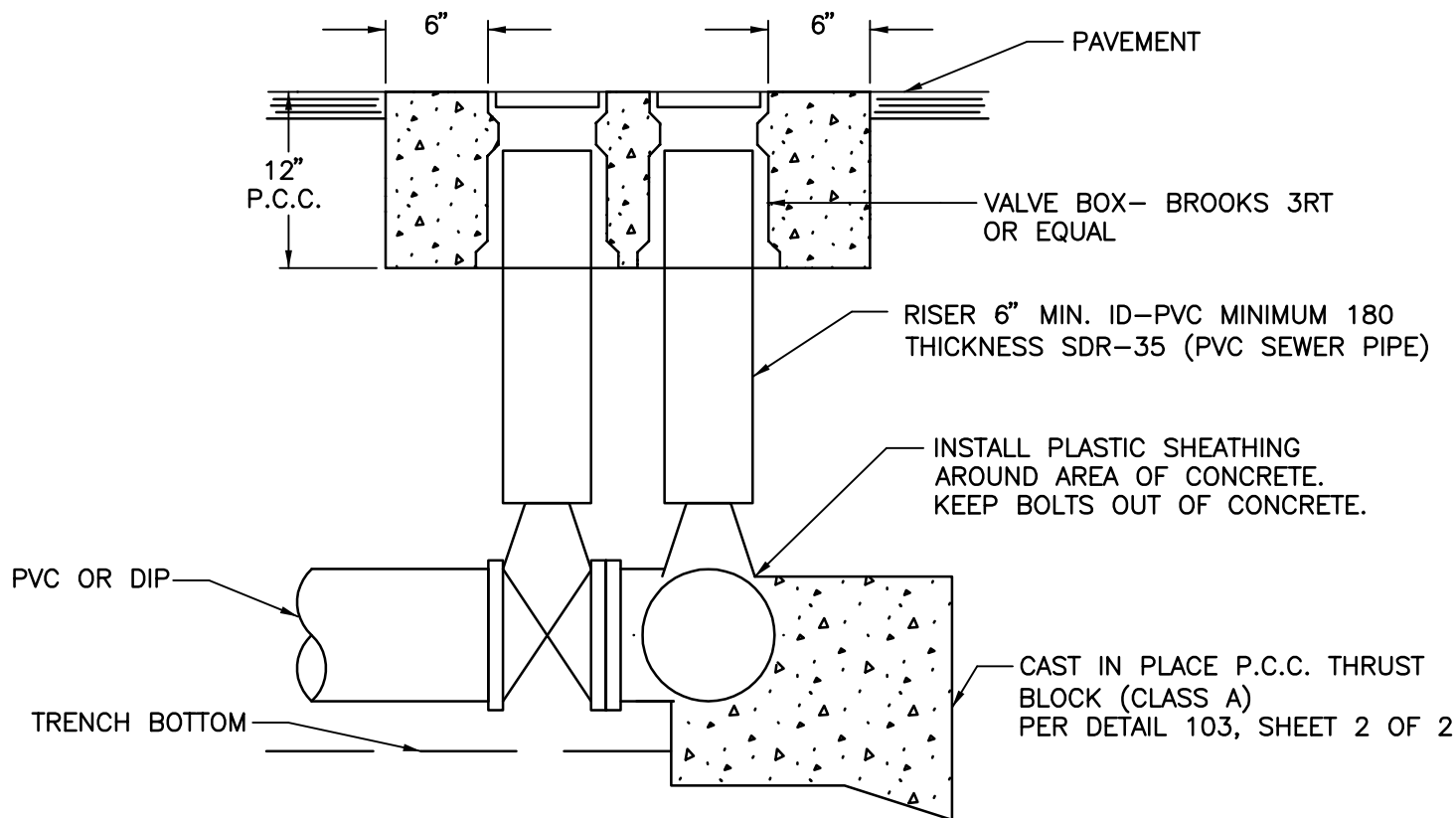


N.T.S.

Drawing No. 102

MISSION HILLS
COMMUNITY SERVICES DISTRICT

CROSS WITH 4 VALVES FLG. X RT.



P.C.C. THRUST BLOCK
PER DETAIL 103, SHEET 2 OF 2

N.T.S.

Drawing No. 103

MISSION HILLS
COMMUNITY SERVICES DISTRICT

TEE WITH 3 VALVES FLG. X RT.

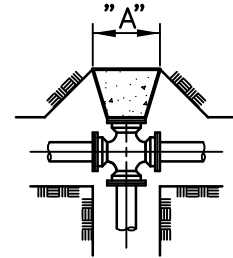
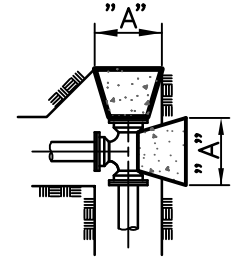
DESIGN CRITERIA:

1. SAFETY FACTOR (S_f) = 1.0
2. DESIGN WATER PRESSURE = 200 P.S.I.
3. CONCRETE THRUST BLOCKS ARE POURED AGAINST FIRM, UNDISTURBED NATURAL GROUND
4. SAFE SOIL BEARING PRESSURE = 2000 PSF (SAND) (S_b) PLUS INCREASE FOR DEPTH AND WIDTH PER UBC TBL. 29-B
5. ADJUST THRUST BLOCK AREA "A" BY THE FOLLOWING FACTORS FOR DIFFERENT SOIL TYPES:

SOIL TYPE	FACTOR	BEARING VALUE
SOFT CLAY	4.0	500 P.S.F.
SAND	2.0	1000
SAND & GRAVEL	1.33	1500
SAND & GRAVEL W/ CLAY	1.0	2000
HARD CLAY / SHALE	0.4	5000

NOTE:

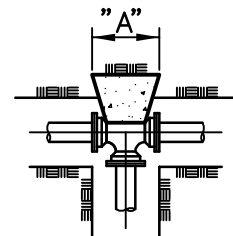
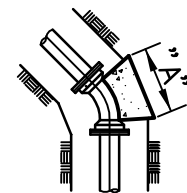
THE THRUST BLOCKS CONFORM TO THE REQUIREMENTS OF N.F.P.A STANDARD NO. 24.

**CROSS (ONE END PLUGGED)****TEE (ONE END PLUGGED)****NOTES:**

1. P.C. CONCRETE SHALL HAVE MINIMUM COMPRESSIVE STRENGTH OF 2000 P.S.I. AT 28 DAYS.
2. CONCRETE THRUST BLOCKS SHALL BE POURED SOLIDLY AGAINST FIRM UNDISTURBED NATIVE SOIL.
3. CONCRETE POURED AGAINST THE PIPE FITTING SHALL NOT EXTEND BEYOND THE JOINTS OR COVER BOLTS.
4. AREA "A" REPRESENTS THE LIMIT OF REQUIRED BEARING AREA.

**AREA OF BEARING FACE OF CONCRETE
THRUST BLOCKS ("A" SQUARE FEET)**

NOMINAL PIPE SIZE (INCHES)	90° BEND	45° BEND	22-1/2° BEND	11-1/4° BEND	TEES, PLUGS, CAPS, HYDRANTS
4	2	2	1	1	2
6	4	2	2	1	3
8	6	3	2	1	4
10	8	4	3	2	6
12	10	6	3	2	7

**TEE****BEND****Drawing No. 103**

MISSION HILLS
COMMUNITY SERVICES DISTRICT

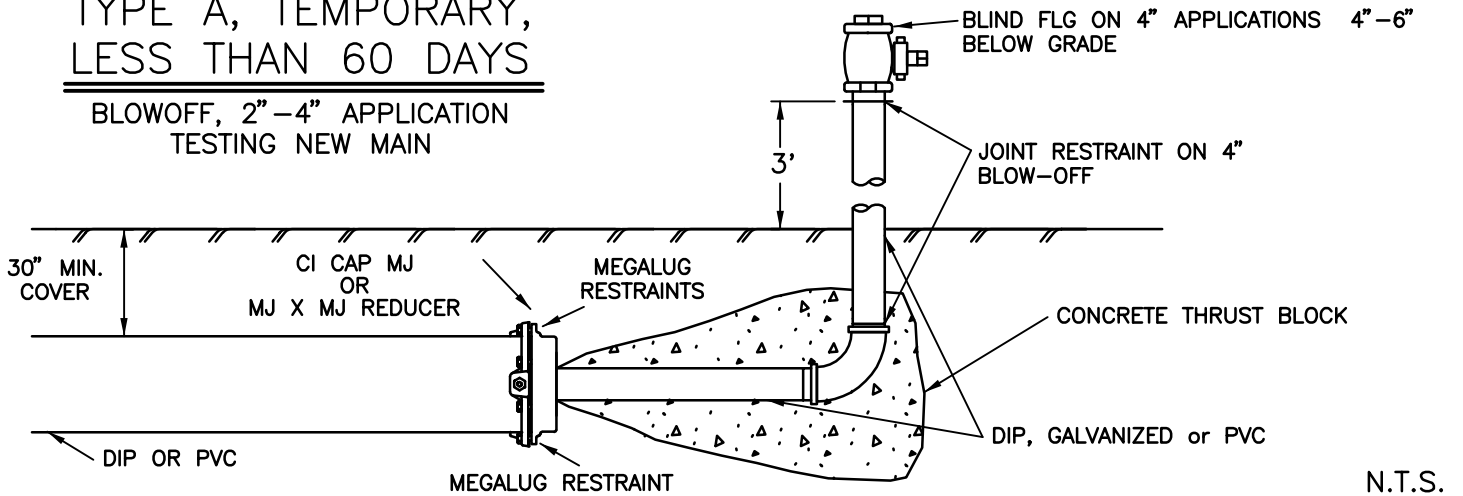
THRUST BLOCK DETAIL

MARK REVISIONS APPR. DATE JULY 2010

SHEET 1 OF 2

TYPE A, TEMPORARY, LESS THAN 60 DAYS

BLOWOFF, 2"-4" APPLICATION
TESTING NEW MAIN

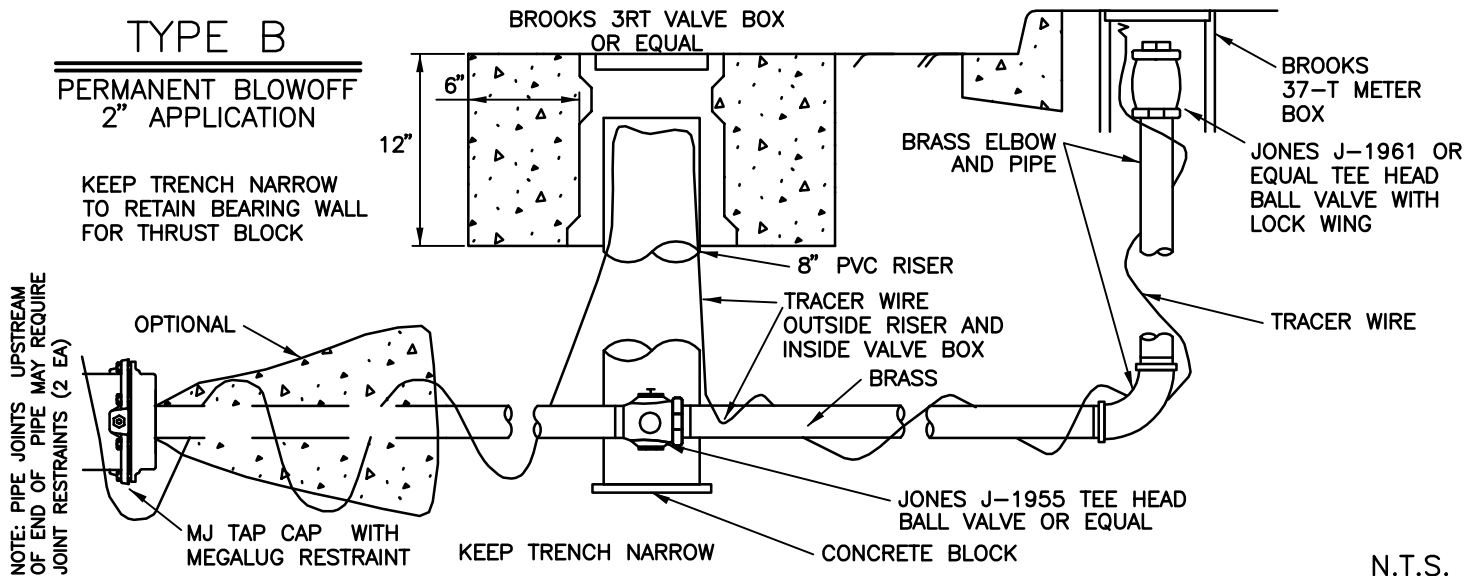


N.T.S.

TYPE B

PERMANENT BLOWOFF
2" APPLICATION

KEEP TRENCH NARROW
TO RETAIN BEARING WALL
FOR THRUST BLOCK

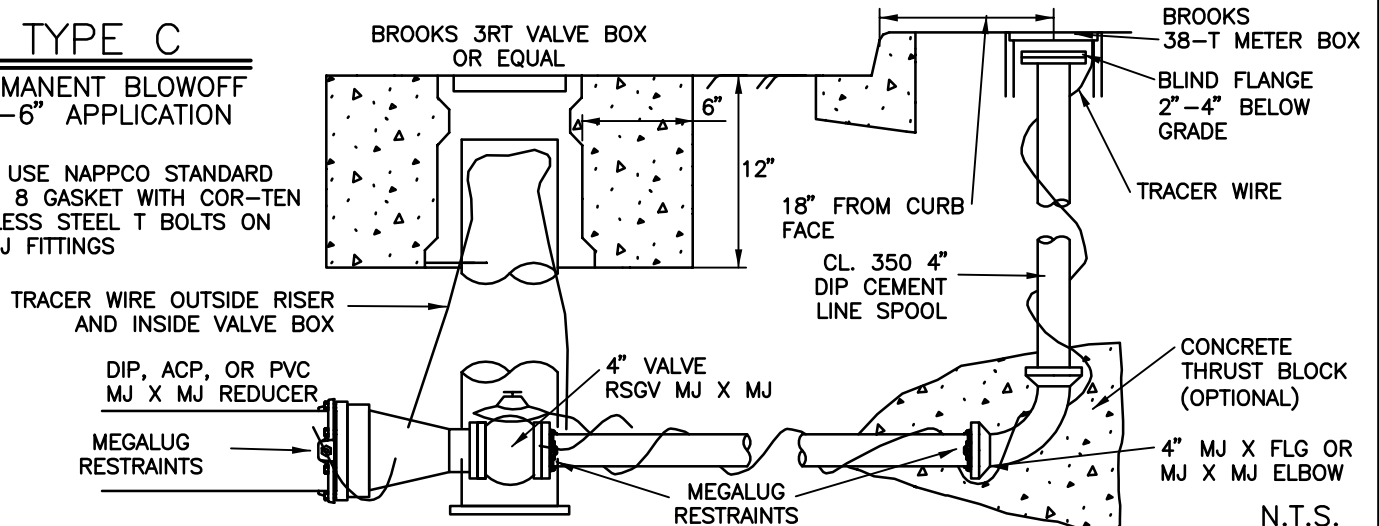


N.T.S.

TYPE C

PERMANENT BLOWOFF
4"-6" APPLICATION

NOTE: USE NAPPCO STANDARD
GLAND 8 GASKET WITH COR-TEN
STAINLESS STEEL T BOLTS ON
ALL MJ FITTINGS



N.T.S.

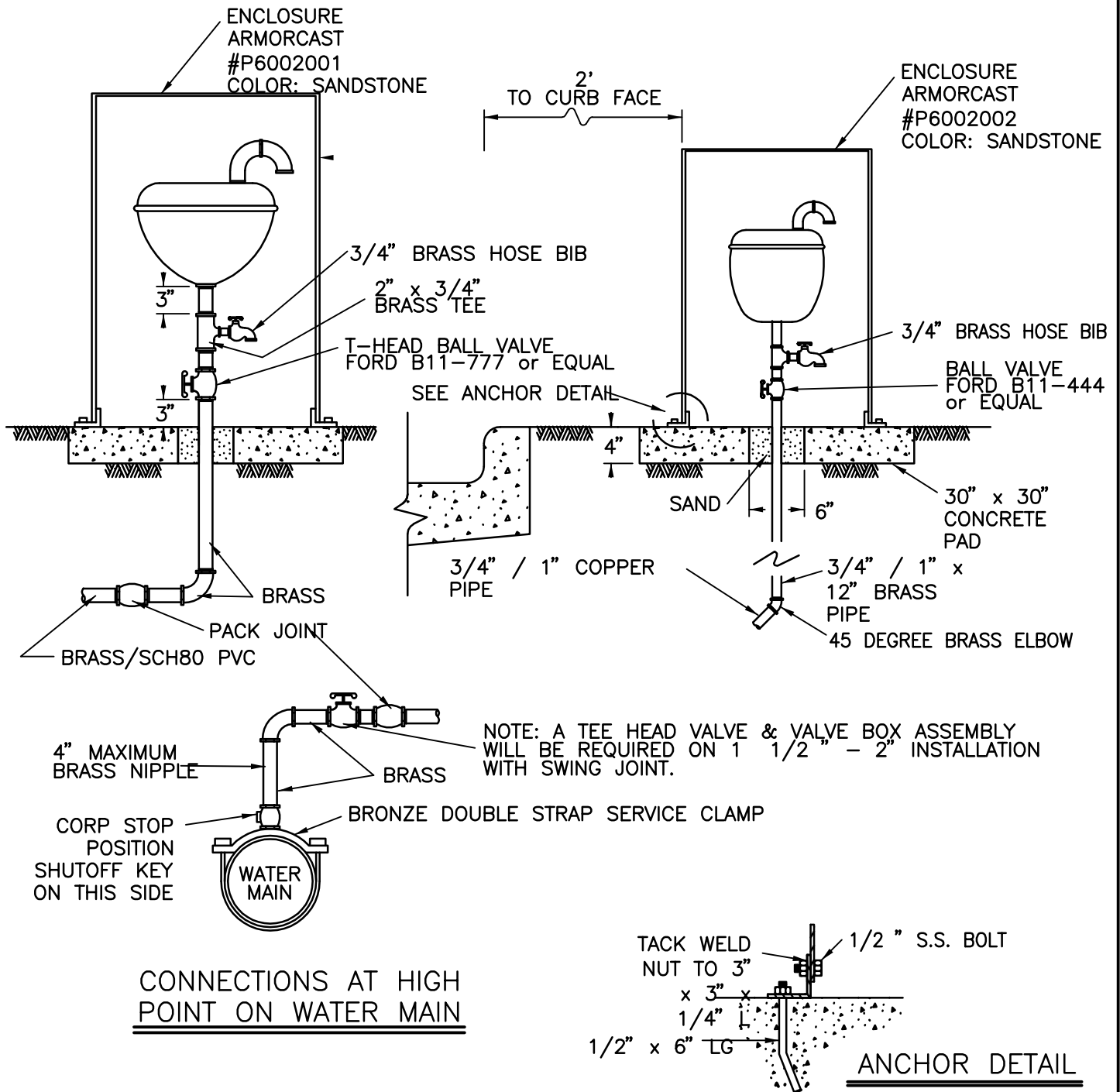
Drawing No. 104

MISSION HILLS
COMMUNITY SERVICES DISTRICT

2"-6" BLOWOFF INSTALLATION

2" COMBINATION AIR RELEASE AND VACUUM VALVE ASSEMBLY

1" COMBINATION AIR RELEASE AND VACUUM VALVE ASSEMBLY



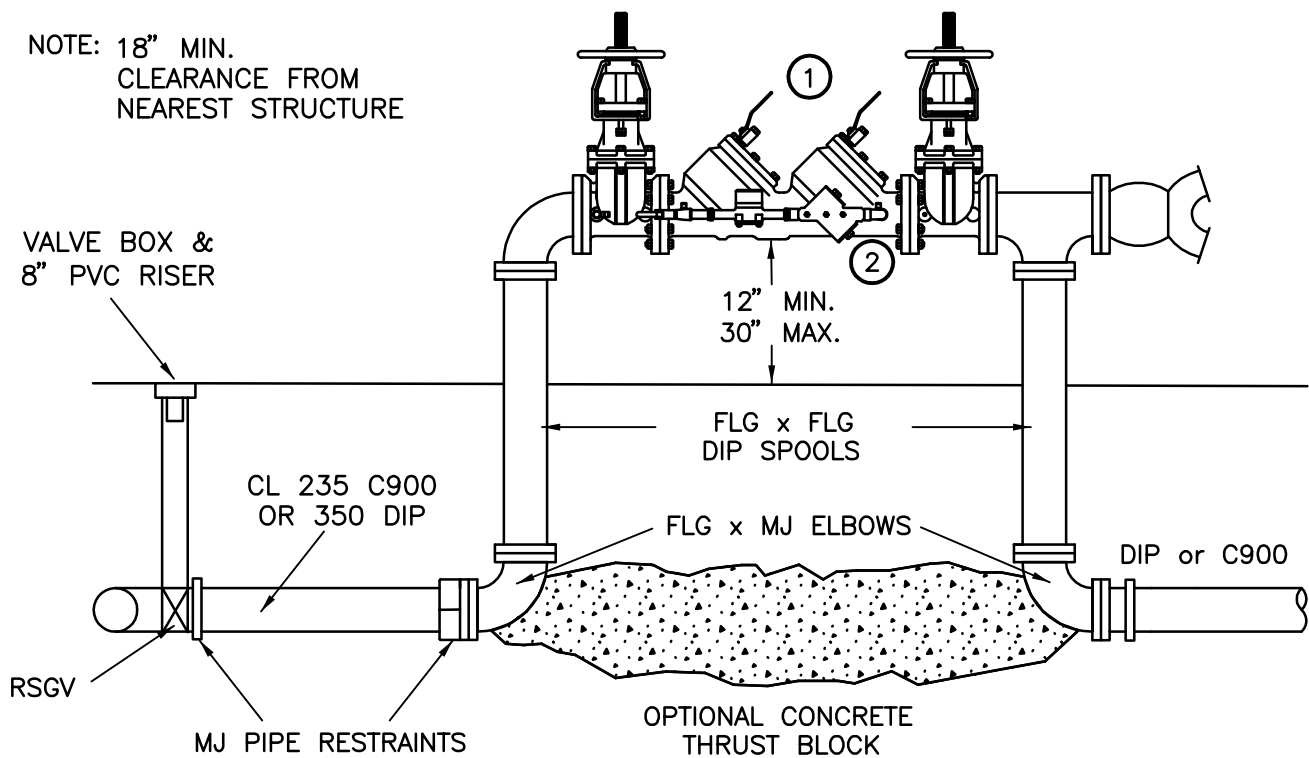
N.T.S.

Drawing No. 105

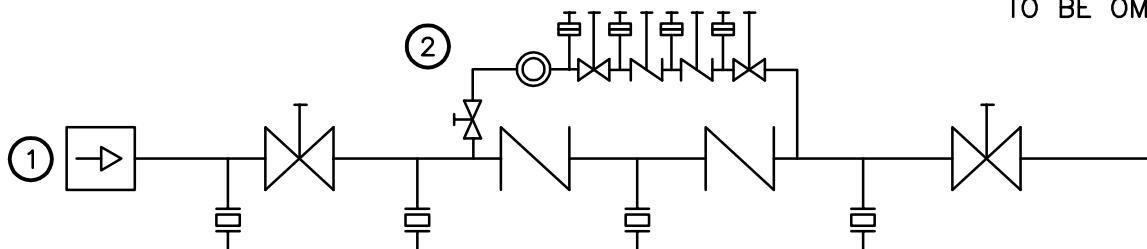
MISSION HILLS
COMMUNITY SERVICES DISTRICT

COMBINATION AIR RELEASE VALVES

NOTE: 18" MIN.
CLEARANCE FROM
NEAREST STRUCTURE



SECTION VIEW



KEY	DESCRIPTION OF EQUIPMENT DEVICES
1	APPROVED DOUBLE CHECK VALVE ASSEMBLY WITH OS & Y VALVES
2	BYPASS METER WITH APPROVED DOUBLE CHECK VALVE ASSEMBLY
	TEST COCK

NOTE: ALL CROSS-CONNECTION CONTROL DEVICES MUST BE TESTED BY A CERTIFIED TESTER PRIOR TO FINAL INSPECTION IN CONFORMANCE WITH TITLE 17 TARIFF RULE NO.16 (RES. W-3477.)

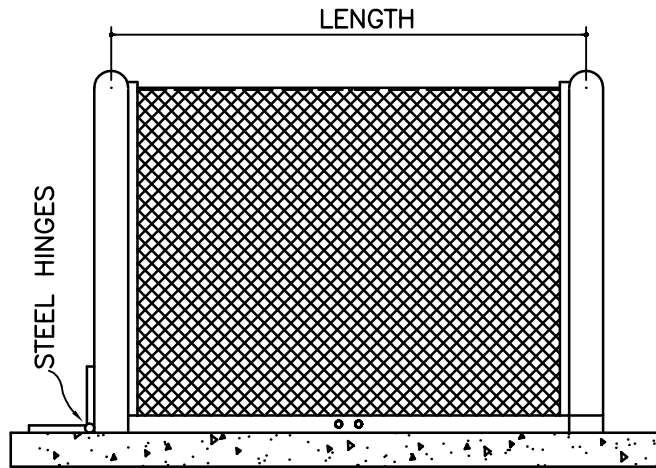
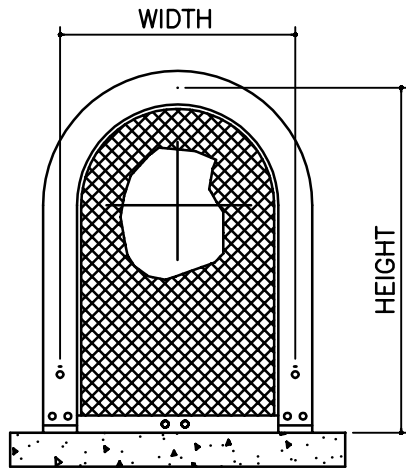
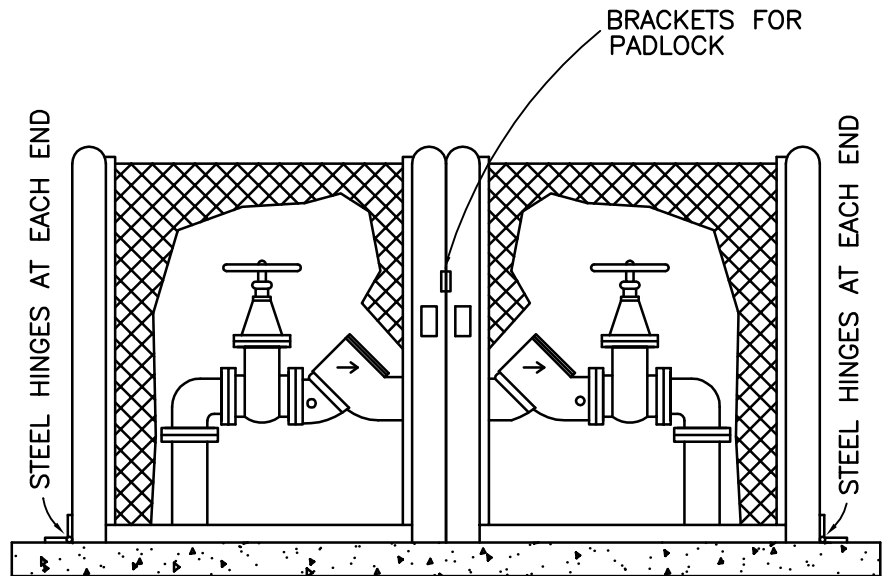
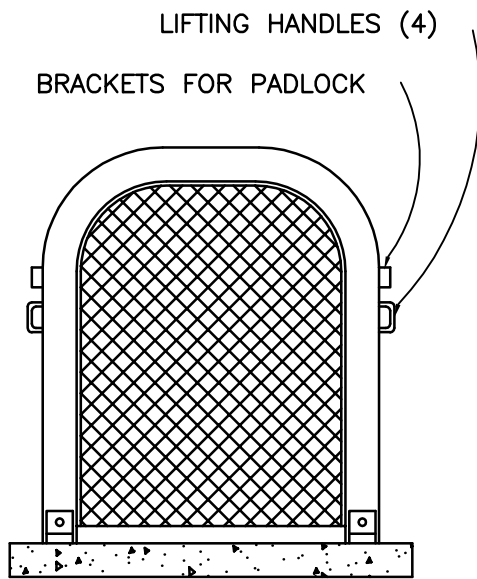
N.T.S.

Drawing No. 106

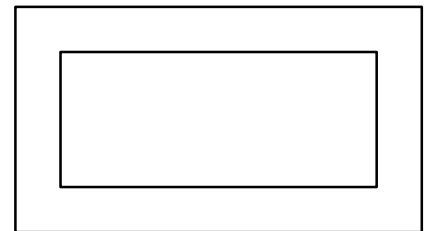
MISSION HILLS
COMMUNITY SERVICES DISTRICT

3" - 12" CROSS-CONNECTION CONTROL
WET FIRE SPRINKLER SYSTEM WITH FIRE
DEPARTMENT CONNECTION

MARK REVISIONS APPR. DATE JULY 2010 SHEET 1 OF 1



ENCLOSURES INSTALLED WHEN REQUIRED ON PLANS



MINIMUM 4" THICK CONCRETE PAD

GUARDSHACK™ ENCLOSURES
OR APPROVED EQUAL

N.T.S.

Drawing No. 107

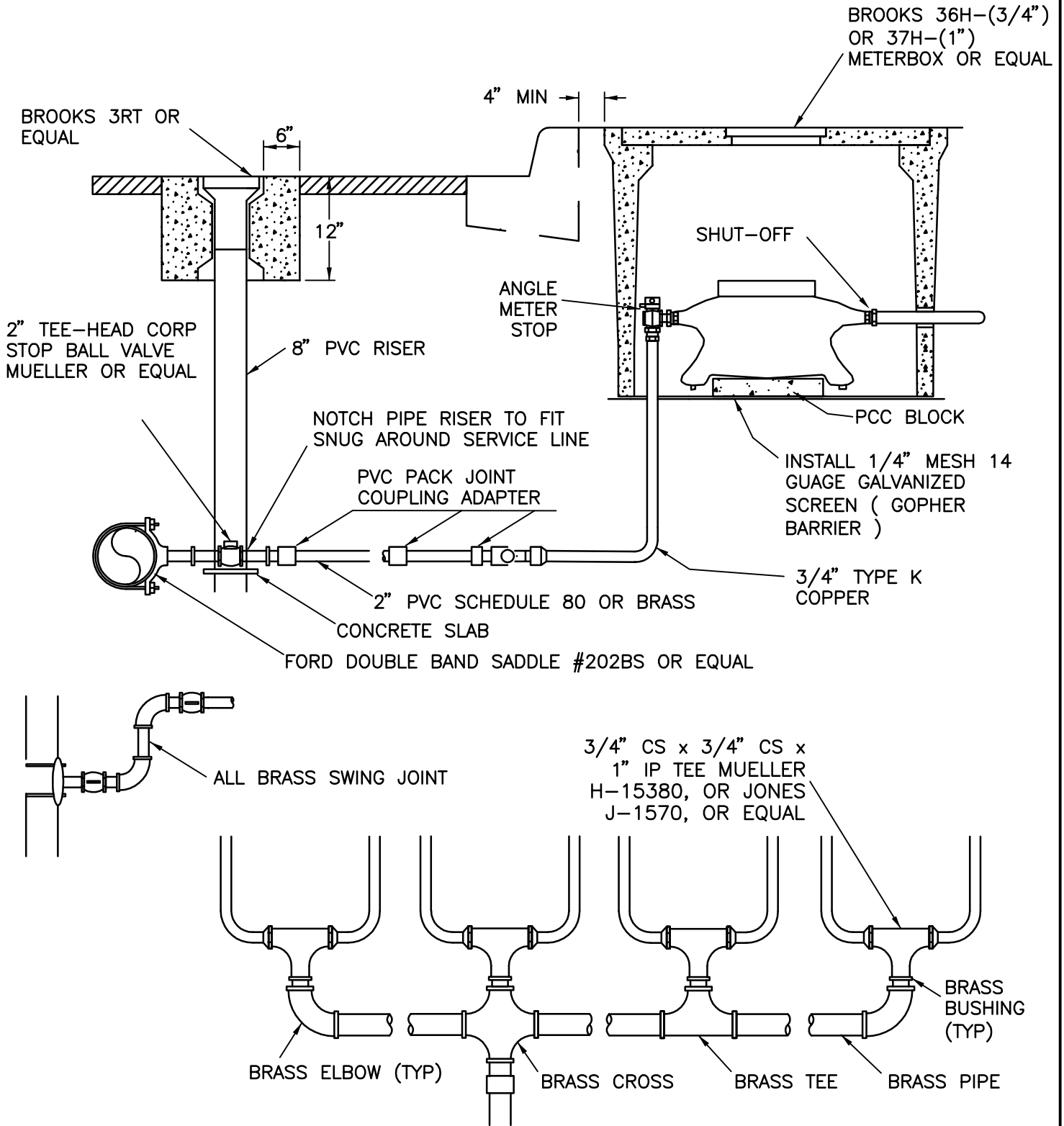
MISSION HILLS
COMMUNITY SERVICES DISTRICT

BACKFLOW PREVENTION
DEVICE ENCLOSURE

MARK	REVISIONS	APPR.	DATE

JULY 2010

SHEET 1 OF 1



Drawing No. 108

MISSION HILLS
COMMUNITY SERVICES DISTRICT

4 - 8 METER MANIFOLD

MARK	REVISIONS	APPR.	DATE

JULY 2010

SHEET 1 OF 1

1-1/2" & 2" SERVICE METER INSTALLATION

NOTE: CONNECTIONS BETWEEN METER AND BACKFLOW ASSEMBLY ARE NOT PERMITTED.

ARMORCAST 30" x 48" x 18" BOX FOR 2" SERVICE
24" x 36" x 18" BOX FOR 1-1/2" SERVICE

1 1/2" OR 2" FORD CUSTOM COPPER SETTER

BRASS OR PVC SEE DRAWING #407 FOR CONNECTION TO WATER MAIN

TO MAIN

BRASS PIPE AND ELBOW

BRASS PIPE AND ELBOW

R.P. DEVICE WHEN REQUIRED

TYPE "L" COPPER

N.T.S.

PVC

1-1/2" & 2" TURBINE METER INSTALLATION IRRIGATION

R.P. DEVICE

1 1/2" OR 2" FORD CUSTOM COPPER SETTER WITHOUT BY-PASS

NOTE: CONNECTIONS BETWEEN METER AND BACKFLOW ASSEMBLY ARE NOT PERMITTED.

TO MAIN BRASS or PVC

4" STRAINER

METER

TEST PORT

BRASS PIPE AND ELBOW

BRASS PIPE AND ELBOW

TYPE "L" COPPER

N.T.S.

PVC

Drawing No. 109

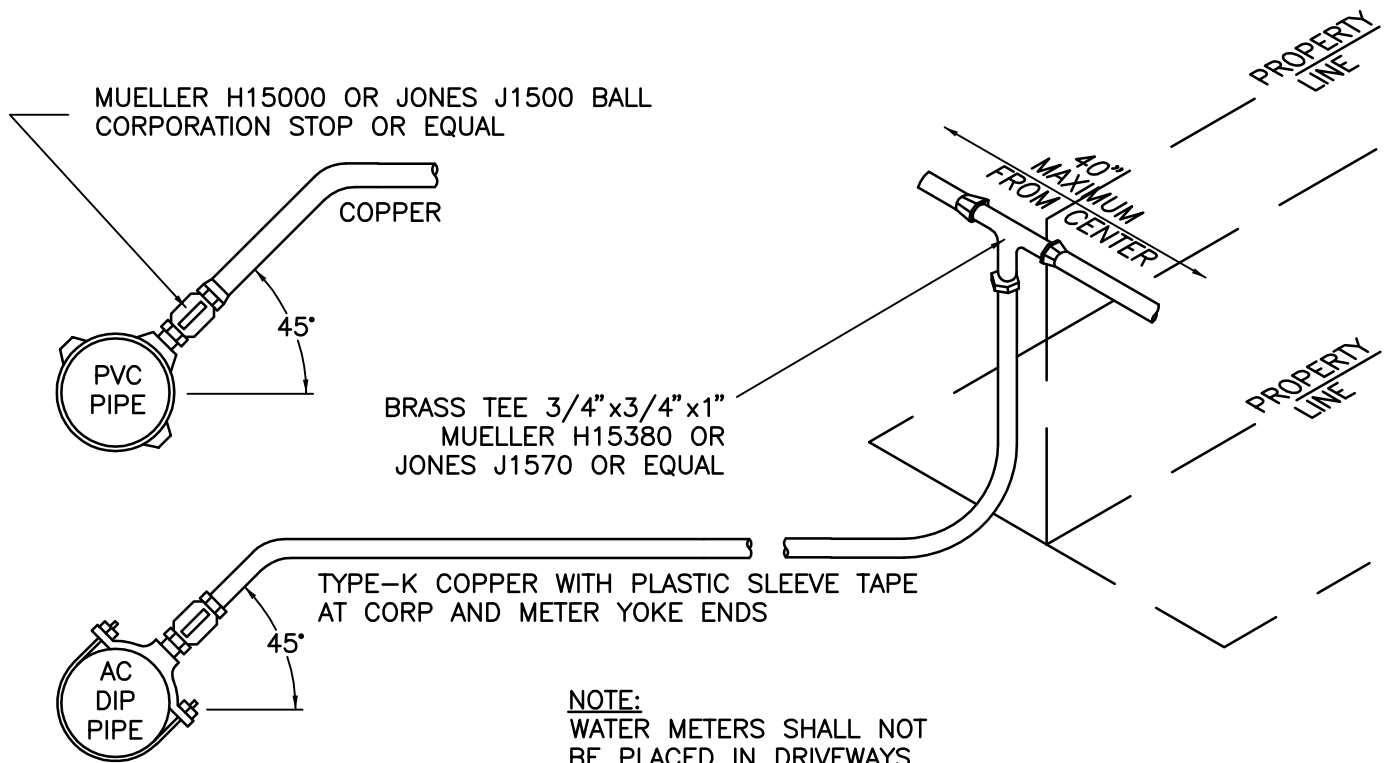
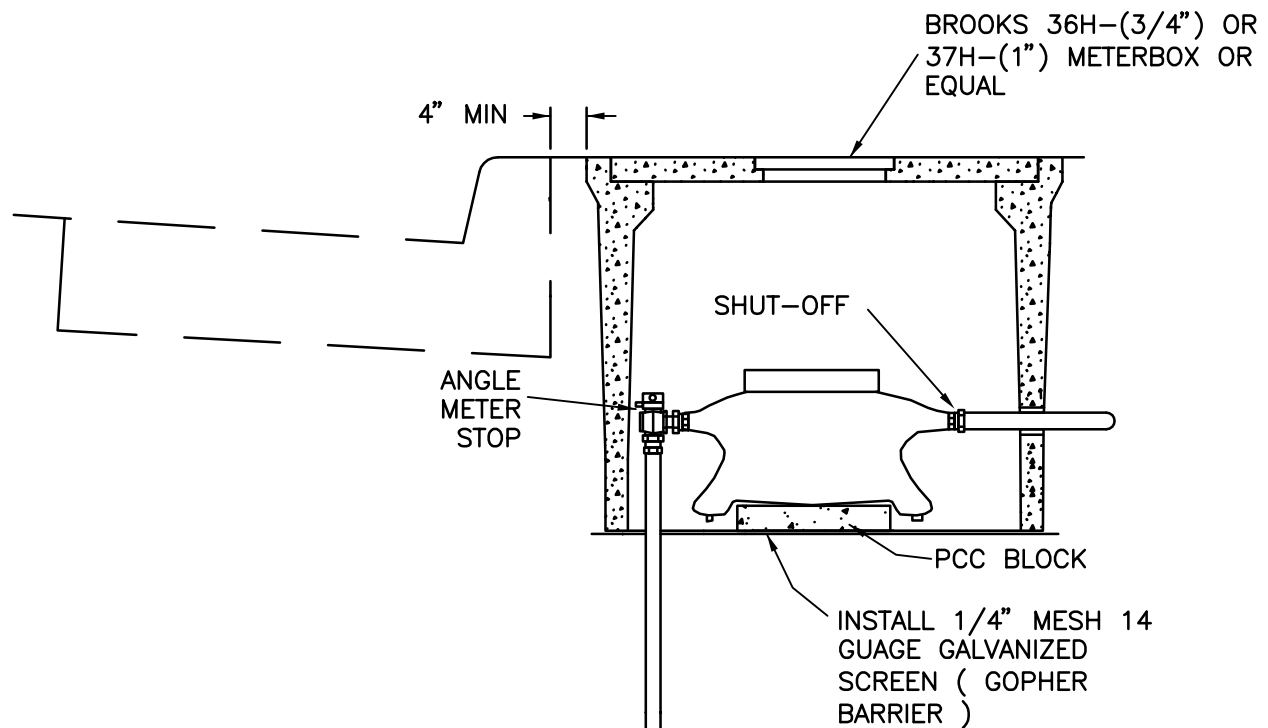
MISSION HILLS
COMMUNITY SERVICES DISTRICT

1-1/2" & 2" SERVICE AND METER
INSTALLATION

JULY 2010

SHEET 1 OF 1

MARK	REVISIONS	APPR.	DATE



N.T.S.

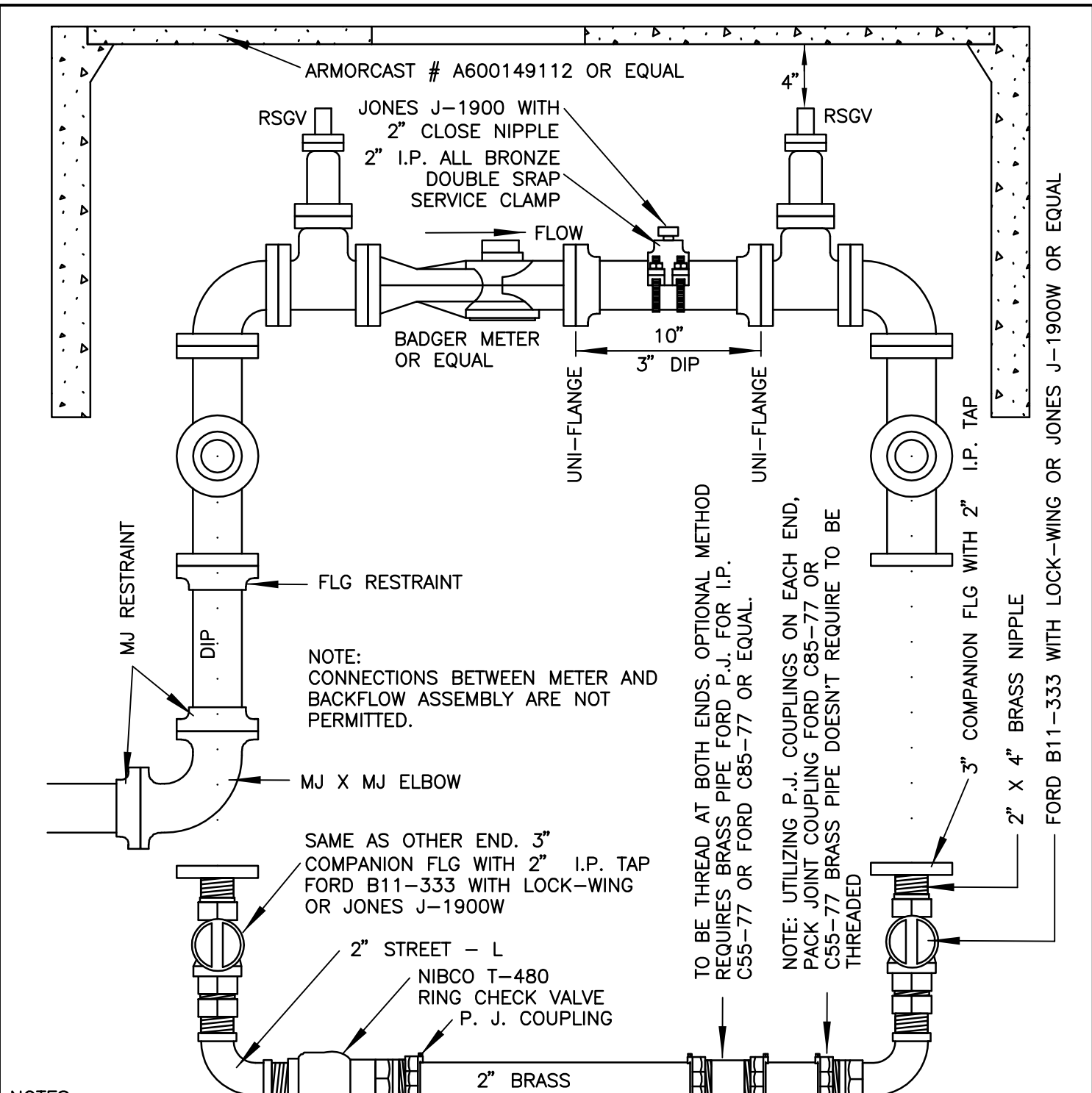
Drawing No. 110

MISSION HILLS
COMMUNITY SERVICES DISTRICT

3/4" X 3/4"
1" WATER SERVICE
CONNECTIONS

MARK	REVISIONS	APPR.	DATE

JULY 2010 SHEET 1 OF 1

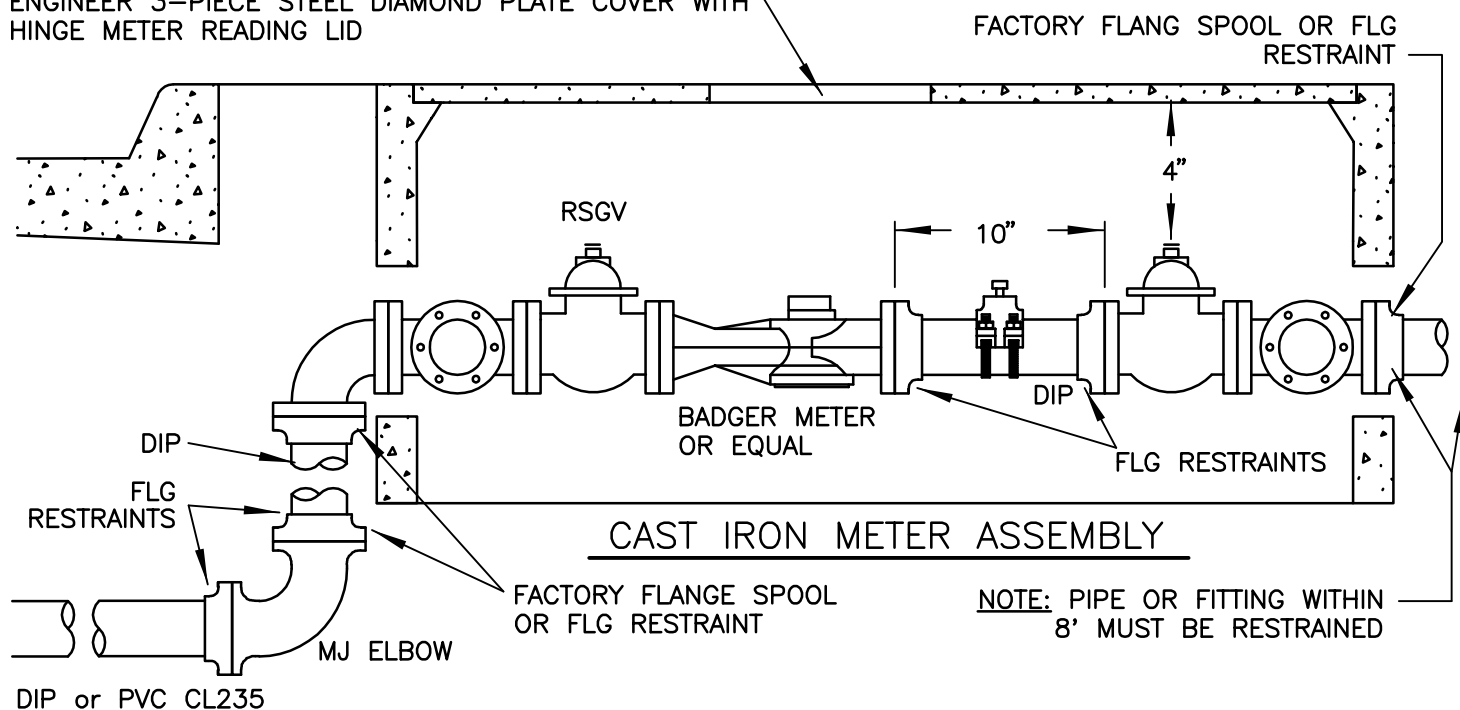


NOTES:
ALL VALVES 3" THROUGH 12" WILL BE RSVG (RESILIANT SEAT GATE VALVES). VALVES SHALL BE MUELLER OR APPROVED EQUAL WITH NON-RISING STEM, WITH EITHER 2" OPERATING NUT OR HAND WHEEL. USE BRASS BOLTS ON METER FLANGES. ALL OTHER BOLTS AND NUTS ARE TO BE LOW CARBON STEEL AND CONFORM TO ASTM A 307 GRADE.

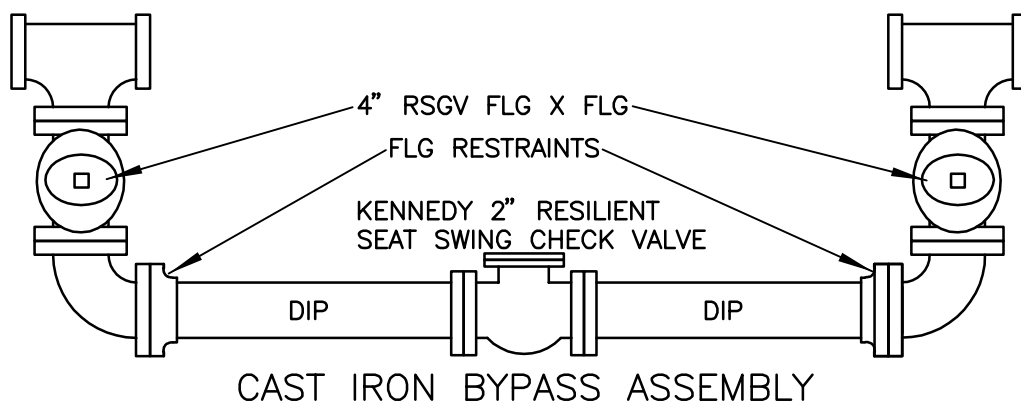
N.T.S.

Drawing No. 111				MISSION HILLS COMMUNITY SERVICES DISTRICT	
				3" METER WITH BY-PASS	
MARK	REVISIONS	APPR.	DATE	JULY 2010	SHEET 1 OF 1

BY SPECIAL DESIGN AND APPROVED BY THE DISTRICT
ENGINEER 3-PIECE STEEL DIAMOND PLATE COVER WITH
HINGE METER READING LID



TO WATER MAIN SEE
DRAWING NO. 417 FOR
INSTALLING ON NEW OR
EXISTING MAIN



NOTES:

1. ALL VALVES 3" THROUGH 12" WILL BE RSVG (RESILIENT SEAT GATE VALVES). VALVES SHALL BE MUELLER OR APPROVED EQUAL WITH NON-RISING STEM, WITH EITHER 2" OPERATING NUT OR HAND WHEEL.
2. USE BRASS BOLTS ON METER FLANGES. ALL OTHER BOLTS AND NUTS ARE TO BE LOW CARBON STEEL AND CONFORM TO ASTM A 307 GRADE.
3. CONNECTIONS BETWEEN METER AND BACKFLOW ASSEMBLY ARE NOT PERMITTED.

N.T.S.

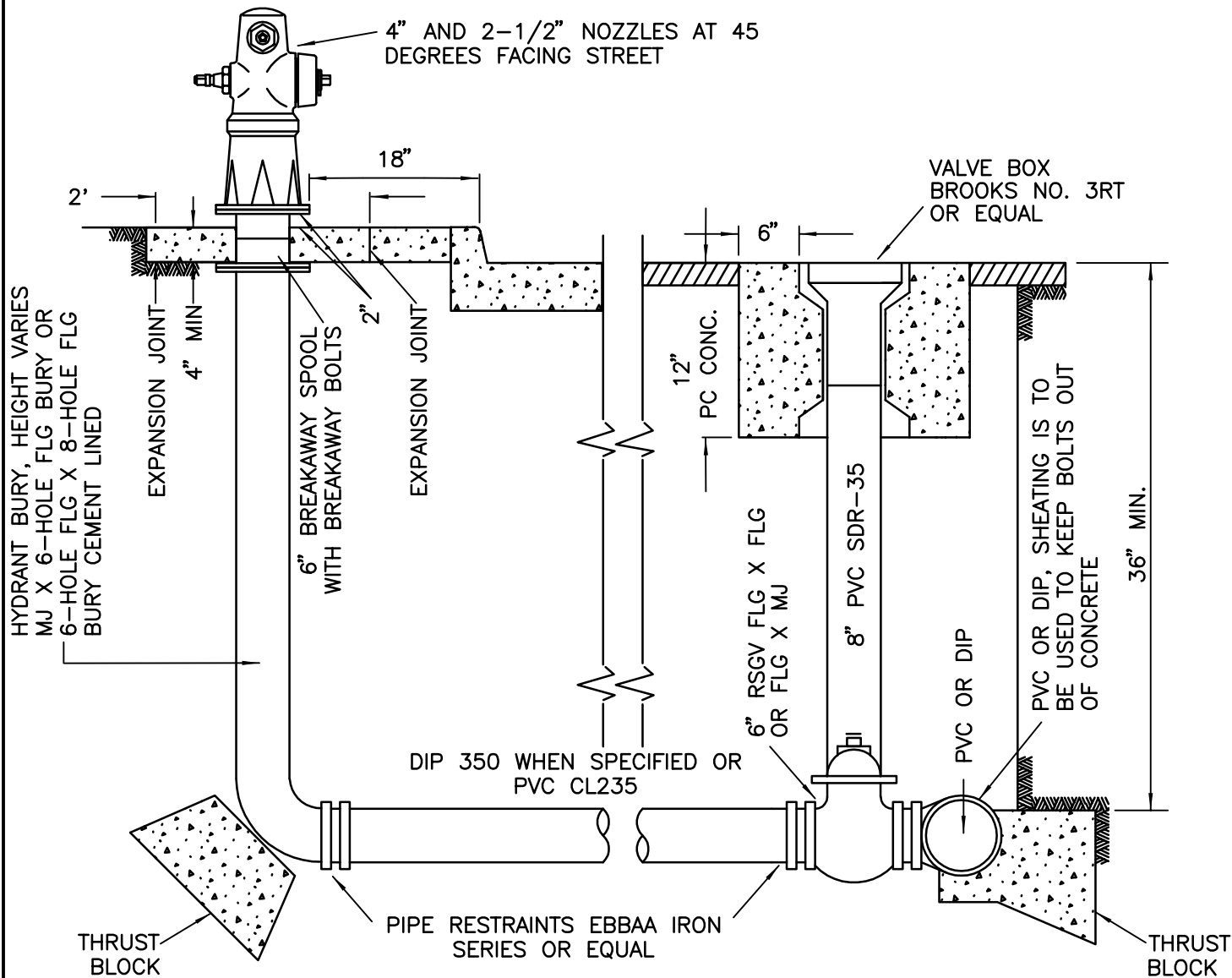
Drawing No. 112

MISSION HILLS
COMMUNITY SERVICES DISTRICT

4" THRU 6" SERVICE INSTALLATION

RESIDENTIAL HYDRANTS SHALL CONFORM TO AWWA C503 AND DISTRICT STANDARDS.

COMMERCIAL HYDRANTS SHALL BE SAME AS #1 EXCEPT WITH ONE 4" NATIONAL STANDARD THREAD OUTLET AND TWO 2-1/2" NATIONAL STANDARD THREAD OUTLETS. JAMES JONES J-3765.

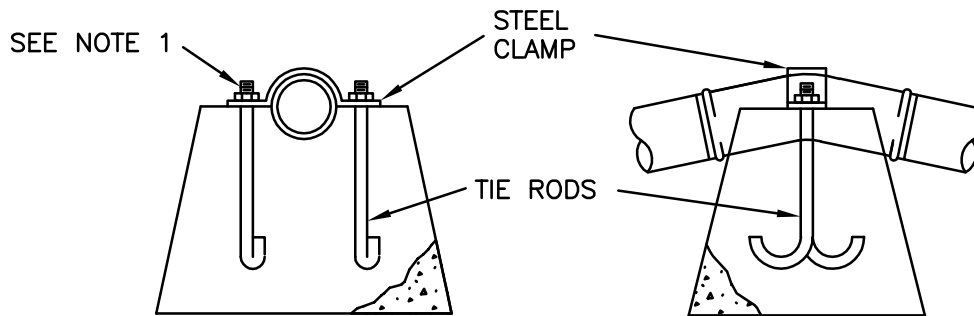
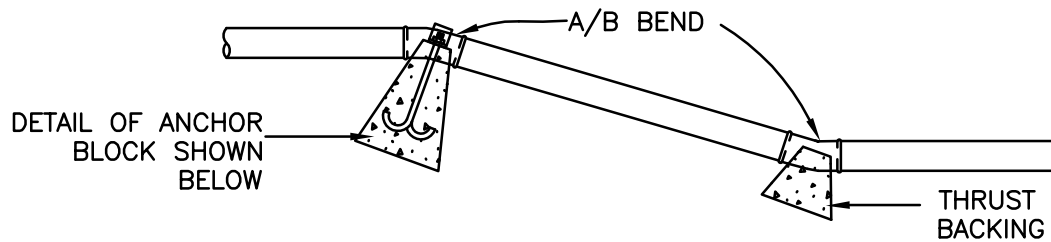


NOTE: ON LONG HYDRANT RUNS USE TRACER WIRE AND STUB TO FLANGE BOLTS.

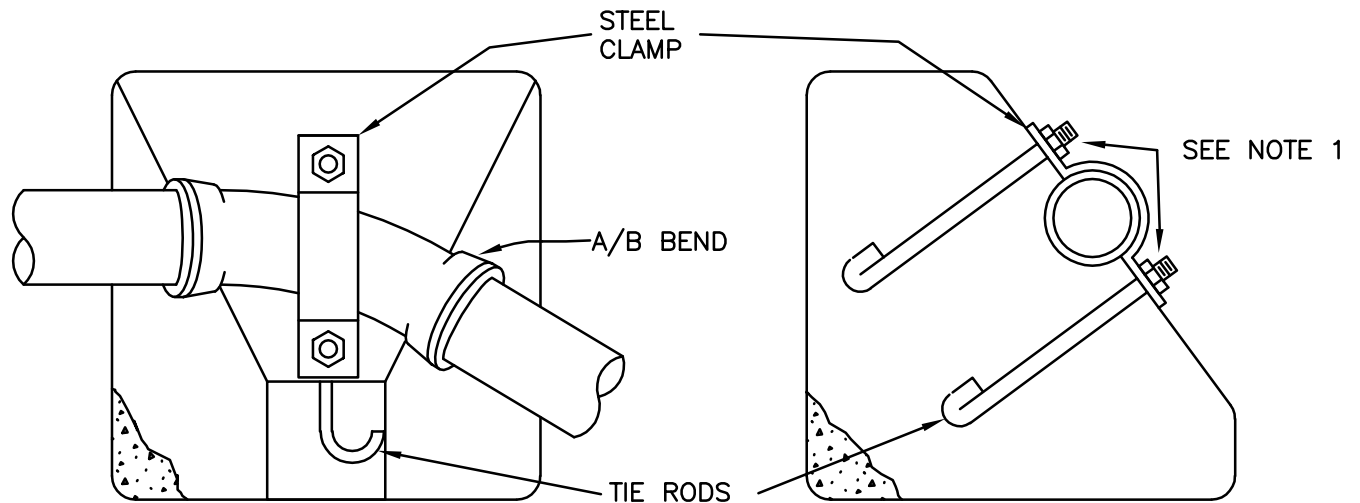
HYDRANT FLANGE CONNECTIONS STANDARD 6 HOLE DRILLING

N.T.S.

Drawing No. 113				MISSION HILLS COMMUNITY SERVICES DISTRICT	
				HYDRANT INSTALLATION	
MARK	REVISIONS	APPR.	DATE	JULY 2010	
				SHEET 1 OF 1	



TYPICAL CONCRETE ANCHOR BLOCK FOR VERTICAL BEND



TYPICAL CONCRETE ANCHOR BLOCK FOR COMBINATION
HORIZONTAL-VERTICAL BEND

NOTE 1. ALL EXPOSED THREADS SHALL BE PAINTED WITH ASPHALTIUM OR APPROVED EQUAL, AFTER NUTS ARE TIGHTENED.

NOTE 2. DIMENSIONS FOR THE CONCRETE ANCHOR PLATE SHALL BE SPECIFIED BY THE ENGINEER TO WITHSTAND A THRUST PRODUCED BY THE LOST PRESSURE PLUS 50 PSI. MINIMUM DIMENSIONS FOR THE TIE RODS AND CLAMP ARE LISTED IN TABLE PROVIDED.

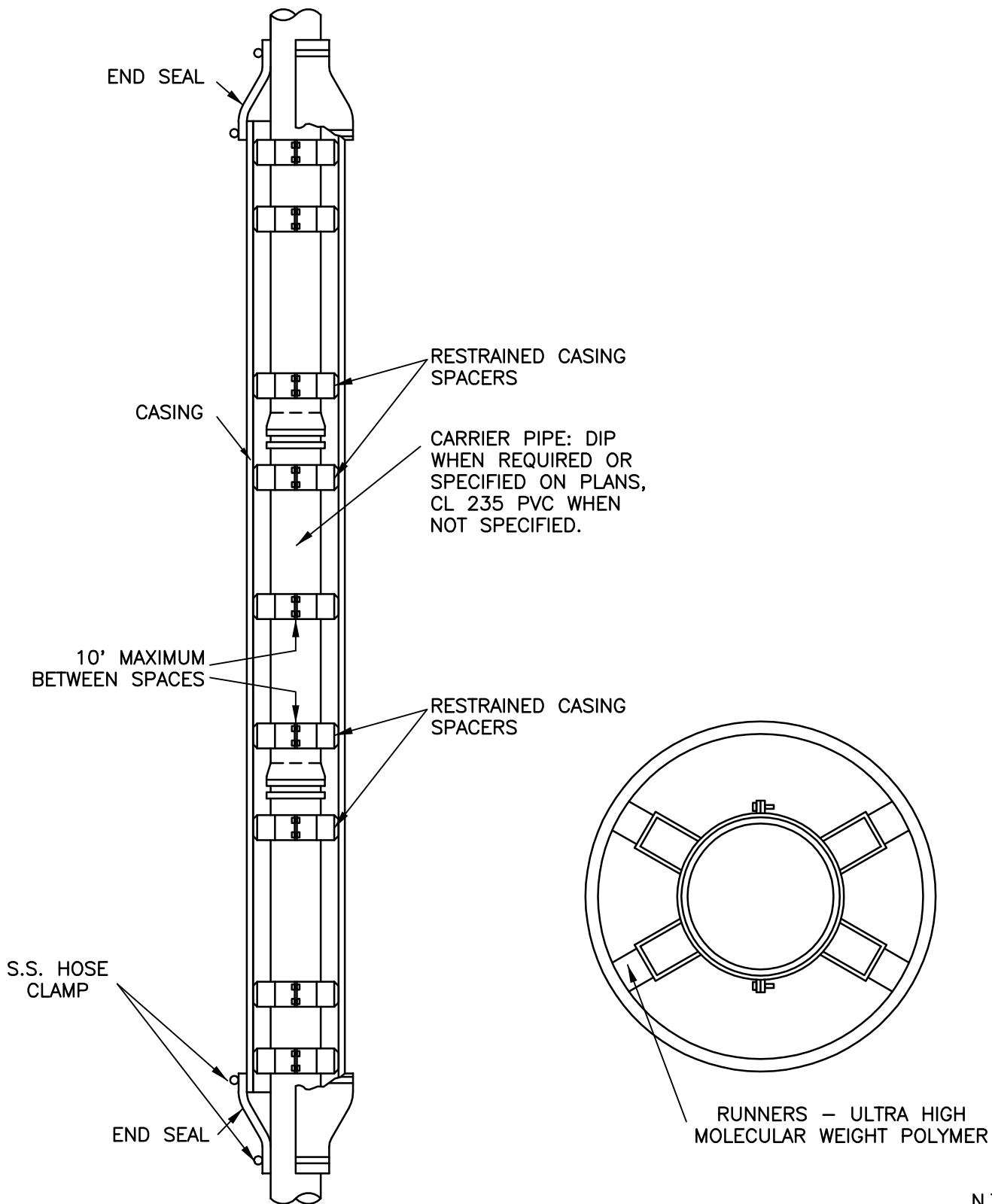
PIPE SIZE	TIE RODS	STEEL CLAMPS
4" & 6"	5/8"	3" x 1/4"
8"	3/4"	3-1/4" x 1/4"
10"	1"	4" x 5/16"
12"	1-1/4"	4" x 1/2"

N.T.S.

Drawing No. 114

MISSION HILLS
COMMUNITY SERVICES DISTRICT

CONCRETE ANCHOR BLOCKS
FOR VERTICAL BENDS

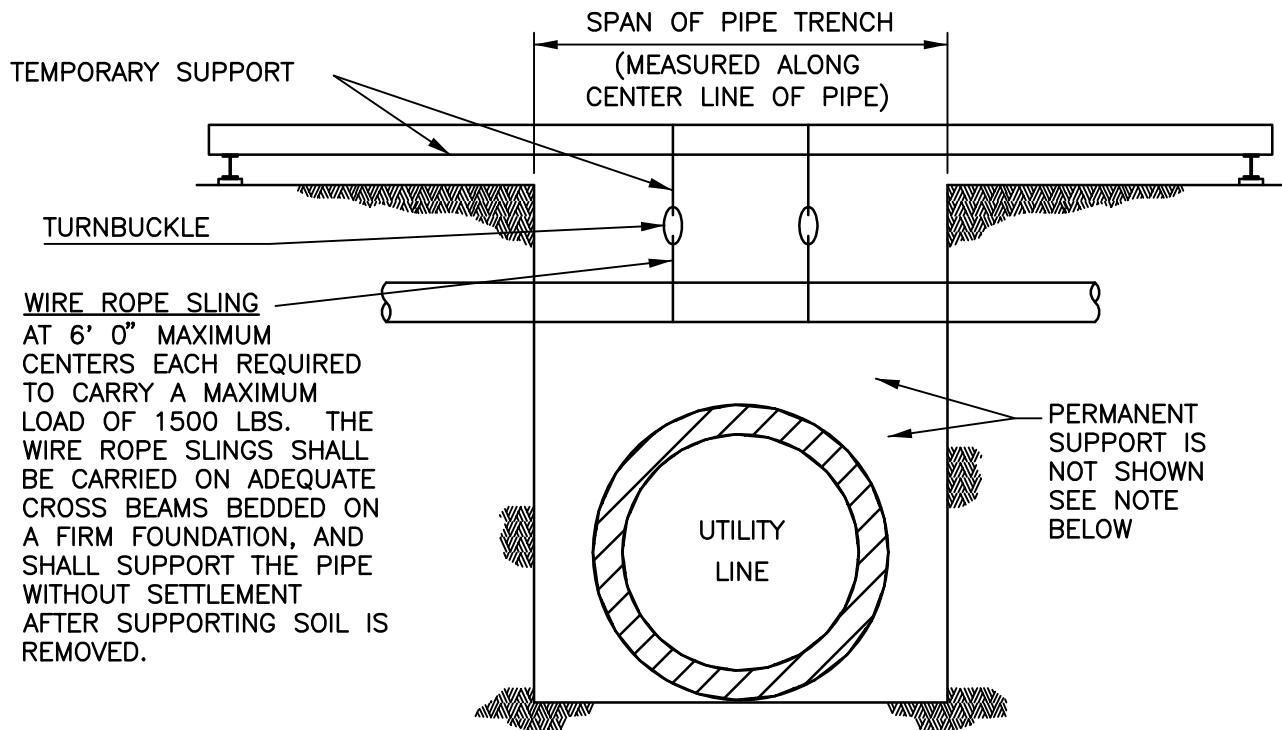


N.T.S.

Drawing No. 115

MISSION HILLS
COMMUNITY SERVICES DISTRICT

TYPICAL CASING
SPACER CONFIGURATION



TYPE OF PIPE	SIZE OF PIPE	SPAN				REQUIREMENT WHEN SPAN EXCEEDS MAXIMUM
		TEMPORARY SUPPORTS		PERMANENT SUPPORTS		
		MIN.	MAX.	MIN.	MAX.	
AC	4" TO 16"	< 4'	<11'	< 4'	11'	REPLACE WITH STEEL CEMENT LINED PIPE (1)
AC	8" TO 16"	< 6'	<11'	< 8'	11'	REPLACE WITH STEEL CEMENT LINED PIPE (1)
CI	4" TO 6"	< 8'	<16'	< 8'	16'	REPLACE WITH STEEL CEMENT LINED PIPE (1)
CI	8" TO 16"	< 8'	<16'	<10'	16'	REPLACE WITH STEEL CEMENT LINED PIPE (1)
STEEL	4" TO 16"	<20'	<35'	<20'	35'	RELOCATE MAIN (1)

NOTE: AC=ASBESTOS CEMENT CI=CAST IRON (1)=BY OTHERS

* PERMANENT WALL TYPE SUPPORTS, IF NECESSARY, SHALL BE CONSTRUCTED IN ACCORDANCE WITH LOS ANGELES COUNTY FLOOD CONTROL DISTRICT DRAWINGS 2-D173.1 CASE 2, 2-D173.2 OR 2-D173.3 CASE 5, WITH A MINIMUM BEARING OF 90 DEGREES.

N.T.S.

Drawing No. 116

MISSION HILLS
COMMUNITY SERVICES DISTRICT

WATER SYSTEM SUPPORT REQUIREMENT
FOR 16" MAINS AND SMALLER

MARK REVISIONS APPR. DATE JULY 2010 SHEET 1 OF 1

Department of Health Services, State of California

Criteria for the Separation of Water Mains and Sanitary Sewers

Case 1 – New sanitary sewer main and a new or existing water main; alternative construction criteria apply to the sanitary sewer main.

Case 2 – New water main and an existing sanitary sewer main; alternative construction criteria may apply to either or both the water main and sanitary sewer main.

Case 1:

Zone Special Construction Required for Sanitary Sewer Main

A Sanitary sewer mains parallel to water mains shall not be permitted in this zone without prior written approval from the Department and public water system.

B If the water main paralleling the sanitary sewer main does not meet the Case 2 Zone B requirements, the sanitary sewer main should be constructed of one of the following:

1. High-density-polyethylene (HDPE) pipe with fusion welded joints (per AWWA C906-99).
2. Spirally-reinforced HDPE pipe with gasketed joints (per ASTM F-894).
3. Extra strength vitrified clay pipe with compression joints.
4. Class 4000, Type II, asbestos-cement pipe with rubber gasket joints.
5. PVC sewer pipe with rubber ring joints (per ASTM D3034) or equivalent.
6. Cast of ductile iron pipe with compression joints.
7. Reinforced concrete pressure pipe with compression joints (per AWWA C302-95).

C If the water main crossing below the sanitary sewer main does not meet the requirements for Case 2 Zone C, the sanitary sewer main should have no joints within ten feet from either side of the water main (in Zone C) and should be constructed of one of the following:

1. A continuous section of ductile iron pipe with hot dip bituminous coating.
2. One of the Zone D options 1, 3, 4, or 5 below.

D If the water main crossing above the sanitary sewer main does not meet the Case 2 Zone D requirements, the sanitary sewer main should have no joints within four feet from either side of the water main (in Zone D) and be constructed of one of the following:

1. HDPE pipe with fusion-welded joints (per AWWA C906-99)
2. Ductile iron pipe with hot dip bituminous coating and mechanical joints (gasketed, bolted joints).
3. A continuous section or Class 200 (DR14 per AWWA C900-97) PVC pipe or equivalent, centered over the pipe being crossed.
4. A continuous section of reinforced concrete pressure pipe (per AWWA C302-95) centered on the pipe being crossed.
5. Any sanitary sewer main within a continuous sleeve.

Drawing No. 117				MISSION HILLS COMMUNITY SERVICES DISTRICT			
				SEPARATION REQUIREMENTS FOR SEWER AND WATER LINES			
MARK	REVISIONS	APPR.	DATE	JULY 2010			
				SHEET 1 OF 3			

Department of Health Services, State of California

Criteria for the Separation of Water Mains and Sanitary Sewers

Case 2:

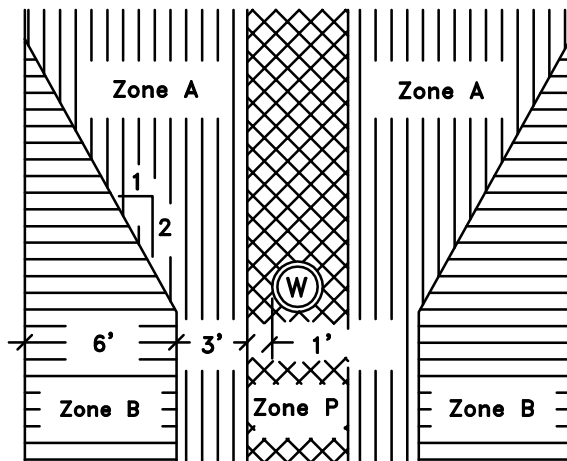
Zone Special Construction Required for Water Main

- A** No water mains parallel to sanitary sewer mains shall be constructed without prior written approval from the Department.
- B** If the sanitary sewer main paralleling the water main does not meet the Case 1 Zone B requirements, the water main should be constructed of one of the following:
1. HDPE pipe with fusion welded joints per (AWWA C906-99).
 2. Ductile iron pipe with hot bituminous coating.
 3. Dipped and wrapped 1/4 inch thick welded steel pipe.
 4. Class 200, Type II, asbestos-cement pressure pipe.
 5. Class 200 pressure rated PVC water pipe (DR14 per AWWA C900-97 & C905-97) or equivalent.
 6. Reinforced concrete pressure pipe, steel cylinder type, per AWWA (C300-97, or C302-99, or C303-95).
- C** If the sanitary sewer main crossing above the water main does not meet the Case 1 Zone C requirements, the water main shall have no joints within 10 feet from either side of the sanitary sewer main (in Zone C) and be constructed of one of the following:
1. HDPE pipe with fusion-welded joints (per AWWA C906-99).
 2. Ductile iron pipe with hot dip bituminous coating.
 3. Dipped and wrapped 1/4 inch thick welded steel pipe.
 4. Class 200 pressure rated PVC water pipe (DR14 per AWWA C900-97 & C905-97) or equivalent.
 5. Reinforced concrete pressure pipe, steel cylinder type, per AWWA (C300-97, or C302-99, or C303-95).
- D** If the sanitary sewer main crossing below the water main does not meet the requirements for Case 1 Zone D, the water main shall have no joints within 8 feet from either side of the sanitary sewer main (in Zone D) and shall be constructed as for Zone C.

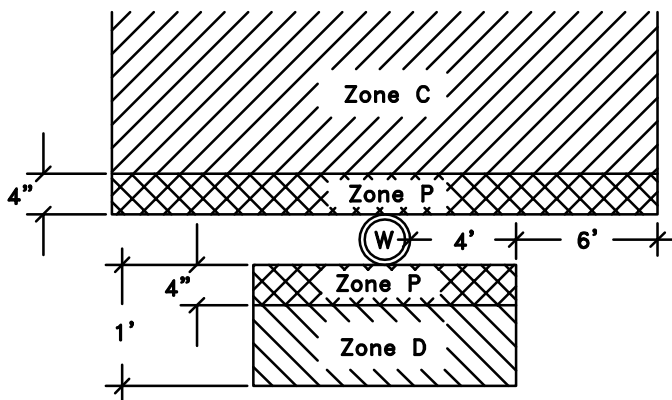
Drawing No. 117				MISSION HILLS COMMUNITY SERVICES DISTRICT	
				SEPARATION REQUIREMENTS FOR SEWER AND WATER LINES	
MARK	REVISIONS	APPR.	DATE	JULY 2010	SHEET 2 OF 3

CASE 1 – NEW SEWER MAIN

PARALLEL



CROSSING

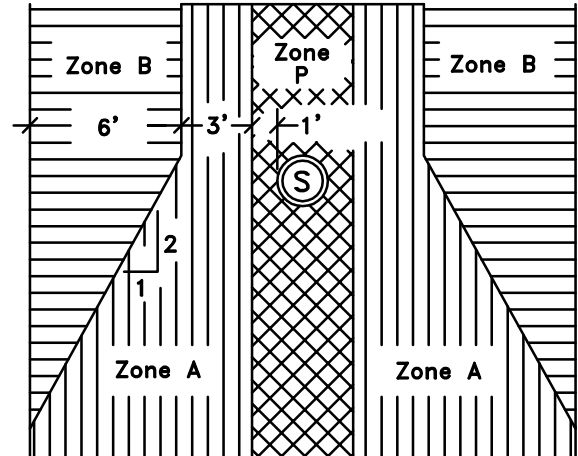


ZONE P is a prohibited zone,
Section 64572(a)(1), Title 22
California Administrative Code.

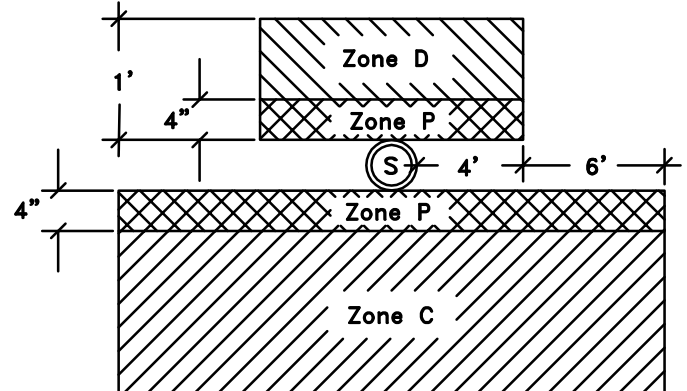
N.T.S.

CASE 2 – NEW WATER MAIN

PARALLEL



CROSSING



ZONE P is a prohibited zone,
Section 64572(a)(1), Title 22
California Administrative Code.

N.T.S.

DEFINITIONS:

COMPRESSION JOINT – A push-on joint that seals by means of the compression of a rubber ring or gasket between the pipe and a bell or coupling.

MECHANICAL JOINT – Bolted joints.

CONTINUOUS SLEEVE – A protective tube of high-density-polyethylene (HDPE) pipe with heat fusion joints or other non-potable metallic casing without joints into which a pipe is inserted.

HOUSE LATERAL – A wastewater line connecting the building drain and the main wastewater line.

SUPPLY LINE – Pipelines conveying raw water to be treated for drinking purposes in accordance with Section 64572.

WATER MAIN – Means any pipeline, except for user service lines, within the distribution system in accordance with Section 64551.70.

RATED WORKING WATER PRESSURE or PRESSURE CLASS – A pipe classification system based upon internal working pressure of the fluid in the pipe, type of pipe material, and the thickness of the pipe wall.

SANITARY SEWER MAIN – A gravity sewer conveying untreated municipal wastewater.

SEWAGE FORCE MAIN – A pressurized sewer conveying untreated municipal wastewater.

Drawing No. 117

MISSION HILLS
COMMUNITY SERVICES DISTRICT

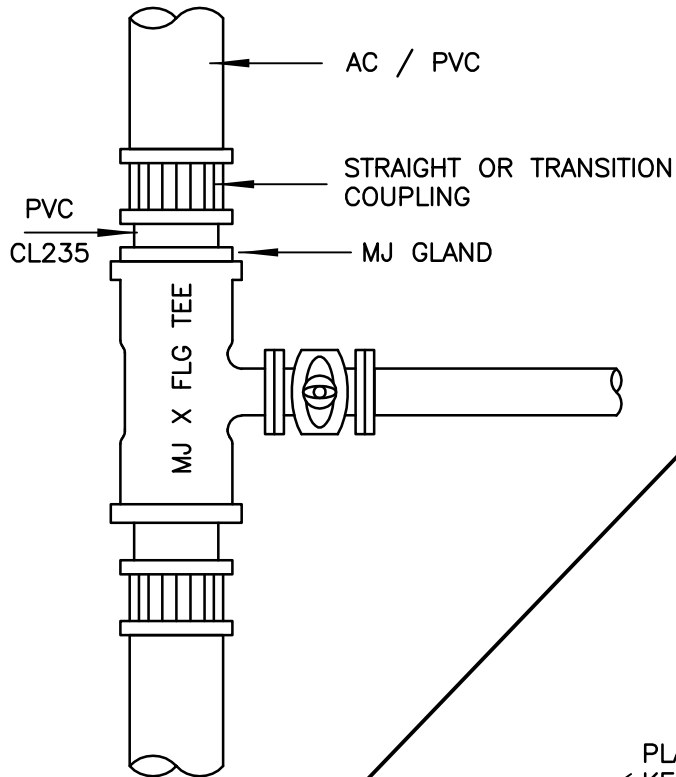
CRITERIA FOR THE SEPARATION OF
WATER MAINS AND SANITARY SEWERS

MARK REVISIONS APPR. DATE JULY 2010

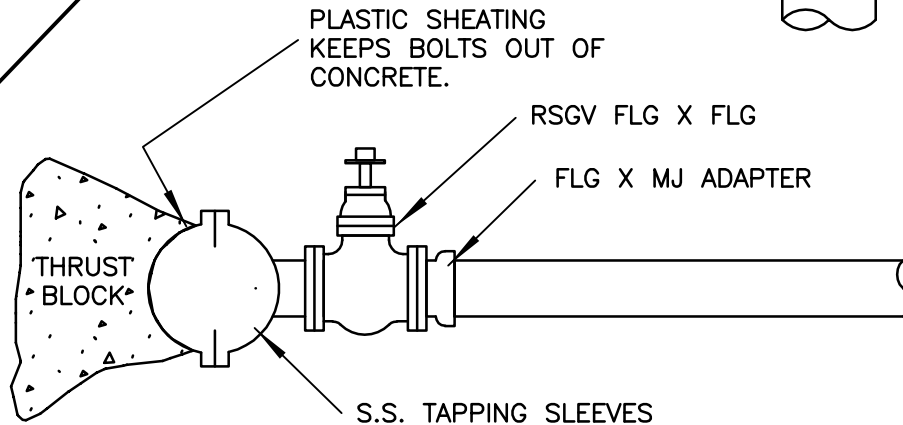
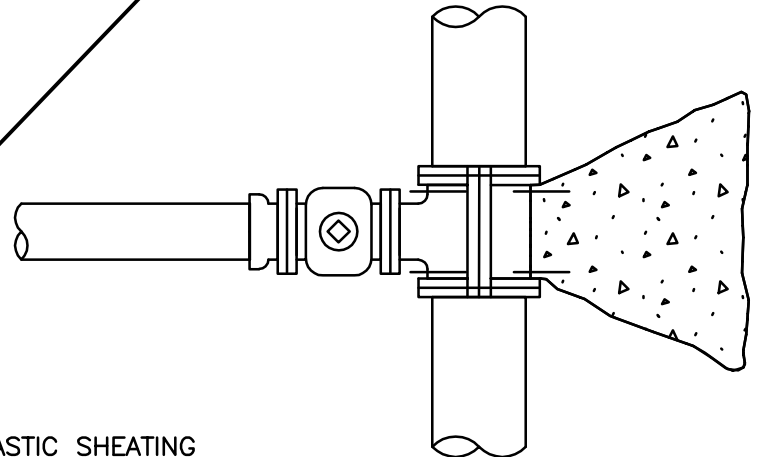
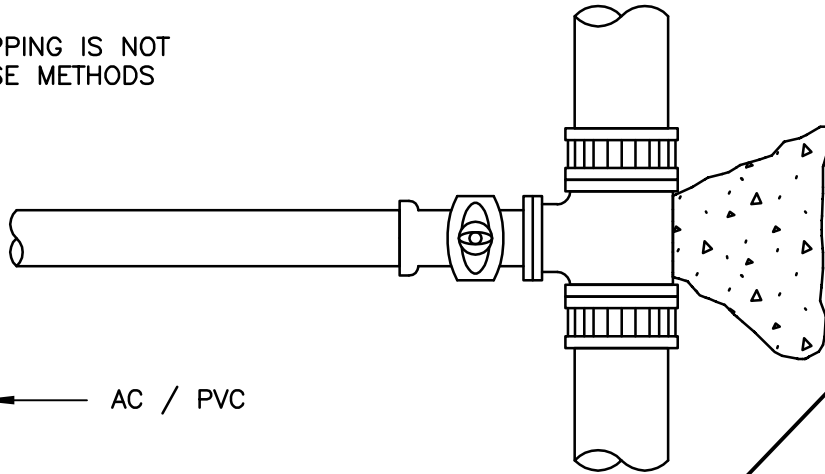
SHEET 3 OF 3

NOTE: THIS DRAWING IS FOR FIRE HYDRANT FIRE LINE,
BACKFLOW AND SERVICE CONNECTIONS

WHEN HOT TAPPING IS NOT
POSSIBLE THESE METHODS
CAN BE USED



NOTE: HOT TAPPING IS
REQUIRED WHEN
CONNECTING A NEW
SERVICE BRANCH FROM
EXISTING MAIN. I.E.
HYDRANT RUN, BACKFLOW
ASSEMBLY



N.T.S.

Drawing No. 118

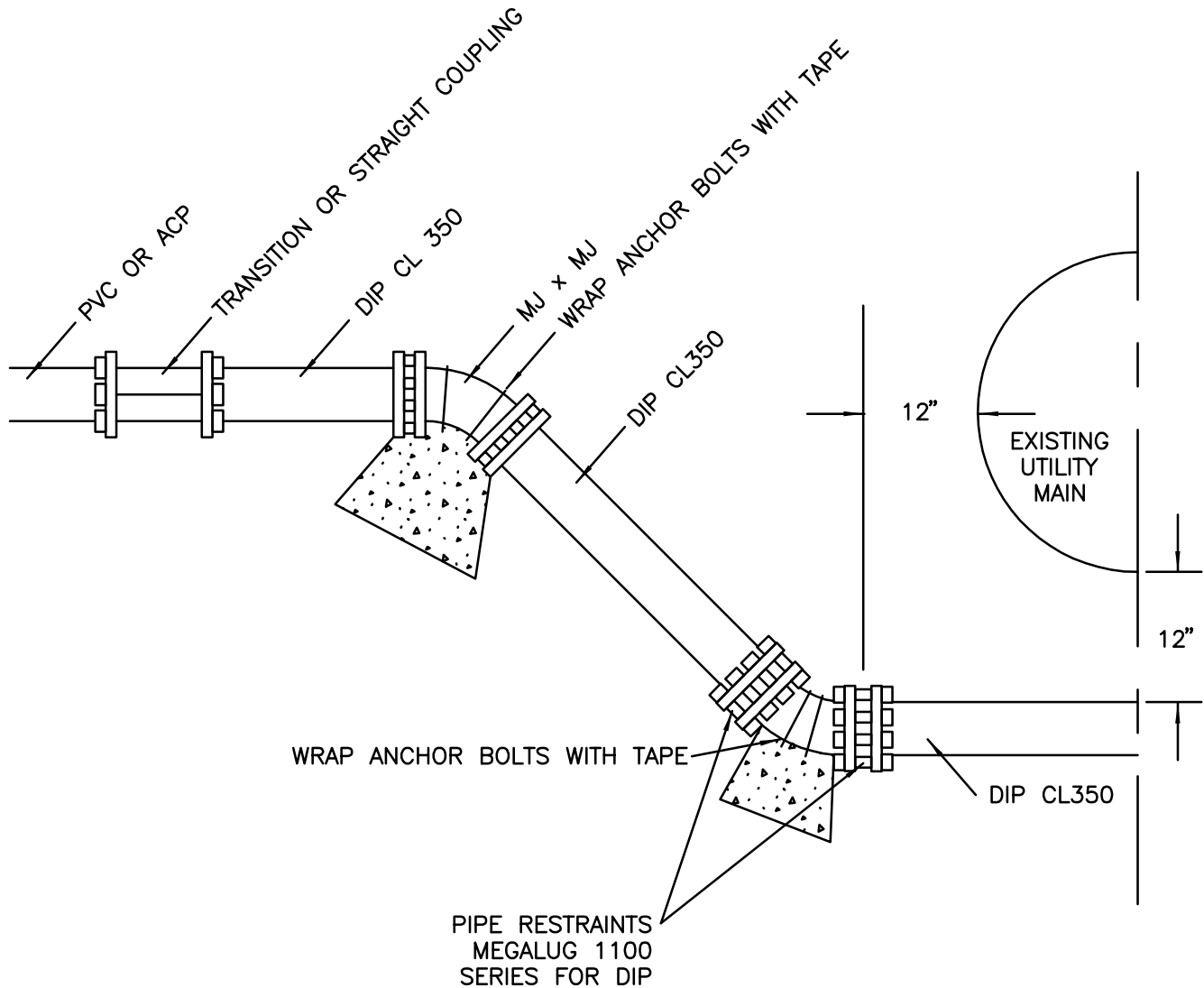
MISSION HILLS
COMMUNITY SERVICES DISTRICT

3", 4", AND 6" CONNECTIONS ON
EXISTING PIPE

MARK	REVISIONS	APPR.	DATE

JULY 2010

SHEET 1 OF 1



Drawing No. 119

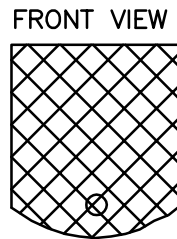
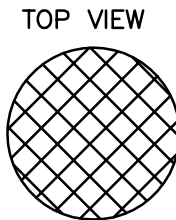
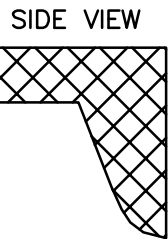
MISSION HILLS
COMMUNITY SERVICES DISTRICT

WATER LINE INVERT

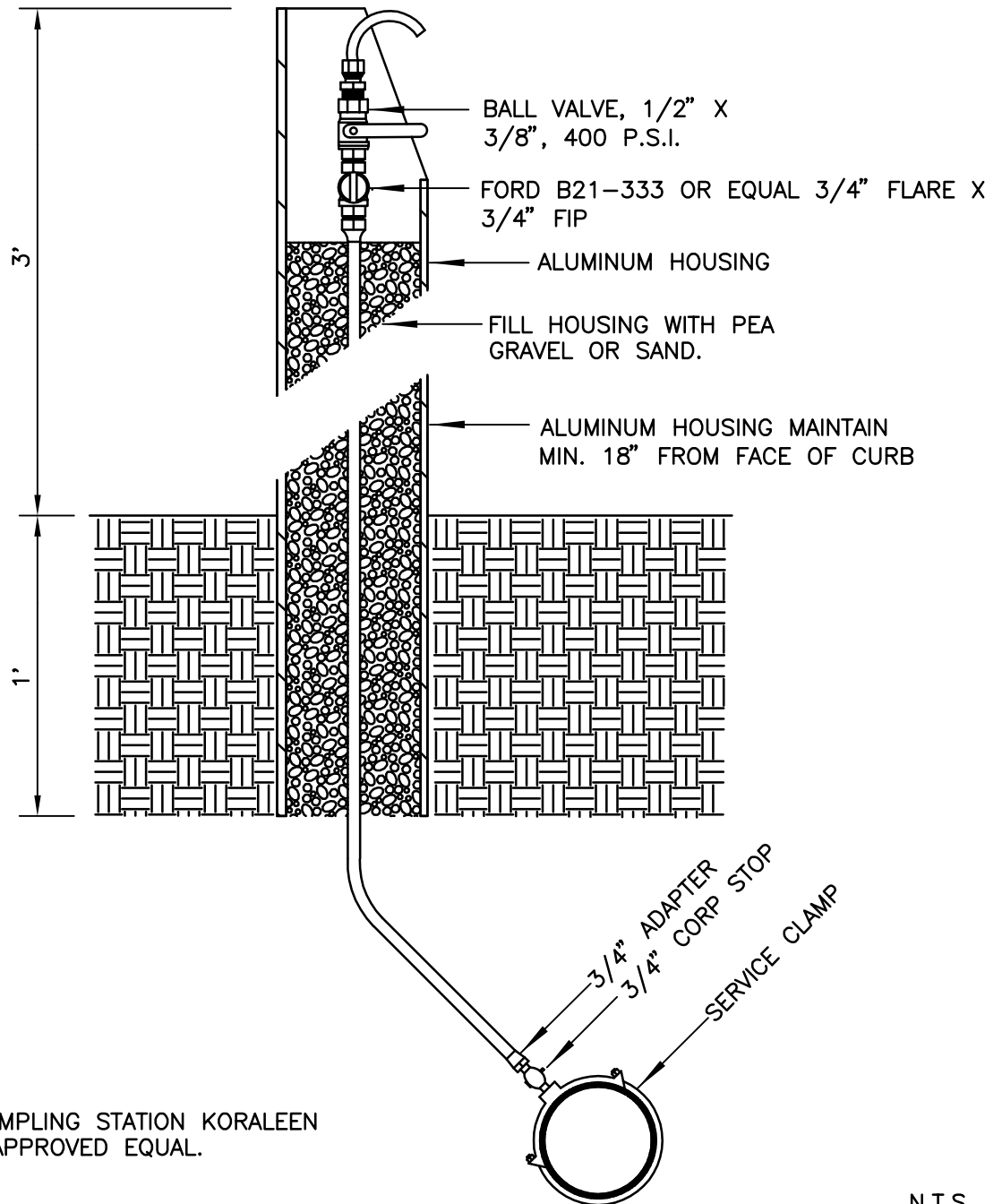
MARK	REVISIONS	APPR.	DATE

JULY 2010

SHEET 1 OF 1



ALUMINUM LID



NOTE:
WATER QUALITY SAMPLING STATION KORALEEN ENTERPRISES OR APPROVED EQUAL.

N.T.S.

Drawing No. 120

MISSION HILLS
COMMUNITY SERVICES DISTRICT

INSTALLATION OF WATER SAMPLING
STATION