Standards for

CONSTRUCTION OF SEWER MAINS

July 2010

TABLE OF CONTENTS

I. GENERAL

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

All labor, equipment, appliances, material, and performance of all operations in connection with construction of sewer mains, including all pipe, fittings, manholes, cleanouts, 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.

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.

II. MATERIALS

A. General

(1) 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.

(2) Materials shall conform to the applicable provisions of the Standard Specifications, as hereinafter specified and approved and shall never be less than those as approved by ASTM as last revised.

B. Material 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 these standard requirements and all ASTM specifications.

C. PVC Sewer Pipe (Polyvinyl Chloride)

(1) Pipe- Polyvinyl chloride plastic sewer pipe and fittings shall conform to the requirements of ASTM Standard Specifications D 3034 SDR 35, as amended to date, except as modified herein. The pipe shall be furnished in 12 ½-ft or 20-ft lengths with integral wall belled ends and elastomeric joints. All pipe and fittings shall be free of imperfection and shall be clearly marked with the name of the manufacturer.

The minimum wall thickness shall be as follows providing a minimum SDR ratio of 35:

Diameter	4"	6"	8"	10"	12"	15"
Wall Thickness	0.125"	0.180"	0.240"	0.300"	0.360"	0.440"

(2) PVC Pipe Joints - All pipe fittings shall have rubber ring bell and spigot joints providing a water tight seal and allowing for contraction and expansion. The bell shall consist of an integral wall section stiffened with two PVC retainer rings which securely lock the solid cross section rubber ring into position.

Joint tightness shall be measured by assembling two sections of pipe in accordance with the manufacturer's recommendations. Subject the joint to an internal hydrostatic pressure of 25 psi for one hour. Consider any leakage a failure of the test requirements.

(3) PVC Pipe Stiffness - Minimum "pipe stiffness" (F/y) at five (5) percent deflection shall be 46 psi for all sizes when calculated in accordance with ASTM Designation D 2412.

(4) PVC Pipe Deflect - All plastic sewer pipe, when installed with all backfill in place and compacted, shall not exceed five (5) percent of the internal pipe diameter.

D. Vitrified Clay Sewer Pipe

(1) Vitrified clay sewer pipe and fittings shall be first quality extra strength, bell and spigot, sound and durable vitrified clay sewer pipe, free from objectionable defects. It shall be hard burned, straight and free from cracks, warps, blisters or objectionable defects. The pipe shall not absorb moisture in excess of eight (8) percent of its dry weight. It shall produce a clear metallic ring when placed on end and struck with a light hammer. The body of the pipe shall be smooth and have a uniform thickness. The pipe ends shall be perpendicular to the longitudinal axis and the socket shall be circular and concentric to the bore of the pipe. Sockets shall be of such diameter to receive to their full depth of the spigot end of the next following pipe without any slipping whatsoever and leave a space of not less than 3/8" in width all around for the joint material.

All extra strength vitrified clay pipe shall conform to all the requirements for extra strength clay sewer pipe as set forth in the specifications of the ASTM Serial Designation C200, as amended to date.

(2) VCP Joints - All vitrified clay pipe and fittings shall be furnished with mechanical compression joints equal to "Wedge-Lock" as manufactured by Pacific Clay Products or "Speed Seal" as manufactured by International Pipe & Ceramics Corporation.

The compression joint on the spigot and bell ends of the pipe shall be factory made of plastisol, polyurethane or other approved resilient elastomer bonded onto the outside of the spigot and the inside of the bell to the pipe and molded and cured to a uniform hardness and compressibility, to form a tight compression coupling when assembled. Materials for compression joints shall conform to ASTM Designation C-425.

E. Main Line Fittings and Accessories

(1) General - All fittings and accessories shall be manufactured by the pipe supplier and have a bell and/or spigot configurations compatible with that of the pipe.

(2) Banded Rubber Couplings - The Contractor shall use banded rubber couplings when connecting replacement pipe to existing pipe. Where connections involve joining PVC pipe to vitrified clay pipe (VCP), the Contractor shall use "reducer" (as appropriate) banded rubber couplings such as Gladding-McBean's Band Seal Type Sewer Coupling or Joint, Calder Couplings, Fernco Flexible Couplings or equal. Installation shall be per manufacturer's recommendations.

F. Cleanouts

(1) Cleanouts shall conform to the Districts Standards, as indicated on the Plans, and these Special Provisions.

(2) Pipe and fittings, except as otherwise shown, shall be of the same material as the sewer pipe. Pipe and fittings shall be properly aligned and maintained while concrete is being placed and allowed to harden. Joints for pipes and fittings shall be made prior to placing concrete. Concrete for bedding, encasement, and wall support for pipes and fittings shall be placed uniformly around the pipe and fittings. Concrete shall be Class 520-C-2500.

(3) The access frame, cover and cap shall be cast iron. The finger holes may be drilled or may be blocked prior to casting; they shall not be punched out.

(4) Concrete pipe wall supports, if required, shall be circular.

(5) Base Pad/Thrust Block shall be cast-in-place Class 520-C-2500 concrete.

G. Precast Concrete Manholes

Precast concrete manholes shall conform to the District Standard Details, and as indicated on the District approved plans. Precast concrete manholes shall be lined with a high polymer vinyl chloride (PVC) sheet lining system that resists strong acidic, alkaline and salt solutions. The lining shall form an integral bond to the concrete manhole components without the use of adhesive. The liner shall have a minimum thickness of 65 mils. The lining system shall be "T-Lock Amer-Plate" as produced by Ameron or approved equal. Liner joints and butted or lapped edges shall be sealed by welding (heat fusing) Amer-Plate weld strips over the edges.

H. Bedding and Encasement Material

Bedding and Encasement for all sanitary sewers shall be crushed rock ¾ inch gradation conforming to Section 200-1.2, "Crushed Rock and Rock Dust", of the Standard Specifications.

I. Back Flow Assemblies

Ownership of the Backflow Assembly is that of the property owner that it serves. Only approved Backflow Assemblies shall be installed in the District.

On premises where system backflow protection is required, the backflow assembly shall be installed on the property owner's premises. On the service lateral there must be no tee, tap or connection of any sort to the main.

J. 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".

K. 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. 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-in 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 after preceding through any area.

(4) Pipe Bedding and Backfill - Pipe bedding, backfill and compaction shall be performed in accordance with the Standards Specifications. 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 District Standards.

(5) Shoring, Bracing and Sheeting - The Contractor shall furnish, install and maintain such shoring, bracing and sheeting as required to conform to the rules and orders of the California Division of Industrial Safety to support sides of the trench and prevent movement which could cause injury to any person or structures. Any damage resulting from lack of adequate shoring, bracing or sheeting shall be repaired at the Contractor's expense. The Contractor shall be fully responsible and liable for the safety of his operations at all times.

C. Removal or Abandonment of Existing Sewer Mains

Existing sewer 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:

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' outside of the standard trench width for the new main.

3. When called out on the Plans or in the contract documents.

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 306-5, "Abandonment of Conduits and Structures", of the Standard Specifications. The District reserves the right to require that the entire length of the abandoned utility be removed.

D. PVC Pipe Installation

All PVC pipe and fittings for underground gravity sewers shall be installed in accordance with the requirements of ASTM Standard D-2321, as amended to date. "Recommended Practice for Installation of Flexible Thermoplastic Sewer Pipe."

Pipe Laying - Each pipe of the diameter called for by the Plans is to be laid on a firm bed and have a true bearing of its entire length. The pipe shall be laid in perfect conformity to the prescribed lines and grades. All adjustments to line and grade must be made by scraping away or filling in the earth under the body of the pipe, and not by wedging or blocking up the hub. A shallow excavation shall be made underneath the pipe at the joint to accommodate the bell and facilitate the making of the joint.

All pipe shall be laid continuously uphill, and with the bell end upgrade. The faces of the spigot ends and of all shoulder or sockets must be true and brought into fair contact and all lumps and excrescences of said faces shall be cut away before the pipe is lowered into the trench. When the work ceases for any reason, the unfinished end of the pipe shall be securely closed with a plug or cover.

The interior of the pipe shall be free from all dirt and foreign matter as the work progresses and left clean at its completion.

In general the pipe shall be installed in accordance with the manufacturer's recommendations and these Standard Requirements.

E. 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, in conformance with guidelines as established by the State of California Department of Health. Any deviation must have the approval of the Engineer.

F. 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 feet 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.

G. Project Site Maintenance

Project site maintenance shall conform to the provisions in Section 7-8, "Work 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.

H. Final Inspection and Tests

Compaction Tests:
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 two hundred (200) linear feet of the 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 District to ensure uniform and required compaction over the entire project

Deflection Test for All Plastic Sewer Pipe and Composite Sewer Pipe:
Following the placement and densification of backfill and prior to the placement of any permanent pavement, all pipe lines shall be cleaned and then mandrelled to measure for obstructions, deflections, joint offsets and lateral pipe intrusions. The mandrel shall be rigid with a circular cross section having a diameter at least ninety-six (96) percent of the specified average inside diameter of the pipe and shall be pulled through the pipe by hand. The minimum length of the cylindrical portion of the mandrel shall be equal to the nominal diameter of the pipe.

Should any section of pipeline fail to pass this mandrel test, the Contractor shall open the pipe trench and repair the pipeline until it satisfactorily passes the mandrel test.

All material, equipment and labor to perform the test shall be provided by the Contractor at no cost to the District.

Recommended Air Test for VC Sewer Pipe:
After the sewer pipe has been laid and backfilled, each section of pipe line between manholes shall be tested by a low pressure air test and inspected by the Engineer.

The following procedure for air testing as specified by the National Clay Pipe Institute (NCPI) will be acceptable for testing sewer lines.

The Contractor shall furnish all facilities and personnel for conducting the test under the observation of the Engineer. The equipment and personnel shall be subject to the approval of the Engineer. The Contractor shall clean the line before proceeding with the air test. All debris shall be removed at the first manhole where its presence is noted. In the event cemented or wedged debris or a damaged pipe shall prevent cleaning, the Contractor shall remove the obstruction. The pipe or sections of pipe to be tested should be wetted before the air test is started.

Immediately following the pipe cleaning and wetting, the pipe shall be tested with low pressure air. Air shall be slowly supplied to the plugged pipe installation until the internal air pressure reaches 4.0 pounds per square inch greater than the average back pressure of any ground water that may submerge the pipe. At least two minutes shall be allowed for temperature stabilization before proceeding further. The rate of air loss shall then be determined by measuring the time interval required for the internal pressure to decrease from 3.5 to 2.5 pounds per square inch greater than the average back pressure of any ground water that may submerge the pipe.

The pipeline shall be considered acceptable when tested at an average pressure of 3.0 pounds per square inch greater than the average back pressure of any ground water that may submerge the pipe when the section under test does not lose air at a rate greater than 0.003 cubic feet per minute per square foot of *internal pipe* area except that the minimum allowable rate of loss for the section shall not be less than 2 cubic feet per minute.

The requirements of this specification shall be considered satisfied if, during the time as computed according to the "Air Test Table" on the following page entitled "Recommended Procedure for Conducting Acceptance Test," the pressure in the pipeline does not drop more than one psi below the initial pressure of 3.5 psi greater than the average back pressure of any ground water head that may submerge the (pipe) line.

Acceptance Test shall be made for each first section of line constructed, for every first reach of line installed where a new sewer crew is used, or wherever the Engineer may direct. The Contractor shall not proceed with any construction until the prerequisite of meeting the successful installation of each section is made, as mentioned above, to qualify the crew and/or material.

If the pipe installation fails to meet these requirements, the Contractor shall determine at his own expense the source or sources of leakage, and he shall repair or replace all defective materials or

workmanship. The completed pipe installation shall meet the requirements of this test, or the alternate water exfiltration or infiltration test before being considered acceptable.

Safety Provisions:
The plugs must be firmly secured and care should be exercised in their removal. (The total force on a 12" plug at 4.0 psi is over 450 pounds). Care must be exercised in not loading the sewer line with the full pressure of the compressor. Keep personnel out of manholes until the pressure has been released. If water leaks into the line after the plugs are installed and floods the air inlet and the needle on the air pressure gauge indicates zero, then possibly the water column has balanced the air pressure in this instance and care is necessary in releasing the pressure. If testing below ground water level, inject the air at the upper plug and/or turn the inlet up as with a water test apparatus.

Televising of Sewer Line:
Prior to acceptance of the sewer line, the District requires, at no cost to the District, Televised inspection of the sewer line. A copy of the inspection video shall be provided to the District for their files. All deficiencies noted during the television will be repaired by the Contractor to the satisfaction of the District. Upon completion of the repairs, the District will re-televise the repaired 'line. The cost of televising the line shall be charged to the Contractor. It is recommended, but not required, that the Contractor televise the sewer lines prior to street paving to minimize the cost of possible repairs.

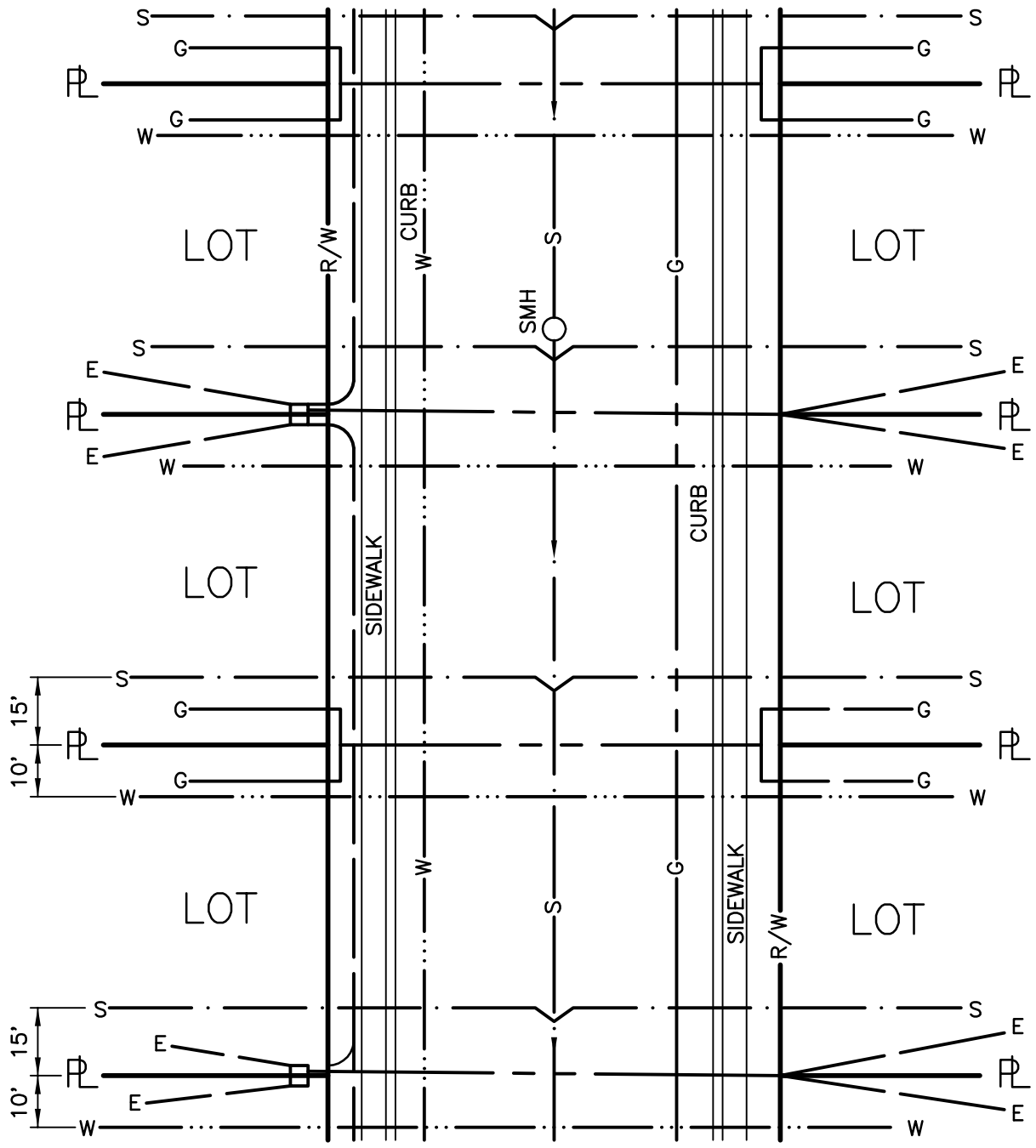
I. Clean-up

After compaction is approved, and prior to final acceptance, all pipe must be flushed and balled (with a Wayne-type Ball) progressively downstream to clean out any accumulated debris. Contractor shall install a screen or similar device at downstream manhole to prevent contamination of downhill lines. This operation requires witness by the Inspector. Immediately after the pipe has been cleaned it shall be tested by the air test procedure described above.

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.

IV. STANDARD DETAILS

100 Utility Service Laterals, Symbols and Abbreviations
117 Separation Requirements for Sewer and Water Lines
200 Standard Sewer Lateral
201 Cleanout for Mainline Construction (6”-8”)
202 Sewer Lateral and Utility Crossing
203 Wye Installation in existing Pipe
204 Backflow Prevention Device
205 Pipe Anchors for Slopes
206 Backfill Stabilizers
207 48” & 60” Manhole
208 Drop Manholes



JUNCTION BOX
SEWER
WATER
GAS
ELECTRIC, CTV, TELEPHONE

N.T.S.

Drawing No. 100

MISSION HILLS
COMMUNITY SERVICES DISTRICT

MARK	REVISIONS	APPR.	DATE

UTILITY SERVICE LATERALS
SYMBOLS & ABBREVIATIONS

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

MARK	REVISIONS	APPR.	DATE

SEPARATION REQUIREMENTS
FOR SEWER AND WATER LINES

JULY 2010

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

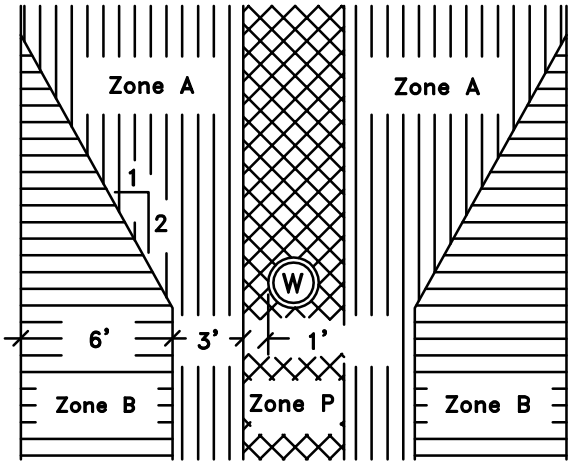
MARK	REVISIONS	APPR.	DATE

SEPARATION REQUIREMENTS FOR SEWER AND WATER LINES

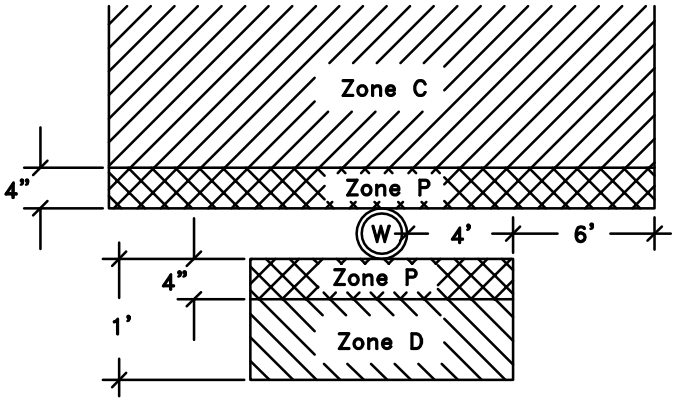
JULY 2010

CASE 1 – NEW SEWER MAIN

PARALLEL



CROSSING

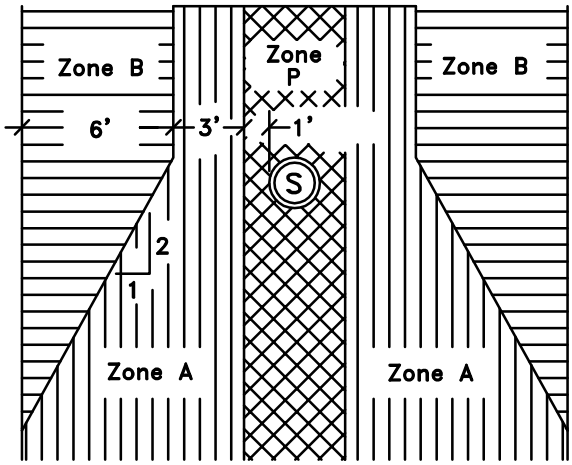


ZONE P is a prohibited zone, Section 64572(a)(1), Title 22 California Administrative Code.

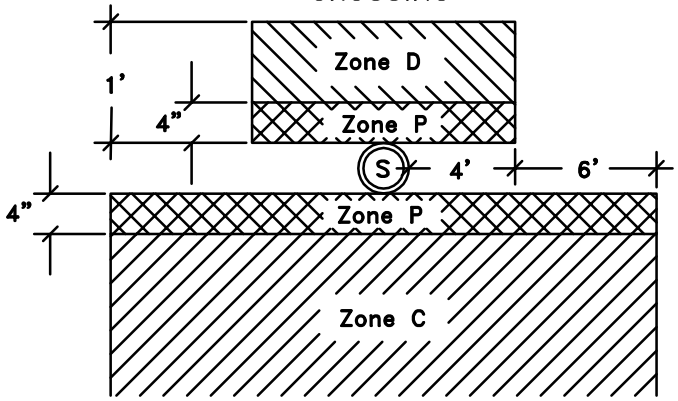
N.T.S.

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 insterted.

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 munipical wastewater.

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

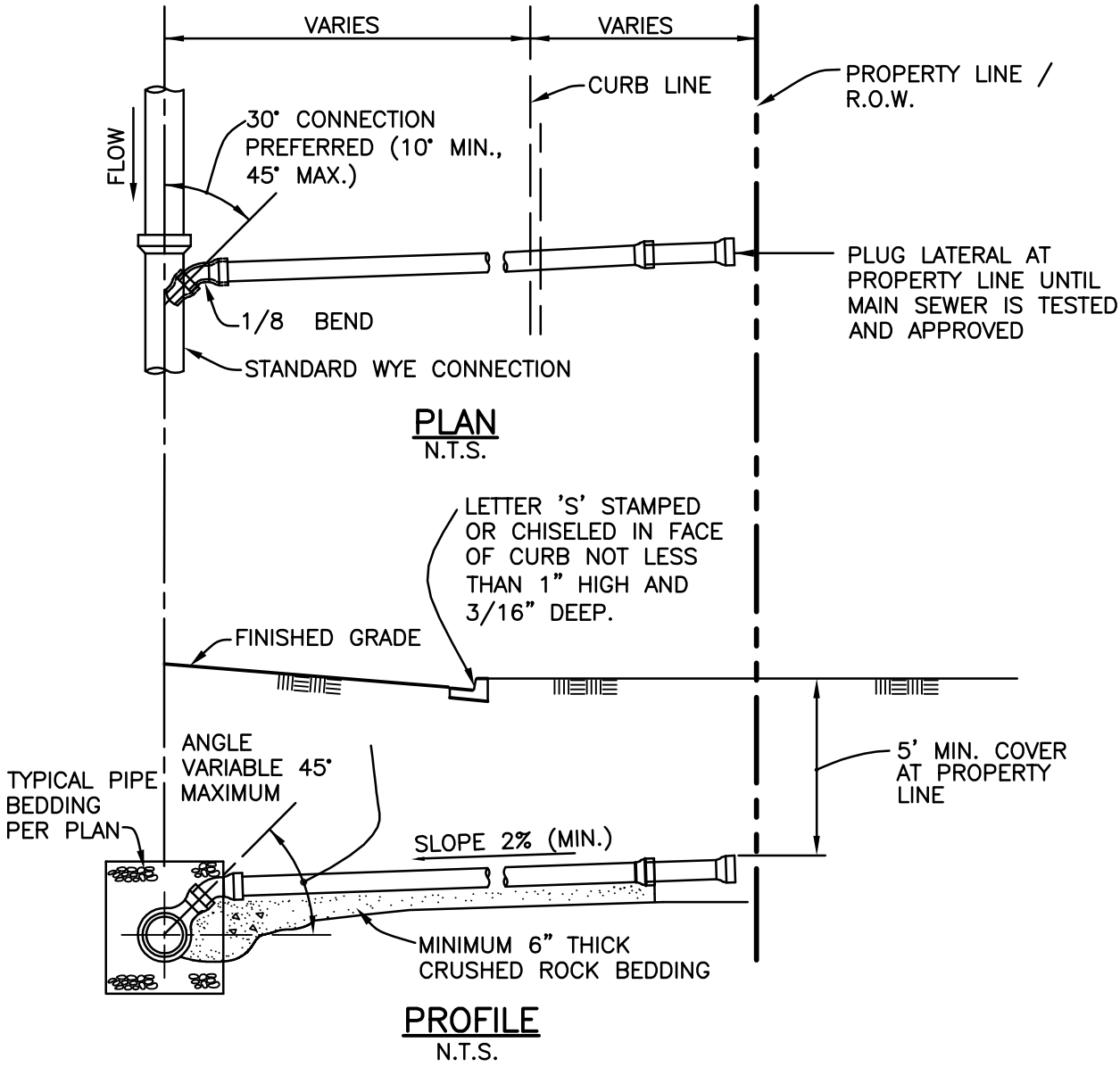
Drawing No. 117

MISSION HILLS
COMMUNITY SERVICES DISTRICT

MARK	REVISIONS	APPR.	DATE

CRITERIA FOR THE SEPARATION OF WATER MAINS AND SANITARY SEWERS

JULY 2010



NOTES

1. LATERAL CONNECTION TO THE SEWER MAIN SHALL NOT BE ON TOP OF THE PIPE.
2. SEWER LATERALS SHALL HAVE A MINIMUM SLOPE OF 1/4" PER FT. (2%).
3. ALL JOINTS ON SEWER LATERAL PIPE SHALL BE COMPRESSION TYPE OR AS APPROVED BY THE DISTRICT.
4. LATERAL SHALL EXTEND TO PROPERTY LINE OR AS DESIGNATED ON DRAWINGS.
5. THE LOCATION OF ALL LATERALS SHALL BE ACCURATELY SHOWN ON THE AS–BUILT DRAWINGS.
6. SIZE PER PLAN.

Drawing No. 200

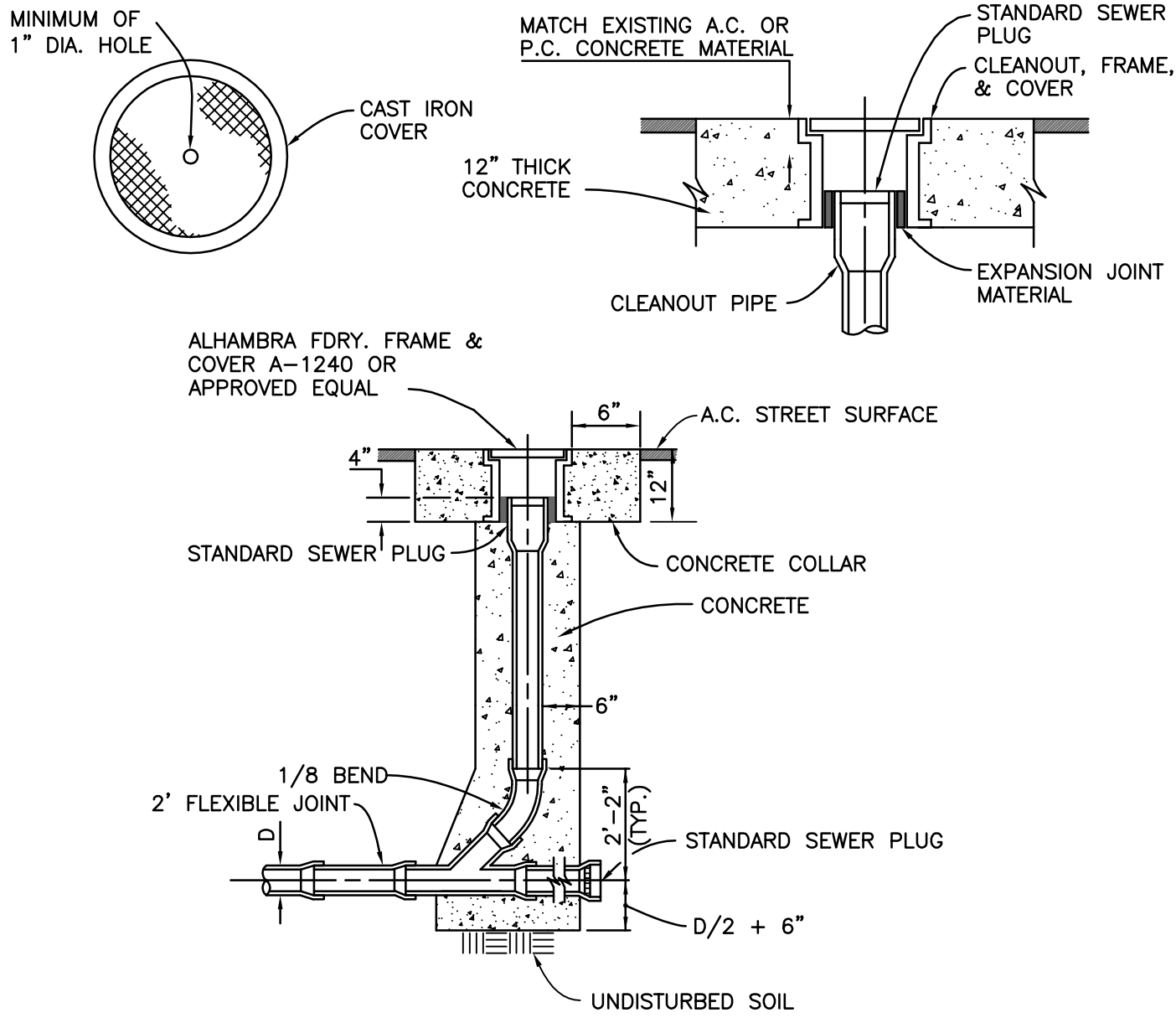
MISSION HILLS
COMMUNITY SERVICES DISTRICT

MARK	REVISIONS	APPR.	DATE

STANDARD SEWER LATERAL

JULY 2010

SHEET 1 OF 1



NOTES:

1. CONSTRUCT MANHOLE INSTEAD OF CLEANOUT WHEN LINE SIZE EXCEEDS 8"
2. CLEANOUT SHALL BE THE SAME MATERIAL AND THE SAME DIAMETER AS THE MAINLINE PIPE.

N.T.S.

Drawing No. 201

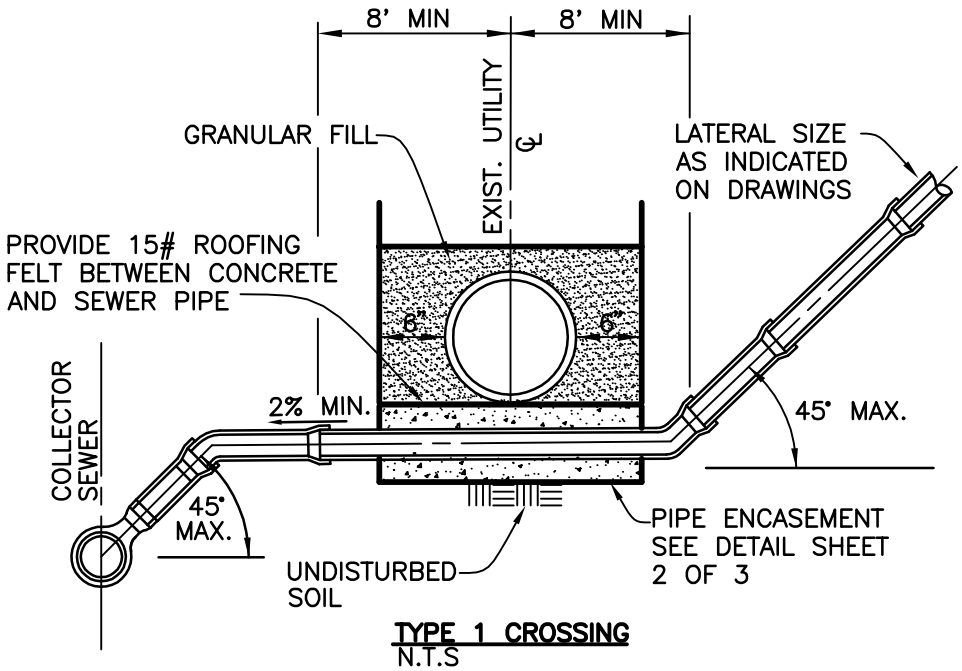
MISSION HILLS
COMMUNITY SERVICES DISTRICT

MARK	REVISIONS	APPR.	DATE

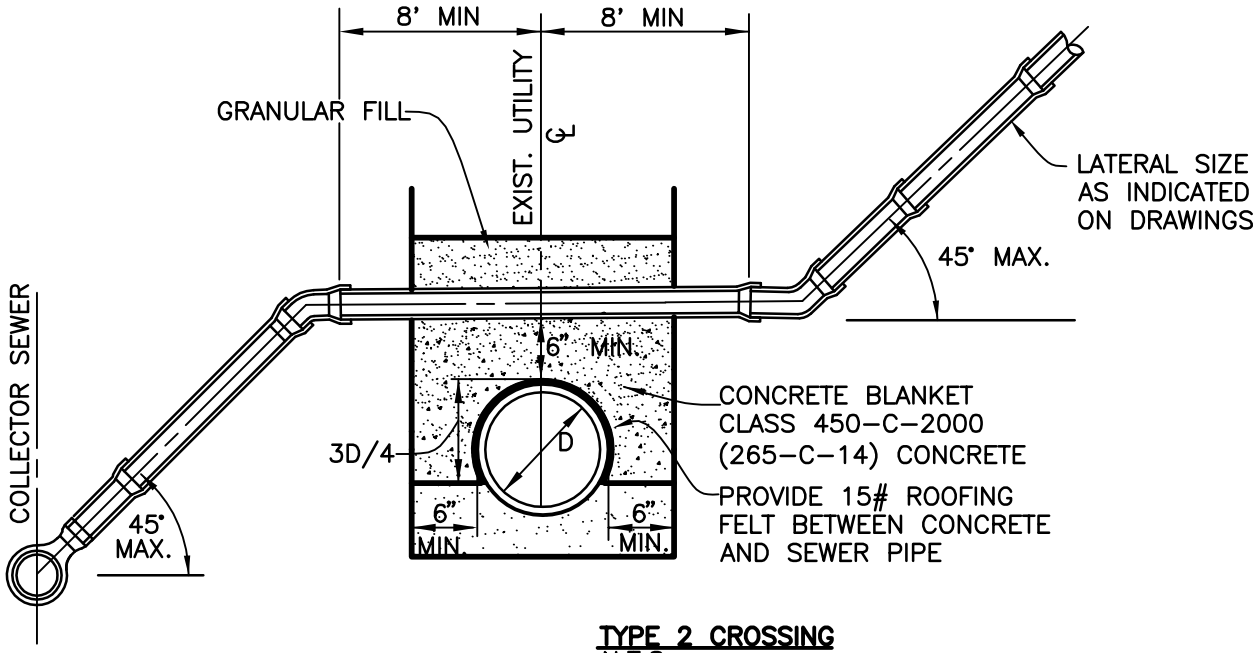
CLEANOUT FOR MAINLINE CONSTRUCTION (6"-8")

JULY 2010

SHEET 1 OF 1



TYPE 1 CROSSING
N.T.S



TYPE 2 CROSSING
N.T.S

NOTES:

1. MINIMUM SLOPE FOR SEWER LATERALS SHALL BE 2%.
2. MINIMUM CLEARANCE BETWEEN SEWER LINES AND EXISTING PROPOSED STRUCTURES SHALL BE 6".
3. TYPE 3 CROSSING TO BE USED ONLY WHEN TYPE 1 AND 2 CROSSINGS DO NOT WORK.

Drawing No. 202

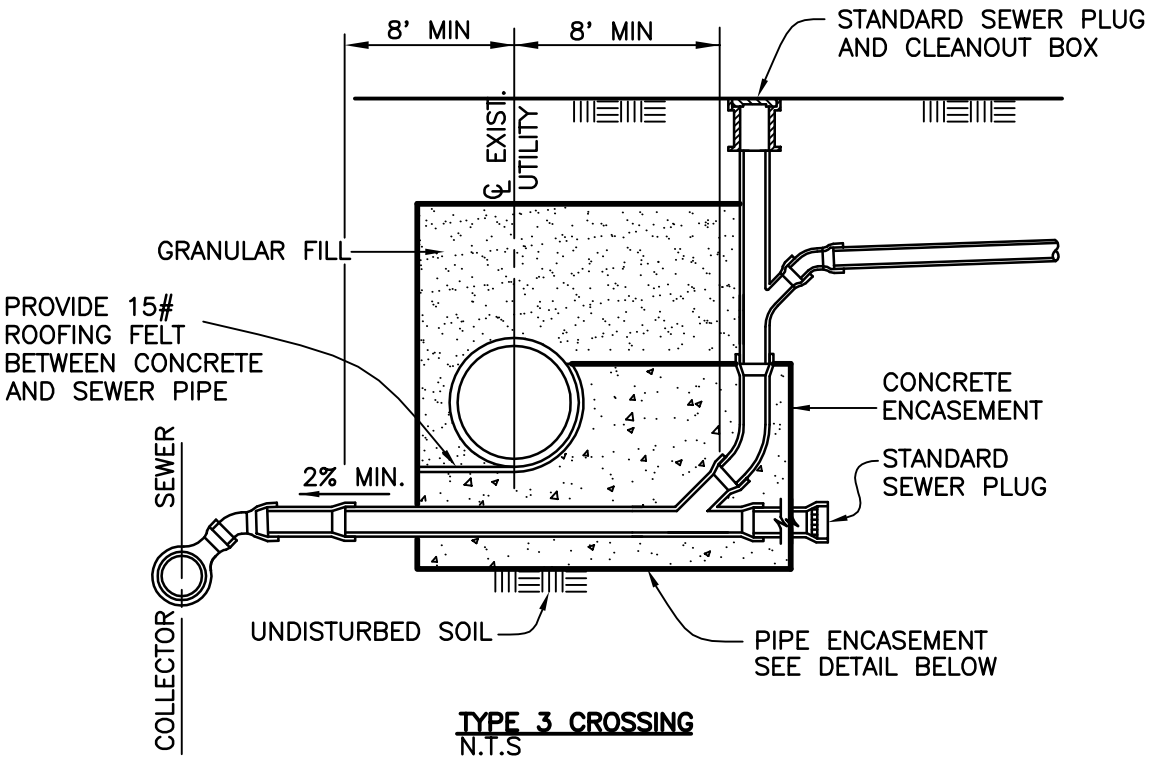
MISSION HILLS
COMMUNITY SERVICES DISTRICT

MARK	REVISIONS	APPR.	DATE

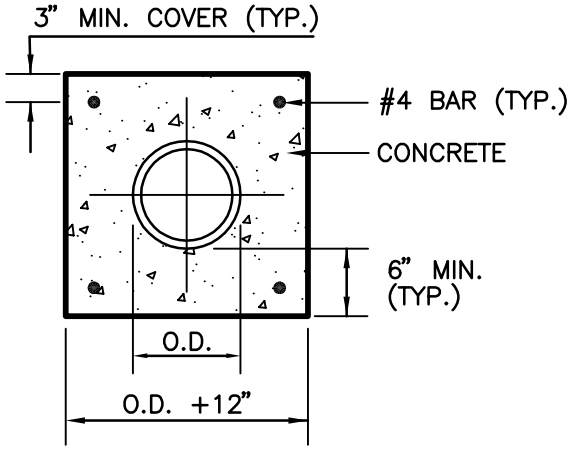
SEWER LATERAL AND UTILITY CROSSING

JULY 2010

SHEET 1 OF 2



TYPE 3 CROSSING
N.T.S



PIPE ENCASEMENT DETAIL
N.T.S

Drawing No. 202

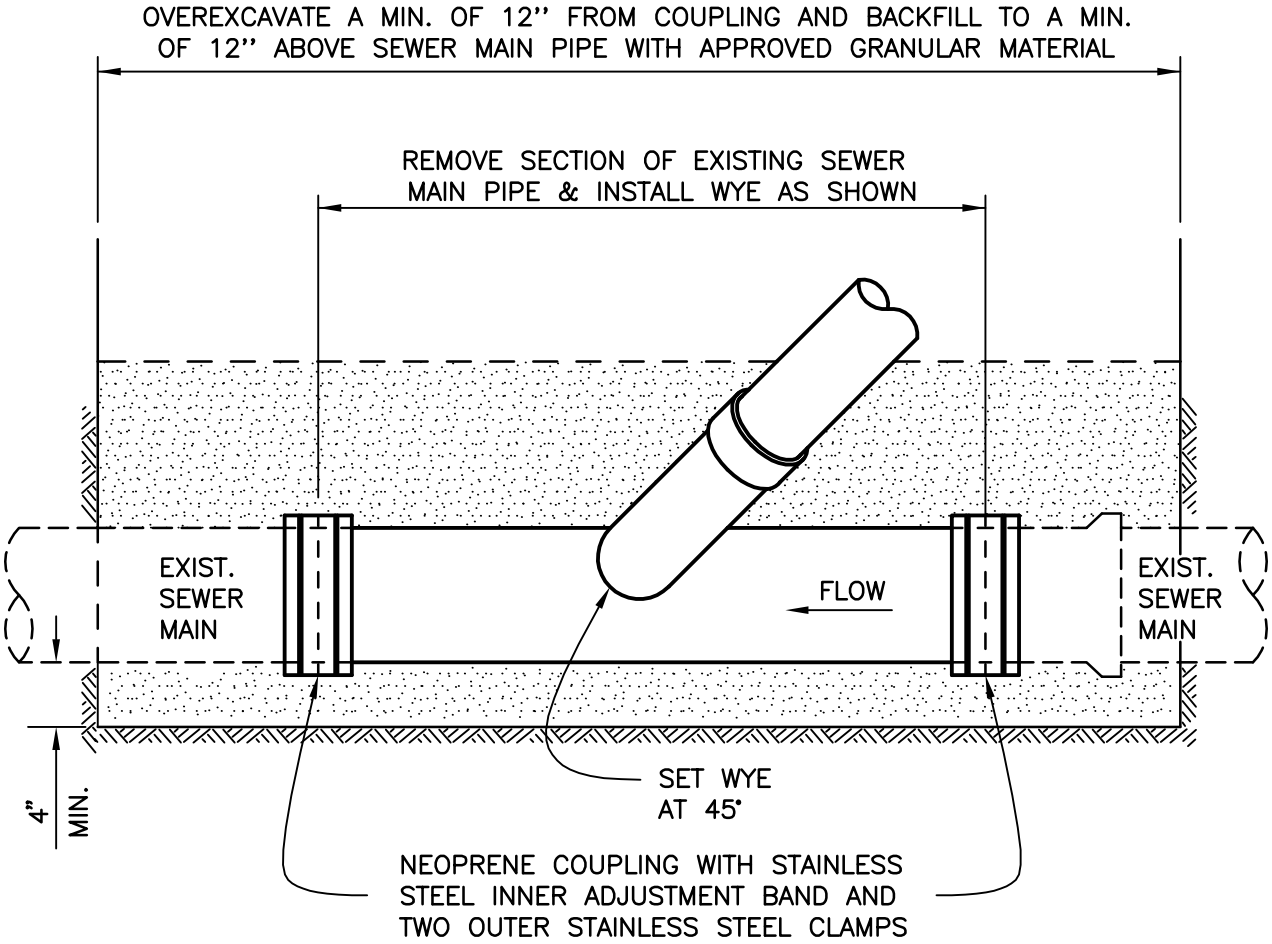
MISSION HILLS
COMMUNITY SERVICES DISTRICT

MARK	REVISIONS	APPR.	DATE

SEWER LATERAL AND UTILITY CROSSING

JULY 2010

SHEET 2 OF 2



NOTE:
ROMAC CB SEWER TAP SADDLE, OR APPROVED EQUAL, MAY BE SUBSTITUTED.

N.T.S.

Drawing No. 203

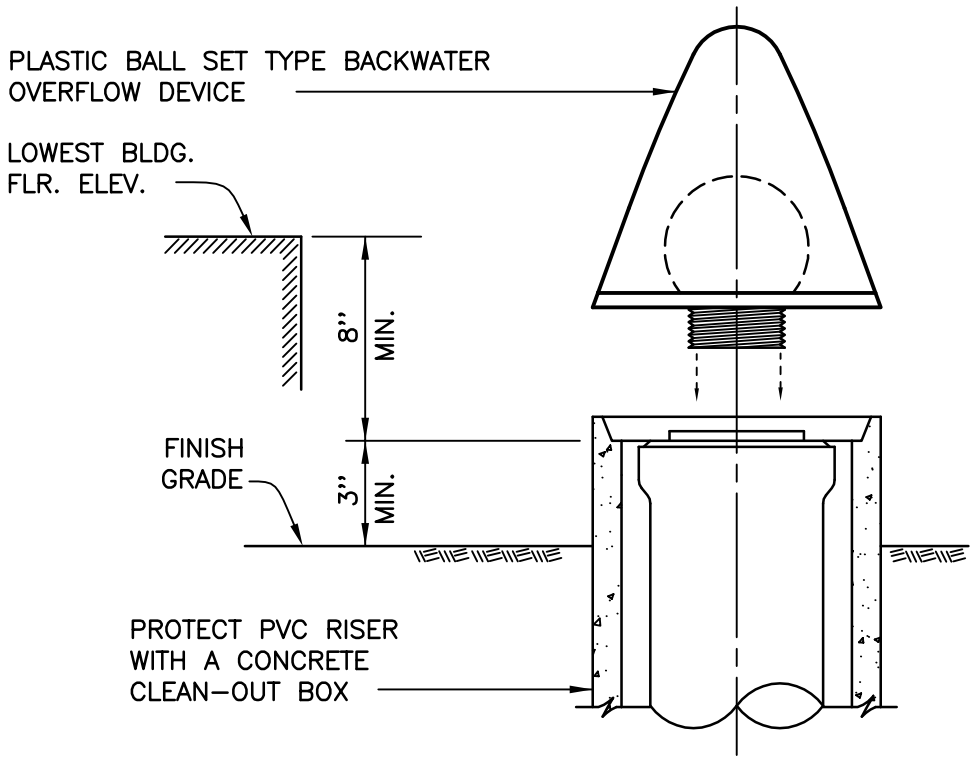
MISSION HILLS
COMMUNITY SERVICES DISTRICT

MARK	REVISIONS	APPR.	DATE

WYE INSTALLATION IN EXISTING PIPE

JULY 2010

SHEET 1 OF 1



NOTES:

1. A BACKWATER OVERFLOW DEVICE WILL BE REQUIRED WHENEVER THE LEVEL OF THE LOWEST FLOOR THAT HAS PLUMBING FIXTURES IS LOWER IN ELEVATION THAN THE FIRST UPSTREAM MANHOLE OR CLEANOUT ON THE SEWER MAIN TO WHICH THE LATERAL CONNECTS.

2. THE OVERFLOW DEVICE SHALL BE INSTALLED AT THE JUNCTION OF THE BUILDING DRAIN AND BUILDING SEWER. UNLESS OTHERWISE AUTHORIZED BY DISTRICT MANAGER/DISTRICT ENGINEER.

N.T.S.

Drawing No. 204

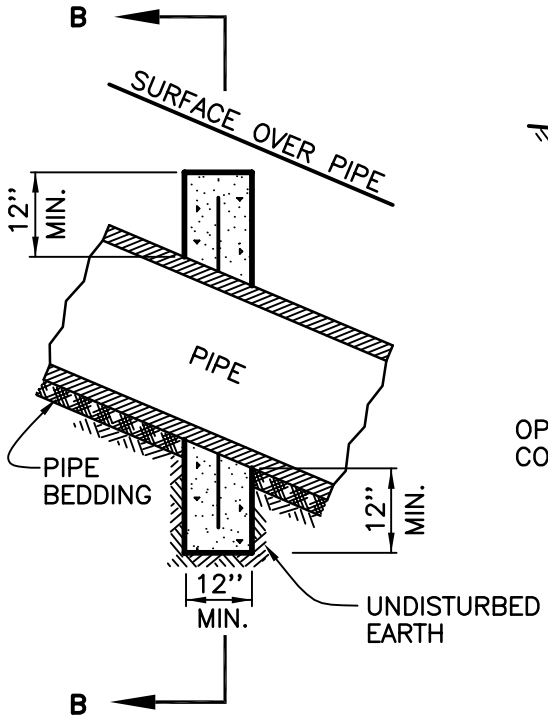
MISSION HILLS
COMMUNITY SERVICES DISTRICT

MARK	REVISIONS	APPR.	DATE

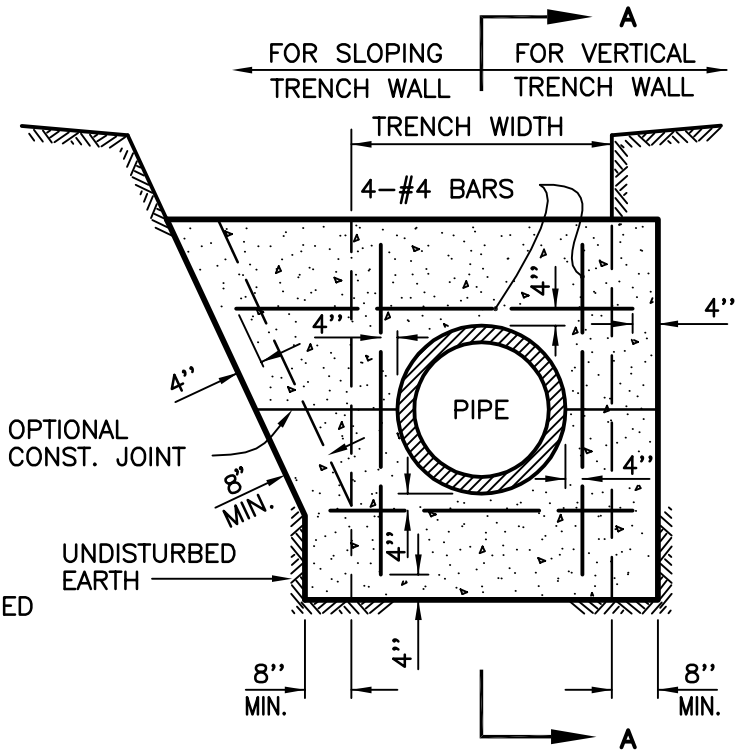
BACKFLOW PREVENTION DEVICE

JULY 2010

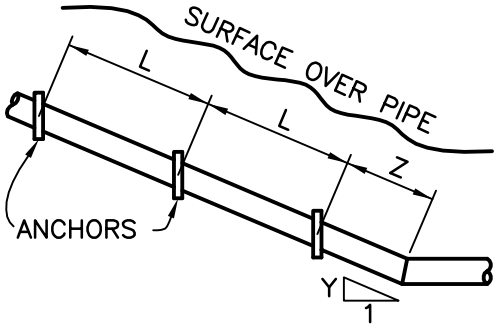
SHEET 1 OF 1



SECTION B–B
N.T.S.



SECTION A–A
N.T.S.



ELEVATION PIPE ANCHORS
N.T.S.

TABLE A

PIPE SLOPE(%) Y:1(100)	L DISTANCE (MAX.)	Z DISTANCE (MAX.)
100	12'	4'
67	14'	8'
50	16'	12'
40	18'	18'
33	20'	20'

NOTES:

1. ANCHORS SHALL BE CONCRETE.
2. FOR CLAY PIPE, ANCHORS SHALL NOT BE PLACED WITHIN 6" OF THE PIPE JOINT.
3. TRENCH SHALL BE BACKFILLED PER NOTE 4 OF STANDARD DRAWING 204.
4. SPACING OF ANCHORS FOR PIPE SLOPES BETWEEN VALUES SHOWN IN TABLE "A" MAY BE PROPORTIONED.

Drawing No. 205

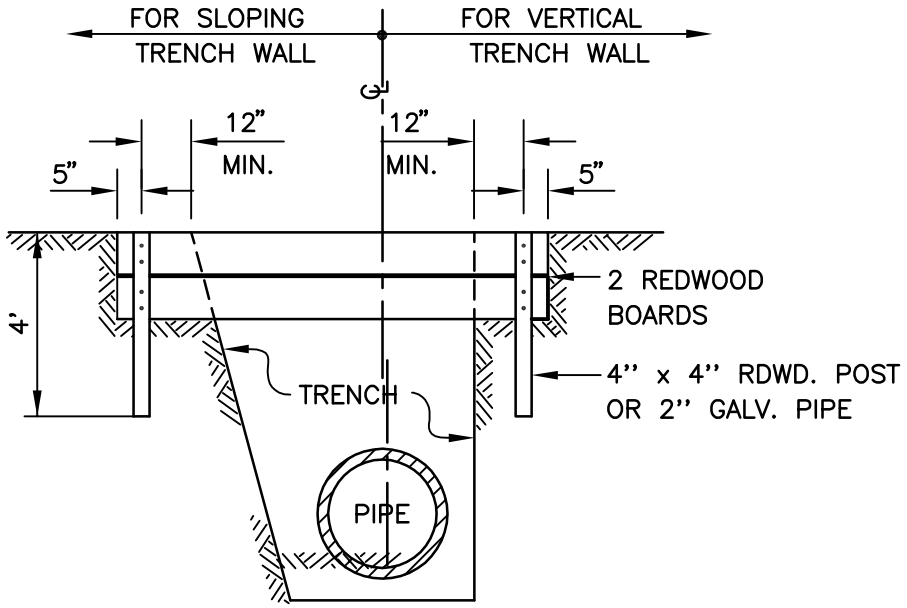
MISSION HILLS
COMMUNITY SERVICES DISTRICT

MARK	REVISIONS	APPR.	DATE

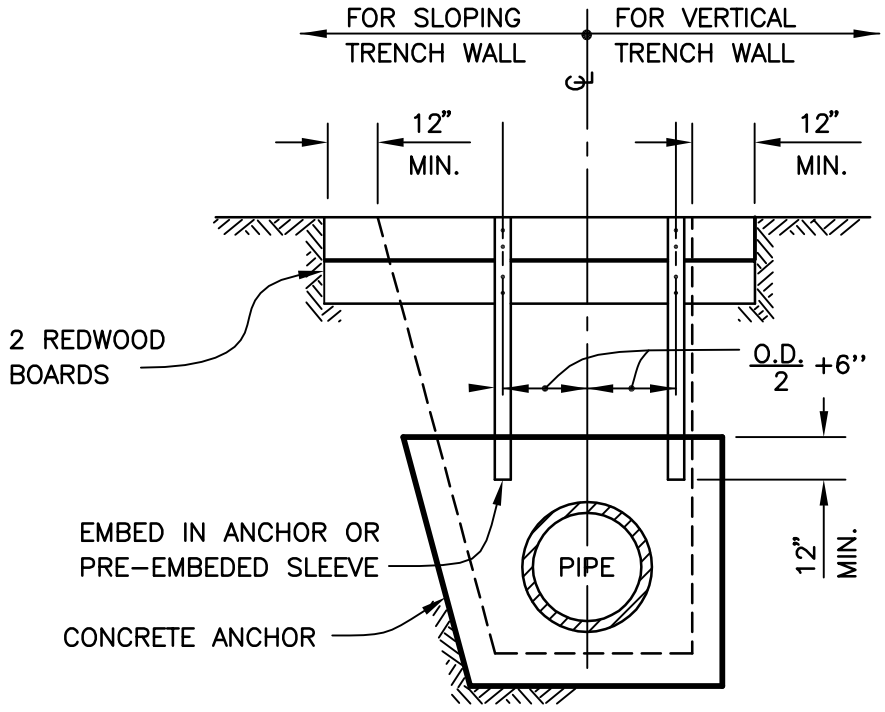
PIPE ANCHORS FOR SLOPES

JULY 2010

SHEET 1 OF 1



ALTERNATE 1 – SECTION C–C
N.T.S.



ALTERNATE 2 – SECTION C–C
N.T.S.

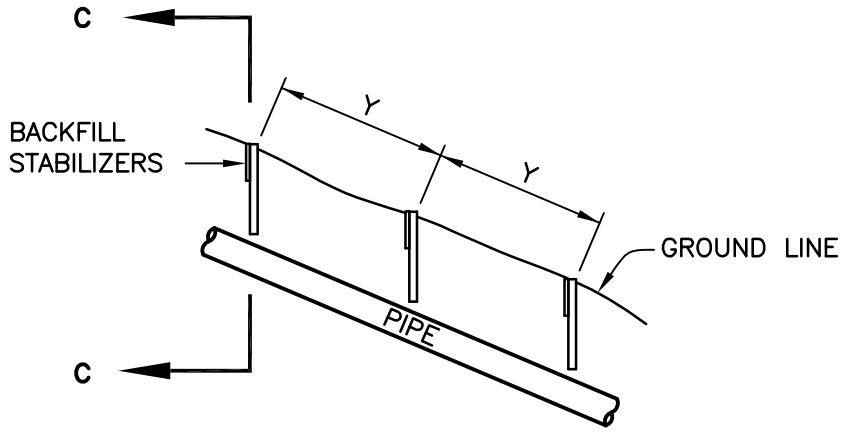
Drawing No. 206

MISSION HILLS
COMMUNITY SERVICES DISTRICT

MARK	REVISIONS	APPR.	DATE

BACKFILL STABILIZERS FOR SLOPES

JULY 2010



ELEVATION BACKFILL STABILIZERS

TABLE B

GROUND SLOPE X:1	Y SPACING (MAX.)
1:1	5'
1 ½:1	9'
2:1	12'
2 ½:1	16'
3:1	20'

NOTES:

1. REDWOOD BOARDS SHALL BE 2'' x 12'' WHERE DEPTH OF COVER OVER PIPE
3. PERMITS. OTHERWISE USE 2'' x 10''.

2. REDWOOD BOARDS SHALL BE PLACED ON THE HIGH GROUND SIDE OF THE POSTS.

4. EACH REDWOOD BOARD SHALL BE FASTENED BY USING 2–16d NAILS TO EACH REDWOOD POST OR A 3/8 INCH BOLT AND NUT WITH WASHERS TO EACH GALVANIZED PIPE. ALL HARDWARE SHALL BE GALVANIZED.

5. TRENCH BACKFILL SHALL BE CONSOLIDATED BY MECHANICAL COMPACTION. IN LIEU OF MECHANICAL COMPACTION, SOIL CEMENT MAY BE USED. HOWEVER, THE TOP 12'' OF BACKFILL SHALL BE NATIVE SOIL, MECHANICALLY COMPACTED.

6. SPACING OF STABILIZERS FOR GROUND SLOPES BETWEEN VALUES SHOWN IN TABLE "B" MAY BE PROPORTIONED.

THE CONTRACTER MAY, AT HIS OPTION, SUBSTITUTE DOUGLAS FIR FOR THE REDWOOD PROVIDED IT HAS BEEN TREATED WITH PRESERVATIVES.

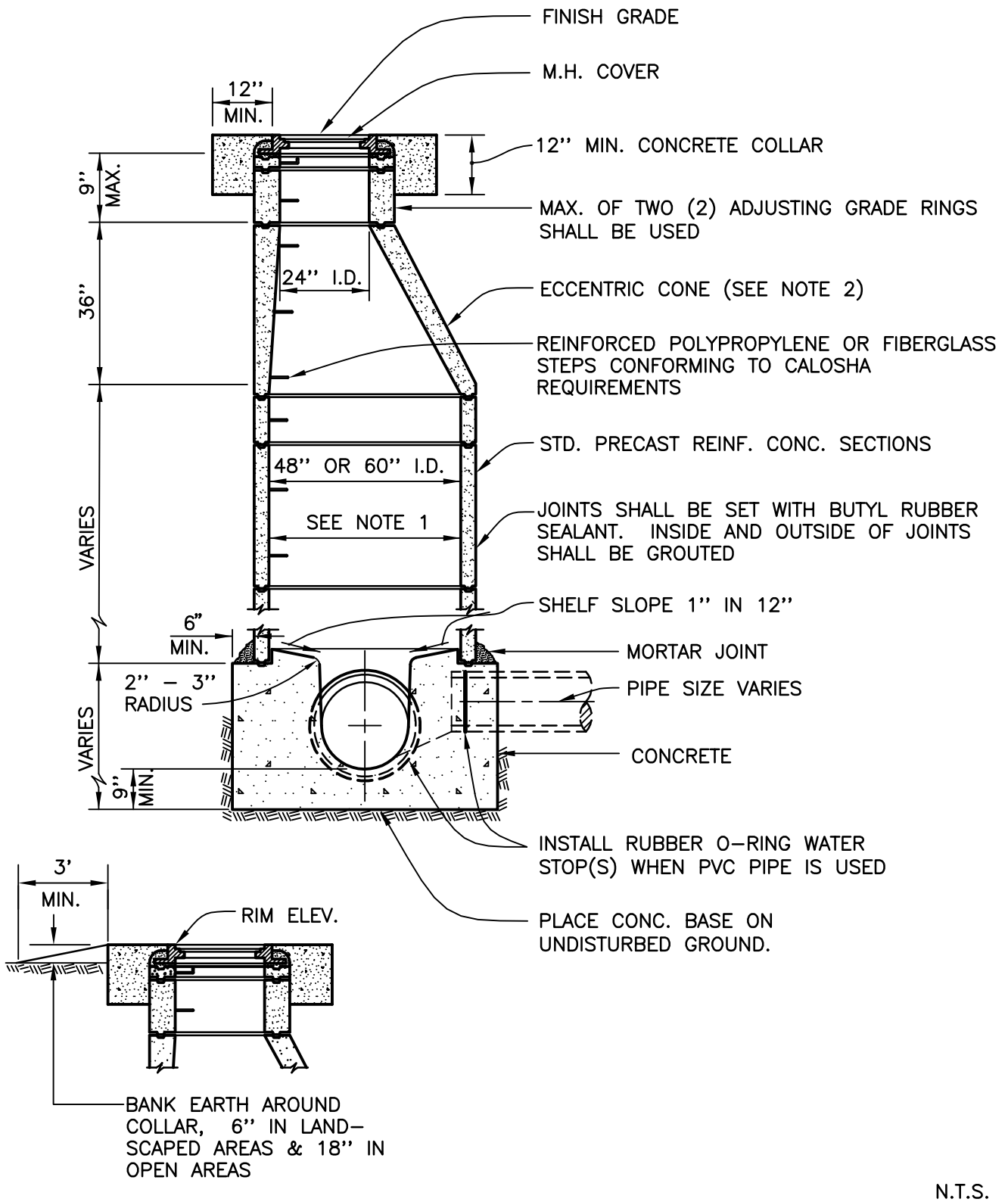
Drawing No. 206

MISSION HILLS
COMMUNITY SERVICES DISTRICT

MARK	REVISIONS	APPR.	DATE

BACKFILL STABILIZERS FOR SLOPES

JULY 2010



N.T.S.

Drawing No. 207

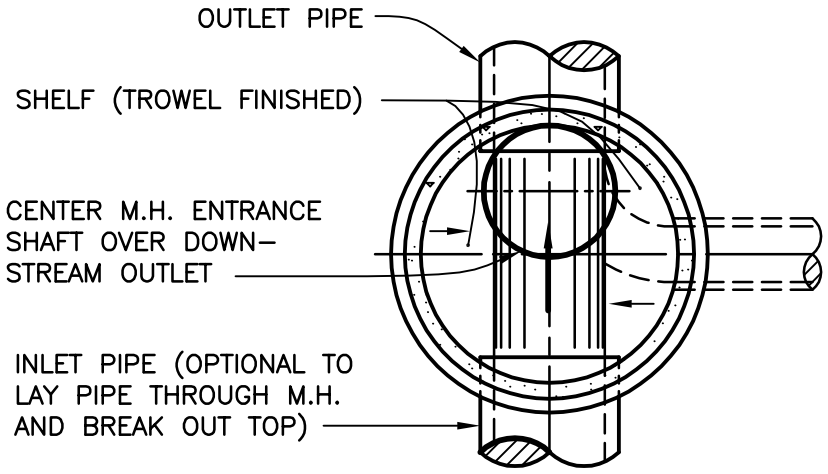
MISSION HILLS
COMMUNITY SERVICES DISTRICT

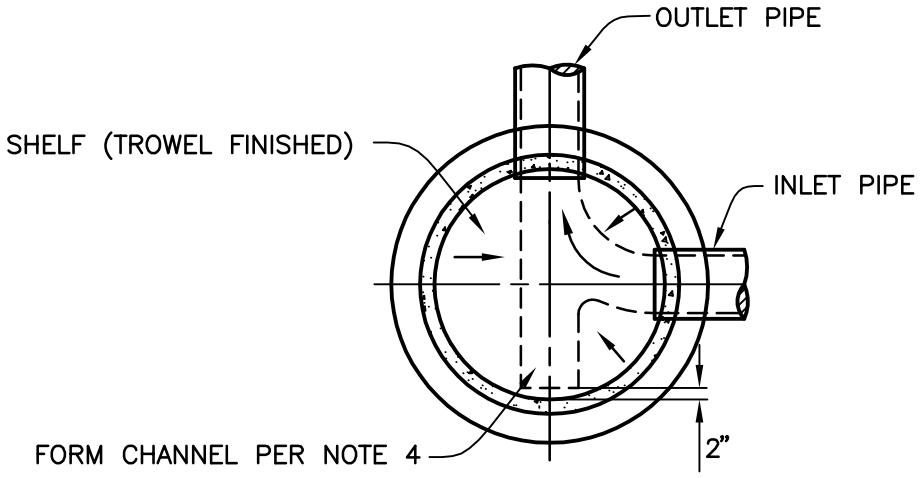
MARK	REVISIONS	APPR.	DATE

48" AND 60" MANHOLE

JULY 2010

SHEET 1 OF 2





NOTES

1. COMPLETELY SEAL THE INSIDE OF THE MANHOLE WITH DISTRICT APPROVED PROTECTIVE COATING WITH HIGH BONDING STRENGTH AND RESISTANCE TO WATER AND SEWER GASES. THE COATING APPLICATION SHALL BE PER THE MANUFACTURES REQUIREMENTS.

2. CONCENTRIC CONES SHALL BE USED WHEN MANHOLES ARE LESS THAN 4' IN TOTAL DEPTH.

3. PRE–CAST CONCRETE M.H. BASES MAY BE PERMITTED WITH APPROVAL FROM THE DISTRICT GENERAL MANAGER/DISTRICT ENGINEER.

4. CHANNELS, IN THE BASE OF A MANHOLE LOCATED ON A 90° TURN IN A SEWER LINE, SHALL BE FORMED AS SHOWN ABOVE TO ALLOW BETTER ACCESS FOR TV INSPECTION UNITS AND OTHER TYPES OF MAINTENANCE EQUIPMENT.

N.T.S.

Drawing No. 207

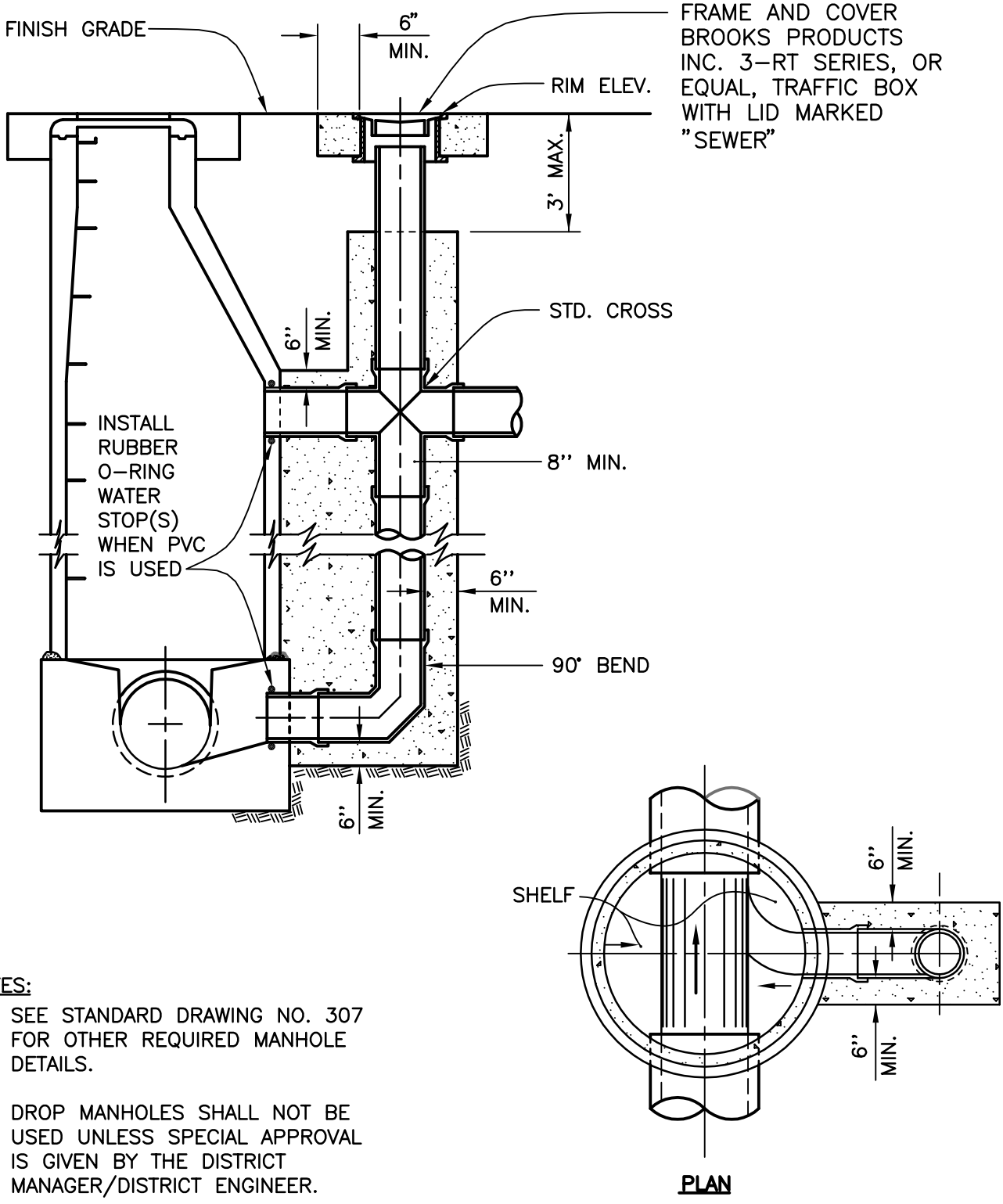
MISSION HILLS
COMMUNITY SERVICES DISTRICT

MARK	REVISIONS	APPR.	DATE

48" AND 60" MANHOLE

JULY 2010

SHEET 2 OF 2



NOTES:

1. SEE STANDARD DRAWING NO. 307 FOR OTHER REQUIRED MANHOLE DETAILS.
2. DROP MANHOLES SHALL NOT BE USED UNLESS SPECIAL APPROVAL IS GIVEN BY THE DISTRICT MANAGER/DISTRICT ENGINEER.

N.T.S.

Drawing No. 208

MISSION HILLS
COMMUNITY SERVICES DISTRICT

MARK	REVISIONS	APPR.	DATE

DROP MANHOLE

JULY 2010

SHEET 1 OF 1