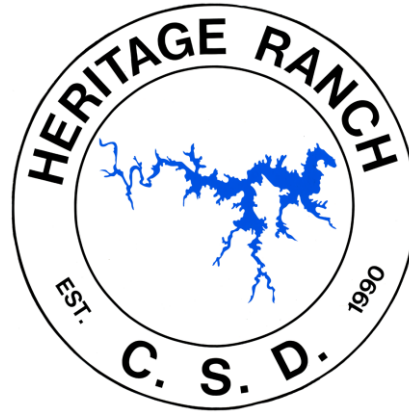


**HERITAGE RANCH
COMMUNITY SERVICES DISTRICT**



**STANDARD SPECIFICATIONS AND
DRAWINGS**

*Adopted by the
Heritage Ranch Community Services District
October 18, 2018*

STANDARD SPECIFICATIONS AND DRAWINGS

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Table of Contents

STANDARD SPECIFICATIONS

CHAPTER 1 GENERAL REQUIREMENTS

1.1	PURPOSE.....	1-1
1.2	DEFINITIONS.....	1-1
1.3	ALTERNATE STANDARDS.....	1-3
1.4	PERMITS.....	1-3
1.5	SAFETY.....	1-3
1.6	CONSTRUCTION PROGRESS.....	1-5
1.7	FINAL ACCEPTANCE.....	1-6

CHAPTER 2 CONSTRUCTION PLANS

2.1	PLANS REQUIRED.....	2-1
2.2	RESPONSIBILITY.....	2-1
2.3	STANDARD IMPROVEMENT PLAN FORMAT.....	2-1
2.4	PLAN APPROVAL.....	2-2
2.5	PLAN CHANGES.....	2-2
2.6	RECORD DRAWINGS.....	2-3

CHAPTER 3 SEWER IMPROVEMENTS

3.1	DESIGN STANDARDS.....	3-1
3.2	LOCATION AND ALIGNMENT.....	3-2
3.3	PRE-TREATMENT.....	3-3
3.4	GRAVITY SEWERS.....	3-3
3.5	SEWAGE PUMP STATIONS.....	3-4
3.6	SEWER LATERALS.....	3-4
3.7	SEWER MANHOLES.....	3-6
3.8	LAYING SEWER PIPE.....	3-8
3.9	DISCHARGE INTO SEWERS.....	3-8
3.10	TESTING OF SEWER MAINS.....	3-9

CHAPTER 4 WATER IMPROVEMENTS

4.1	DESIGN STANDARDS.....	4-1
4.2	LOCATION AND ALIGNMENT.....	4-2
4.3	SEPARATION FROM SEWER OR STORM DRAIN.....	4-3
4.4	CROSS CONNECTIONS.....	4-5
4.5	WATER MAIN.....	4-6
4.6	TRENCHING AND BACKFILL.....	4-8
4.7	LAYING WATER PIPE.....	4-11
4.8	VALVES.....	4-11
4.9	FIRE HYDRANT ASSEMBLIES.....	4-12
4.10	BLOW-OFFS.....	4-12
4.11	AIR AND VACUUM RELEASE VALVES.....	4-12
4.12	SAMPLING STATIONS.....	4-12
4.13	WATER SERVICES.....	4-12
4.14	TESTING.....	4-13

STANDARD DRAWINGS

N-01	STANDARD CONSTRUCTION
N-02	STANDARD CONSTRUCTION NOTES (CONTINUED)
N-03	ENGINEER'S CERTIFICATION
N-04	WATER VALVE AND SEWER MANHOLE ABOVE COVER CONCRETE COLLAR
S-01	STANDARD SEWER MANHOLE
S-02	STANDARD SEWER MANHOLE BASE
S-03.1	SEWER LATERAL LOCATION SINGLE SERVICE
S-03.2	SEWER LATERAL LOCATION SINGLE SERVICE (CONTINUED)
S-04	STEEP SEWER SERVICE LATERALS
W-01	FIRE HYDRANT ASSEMBLY
W-02	FIRE HYDRANT LOCATION
W-03	WATER VALVE
W-04	WATER SERVICE CONNECTION
W-05	WATER SERVICE MANIFOLD [5 OR MORE SERVICES]
W-06	WATER SERVICE LOCATION – NO CURB OR SIDEWALK
W-07	WATER AND SEWER TRENCH
W-08	WATER AND SEWER SEPARATION NOTES
W-09	WATER AND SEWER SEPARATION DIAGRAM
W-10	1" COMBINATION AIR VALVE ASSEMBLY ABOVE GROUND
W-11	1" COMBINATION AIR VALVE ASSEMBLY UNDERGROUND SEWAGE A&V
W-12	WATER SAMPLING STATION
W-13	DOUBLE CHECK VALVE ASSEMBLY
W-14	REDUCED PRESSURE VALVE ASSEMBLY
W-15	BLOW-OFF ASSEMBLY
W-16.1	THRUST BLOCK REQUIREMENTS (COUNTY OF SLO DPW STD. W-1)
W-16.2	THRUST BLOCK REQUIREMENTS (COUNTY OF SLO DPW STD. W-1)
W-17.1	HRCSD APPROVED MATERIALS LIST
W-17.2	HRCSD APPROVED MATERIALS LIST (CONTINUED)

CHAPTER 1 GENERAL REQUIREMENTS

1.1 PURPOSE

The purpose of these Standard Specifications and Drawings (Standards) is to provide minimum requirements for the design, methods of construction, types and uses of materials, and the preparation of plans for new construction, repair/replacement, or alteration of District facilities for sewer and water utilities, within the Heritage Ranch Community Services District (HRCSD).

Any items which are not included in these Standards shall be constructed in accordance with the latest edition of San Luis Obispo County Department of Public Works Standards, or other HRCSD-approved standards.

Where water or sewer systems are being constructed, operated and maintained in County road right-of-way, plans and specifications must be approved by both HRCSD and County. Where discrepancies or conflict exist between agencies' standards, HRCSD standards shall prevail.

1.2 DEFINITIONS

In these Standard Specifications and Drawings, the intent and meaning of the terms that are used shall be as defined in Section 1 of the State Standards, except as noted below.

- A. ***Applicant*** - Shall mean the owner of land where any improvements are proposed to be constructed for eventual acceptance by HRCSD. The applicant may also be referred to as the Developer or Owner.
- B. ***ASTM*** - Shall mean the industry standards and the society known as the American Society of Testing Materials, the latest revision thereof.
- C. ***AWWA*** - Shall mean the industry standards and the society known as the American Water Works Association, the latest revision thereof.
- D. ***Contractor*** - Shall mean any person or persons, firm, partnership, corporation or combination thereof who has/have entered into a contract with any person, corporation, company, or the HRCSD as party or parties of the second part, or their legal representatives, for the construction of any improvement or portion of any improvement within the HRCSD.
- E. ***County*** - Shall mean the County of San Luis Obispo.

- F. **County Standards** - The Standards and Specifications for the County of San Luis Obispo Department of Public Works & Transportation, latest edition.
- G. **District** - Shall mean the Heritage Ranch Community Services District.
- H. **District Engineer** - Shall mean the authorized registered civil engineer acting on behalf of the District for general engineering matters. The current District Engineer is Wallace Group, a California Corporation, San Luis Obispo, California
- I. **Engineer** - Shall mean the General Manager for HRCSD acting directly or through his authorized representative, or District Engineer.
- J. **Engineer-of-Record** - Shall mean any person or persons, firm, partnership or corporation legally authorized to practice civil engineering in the State of California designated by an Applicant who prepares and submits improvement plans and specifications on behalf of the Applicant, and who certifies the Record Drawings of the final construction.
- K. **HRCSD** - Heritage Ranch Community Services District.
- L. **HRCSD Inspector** – HRCSD or designated Inspector directed to provide inspection services on behalf of HRCSD.
- M. **Improvements** - Any or all work submitted, or expected to be submitted to HRCSD for acceptance into the HRCSD water and/or sewer system.
- N. **State** - When State Standards are applicable, the word “State” as used in the State Standards shall mean HRCSD.
- O. **State Standards** - Shall mean the latest edition of the Standard Specifications of the State of California, Department of Transportation (Caltrans).
- P. **UBC** - Shall mean Uniform Building Code, latest edition.
- Q. **UFC** - Shall mean Uniform Fire Code, latest edition.
- R. **UPC** - Shall mean Uniform Plumbing Code, latest edition.

1.3 ALTERNATE STANDARDS

Alternate materials or methods of construction may be accepted by HRCSD on a case-by-case basis in lieu of these Standards; provided the proposed alternate is of equal or greater utility and quality, provided that it does not pose a threat to public health or safety, and provided that such alternate materials or methods are in conformance with County Standards when within the public right-of-way. Alternates shall not be used until first approved in writing by the Engineer. All costs associated with approved alternate standards shall borne by the Applicant.

1.4 PERMITS

- A. ***HRCSD Permits.*** Any Contractor and/or Applicant wishing to do work under these Standards shall first obtain a permit or approved plans from the District. If such permit or approved plans has not been obtained, the work shall be stopped at the direction of the Engineer, who may cause the work already completed to be removed and the site restored to its original condition. For new buildings and dwellings, HRCSD shall receive approved building permits from the County of San Luis Obispo Planning Department, prior to the HRCSD issuing permits for such new work.
- B. ***County Permits.*** Any Contractor performing work within the County right-of-way shall also obtain a County encroachment permit, which includes requirements beyond those contained in these Standards.
- C. ***CAL/OSHA.*** Any Contractor doing excavations of 5 feet or more in depth shall possess a current CAL/OSHA permit. A copy of such permit shall be presented to the District upon request.
- D. ***State License.*** Any Contractor performing work under these Standards shall possess an appropriate, valid license to perform such work, from the California State License Board. The Contractor or his duly authorized representative must be available on the job site during the time when any work is in progress. If such is not the case, work shall be stopped at the direction of the Engineer. For water and sewer utility work at HRCSD, Contractors shall possess an "A" General Engineering license, unless otherwise specified or approved in the construction documents. Other specialty licensing may be required at the discretion of the HRCSD, for specific types of work.

1.5 SAFETY

The Contractor shall assume all responsibility for job site safety during construction and shall agree to hold HRCSD harmless in conformance with OSHA and CAL/OSHA construction safety requirements. OSHA and CAL/OSHA requirements must be met at all times. Additionally, all work performed shall conform to the requirements of either

the State of California Construction Safety Orders, or the Federal Safety Codes, whichever are more stringent.

- A. **Excavations.** All excavations shall be performed, protected and supported as required for safety and in the manner set forth in the operations rules, orders and regulations set forth by the Division of Industrial Safety of the State of California.

Shoring Plan. Any excavation for a trench 5-feet or more in depth may require a shoring plan. When necessary, the Contractor shall prepare a shoring plan in accordance with OSHA and CAL/OSHA requirements. If required by the District, the shoring plan shall be submitted to the District for their files; however, the District will not review and approve such plans related to Contractor's safety. When requested by the HRCSD, such plan shall be submitted at least 5 working days before the Contractor intends to begin work on the trench. The plan shall be prepared by a California Registered Civil or Structural Engineer.

Nothing herein shall be deemed to allow the use of any shoring, sloping or protective system less effective than that required by the Construction Safety Orders.

- B. **Confined Spaces.** All work being performed on HRCSD facilities that constitutes work in a confined space as defined by CAL/OSHA, shall meet the regulations and safety requirements, including permits where necessary.
- C. **Traffic Plans.** Applicant shall prepare Traffic Control Plans for approval by the HROA and HRCSD, and the County of San Luis Obispo Department of Public Works when Work is in County right-of-way. All signs, signals, flares, barricades, flagmen, or other warning devices necessary for the protection and convenience of the public during the construction phase shall be furnished, installed and maintained by the Contractor in accordance with the latest edition of the State of California "Manual of Traffic Control." Signs and other traffic warning devices must be in accordance with the latest edition of the State of California "Manual of Warning Signs, Lights, and Devices For Use in Performance of Work Upon Highways."
- D. **Stockpiles and Trenches.** Excavated material shall be stockpiled in such a manner that it will not endanger the work or public at any time. Temporary stockpiles within the right-of-way will be allowed by HRCSD on a case-by-case basis; however, no stockpiles shall remain in the right-of-way during non-work hours at any time. Open trenches and waste piles shall be adequately barricaded. Trenches in or adjacent to roadways shall be backfilled at the close of each working day, or adequately trench plated using non-skid traffic plates conforming to State requirements.

1.6 CONSTRUCTION PROGRESS

- A. ***Prior to Construction.*** No construction shall be allowed without improvement plans approved by the District. Construction started without approved plans is at the Contractor's own risk and the Engineer may require that the improvements be removed as well as the area restored to its original condition. In addition, the following are required prior to the start of construction.
1. Three sets of approved plans shall be provided to HRCSD.
 2. An Engineers cost estimate of the improvements which are subject to HRCSD inspection.
 3. An executed inspection agreement shall be provided.
 4. A minimum two working day notice for inspection shall be provided to HRCSD.
 5. Upon request by the Engineer, a pre-construction conference shall be held. The preconstruction conference shall be attended by the Applicant, EOR, Contractor, and other involved agencies or utilities.
- B. ***During Construction.*** All work being performed under these Standards, or subject to District approval, shall be inspected by the HRCSD Inspector, and/or all required testing shall be performed by Contractor in the presence of the HRCSD Inspector. The Contractor shall fully cooperate with and provide full access to the HRCSD Inspector at all times during construction in progress for the purposes of inspection. The inspection of the work shall not relieve the Applicant, Developer, EOR or Contractor of their obligations to construct the improvements in accordance with these Standards and the approved plans.
1. ***Underground Utilities.*** Prior to beginning any excavation work, the Contractor shall call "USA" line locators in order to locate any underground facilities at 811. Such notation shall appear on the front sheet of all approved plans. Work shall not commence until such time member utility agencies have been afforded the opportunity to mark utilities in the field in accordance with the timeline stated in the USAAlert ticket, a minimum of two working days but no longer than 14 calendar days from the time of notification. If Contractor elects to begin work after the legal minimum two working days notice, Contractor shall take all reasonable measures to ensure that all utility agencies that may have utilities in the area of the work, have been notified. Contractor shall be responsible for protection of underground utilities in the area of work, regardless of whether underground utilities have been marked or not.
 2. ***Engineer-of-Record.*** The Applicant, at its sole expense, shall retain the services of a registered civil engineer for overseeing the construction of improvements. At a minimum the Engineer-of-Record shall perform the following:

- (1) Arrange for and conduct the preconstruction meeting.
 - (2) Provide interpretation of the approved plans for the Contractor, as required.
 - (3) Perform shop drawing review of materials and equipment supplied for the improvements.
 - (4) Provide construction oversight for the Contractor.
 - (5) Maintain and complete Record Drawings of the improvements.
 - (6) Obtain HRCSD approval prior to the release of any revised drawings or specifications. Provide copies of revised drawings or specifications to HRCSD.
 - (7) Provide certification (see HRCSD Standard Dwg. N-03) that the Contractor's work conforms to the approved plans, specifications, and submittals.
3. *Work Schedule.* No work shall be performed on Saturday, Sunday, or any legal holiday unless prior arrangements are made with the District. If work is arranged with the District on Saturdays, Sundays, or legal holidays, the Applicant will be responsible for overtime payment of all District employees involved. A two working day advance notice will be required prior to beginning construction on any work subject to HRCSD inspection.
4. *Construction Water.* All water drawn from HRCSD facilities shall be metered and shall be subject to current HRCSD regulation and water rates. Construction water shall only be drawn from facilities designated by HRCSD. Construction water service may be terminated by HRCSD if such action is necessary to maintain public health and safety of the water supply (including maintaining adequate minimum pressure in the system). Furthermore, during severe drought conditions, the District reserves the right to temporarily deny construction water metered service.
5. *Theft of Water.* Any unauthorized drawing of water from the HRCSD system constitutes a misdemeanor and is in violation of State Penal Code 498. Violators will be prosecuted.

1.7 FINAL ACCEPTANCE

Except as specifically authorized by the Engineer, facilities constructed which are to be operated or maintained by HRCSD may not be placed into service or otherwise utilized until the improvements have been accepted by HRCSD.

- A. ***Final Inspection.*** At the completion of construction the Contractor may request a final inspection. Within 5 working days of the request, the Engineer will inspect the improvements constructed under these specifications and note any defects or deficiencies. The Contractor will be notified in writing (punchlist) of any

deficiencies which require correction. After correction of the defects or deficiencies, a second final inspection will be scheduled.

Prior to requesting final inspection, the Contractor shall complete all required improvements, and shall thoroughly clean the site of all rubbish, excess material and equipment. All portions of the site shall be left in a neat and orderly condition satisfactory to the Engineer.

In addition, the following are required prior to the final inspection:

1. Engineer's Improvement Certification (Standard Dwg. N-03).
2. Soil testing reports.
3. Material Compliance reports.
4. A reproducible mylar set of the Record Drawings approved by the District.
5. All applicable Operating and Maintenance Manuals and warranties.
6. An electronic copy of improvement plans with record drawing changes, in AutoCAD and PDF format.
7. All necessary easements and right-of-way dedications.
8. All fees shall be paid.

- B. ***Acceptance Notice.*** When the Contractor has completed construction to the satisfaction of the Engineer, and has submitted all required information necessary to obtain a successful final inspection, the Engineer will so notify the Applicant and will recommend acceptance of the improvements by the District Board of Directors

CHAPTER 2 CONSTRUCTION PLANS

2.1 PLANS REQUIRED

Complete plans and specifications for all proposed facilities, including any necessary dedications and easements, and an Engineer's Opinion of Probable Construction Cost of the improvements subject to HRCSD inspection shall be submitted to the Engineer for approval and must receive the required approval prior to the beginning of construction of any such improvements.

2.2 RESPONSIBILITY

Responsibility for the design of improvements is the sole obligation of the Applicant and EOR. Notwithstanding the requirements of these specifications, the Applicant/EOR shall comply with all Federal and State Laws, Local Ordinances or Resolutions, and generally accepted engineering practice. This responsibility shall apply even though errors, omissions or conflicts may have been overlooked in the review of the plans.

The District approval of the EOR's plans does not relieve the Applicant of this obligation.

2.3 STANDARD IMPROVEMENT PLAN FORMAT

Improvement plans shall be prepared in accordance with the following standard format:

- A. Plans shall be prepared on 24" x 36" sheets, properly scaled with North Arrows on all plan views.
- B. Lettering shall be Inked, clearly legible, and a minimum of 0.08" high. All text and drawing information shall be clearly legible when reduced to half-size.
- C. "Stickyback" adhesive line work shall not be allowed under any circumstances. PDF images used on drawings shall be clear and legible.
- D. Minimum scales used on the plans shall be:
 - 1"=40' for plan views
 - 1"=4' vertical for profile views.
- E. A composite utility plan shall be included for all Tract projects. For smaller projects such as Parcel Maps, the composite utility plan requirement may be waived by the Engineer.
- F. All rights-of-way and easements shall be shown on the plans.
- G. Existing topography shall be shown which indicates all pertinent topographic features which may affect the design. This shall include existing underground and overhead utilities.
- H. On the first sheet of the plans, the following shall be shown:

1. A vicinity map.
 2. HRCSD Standard notes.
 3. A signature block for each utility.
 4. A signature block for the HRCSD General Manager and District Engineer (provide a signature or initial block for the HRCSD General Manager and District Engineer on each sheet showing HRCSD utilities).
 5. A signature block for the County Fire Chief, where applicable.
 6. USA Notification (Dig Alert).
 7. Plans which exceed 2 sheets shall have a title sheet with a drawing index.
- I. Plan and Profile plan sheets shall be drawn to scale, and shall show all facilities to be constructed, and their relationship to existing and future facilities within the construction area. Plan and Profile sheets shall show all existing or proposed:
1. Sewer manholes, cleanouts, pipes, laterals, etc.
 2. Water valves, air releases, blow offs, fire hydrants, thrust block location and size, restrained joint interval and corresponding calculations, pipes, services, sampling stations etc.
 3. Storm drain system (County approval required).
 4. Public utilities.
 5. Street or surface improvements.
 6. Profile sheets shall show water, sewer and storm drain pipes to scale, and shall clearly show all utility crossings.
- J. The EOR shall sign and seal all sheets of the plans.

2.4 PLAN APPROVAL

Plans submitted to HRCSD for review shall include an approved reimbursement agreement for all HRCSD costs incurred during plan check process. Upon receipt of the executive agreement, HRCSD will review the plans for conformance to these Standards and District requirements. Prior to the start of Construction, the Applicant/EOR shall provide HRCSD with 3 copies of the improvement plans as approved by HRCSD.

HRCSD may require water and sewer modeling, capacity analyses, and other efforts deemed necessary to review plans and proposed projects. Costs for such services will be borne by the Applicant and included as part of the reimbursement agreement.

2.5 PLAN CHANGES

Any changes made to the plans after HRCSD approval shall be approved by the Engineer-of-Record and HRCSD by means of:

- A. Prior to award of contract to Contractor, by addendum with revisions clouded;
- B. After award of contract to Contractor, by written change order accompanied by drawing modifications noted as a revision with corresponding date(s) noted.

2.6 RECORD DRAWINGS

During the progress of the work, the EOR and Contractor shall maintain one set of prints of the improvement plans showing all constructed changes from the original approved plans. Each change shall be approved by the Engineer before being made. Upon completion of the work, the Applicant/EOR shall revise the original tracings of the improvement plans to reflect all construction changes. The Applicant/EOR shall submit check prints of the Record Drawings to the Engineer for review prior to requesting final inspection. After any required revisions are made and the District Engineer has approved the Drawings, the Applicant/EOR shall furnish the District with one reproducible Mylar set, two full-size bond copies, and the AutoCAD and PDF electronic files of the completed Drawings.

CHAPTER 3 SEWER IMPROVEMENTS

3.1 DESIGN STANDARDS

- A. **Design Flow.** Developer shall provide sewage flow calculations for approval by HRCSD and Engineer. Such flow calculations shall provide average flow expressed per equivalent dwelling unit (EDU). Peak flow shall be considered to be 2.5 times the average flow. Sewer pipes up to 12-inch diameter shall be sized to handle the peak flow when the pipe is flowing half full ($d/D=0.5$) and for 15 inch diameter sewers and larger, sized to handle peak flow when the pipe is flowing 3/4 full ($d/D=0.75$).
- B. **Grades.** Sanitary sewer grades shall be designed to provide a minimum velocity of 2 feet per second when flowing at peak flow. The following table indicates the slopes which will provide that velocity when flowing half full, and these shall be used as the minimum standard for design. Lesser slopes may be approved by the Engineer only when topography conditions preclude the use of these values.

MINIMUM SEWER GRADES	
Diameter	Slope in Feet/Foot Minimum Acceptable Slope
6"	.0050
8"	.0050
10"	.0025
12"	.0020
15"	.0015
18"	.0012
House Lateral	.0208

Unless special provisions for erosion protection have been provided, and approved by the Engineer, design velocities for sanitary sewers shall not exceed 10 feet per second. The maximum design discharge shall not exceed the flow at critical slope and velocity. Sanitary sewers should not be designed for flow conditions at critical slope and velocity.

3.2 LOCATION AND ALIGNMENT

All sewer facilities designed for operation or maintenance by HRCSD shall be constructed within a right of way dedicated for a public street or road, unless such location is deemed impractical by the Engineer. Any sewer facilities not constructed in a public right of way shall be constructed within a recorded easement dedicated to the District. Easements shall be a minimum of 20 feet wide, and shall be in a form acceptable to the District.

- A. **Access.** Access for maintenance shall be provided for all sewer facilities. At a minimum, this shall require an all-weather access road to each manhole and cleanout. All weather access roads shall be within a public right of way or dedicated easement.
- B. **Curved Sewers.** Whenever possible, sewer lines shall be straight from manhole to manhole. In special circumstances, and with approval from the Engineer, sewers may be curved horizontally in accordance with the manufacturer's recommendations for maximum joint deflection. Bending of the pipe shall not be allowed under any circumstances. When designing a curved sewer, the EOR shall include the manufacturer's name and recommended practice for joint deflection as a part of the construction documents. Sewers shall maintain uniform slope between sewer manholes at all times.

When a sewer main is deflected in a horizontal curve, the construction shall include a 12 gauge insulated tracer wire in the trench. The wire shall be terminated in a manner acceptable to the Engineer.

- C. **Separation from Water Mains.** All new sewer mains, force mains, house service laterals and appurtenant items shall be installed in conformance with standards for separation from water facilities described in Section 4.3 and as shown on the Standard Drawings.
- D. **Depth.** The normal design depth of a sanitary sewer system shall be such as to obtain a minimum cover of 36 inches for the house service lateral at the property line, and a minimum cover of 60 inches for sewer main, trunk, and interceptor sewer lines. Under certain topographic conditions lesser depths may be allowed by the Engineer on a case-by-case basis.

Sewer mains and laterals shall be designed so as to function by gravity flow from each lot without the need for an ejector pump. Exceptions may be granted by the Engineer on a case-by-case basis, when there is no other means of conveying sewage flows from the dwelling or structure.

3.3 PRE-TREATMENT

The State Water Resources Control Board (SWRCB) Sanitary Sewer System (SSS) Order No. 2006-0003-DWQ and WQ 2008-0002-EXEC require the HRCSD to prepare a Sewer System Management Plan (SSMP) conforming to these Orders, to prevent sewer system overflows (SSOs) in the sewer collection system. These SSMP requirements may warrant the need for the District to require pretreatment devices (interceptors, grease traps, monitoring manholes, etc.) to prevent the discharge of sand, oil, grease, or other deleterious substances from entering the sewer system. On a case-by-case basis, the HRCSD may require certain facilities such as restaurants or other facilities that may generate such substances, to provide such measures to prevent and minimize the discharge of fats, oils and grease (FOG) into the sewer collection system. In such cases, the District will require the Applicant/EOR to submit plans for the proper management of FOG, subject to the approval of the HRCSD and District Engineer.

3.4 GRAVITY SEWERS

Normally, all new gravity sewer lines and fittings shall be PVC pipe. In special circumstances, the Engineer may require that sewer pipe and fittings be Ductile Iron, particularly in the case of shallow bury conditions (less than 3 feet cover).

- A. ***PVC Sewer Lines.*** Polyvinyl Chloride (PVC) Sewer lines up to 15-inches in diameter shall conform to ASTM D-3034 (SDR 35). PVC pipe 18 to 36 inches shall conform to ASTM F-794 (Vylon).
 - 1. ***Joints.*** All pipe joints for PVC Sewer Lines shall be with elastomeric gaskets conforming to ASTM F-477. Wherever possible, PVC pipe shall have integral bell and spigots. Solvent weld joints and caulder type couplings shall not be used.
- B. ***DIP Sewer Lines.*** Ductile Iron (DIP) pipe and fittings for sewer mains shall conform to AWWA C-151, Class 350. Joints shall be an approved type mechanical joint. On a case-by-case basis, HRCSD may require special interior lining (Protecto 401 ceramic epoxy lining or equal) in lieu of cement mortar lining, for corrosive sewer applications. Exterior coating shall be as specified in Section 4.5.C.
- C. ***Sewer Main Size.*** The minimum size for a sewer main shall be 8 inches inside diameter unless otherwise approved by the Engineer.
- D. ***Connection to Existing Main.*** Whenever possible, the tie-in of a new sewer main or lateral to an existing sewer shall be the last phase of a new installation. A tie-in shall not be performed without notification to the HRCSD inspector. At the time of the tie-in, an inflatable plug shall be installed in the inlet of the nearest manhole upstream of the tie-in. If necessary to maintain service, the Contractor shall

provide temporary pumping facilities.

Connections (tie in) to existing sewer mains shall be constructed with the use of either a PVC double bell stop coupling (ring-tite), or a PVC adapter (ring-tite), depending on the type of pipe being connected to.

- E. **Repairs.** For new sewer construction, any damaged pipe shall be removed and replaced with new materials of current HRCSD standards, such that only new material in good condition and proper installation is provided. Replacement materials shall be of equal or better quality than the damaged materials being replaced. For existing HRCSD sewer mains, repairs to damaged sewer mains shall be completed with the use of a new section of PVC pipe, ½ inch shorter than the section removed and two PVC double bell couplings.
- F. **Trenching and Backfill.** Trenching and backfill for sewer main trenches shall be the same as for water mains (Section 4.6). Refer to Detail W-07 for other trench requirements, including warning tape and tracer wire.

3.5 SEWAGE PUMP STATIONS

Sewer systems shall be designed to avoid the need for sewage pump stations wherever possible. Whenever the design of a sewer system requires the design of a sewage pump station, the design shall be given special consideration by the Engineer. The Applicant/EOR shall submit a preliminary design report (PDR) including supporting calculations, for consideration prior to submitting completed design drawings.

- A. **Force Mains.** Sewer force mains shall be Class 200 (DR 21) PVC pipe conforming to AWWA C-900, and shall be a minimum diameter of 4 inches. To maintain cleansing velocities in the force main, the lift station pumps shall be sized to pump at a minimum of 100 gpm. Exceptions to this requirement may be allowed by the Engineer on a case by case basis. Construction and testing of the force main shall be in accordance with the requirements for water main construction, including warning tape and tracer wire requirements. Standard Dwg. W-09 shall be followed for adequate separation from potable water mains, and/or special construction requirements should separation criteria not be capable of being met due to existing utility constraints. Force mains shall be provided with minimum 4 feet of cover, top of pipe to finished grade/surface. Thrust restraint requirements in Section 4.5E shall apply to sewer force mains.

3.6 SEWER LATERALS

Separate service laterals shall be provided for each parcel of land. Homes (including secondary homes) or buildings under separate ownership, or occupied by separate tenants shall also be provided with separate laterals. Sewer laterals and cleanouts shall conform to the latest edition of the Uniform Plumbing Code, unless otherwise specified.

Exception: Guest houses (as defined by the County Building Code) shall not be required to have a separate lateral.

- A. **Maintenance.** In accordance with the adopted District code of ordinances, sewer laterals are owned and maintained by the Property Owner. This maintenance responsibility includes the entire lateral from the wye connection at the main to the house connection.
- B. **Size of Lateral.** The minimum size of sewer lateral to serve individual residences or commercial uses shall be 4 inches diameter. The actual size of sewer laterals larger than 4 inches shall be determined by fixture unit calculations in accordance with the current edition of the UPC. Upon request by the Engineer, the EOR shall supply fixture unit calculations for a proposed sewer service.
- C. **Large Laterals.** Laterals required to be larger than 4 inches based on fixture unit calculations (lateral flowing one half full) shall be connected to the sewer main at a manhole. All joints shall use elastomeric gasketed (ring-tite) joints.
- D. **Existing Sewer Main.** All sewer laterals connected to existing sewer mains shall be constructed in accordance with the Standard Drawings. When connecting to an existing sewer main, the main shall be saddled and tapped. Laterals shall be constructed in accordance with Drawing S-03. All joints shall use elastomeric gasketed (ring-tite) joints.
- E. **New Sewer Main and Lateral.** When a new main is being installed, all new laterals shall be installed at the same time. The new sewer laterals shall be connected to the main with a wye connection. Laterals shall be constructed in accordance with Drawing S-03. All joints shall use elastomeric gasketed (ring-tite) joints. New sewer laterals shall be per HRCSD Standard Drawing S-03, and minimum 4" diameter SDR 35 PVC pipe.
- F. **Sewer Lateral Clean-outs.** A one-way clean-out shall be installed at the property line.
- G. **Future Laterals.** On laterals left for future connection, the clean-out shall be plugged on the inlet side and a four-inch PVC riser shall extend to at least three inches above grade as shown on Standard Dwg. S-03.1. The riser shall be covered with a PVC cap. This riser may be lowered to grade once the building is occupied and/or the lateral is placed in service.
- H. **Curb Marking.** In areas with curbs, the location of sewer lateral shall be marked with an "S" on the face of the curb, as shown on Drawing S-03.1. For asphalt berms where no concrete sidewalk or curb is available, or in unsurfaced dirt areas, Contractor shall install tracer wire on the sewer lateral the entire length of the lateral.

- I. ***Sewer Lateral Testing and Inspection.*** All sewer laterals shall be inspected and approved by the District before sewer service will be provided. Up to the time of inspection, all work shall remain uncovered and convenient for the HRCSD's examination; Contractor shall be responsible for ensuring safe conditions and to safeguard the public from any open trenches. The inspection shall be made within two working days of receipt of the notice by the HRCSD Inspector. The new sewer lateral connection work shall be completed within sixty (60) calendar days of the date the application was received by the HRCSD; if connection work is not completed within this specified time frame, then the Applicant shall submit a new fee for such connection work that will be documented by the HRCSD by Customer Service Order.

New sewer laterals shall be tested in accordance with Section 3.10, Testing of Sewer Mains. No private sewer lateral shall be covered or put into use until it has been tested and approved as prescribed herein. The Contractor shall supply all equipment and materials to complete the test.

The Customer shall comply with the provisions of the San Luis Obispo County Code of Building Regulations, the San Luis Obispo County Plumbing Code and the HRCSD Code of Ordinances pertaining to the design and construction and use of private sewer lines. The Customer shall at all times keep such private laterals in good operating condition.

3.7 SEWER MANHOLES

Sewer manhole construction shall be watertight and shall conform to Drawing S-01.

- A. ***Ladders.*** Ladder rungs shall not be installed in manholes.
- B. ***Manhole Spacing.*** The normal maximum spacing for manholes on conventional straight-aligned sewers shall be 400'. A sewer on a curved alignment with a radius of less than 400' shall have manholes spaced at a maximum of 300' or adjusted to fit the individual case. The maximum spacing of manholes on trunk sewer lines shall be as follows:
- 6" to 10" diameter 400'
 - 12" to 24" diameter 500'
 - 27" to 36" diameter 600'
- C. ***Future Stub Outs.*** A stub out for future mains shall be installed where the main can be expected to be extended, particularly at intersections. Short stub outs shall be a minimum of 5 feet, and when approved by the Engineer, may be constructed without a clean out. Where a stub line on a sewer main exceeds 200 feet in length, a manhole shall be installed at the end. Where a stub line on a sewer main is less than 200 feet in length, a clean-out may be installed with District approval.

All stub-outs shall be capped/terminated in a manner approved by HRCSD.

- D. ***Manhole Elevations.*** Whenever a change in the size of the pipe, or an angle of 20 degrees or greater in alignment occurs, the flowline of the pipe flowing into the manhole shall be a minimum of 0.15 feet above the flowline of the pipe flowing from the manhole, or an amount necessary to match the inside crowns of the pipes, whichever is greater. The minimum elevation drop across each manhole shall be 0.1 feet, unless otherwise approved by HRCSD.
- E. ***Cast in Place Bases.*** Cast in place concrete manhole bases shall be constructed in accordance with Drawing S-01 and the following:
1. ***Straight runs.*** Where manholes are constructed on straight runs, the manholes may be constructed with the pipe laid through. The portion of the pipe within the manhole shall be cut out and removed once the manhole base is cured.
 2. ***Waterstops.*** PVC adaptor rings (waterstops) shall be installed on all PVC pipe within manholes. If the pipe is laid through, these gaskets shall be protected until the manhole base is poured.
- F. ***Precast Manhole Base.*** When approved by the Engineer, a precast manhole base may be used for sewer manholes. Precast manhole bases shall be constructed in accordance with Drawing S-01.
- G. ***Drop Manholes.*** The need for the construction of drop manholes should be avoided, whenever possible, by the adjustment of sewer pipe gradients during design. When avoidance is not possible, the District may allow, on a case-by-case basis, a standard drop manhole to be constructed in conformance with the County of San Luis Obispo Standard Drawings, Drawing S-1a or as otherwise approved by the District.
- H. ***Connection to Existing Manholes.*** Connections to existing manholes shall be made by coring the manhole. The core shall be of the proper size to allow the use of a flexible pipe-to-manhole connector. The flexible connector shall be manufactured by Kor-N-Seal or approved equal. A flow channel shall be provided within the existing manhole and shall be shaped to provide a smooth flow condition.

The Contractor shall provide at least a two working day notice to HRCSD and the District Engineer prior to any connection to existing manholes.

3.8 LAYING SEWER PIPE

- A. **Verification of Grades.** Sewer pipe shall be constructed to the lines and grades shown on the approved plans. Each pipe length shall be checked to verify the grade line.
- B. **Handling.** Sewer pipe shall be handled with care to avoid damage. The interior and machined ends of the pipe and fittings shall be kept free of dirt and foreign matter at all times. Pipe or fittings which have been damaged in such a way that they cannot be repaired to the Engineer's satisfaction shall be replaced at the Contractor's expense.
- C. **Placement.** Sewer pipe shall be laid continuously upgrade with the bell of the pipe facing forward (upstream). Each length of pipe shall be laid on a firm bed and shall have a true bearing for the entire length, except for coupling holes. Prior to lowering the pipe in the trench, coupling holes shall be dug of sufficient size to allow assembly and provide a 2 inch minimum clearance around the coupling.
- D. **Joining.** Both bell and spigot shall be clean before the joint is made, and care shall be taken that nothing but the joint-making material enters the joints. Sewer pipe shall not be deflected horizontally at joints more than 50% of the manufacturers' recommended maximum joint deflection.
- E. **Temporary Plug.** Whenever pipe laying is not in progress, the open ends of the pipe shall be closed by an appropriate means to prevent the entry of trench water or other foreign matter into the pipe.
- F. **Wet Conditions.** Whenever water is present in the trench, enough backfill shall be placed over the pipe to prevent floating. Any pipe that has floated shall be removed and relaid as directed by the Engineer. No pipe shall be laid in wet trench conditions that preclude proper bedding, or when in the opinion of the Engineer, the trench conditions or the weather are unsuitable for proper installation.

3.9 DISCHARGE INTO SEWERS

Except for potable water used for testing or cleaning, nothing shall be discharged into the HRCSD sewer system until all of the requirements for new work have been met. Special care shall be taken to prevent entry of surface run-off into the sewer laterals, manholes, exposed ends of pipe, and any other potential point of entry.

- A. **Flushing Water Lines.** At no time shall chlorinated water used for flushing newly constructed water mains be discharged into the HRCSD sewer system. Dechlorinated water may be discharged to the sewer, with advanced approval by the District.

TESTING OF SEWER MAINS

Prior to acceptance by HRCSD, newly constructed sewer mains shall be tested for leakage by a low pressure air test, and deflection by a mandrel test. In addition, the sewer shall be inspected by video.

- A. ***Sewer Cleaning.*** Prior to video inspection, and after leakage testing, new sewer shall be cleaned by hydro-jetting and vacuuming the sewer line.
- B. ***Leakage Testing.*** The leakage test shall be performed by the Contractor under the observation of a HRCSD inspector. The inspector shall be provided at least two working day notice prior to the test. The leakage test shall be performed by a low pressure air test as follows:

The Contractor shall furnish all labor, air test equipment, and all other materials for making the required air test at his own expense.

After the sewer lines have been properly backfilled to a depth where additional backfilling will not disturb the position of the pipe, all or any sections that the Engineer may select may be tested. In no case shall the required minimum backfill be less than four feet above the top of the pipe before subjecting the line to the test.

Each section of sanitary sewer between two successive manholes shall be tested by plugging all pipe outlets with suitable test plugs. Air shall be slowly added until the internal pressure is raised to 4.0 pounds per square inch (psi).

The compressor used to add air to the pipe shall have a blow-off valve set at 5 psi to assure that the internal pressure of the pipe does not exceed 5 psi.

The internal pressure of 4 psi shall be maintained for at least two minutes to allow the air temperature to stabilize after which the air supply shall be disconnected and the pressure allowed to decrease to 3.5 psi. The time in minutes that is required for the internal air pressure to drop from 3.5 psi to 2.5 psi shall be measured and the results compared with the values tabulate below.

If the pressure drop from 3.5 psig to 2.5 psig occurs in less time than the above tabulated or calculated values, the pipe shall be repaired and, if necessary, replaced and re-laid at the Contractor's expense until the joints and pipe hold air pressure satisfactorily under this test.

SEWER PIPE PRESSURE TEST	
Pipe Diameter Inches	Minimum time (minutes) for pressure to drop from 3.5 psi to 2.5 psi, per 100 feet of pipe:
4	0.3
6	0.7
8	1.2
10	1.5
12	1.8
15	2.1
18	2.4
21	3.0
24	3.6

C. ***Deflection Test.*** Mandrel test (deflection test) shall be performed by the Contractor in order to verify the roundness and proper backfilling/installation of the pipeline.

1. ***Mandrel type.*** Mandrels shall be approved by the Engineer prior to use and shall meet the following requirements:
 - (a) When requested, the Contractor shall make the mandrels available to the Engineer for verification of size and suitability.
 - (b) Mandrels shall be sized to indicate a maximum allowable 7% deflection, and shall be the nine-fin type.

2. ***Test procedure.*** The deflection test shall consist of testing pipe for proper installation as follows:

After the pipeline has been installed and backfill materials have been compacted to their required standard densities, the mandrel shall be pulled by hand through the pipeline with a suitable rope or cable that is connected to an eyebolt at one end of the gauge.

A similar rope or cable shall be attached to the eyebolt at the opposite end of the mandrel and tension shall be applied to it. This will ensure that the

mandrel maintains its correct position during testing and also to remove the mandrel if it should become lodged in an excessively deflected pipeline. Winching or other means of forcing the mandrel through the pipeline are unacceptable. After completion of the mandrel test, Contractor shall clean the tested sewer reach by hydro-jetting and vacuuming. This cleaning shall be performed prior to the video inspection.

- D. ***Video Inspection.*** Prior to acceptance by HRCSD, newly constructed sewer mains shall be video inspected. The video inspection shall be made on a new, high quality digital video in color and have a continuous display of date, time, and footage. The digital video inspection shall document the main being inspected (i.e. street and reach), existence of and lateral locations of wyes, laterals, manholes, and any unusual features such as misaligned joints, breaks, infiltration, standing water and the like.

Video inspection shall be performed prior to acceptance but after the main is completely installed, the trench is backfilled and compacted, and the main has been balled and flushed. Any section of main that is replaced or altered after the video inspection shall be re-inspected by video upon completion.

1. ***Acceptance.*** In general, sewer mains shall be constructed to a continuous grade, and the video shall indicate this by showing an absence of ponded water. In unusual circumstances, the Engineer may accept a sewer main when the video indicates isolated instances of ponding up to 1/4 inch deep, extending for no more than 10 feet.

In no case will a sewer main be accepted which ponds in excess of this amount, or which otherwise is constructed to a non-uniform grade, in the opinion of the Engineer.

2. ***Submittal.*** Electronic copies of the video inspections along with a written log containing all of the features and distances shall be submitted to HRCSD for review. The video and written log shall become property of HRCSD upon submittal.

CHAPTER 4 WATER IMPROVEMENTS

4.1 DESIGN STANDARDS

The distribution system, wherever possible, shall be laid out in a grid system with no dead ends. Where dead ends cannot be avoided the dead end main shall be constructed with a fire hydrant assembly or blow-off, refer to Section 4.5.

- A. ***Design Flow.*** The distribution system shall be designed to provide for the maximum required fire flow, concurrent with the maximum day demand. Fire flow shall be as shown in the current HRCSD Water Master Plan, or as designated by SLO County Fire, whichever is greater. Minimum supply requirements shall be 1,000 gpm at 20 psi residual pressure (during fire flow conditions). Maximum day demand factors shall be as designated in the HRCSD Water Master Plan for the months of July-August. All water system criteria and demands will be confirmed and approved by the Engineer as part of the plan check process.

- B. ***Design Pressure.*** The distribution system shall be designed to provide minimum residual pressure during a fire, of 20 psi, and minimum water service pressure of 40 psi (meeting State Division of Drinking Water standards) anywhere in the distribution system. These pressures shall be obtained with the HRCSD storage tanks at ½ full. In special cases where the proposed building pad elevation is such that the minimum 40 psi pressure cannot reasonably be achieved, the Engineer will consider on a case-by-case basis, the use of individual booster pumps to serve an individual customer (Such individual booster pump will be the responsibility of the Property Owner to operate and maintain) or creation of a separate boosted water pressure zone at the expense of the Applicant. Where system pressures exceed 80 psi, Applicant may be required to create a separate pressure zone separated with a pressure reducing valve (PRV) to maintain pressure at or below 80 psi. On a case-by-case basis, individual PRVs to homes may be allowed in lieu of creation of new pressure zone, at the discretion of HRCSD.

- C. ***Design Velocity.*** The system shall be designed, where possible, with a maximum velocity of 10 feet per second under maximum day demand plus fire demand conditions. Where the maximum velocity exceeds 10 fps, when warranted, the Engineer may require the preparation of surge calculations demonstrating that allowable pipe pressures will not be exceeded under surge conditions, and/or the provision for surge relief improvements such as pressure relief valves or other devices to control and prevent water system damage from excessive surge pressures.

- D. **Planned System.** Water Distribution System improvements shall be designed to show the planned buildout of the area. Facilities shown on future improvement in the HRCSD Water Master Plan shall be considered as minimum size improvements for this purpose.

In general, the size of new water mains shall be 8-inch minimum. With prior approval of the Engineer, smaller mains may be used, for instance, for short (400 ft) dead end lines not serving a fire hydrant.

4.2 LOCATION AND ALIGNMENT

All water facilities designed for operation and maintenance by HRCSD shall be constructed within a right of way dedicated for a public street or road, unless such location is deemed impractical by the Engineer. Any water facilities not constructed in a public right of way shall be constructed within a recorded easement dedicated to the District. Easements shall be a minimum of 20 feet wide, and shall be in a form acceptable to the District.

- A. **Access.** Access for maintenance shall be provided for all water facilities. At a minimum, this shall require an all-weather access road to each fire hydrant and valve. All weather access roads shall be within public rights of way or dedicated easements.
- B. **Alignment Transitions.** Water mains may transition horizontally and vertically by use of standard fittings, joint deflection (no bending of pipe shall be allowed), and approved pipe couplings. Joint deflection shall not exceed more than 50% of manufacturers' recommendations. When designing such water mains, the EOR shall include the manufacturers' name and recommended maximum joint deflection as a part of the construction documents.
- C. **Depth.** Except as noted on the improvement plans, water mains shall be set at a profile which provides at least three feet of cover over the top of the pipe. Depths shallower than three feet of cover will be considered and approved on a case-by-case basis. It shall be the EOR's responsibility to design and propose pipe concrete encasement when minimum depth of cover cannot be achieved, subject to approval by the Engineer. When pipe cover is shallow, Class 350 ductile iron pipe shall be used in lieu of C900 PVC pipe.
- D. **Valving.** The distribution system shall be equipped with a sufficient number of valves so that no single shut down will result in a removal from service of a length of main greater than 500 feet in commercial or residential areas; 800 feet when the area is zoned for 1 acre or larger lots. Valves shall be provided where required by the Engineer for system isolation and general water system operations.

All water main intersections (crosses or tees) shall have a valve on each run. Engineer may grant exceptions to this where a new valve on a run may be redundant to an already existing valve on the water main.

- E. ***Fire Hydrant Locations.*** Where possible, fire hydrants shall be placed at street intersection at intervals not exceeding 300 feet in commercial or industrial areas and 400 feet in other areas. The location of the hydrants shall be approved by SLO County Fire, and HRCSD. Fire hydrants shall be constructed in accordance with Drawing W-01, also shall be located in accordance with Drawing W-02, including the requirement for blue retroreflective markers in the roadway to delineate hydrant locations during night-time hours, and providing vehicle impact protection (bollards) where warranted. Protective bollards shall meet the requirements of California Fire Code, Section 312 Vehicle Impact Protection, which have been incorporated into Drawing W-02.

4.3 SEPARATION FROM SEWER OR STORM DRAIN

All new water mains, house services and appurtenant items shall be installed in conformance with the State of California Division of Drinking Water (DDW, formerly Department of Health Services) requirements for separation and special construction. Additionally, all new sewer and water installation shall conform to Standard Drawings.

A. Special Construction in Areas of Conflict Between Water and Sewer Lines

1. *Notes and Definitions.*

- (a) Health Agency - The Division of Drinking Water.
- (b) Water Supplier - "Person operating a public water system" or "supplier of water" means any person who owns or operates a public water system.
- (c) Low Head Water Main - Any water main which has a pressure of five psi or less at any time at any point in the main.
- (d) Compression Joint - A push-on joint that seals by means of compression or a rubber ring or gasket between the pipe and a bell or coupling.
- (e) Mechanical Joints - Bolted joints.
- (f) 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.
- (g) Fused Joint - The jointing of sections of pipe using thermal or chemical bonding processes.
- (h) Sleeve - A protective tube of steel with a wall thickness of not less than 1/4-inch into which pipe is inserted.
- (i) Ground Water - Subsurface water found in the saturation zone.

- (j) House Lateral - A sewer connecting the building drain and the main sewer line.

B. **Basic Separation Standards.** The “California Waterworks Standards” sets forth the minimum separation requirements between water mains and sewer lines. These Standards, contained in Section 64630, Title 22, California Administrative Code, specify:

1. **Parallel Construction.** Parallel construction is the horizontal distance between pressure water and sewer lines shall be at least 10 feet, and between pressure water main and storm drain the horizontal separation shall be 4 feet.
2. **Perpendicular Construction (Crossing).** Pressure water mains shall be at least one foot above sanitary sewer and storm drain lines where these lines must cross.
 - (a) Separation distances shall be measured from the nearest edges of the utilities.
 - (b) Common Trench: Water mains and sewer lines must not be installed in the same trench.

When water mains and sanitary sewers or storm drains are not adequately separated, the potential for contamination of the water supply increases. Therefore, when adequate physical separation cannot be obtained, an increase in the factor of safety shall be provided by increasing the structural integrity of both the pipe materials and joints. Such special construction standards are shown on Drawing W-08 and W-09.

C. **Exceptions to Basic Separation Standards.** Local conditions, such as available space, limited slope, existing structures, etc., may create a situation where there is no alternative but to install water mains or sewer lines at a distance less than that required by the Basic Separation Standards. In such cases, alternative construction criteria as specified below should be followed, subject to the special provisions. The DDW has also issued supplemental guidance for sanitary separation between potable water mains and non-potable water mains such as recycled water or raw water pipelines. Engineer will consider on a case-by-case basis, exceptions to the basic separation standards if such conditions arise. A copy of the DDW Guidance Memorandum, dated October 16, 2003, is included as Appendix A to these specifications. As of the date of issuance of these HRCSD standards, the Engineer has confirmed that the 2003 Guidance Memorandum is still valid and that DDW has not issued updated separation criteria since the date of the 2003 Guidance Memorandum.

Installations of water mains and sewer lines 24 inches diameter or larger should be reviewed and approved by the health agency prior to construction.

D. ***Special Provisions.***

1. The Basic Separation Standards are applicable under normal conditions for sewerage collection lines and water distribution mains. More stringent requirements may be necessary if conditions, such as high groundwater, exist.
2. Sewer lines shall not be installed within 25 feet horizontally of a low head (5 psi or less) water main.

E. ***Alternate Criteria for Construction.*** The construction criteria for sewer lines or water mains where the Basic Separation Standards cannot be met are shown in Drawings W-9 and W-10. There are two situations encountered:

Case 1--New sewer line--new existing water main.

Case 2--New water main--existing sewer line.

For Case 1, the alternate construction criteria apply to the sewer line.

For Case 2, the alternate construction criteria apply to either or both the water main and sewer line.

The construction criteria also apply to the sewer laterals that cross above a pressure water main but not to those sewer laterals that cross below a pressure water main.

4.4 CROSS CONNECTIONS

A. ***Backflow Prevention.*** Backflow prevention devices shall be installed on all service connections determined by the Engineer to pose a potential threat to the health and safety of the HRCSD water system. At a minimum the following services connections shall require backflow prevention.

1. All landscape irrigation services, unless otherwise approved by District
2. Medical and health care facilities
3. Areas served by private wells
4. Restaurants and other food preparation facilities
5. Private fire protection lines
6. Laboratories
7. Commercial and Industrial facilities.

B. ***Backflow Device.*** The type of backflow device shall be in accordance with the California DDW regulations relating to cross-connections (California Administrative Code - Title 17 - Article 2,7604). The type of device and the method of installation shall also be subject to review and approval of the County

Environmental Health Department.

- C. **Location of Backflow Devices.** Backflow devices shall be constructed according to Drawings W-14 and W-15. Backflow devices shall be located as close as practical to the point of connection, and on the "customer side" or on private property. In addition, backflow devices shall be located in accordance with Section 7603, Article 2 of the California Administrative Code, Title 17.
- D. **Ownership and Maintenance.** Ownership and maintenance of backflow preventers shall remain with the property owner/customer and not with HRCSD. Customer shall be responsible for retaining the services of a qualified backflow tester, to comply with annual backflow device testing and reporting. Customer shall be responsible for ensuring required annual testing results and paperwork is filed with the County each year. Failure to do so may result in temporary shutoff of water service until such time Customer complies with this requirement.

4.5 WATER MAIN

All new buried water mains shall be Polyvinyl chloride (PVC) C900 pipe, except that where required by the Engineer, new water main shall be ductile iron pipe (DIP). All above ground water main shall be DIP. If requested by the Engineer, the supplier shall furnish a certificate that all pipe, valves, fittings, protective coatings, and all other materials meet the requirements of these Standards. The minimum size of new water main shall be 8 inches diameter, except that on a short (400 ft) dead end not serving a fire hydrant, the minimum shall be 6 inches. All dead-end mains shall be provided with a standard blow-off, hydrant or other acceptable means of flushing, at the discretion of the HRCSD.

- A. **PVC Water Main.** PVC water pipes shall be a minimum of Class 160 (DR 26) and shall conform to AWWA C-900.
- B. **Joints.** Wherever possible, PVC pipes shall have integral bell and spigots. All PVC pipe joints shall have elastomeric gaskets conforming to ASTM F477. Solvent cement joints shall not be used.
- C. **DIP Water Main.** Buried DIP shall be coated with standard bituminous coal tar coating of 1 mil thick and polyethylene encased, and cement mortar lined in accordance with AWWA C-104 and C-151. Joints shall be approved mechanical joints.
 - 1. Above ground DIP shall be thickness class 350 minimum, shall be cement mortar lined, shall have flanged joints, and shall conform to AWWA C-104, and C-151. Above ground pipe and fittings shall be coated with standard asphaltic coating as specified above, or epoxy painted blue, at the direction of the Engineer. If painting of DIP is specified, such pipe shall

be ordered/delivered without the standard asphaltic coating, and factory-coated (epoxy) prior to shipping.

- D. ***Fittings for Water Main.*** Bends, elbows, tees, crosses, and special fittings shall be cast iron or ductile iron conforming to AWWA C-110, or compact ductile iron fittings per C-153, or approved equal. Eccentric reducers shall be installed when required to minimize air pockets.
1. Fittings shall be cement mortar lined in accordance with AWWA C-104. Fittings lined in the field will not be considered as conforming to AWWA C-104 and will not be accepted.
 2. The outside of cast iron fittings for general use shall have a bituminous coating of coal tar approximately 1 mil thick, unless otherwise specified, and shall be wrapped in polyethylene per AWWA C105 unless otherwise specified. The finishing coat shall be continuous and smooth. It shall be neither brittle when cold nor sticky when exposed to the sun, and shall adhere strongly to the pipe.
 3. Special coatings and/or tape wrap for buried fittings and flanges may be required by the District Engineer on a case-by-case basis. Contractor and/or Applicant shall receive such approval on the plans and/or specifications prior to commencement of construction.
- E. ***Tracer Wire.*** Twelve gauge insulated copper tracer wire shall be laid in the trench above the pipe and branched to all water service laterals, fire hydrants, air relief valves and blowoffs. The tracer wire shall be brought to finish grade through all meter boxes and valve access boxes. At fire hydrants, the tracer wire shall be brought to six inches above finish grade and secured to the hydrant bolt flange.
- F. ***Thrust Restraint.*** Thrust restraint shall be accomplished through the use of thrust blocks or restrained joints. Thrust blocks shall be constructed at all pipe bends greater than 5 degrees, at tees, at valves, at dead ends, and at other locations where there is the potential for thrust. Thrust block sizing shall conform to Standard Drawing W-16. Concrete for thrust blocks shall conform to State Standard Class A (5-1/2-sack) minimum. Vertical thrust restraint shall be accomplished by restrained joints of adequate length to counter-act the thrust force; Engineer may also approve gravity thrust blocks in lieu of restrained joints. If restrained joints are used, thrust blocks shall still be required at all horizontal and vertical fittings of 22-1/2 degrees and greater. With prior approval of the Engineer, alternate thrust restraints to thrust blocks may be provided. At a minimum, EOR shall submit restrained joint calculations for review and approval by Engineer, that supports the design plans and thrust restraint proposed.

Before any thrust block is poured against a waterline or fitting, the fitting shall be wrapped in polyethylene plastic sheets. No concrete shall be poured against bare pipe or fittings.

Regardless of type of thrust restraint used, at all pipe dead ends, thrust blocks shall be required. This includes at future tie-in points at crosses and tees.

4.6 TRENCHING AND BACKFILL

- A. **Safety.** All trenching and backfill shall comply with Section 1.5 regarding safety precautions.
- B. **Trench Excavation.** Unless otherwise specified, the excavation for water pipe shall be an open trench, excavated to 6 inches below the bottom of the pipe. This undercutting shall be refilled with suitable bedding material as described in these Specifications.
- C. **Existing Paving.** When the trench is in an existing paved area, the pavement shall be sawcut and removed ahead of the trenching operations. Grinding will be considered an acceptable alternative method of removal provided that a clean sawcut pavement edge shall be provided prior to final paving. The proper tools and equipment shall be used in marking and breaking so that the pavement will be cut accurately on neat and parallel lines. When the trench is in an existing paved area, HROA/County requirements for removal and restoration of the paving shall be followed. When in the opinion of the Engineer the remaining paving has been damaged during construction, additional pavement restoration may be required, as required by the Engineer, at no additional cost to HRCSD.
- D. **Unsuitable Material.** Whenever the bottom of the trench is soft, yielding, or unsuitable as a foundation for the pipe, the unsuitable material shall be removed to a depth determined by the Engineer, and replaced with compacted bedding material. It is the intention of these specifications, that a firm uniform bedding be provided for the pipe.
- E. **Dewatering.** When water is encountered, the trench shall be kept dewatered until the laying and jointing of the pipe, and placing of the bedding material has been completed, inspected, and approved. The groundwater removed from the trench shall be disposed of in such a manner that it will not cause any damage to public or private property, and that it will not be a menace or inconvenience to the public or the environment.
- F. **Bedding.** Bedding material, approved by the Engineer and meeting the minimum standards listed below, shall be deposited and compacted to 90% relative compaction in the trench. The compacted bedding material shall extend to a minimum of 6 inches below and to the sides of the pipe, and 12 inches above the

top of the pipe in conformance with standard drawing W-7. Bedding material shall be non plastic sand meeting the following specifications:

TRENCH BEDDING MATERIAL	
Sieve Size	Percentage Passing Sieve
1/2 inch	100
No. 4	80 - 100
No. 200	0 - 15
Sand Equivalent	20

- G. **Subsequent Backfill.** All trenches shall be backfilled to the full width of the trench, after pipe, fittings, appurtenances and bedding material have been installed, and before the required pressure and leakage tests are performed. The backfill under and around the pipe shall be thoroughly consolidated before any additional material is placed.

Subject to the provisions herein, and where deemed acceptable by a qualified Soils Engineer and supporting Soils Report, native material or material from the project excavations may be used as backfill, provided that all organic material, rubbish, debris, and other objectionable material are first removed. Broken concrete and pavement from the project excavations will be subject to the same limitations as rocks.

Rocks larger than 3 inches in any dimension will not be permitted in backfill placed between 1 foot above the top of the pipe and 12 inches below pavement subgrade. Where rocks are included in the backfill, they shall be mixed with suitable excavated materials so as to eliminate voids.

Controlled low strength material (CLSM) or sand cement slurry backfill may be required under certain conditions, such as beneath areas of utility congestion where conventional backfill and compaction is difficult. Such requirement will be at the discretion of the Engineer on a case-by-case basis.

- H. **Compaction.** Compaction shall be as shown on the plans and Standard Drawings. Compaction methods must be carried out so no damage or displacement of the pipe results.

Any trenches improperly backfilled, or where settlement occurs, shall be reopened to the depth required for proper compaction, then refilled and compacted, with the surface restored to the required grade and compacted and smoothed off.

- I. ***Pavement Replacement.*** Replacement of roadway paving shall be in conformance with Heritage Ranch Owners Association specifications. However, for County roadways, the pavement replacement shall meet County requirements. In addition, roadway replacement shall meet the following minimum standards:

Paving replacement shall not proceed until the all backfilling and compaction requirements have been met.

The replacement of roadway structural section over all cuts in existing bituminous pavement shall be 6 inches minimum of Class 2 aggregate base and 3 inches minimum of Type B asphalt concrete. However, in no case shall the structural section be less than the existing adjacent pavement section.

1. ***Temporary Surfacing.*** Until the permanent pavement is placed, the material at the surface of the trench shall be maintained at all times at a grade level with the street, suitable for the safe passage of traffic. Temporary surfacing shall be cold patch asphalt unless otherwise approved by the Engineer. When ready for resurfacing, the upper portion of the trench shall be excavated to a depth sufficient for installation of the required structural section.

In any case where a trench is cut across a main thoroughfare, or if noted on the drawings, a temporary asphalt plant-mix-cutback surface shall be placed immediately after the backfill has been completed and removed just prior to placing the permanent surfacing material.

2. Aggregate base shall be placed, compacted and graded. Edges of the existing asphalt concrete shall be trimmed to provide a neat and straight vertical joint. The joint face shall then be cleaned and tacked with asphaltic emulsion. Type B asphalt concrete shall be placed in accordance with Section 39 of the State Standard Specifications.

- J. ***Asphaltic Emulsion (Paint Binder).*** Asphaltic emulsion shall be applied to the pavement edges, free of loose material, in accordance with the provisions of Section 94 of the State Standard Specifications.

Asphaltic emulsion shall be Type SS-1h and shall be applied as directed by the Engineer.

- K. ***Asphaltic Concrete.*** Asphaltic concrete shall be type B and shall conform to the provisions in Section 39 of the State Standard Specifications, and the following:

1. The amount of asphalt binder to be mixed with the aggregate shall be between 6.1 percent and 6.2 percent by weight of the dry aggregate as determined by the Engineer.

2. Spreading and compacting shall be performed by methods that will produce surfaces of uniform smoothness, texture, and density.
- L. **Restoration.** All restoration and cleanup work shall follow closely the completed trench paving operation. All traffic striping and markings, including hydrant reflectors and other delineators, shall be restored to pre-construction condition or better.

4.7 LAYING WATER PIPE

- A. **Lines and Grades.** Water pipe shall be laid to the lines and grades shown on the approved plans.
- B. **Handling.** Water pipe shall be handled with care to avoid damage. The interior and machined ends of the pipe and fittings shall be kept free of dirt and foreign matter at all times. Pipe stored overnight shall remain covered in tarps or plastic, or ends of pipe shall be plugged to minimize entry of foreign matter and animals/vermin. Pipe or fittings which have been damaged in such a way that they cannot be repaired to the Engineer's satisfaction shall be replaced at the Contractor's expense.
- C. **Placement.** Each length of pipe shall be laid on a firm bed and shall have a true bearing for the entire length, except for coupling holes. Prior to lowering the pipe in the trench, coupling holes shall be dug of sufficient size to allow assembly and provide a 2-inch minimum clearance around the coupling.
- D. **Joining.** Both bell and spigot shall be clean before the joint is made, and care shall be taken that nothing but the joint-making material enters the joints. Water pipe shall not be deflected either vertically or horizontally, more than the manufacturers' recommendation.
- E. **Temporary Plug.** Whenever pipe laying is not in progress, the open ends of the pipe shall be closed by an appropriate means to prevent the entry of trench water, other foreign matter and animals/vermin into the pipe.
- F. **Wet Conditions.** Whenever water is present in the trench, enough backfill shall be placed over the pipe to prevent floating. Any pipe that has floated shall be removed and relaid as directed by the Engineer. No pipe shall be laid in wet trench conditions that preclude proper bedding, or when in the opinion of the Engineer, the trench conditions or the weather are unsuitable for proper installation.

4.8 VALVES

All water valves shall be epoxy lined, resilient seated gate valves conforming to AWWA C-509 and these specifications. Valves 6 inch through 16 inches shall be Mueller, Clow,

or approved equal. Valves larger than 16-inch shall be butterfly valves as approved by HRCSD. Valve installations shall conform to Standard Drawing W-03. Concrete valve anchors shall be required for all in-line valves as shown on the Standard Drawing. All fittings shall be wrapped in plastic to protect bolts from being covered in concrete.

4.9 FIRE HYDRANT ASSEMBLIES

Fire Hydrants shall be approved by SLO County Fire and HRCSD, and shall be of the wet-barrel type unless otherwise specified. The main body, shall be painted safety yellow. Fire hydrant installations shall conform to Standard Drawing W-01 and W-02, including providing blue reflector in street delineating location of hydrant.

4.10 BLOW-OFFS

Water line blow-offs shall be installed at all dead ends, at low points, or other places where sediments may collect, and where required by the Engineer. Where possible, fire hydrants shall be used as blow-offs. Blow-off assembly installations shall conform to Standard Drawing W-15.

4.11 AIR AND VACUUM RELEASE VALVES

Unless otherwise specified, all air release valves shall be combination air and vacuum release valves, to expel air pockets that may form, and to allow introduction of air when internal pipe pressures create pressure conditions below atmospheric pressure. Air and vacuum release valves (air/vacs) shall be installed at high points and where air pockets may form, and at locations required by the Engineer. Air/vac installations shall conform to Standard Drawing W-10.

4.12 SAMPLING STATIONS

Sampling stations shall be installed at locations specified by HRCSD. Sampling stations shall comply with County Department of Public Works Standard W-07, unless otherwise specified by HRCSD. At a minimum, the following shall apply:

1. Provide a minimum of one sampling station in each discrete pressure zone.
2. Sampling stations shall be located a minimum of 100 feet from a fire hydrant.
3. Sampling stations shall not be placed past the last service connection on a dead-end main.
4. If a system has more than one service loop, there shall be at least one sampling station in each service loop.

4.13 WATER SERVICES

Separate water service laterals shall be provided for each parcel of land, unless otherwise approved by HRCSD. Multiple service laterals to an individual parcel may be approved

by HRCSD on a case-by-case basis. Homes (including secondary homes) or buildings under separate ownership or occupied by separate tenants shall also be provided with separate service connections. Exception: Guest houses (as defined by the County Building Code) shall not be required to have a separate service lateral.

Water service connections shall conform to Standard Drawing W-04, W-05 and W-06.

- A. ***Size of Meter and Service.*** The size of the water meter and service shall conform to the District's policies. Minimum water service size shall be 1" unless otherwise approved by the Engineer. The HRCSD's approved rate structure and policies define appropriate capital charges for service based on actual meter size required, for those services less than 1" size.
- B. ***Connection to Existing Main (Tie-in).*** HRCSD and affected customers shall be given written notice a minimum of at least 3 working days prior to any prepared shut down. HRCSD will perform all water main shutdowns. Scheduling of shutdown times will be at the discretion of HRCSD. Prior to any shutdown for a tie-in the following must be performed:
 - 1. All encroachment permits and rights-of-entry must be obtained;
 - 2. 3 working days prior notice shall be given to HRCSD and the affected customers;
 - 3. All necessary materials must be on-site and fully assembled;
 - 4. The point of tie-in shall be fully exposed.
- C. ***New Water Main.*** When a new water main is being installed, all new water services shall be installed at the same time.

4.14 TESTING

All new water system installations shall be tested for leakage and disinfection. The Contractor shall provide at least two working day notice to HRCSD prior to performing any tests.

- A. ***Pressure (Leakage) Test.*** The Contractor shall perform a pressure test, which shall be observed by the Engineer. The test shall be performed as follows:
 - 1. A pressure test will only be made after all backfilling is completed, and not before all concrete thrust blocks have reached full strength.
 - 2. The test pressure will be equal to the pressure class of the pipe, plus 50 psi (at the lowest point in the reach of water pipe to be tested), unless otherwise approved by the Engineer. The duration of the test will be 2 hours unless specified otherwise by the Engineer.

3. The water system shall first be slowly filled with water and all air expelled. All valves controlling the section shall be closed and allowed to set for at least 24 hours.
4. The pipe shall be raised to test pressure by a method acceptable to the Engineer. All pressure gauges shall be acceptable to the Engineer.
5. During the test, all air shall be expelled from the piping. If necessary, a temporary service saddle shall be installed to permit air to escape. After the testing is completed this saddle shall be plugged and backfilled. The Contractor shall also install all such temporary valves as necessary for isolating the test section.
6. Any cracked or defective pipe, fittings, valves or hydrants discovered during the test shall be removed and replaced with sound material and the test repeated until the system is proved satisfactory.
7. The allowable leakage in the test section shall not exceed the following rates:

WATER SYSTEM LEAKAGE TEST		
Allowable leakage (gph) per 1000 feet of pipe or 50 joints:		
Pipe Size, Inches	160 psi	210 psi
4	0.33	0.41
6	0.50	0.61
8	0.66	0.81
10	0.83	1.02
12	0.99	1.22

8. After completion of the pressure testing, the mains, hydrants, blow-offs, and service connections shall be flushed until the water is free of all pipe lubricant, foreign material, and excess chlorine.
- B. **Disinfection.** New water mains shall be disinfected in accordance with AWWA C-651 using the HTH tablet (calcium hypochlorite) method; except that the initial dosage shall be 50 mg/L with a residual of at least 10 mg/L after a 24-hour period. Disinfection of the main shall be performed in conjunction with the pressure testing.

Following successful pressure testing and disinfection, bacteriological testing and standard plate counts shall be performed by HRCSD personnel. The cost of the first bacti test shall be borne by HRCSD. Subsequent costs incurred for failed testing shall be reimbursed by the Applicant prior to final acceptance.

The new mains shall remain shut-off and isolated from the existing system until cleared by HRCSD. A tie-in to the HRCSD system does not constitute acceptance of the mains by HRCSD.

For all new construction, where new water mains tie-in to the existing HRCSD water system, Contractor shall provide a written plan that describes how the new water main will be adequately isolated from the existing system, and how the new water utilities will be hydrostatically tested and disinfected. This plan shall be approved by the Engineer prior to such Work taking place.

- C. ***Discharge into Sewers.*** At no time shall the water used for flushing newly constructed water mains be discharged into the HRCSD sewer system, without prior approval of HRCSD. Dechlorination of such water may be required prior to discharge.

APPENDIX A

**GUIDANCE MEMO NO. 2003-02
GUIDANCE CRITERIA FOR THE SEPARATION
OF WATER MAINS AND NON-POTABLE
PIPELINES**

Memorandum

Date: April 14, 2003 (**Revised Date: October 16, 2003**)

To: Regional and District Engineers

From: David P. Spath, Ph.D., Chief (*Original signed by Dave*)
Drinking Water and Environmental Management
601 North 7th Street, MS 216
Sacramento, CA 95814
(916) 322-2308

Subject: **GUIDANCE MEMO NO. 2003-02: GUIDANCE CRITERIA FOR THE SEPARATION OF WATER MAINS AND NON-POTABLE PIPELINES**

The purpose of this memo is to update guidance dated April 5, 1983 for consistency with proposed 2003 regulations. Should there be any modification to the proposed Water Works Standards that may impact the content of this guidance, the guidance will be amended accordingly.

GUIDANCE: CRITERIA FOR THE SEPARATION OF WATER MAINS AND NON-POTABLE PIPELINES

BACKGROUND

When buried water mains are in close proximity to non-potable pipelines, the water mains are vulnerable to contamination that can pose a risk of waterborne disease outbreaks. For example, sewers (sanitary sewer mains and sewage force mains) frequently leak and saturate the surrounding soil with sewage due to structural failure, improperly constructed joints, and/or subsidence or upheaval of the soil encasing the sewer. If a nearby water main is depressurized and no pressure or negative pressure occurs, that situation is a public health hazard that is compounded if an existing sewer is broken during the installation or repair of the water main. Further, failure of a water main in close proximity to other pipelines may disturb their bedding and cause them to fail. In the event of an earthquake or other disaster, simultaneous failure of all pipelines could occur.

The most effective protection against this type of drinking water contamination is adequate construction and separation of non-potable pipelines and water mains. The Waterworks Standards (Title 22, Chapter 16, Section 64572) provide separation criteria for new construction. However, when these criteria cannot be met, the risk of contamination can be reduced by increasing the structural integrity of pipe materials and joints, and ensuring minimum separation requirements are met. Therefore, the following guidance details construction criteria for the installation of water mains and non-potable pipelines to minimize the risk of contamination of drinking water.



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.
- **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.
- **DISINFECTED TERTIARY RECYCLED WATER** - Wastewater that has been filtered and subsequently disinfected in accordance with Section 60301.230, Chapter 3 (Water Recycling Criteria), Title 22, California Code of Regulations.
- **HOUSE LATERAL** - A sewer line connecting the building drain and the sanitary sewer main serving the street.
- **SUPPLY LINE** - Pipelines conveying raw water to be treated for drinking purposes in accordance with Section 64572 ©, **proposed** Water Works Standards.
- **WATER MAIN** - Means any pipeline, except for user service lines, within the distribution system in accordance with Section 64551.70, **proposed** Water Works Standards.
- **RATED WORKING WATER PRESSURE** - A pipe classification system based on 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.

APPLICABILITY

Note that the construction criteria presented in this document apply to house laterals that cross above a water main, but not to those house laterals that cross below a water main.

Water mains or non-potable pipelines that are 24-inches in diameter or larger may pose a higher degree of public health concern because of the large volumes of flow involved. Therefore, installation of water mains or non-potable pipelines 24-inches in diameter or larger should be reviewed and approved in writing by the Department on a case-by-case basis prior to construction.

In no case, should water mains and non-potable pipelines conveying sewage or other liquids be installed in the same trench.

REGULATORY REQUIREMENTS

Any new development project in which all the underground facilities are being constructed for the first time must comply with the following regulatory requirements:

Existing requirements:

Section 64630. (Title 22 CA Code of Regulations) Water Main Installation

(c) Water mains shall be installed at least:

- (1) Ten feet (3 meters) horizontally from and 1 foot (0.3 meters) higher than sanitary sewer mains located parallel to the main.
- (2) One foot (0.3 meters) higher than sanitary sewer mains crossing the main.
- (3) Ten feet (3 meters), and preferably 25 feet (7.5 meters), horizontally from sewage leach fields, cesspools, seepage pits and septic tanks.

(d) Separation distances specified in (c) shall be measured from the nearest outside edges of the facilities.

(e) Where the requirements of (c) and (d) cannot be met due to topography, inadequate right-of-way easements, or conflicts with other provisions of these regulations, lesser separation is permissible if:

- (1) The water main and the sewer are located as far apart as feasible within the conditions listed above.
- (2) The water main and the sewer are not installed within the same trench.
- (3) The water main is appropriately constructed to prevent contamination of the water in the main by sewer leakage.

(f) Water mains shall be disinfected according to AWWA Standard C601-81 before being placed in service.

(g) Installation of water mains near the following sources of potential contamination shall be subject to written approval by the Department on a case-by-case basis:

- (1) Storage ponds or land disposal sites for wastewater or industrial process water containing toxic materials or pathogenic organisms.
- (2) Solid waste disposal sites.
- (3) Facilities such as storage tanks and pipe mains where malfunction of the facility would subject the water in the main to toxic or pathogenic contamination.

Although the following requirements have not yet been adopted, they should be within the next two years and should be used as guidance for future construction.

Proposed requirements as of the date of this document:

Section 64572. Water Main Separation

(a) New water mains and new supply lines shall not be installed in the same trench as, and shall be at least 10 feet horizontally from, and one foot vertically above, any parallel pipeline conveying:

- (1) Untreated sewage,
- (2) Primary or secondary treated sewage,
- (3) Disinfected secondary-2.2 recycled water (defined in section 60301.220),
- (4) Disinfected secondary-23 recycled water (defined in section 60301.225), and
- (5) Hazardous fluids such as fuels, industrial wastes, and wastewater sludge.

(b) New water mains and new supply lines shall be installed at least 4 feet horizontally from, and one foot vertically above, any parallel pipeline conveying:

- (1) Disinfected tertiary recycled water (defined in section 60301.230), and
- (2) Storm drainage.

(c) New supply lines conveying raw water to be treated for drinking purposes shall be installed at least 4 feet horizontally from, and one foot vertically below, any water main.

(d) If crossing a pipeline conveying a fluid listed in subsection (a) or (b), a new water main shall be constructed perpendicular to and at least one foot above that pipeline. No connection joints shall be made in the water main within eight horizontal feet of fluid pipeline.

(e) The vertical separation specified in subsections (a), (b), and (c) is required only when the horizontal distance between a water main and pipeline is ten feet or less.

(f) New water mains shall not be installed within 100 horizontal feet of any sanitary landfill, wastewater disposal pond, or hazardous waste disposal site, or within 25 feet of any cesspool, septic tank, sewage leach field, seepage pit, or groundwater recharge project site.

(g) The minimum separation distances set forth in this section shall be measured from the nearest outside edge of each pipe barrel.

ALTERNATIVE CRITERIA FOR CONSTRUCTION

Water Mains, and Sewers and Other Non-potable Fluid-carrying Pipelines

When new water mains, new sanitary sewer mains, or other non-potable fluid-carrying pipelines are being installed in existing developed areas, local conditions (e.g., available space, limited slope, existing structures) may create a situation in which there is no alternative but to install water mains, sanitary sewer mains, or other non-potable pipelines at a distance less than that required by the regulations [existing Section 64630 (proposed Section 64572)]. In such cases, through permit action, the Department may approve

alternative construction criteria. The alternative approach is allowed under the proposed regulation Section 64551(c):

“A water system that proposes to use an alternative to the requirements in this chapter shall demonstrate to the Department how it will institute additional mitigation measures to ensure that the proposed alternative would not result in an increased risk to public health.”

Appropriate alternative construction criteria for two different cases in which the regulatory criteria for sanitary sewer main and water main separation cannot be met are shown in **Figures 1 and 2**.

- **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: New Sanitary Sewer Main Installation (Figures 1 and 2)

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 or ductile iron pipe with compression joints; or
 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; or
 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 of Class 200 (DR 14 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 over the pipe being crossed; or
 5. Any sanitary sewer main within a continuous sleeve.

Case 2: New water mains Installation (Figures 1 and 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 dip bituminous coating;
 3. Dipped and wrapped one-fourth-inch-thick welded steel pipe;
 4. Class 200, Type II, asbestos-cement pressure pipe;

5. Class 200 pressure rated PVC water pipe (DR 14 per AWWA C900-97 & C905-97) or equivalent; or
 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 should have no joints within ten 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 one-fourth-inch-thick welded steel pipe;
 4. Class 200 pressure rated PVC water pipe (DR 14 per AWWA C900-97 & C905-97); or
 5. Reinforced concrete pressure pipe, steel cylinder type, per AWWA (C300-97 or C301-99 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 should have no joints within eight feet from either side of the sanitary sewer main (in Zone D) and should be constructed as for Zone C.

Water Mains and Pipelines Conveying Non-potable Fluids

When the basic separation criteria cannot be met between water mains and pipelines conveying non-potable fluids, the requirements described above for sanitary sewer mains should apply. This includes the requirements for selecting special construction materials and the separation requirements shown in Figures 1 and 2. Note that not all construction materials allowed for sanitary sewer mains will be appropriate for other non-potable fluid lines. For example, certain plastic lines may not be appropriate for the transport of some fuel products. The selection of compatible materials of construction for non-potable fluids is a decision to be made by the project engineer.

Water Mains and Sewage Force Mains

- Sewage force mains shall not be installed within ten feet (horizontally) of a water main.

- When a sewage force main must cross a water main, the crossing should be as close as practical to the perpendicular. The sewage force main should be at least one foot below the water main.
- When a new sewage force main crosses under an existing water main, and a one-foot vertical separation cannot be provided, all portions of the sewage force main within eight feet (horizontally) of the outside walls of the water main should be enclosed in a continuous sleeve. In these cases, a minimum vertical separation distance of 4 inches should be maintained between the outside edge of the bottom of the water main and the top of the continuous sleeve.
- When a new water main crosses over an existing sewage force main, the water main should be constructed of pipe materials with a minimum rated working pressure of 200 psig or the equivalent.

Water Mains and Tertiary Treated Recycled Water or Storm Drainage

The basic separation criteria for water mains and pipelines conveying tertiary treated recycled water or storm drainage lines are a 4-foot horizontal separation where lines are running parallel and a 1-foot vertical separation (water line above recycled or storm drainage) where the lines cross each other.

When these criteria cannot be met, the Zone A criteria apply where lines are running parallel, and the Zone C and Zone D criteria apply where the lines cross each other as shown on Figures 1 and 2. For these situations, the Zone "P" criteria are in effect and prohibit construction less than 1 foot in parallel installations and less than 4 inches in vertical (crossing) situations.

For tertiary treated recycled water and storm drainage lines, the Zone B criteria (requirements for special pipe) do not apply as the basic separation criteria is a four-foot horizontal separation criteria for parallel lines. The tertiary treated recycled water lines should be constructed in accordance with the color-coding, and labeling requirements per Section 116815, California Health and Safety Code of Regulations.

MISCELLANEOUS GUIDANCE

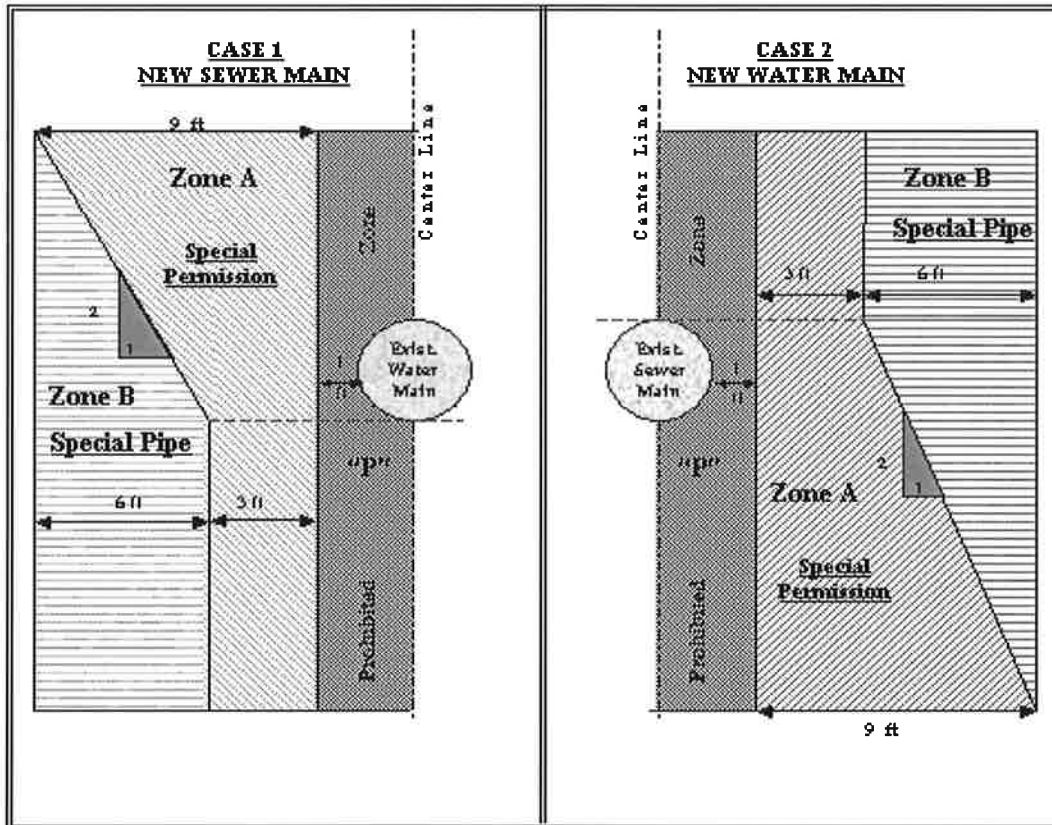
- More stringent requirements may be necessary if conditions such as high groundwater exist. HDPE or similar pipe may be required to provide flexibility to move without potential joint leaks.
- Sanitary sewer mains should not be installed within 25 feet horizontally of a low head (5 psig or less pressure) water main.
- New water mains and sanitary sewer mains should be pressure tested in accordance with manufacturer's specifications.

- When installing water mains, sewers, or other pipelines, measures should be taken to prevent or minimize disturbances of existing pipelines. Disturbance of the conduit's supporting base could eventually result in pipeline failure.
- Special consideration should be given to the selection of pipe materials if corrosive conditions are likely to exist. These conditions may be due to soil type and/or the nature of the fluid conveyed in the conduit, such as a septic sewage producing corrosive hydrogen sulfide.

NOTE: Dimensions are from the outside of the water main to the outside of the other pipeline, manhole, or sleeve.

FIGURE 1 PARALLEL CONSTRUCTION

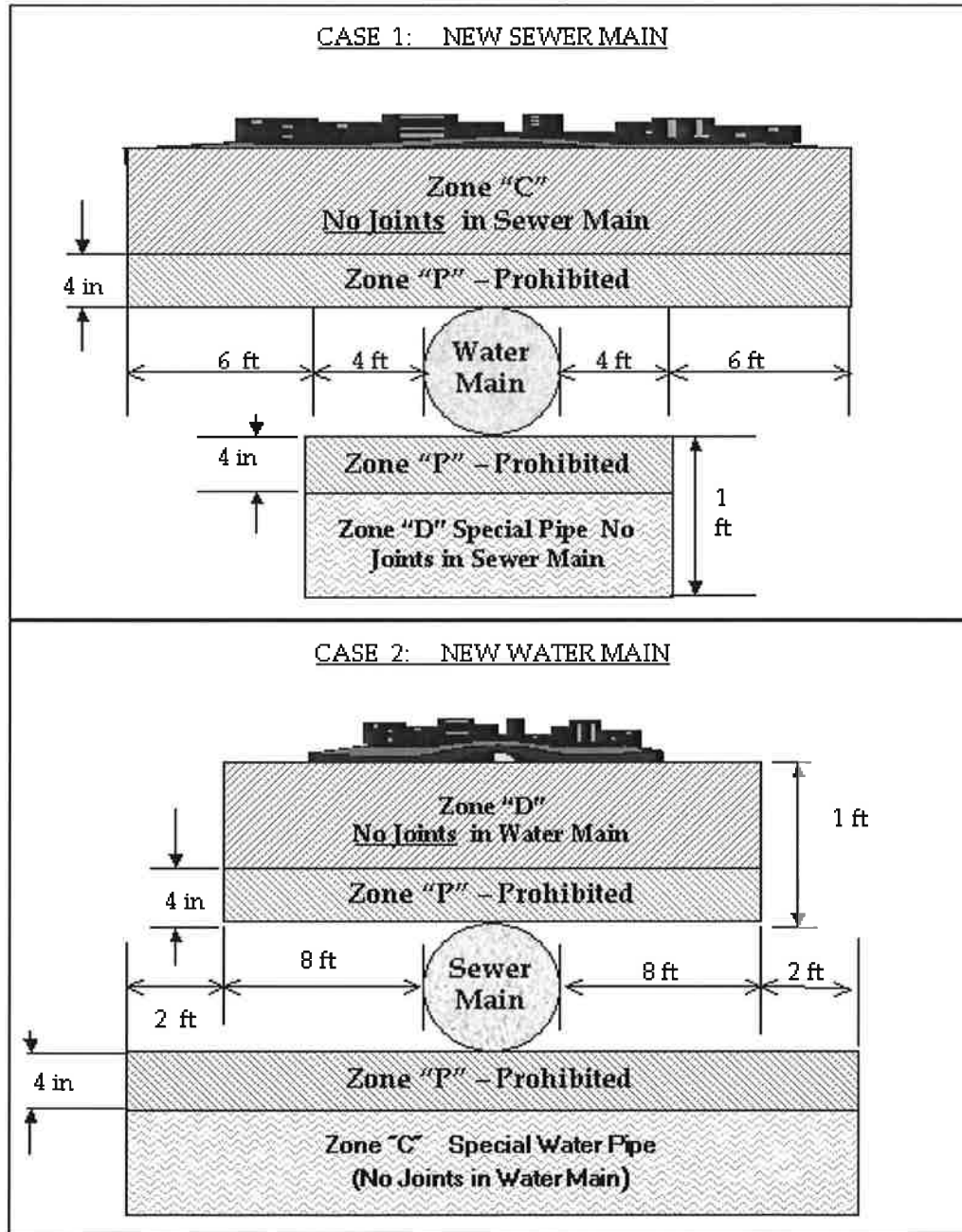
Not To Scale



Note: Zones identical on either side of center lines.

Zones "P" is a prohibited zone. Section 64630 (e) (2) California Code of Regulations, Title 22 (Current); or Section 64572 (a) California Code of Regulations, Title 22 (Proposed).

FIGURE 2 CROSSINGS
Not To Scale



HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD CONSTRUCTION NOTES

1. **Approved Plans** - No construction shall be started without plans approved by the Heritage Ranch Community Services District (HRCSD), and where applicable, by San Luis Obispo County. The HRCSD Inspector shall be notified at least two working days prior to starting of construction and any inspection. Any construction done without approved plans and prior to notification to the HRCSD Inspector may be rejected and will be at the Contractor's and/or Owner's risk.

The Contractor shall have copies of the approved plans for this project on the site at all times and shall be familiar with all applicable standards and specifications.
2. **Standard Specifications** - All construction work and installations shall conform to the HRCSD Standard Specifications and Drawings, and all work shall be subject to the approval of the HRCSD Engineer.
3. **Inspection Agreement** - An executed inspection agreement is required prior to the start of construction.
4. **Inspection** - The HRCSD Inspector, acting on behalf of the HRCSD Engineer, may require revisions to the approved Plans and Specifications to solve unforeseen problems that may arise in the field.
5. **Encroachment Permits** - No work within a County or Caltrans right-of-way shall be performed without an executed encroachment permit.
6. **Utility Notification** - Prior to beginning any earthwork, the Contractor shall be responsible for contacting all agencies involved and shall locate all facilities prior to excavation in any area. The Contractor shall call Underground Service Alert (USA), toll free at 811 at least two working days prior to the start of construction.
7. **Existing Utilities** - The locations and elevations of existing utilities where shown on the plans are based on available records, and are approximate only. The Contractor agrees to assume sole and complete responsibility for locating or having located all underground utilities and other facilities and for protecting the same during the course of constructing the project. Any deviations from the plan location of any existing facilities shall be immediately brought to the attention of the HRCSD Inspector.
8. **Safety** - Neither the Heritage Ranch Community Services District or the Engineer of Record will be responsible for compliance with safety measures or regulations. The Contractor (including the Owner/Builder) shall design, construct, and maintain all safety devices, and shall be solely responsible for conforming to all Local, State, and Federal, Safety and Health Standards, Laws, and Regulations.
9. **Indemnification** - The Applicant agrees that in accordance with generally accepted construction practices, Applicant shall assume sole and complete responsibility for the condition of the job site during the course of the project, including the safety of persons and property; that this requirement shall apply continuously and not be limited to normal working hours; and the Applicant shall defend, indemnify, and hold the District and District's agents, employees and consultants harmless from any and all claims, demands, damages, costs, expenses (including attorney's fees), judgements or liabilities arising out of the performance or attempted performance of the work on this project; except those claims, demands, damages, costs, expenses (including attorney's fees), judgements or liabilities resulting from the negligence or willful misconduct of the District.

<i>Revisions</i>	<i>Appd.</i>	<i>Dates</i>	HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING	SHEET: N-01
				DATE: _____
				DRAWN BY: DRD
				SCALE: NONE
APPROVED BY THE DISTRICT ENGINEER			DATE	STANDARD CONSTRUCTIONS NOTES

10. **Protection of Property** - The Contractor shall be responsible for the protection of Public and Private property adjacent to his work, and shall exercise due caution to avoid damage to such property. The Contractor shall replace or repair to their original condition, all improvements within or adjacent to the work area which are not designated for removal, and which are damaged or removed as a result of his operations.
11. **Site Conditions** - The Contractor shall continually review job site conditions. Conditions requiring construction different from that shown on the plans shall be reported to the Engineer, and HRCSD prior to proceeding with the affected construction. All deviations from approved plans shall be approved by HRCSD prior to the start of such changed work.
12. **Contractors Record of Changes** - The Contractor shall maintain a current, complete, and accurate record of all changes which deviate from the construction as shown on these Plans and Specifications for the purpose of providing the Engineer of Record with a basis for the preparation of Record Drawings.
13. **Record Drawings** - The Engineer of Record shall prepare drawings based on Contractor's Record of changes, following final inspection of the work by HRCSD. Record Drawings ("As-Built") shall be prepared by the Engineer of Record and approved by HRCSD prior to Final Acceptance of the work by the HRCSD. Final acceptance will only be granted after receiving Record Drawings which include one full-size mylar copy, one electronic copy (PDF), and AutoCAD Drawings which include the documented "As-Built" changes.
14. **Plan Corrections** - The Plan Check and Approval of these plans by the HRCSD does not relieve the Engineer of Record from any discrepancies, errors, or omissions, which may become apparent prior to the completion of construction. The Engineer of Record shall be responsible for correcting any design deficiencies, errors, or omissions to the approval of the HRCSD Engineer in accordance with the HRCSD Standard Plans and Specifications.

<i>Revisions</i>	<i>Appd.</i>	<i>Dates</i>	HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING	<i>SHEET:</i> N-02
				<i>DATE:</i> _____
				<i>DRAWN BY:</i> DRD
				<i>SCALE:</i> NONE
<i>APPROVED BY THE DISTRICT ENGINEER</i>		<i>DATE</i>	STANDARD CONSTRUCTION NOTES	

HERITAGE RANCH COMMUNITY SERVICES DISTRICT

ENGINEER OF WORK/ENGINEER OF RECORD CERTIFICATION

I, _____ R.C.E No. _____, hereby state that I have inspected the improvements required for the approval of:

(Project Name)

and shown on the improvement plans thereof prepared by:

(Engineer of Record)

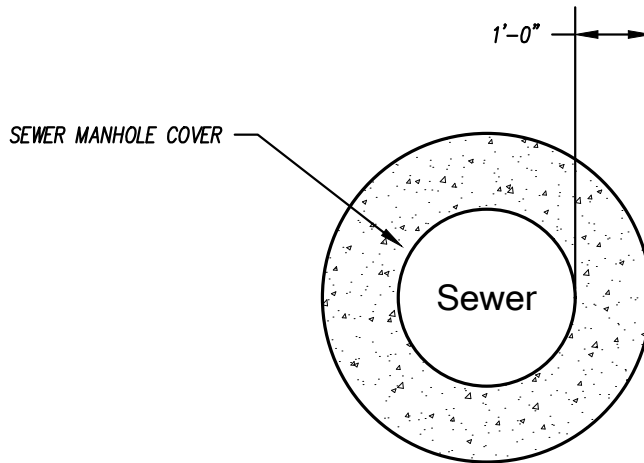
and approved on: _____, 20____, and that said improvements were constructed in substantial conformance with the horizontal and vertical alignment in accordance with those plans and specifications approved by HRCSD, including approved changes shown on the record drawings prepared by me and dated: _____, 20____.

I have taken, or have had provided to me by other qualified engineers, sufficient quality control tests to assure that the specifications have been met. Copies of inspection logs, record drawings and appropriate quality control tests are attached.

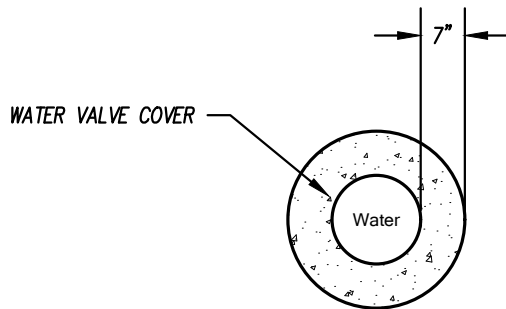
RCE Signature _____
Date

RCE License No.

<i>Revisions</i>	<i>Appd.</i>	<i>Dates</i>	HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING	<i>SHEET:</i> N-03
				<i>DATE:</i> _____
				<i>DRAWN BY:</i> DRD
				<i>SCALE:</i> NONE
<i>APPROVED BY THE DISTRICT ENGINEER</i>			ENGINEER'S CERTIFICATION	
<i>DATE</i>				



SEWER MANHOLE

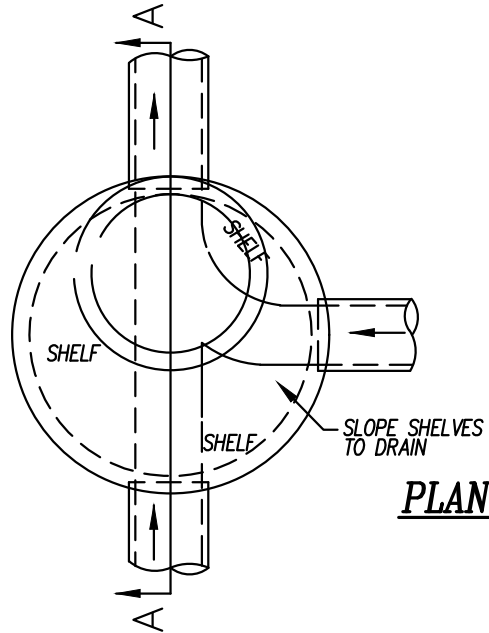
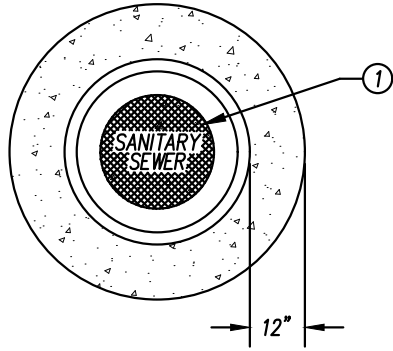


WATER VALVE

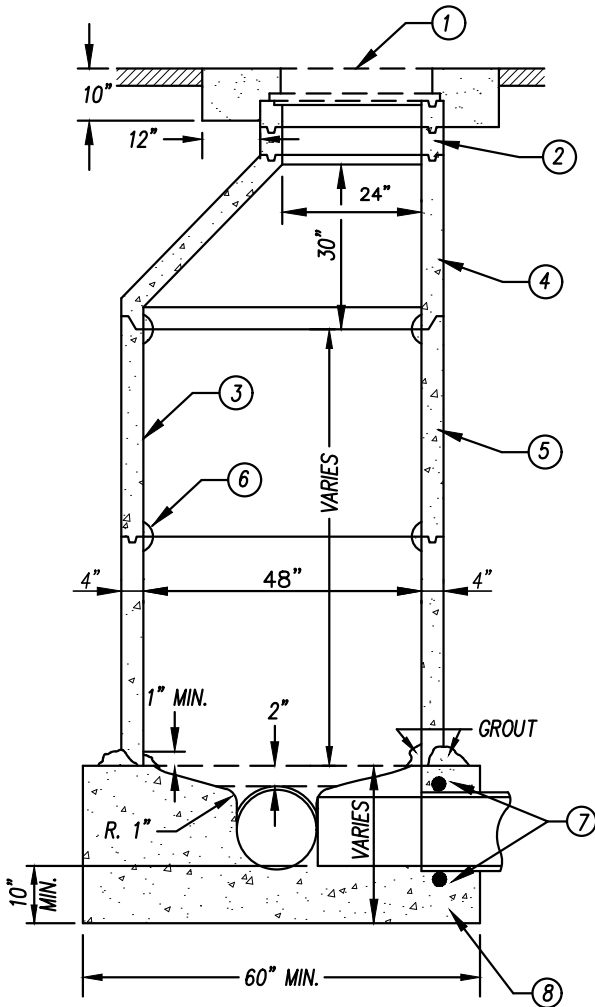
NOTES:

1. CONCRETE SHALL BE 520-C-2500 (5 1/2 SACK, 3/4" AGGREGATE MIN.) CLASS A CONCRETE.
2. ALLOW CONCRETE TO CURE 48 HOURS PRIOR TO TRAFFIC USE. IN AREAS OF HIGH TRAFFIC, SUBMIT TO HRCSD FOR APPROVAL, HIGH EARLY STRENGTH CONCRETE THAT CAN ALLOW TRAFFIC USE IN 12 HOURS.
3. TROWEL TO STREET GRADE WITH A 1/4" LIP. IN UNPAVED AREAS, TROWEL TO 1/2" ABOVE FINISHED GROUND, INSTALL LEVEL.
4. ALL COVERS AND LIDS SHALL BE RATTLE FREE WITHOUT USE OF SEALANT.
5. ALL CAST IRON TO BE HEAVY DUTY FOR TRAFFIC SERVICES.
6. UNLESS OTHERWISE SHOWN, CONCRETE COLLAR THICKNESS SHALL BE 10".
7. COLLARS SHALL BE CIRCULAR UNLESS OTHERWISE SHOWN AND APPROVED BY HRCSD.

<i>Revisions</i>	<i>Appd.</i>	<i>Dates</i>	HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING	SHEET: N-04
				DATE: _____
				DRAWN BY: <i>DRD</i>
				SCALE: 1" = 2'
APPROVED BY THE DISTRICT ENGINEER _____			WATER VALVE AND SEWER MANHOLE COVER CONCRETE COLLAR	
DATE _____				



PLAN VIEW



SECTION A-A

NOTES:

1. COVER - MANHOLE FRAMES AND COVER SHALL CONFORM TO HS20 TRAFFIC LOADING, AND SHALL HAVE A 24" CLEAR OPENING AND A SEALED BLIND PICKHOLE. THE COVER SHALL BE LETTERED "SANITARY SEWER". THE INSIDE OF THE FRAME SHALL BE GROUTED WITH NON-SHRINK GROUT. LID SHALL BE RATTLE FREE WITHOUT THE USE OF A SEALANT. SEE DETAIL N-04 FOR CONCRETE COLLAR.
2. ADJUSTMENTS - RINGS SHALL BE 3" OR 6". TOP OF CONE TO TOP OF FRAME SHALL NOT EXCEED 15". GRADE RINGS AND MANHOLE FRAME SHALL BE SEALED AT EVERY JOINT WITH BUTYL RUBBER (CONSEAL CS-102 OR EQUAL) AND GROUTED ON THE INSIDE.
3. INTERIOR MANHOLE PROTECTIVE LINING SHALL BE REQUIRED WHEN INDICATED ON PROJECT PLANS AND/OR SPECIFICATIONS.
4. CONE - CONE SHALL BE ECCENTRIC AND CONFORM TO THE REQUIREMENTS FOR RISERS. THE STRAIGHT SIDE OF THE CONE SHALL BE POSITIONED OVER THE MANHOLE OUTLET. CONCENTRIC CONES MAY BE USED ONLY IN SPECIAL CASES WITH THE PRIOR WRITTEN CONSENT OF THE ENGINEER.
5. MANHOLE RISERS SHALL BE 48" IN DIAMETER, PRECAST CONCRETE CONFORMING TO ASTM C478-61T CLASS 2 REINFORCED CONCRETE PIPE, OR AS APPROVED BY DISTRICT.
6. JOINTS - JOINTS SHALL BE SET WITH BUTYL RUBBER SEALANT (CONSEAL CS-102). INSIDE OF JOINTS SHALL BE GROUTED WITH NON-SHRINK GROUT.
7. WATER STOPS - WHEN PVC USED, I.E. ADAPTER RINGS [KOR-N-SEAL]
8. BASE - MANHOLE BASE SHALL CONFORM TO STANDARD PLANS S-02.

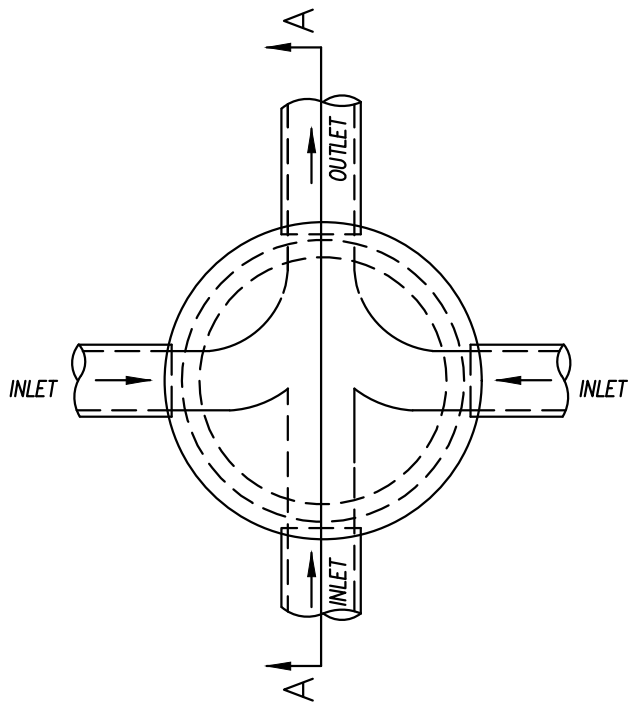
Revisions	Appd.	Dates

APPROVED BY THE DISTRICT ENGINEER _____ DATE _____

**HERITAGE RANCH
COMMUNITY SERVICES DISTRICT
STANDARD DRAWING**

STANDARD SEWER MANHOLE

SHEET: **S-01**
DATE: _____
DRAWN BY: DRD
SCALE: N.T.S.

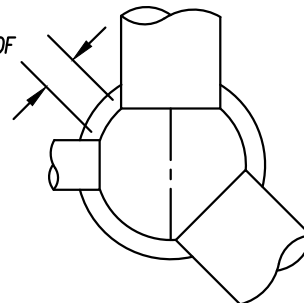


PLAN VIEW

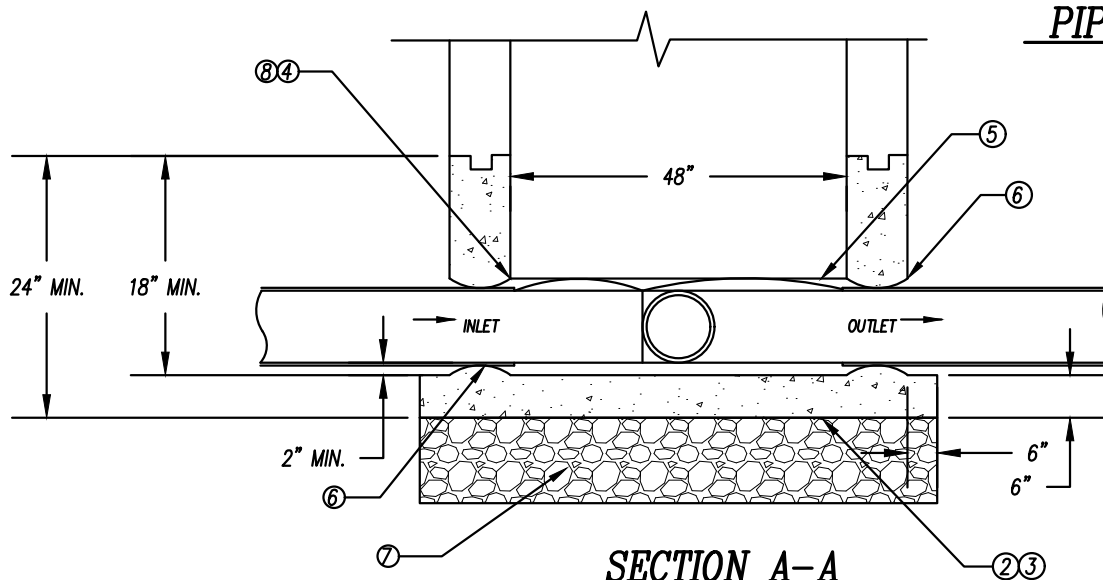
NOTES:

1. MANHOLE BASE MAY BE CONSTRUCTED IN FIELD OR PRECAST BASE CONFORMING TO ASTM C478 MAY BE USED.
2. CONCRETE SHALL BE PER NOTE 1, DWG. N-03.
3. REINFORCING STEEL SHALL HAVE A 2" COVER (MIN.) OVER THE STEEL ON THE INSIDE FACE. USE #5 @ 9" O.C. EACH WAY (MIN.)
4. INVERT CHANNELS AND SHELF MAY BE CONSTRUCTED AT A FACTORY OR IN THE FIELD. DEPTH OF CHANNEL SHALL EQUAL THE PIPE DIAMETER FOR ALL SIZES OF PIPE. CHANNEL SHALL RECEIVE A STEEL TROWEL FINISH.
5. SLOPE SHELF TOWARDS CHANNEL. SHELF AREAS SHALL RECEIVE A BROOM FINISH.
6. CEMENT MORTAR JOINTS SHALL NOT EXCEED 3/8" IN THICKNESS. DO NOT MORTAR EXTERIOR PERIMETER OF PIPE OPENING OR TOP HALF OF PIPE.
7. MANHOLE BASE SHALL BE PLACED OVER 6" CLEAN SAND OR GRAVEL (MIN.). IF GRAVEL IS USED, GEOTEXTILE FABRIC SHALL COVER SUBGRADE. SUBGRADE SHALL BE COMPACTED TO 95% UNLESS OTHERWISE SHOWN AND APPROVED BY HRCSO, A 0.1 FOOT DROP SHALL BE PROVIDED ACROSS MANHOLE BOTTOM TO MINIMIZE SOLIDS DEPOSITION.

MINIMUM DISTANCE BETWEEN HOLES APPROXIMATE 1/2 OF SMALLEST PIPE O.D.



PIPE SPACING



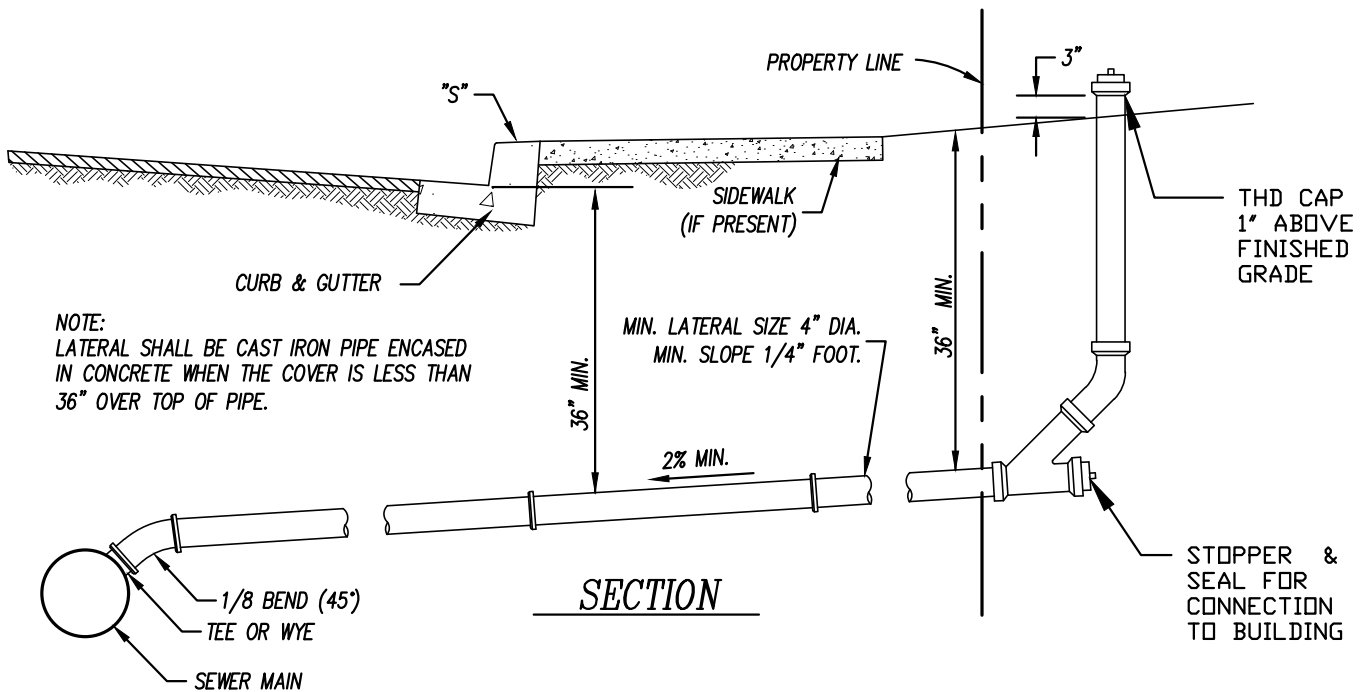
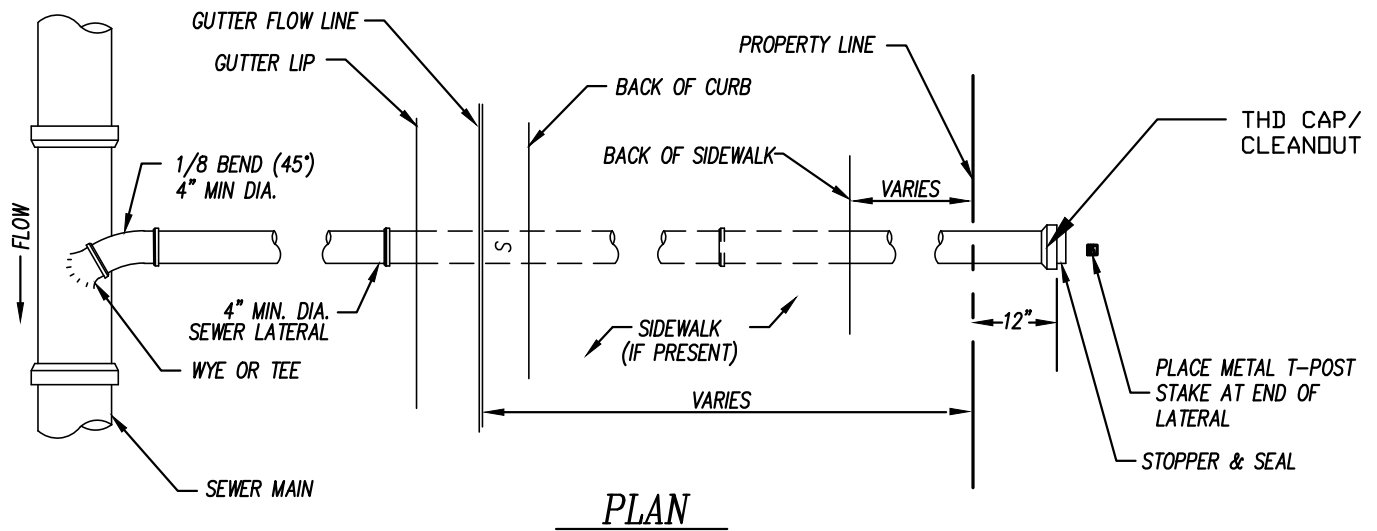
SECTION A-A

Revisions	Appd.	Dates
APPROVED BY THE DISTRICT ENGINEER		DATE

**HERITAGE RANCH
COMMUNITY SERVICES DISTRICT
STANDARD DRAWING**

STANDARD SEWER
MANHOLE BASE

SHEET: **S-02**
DATE: _____
DRAWN BY: DRD
SCALE: N.T.S.



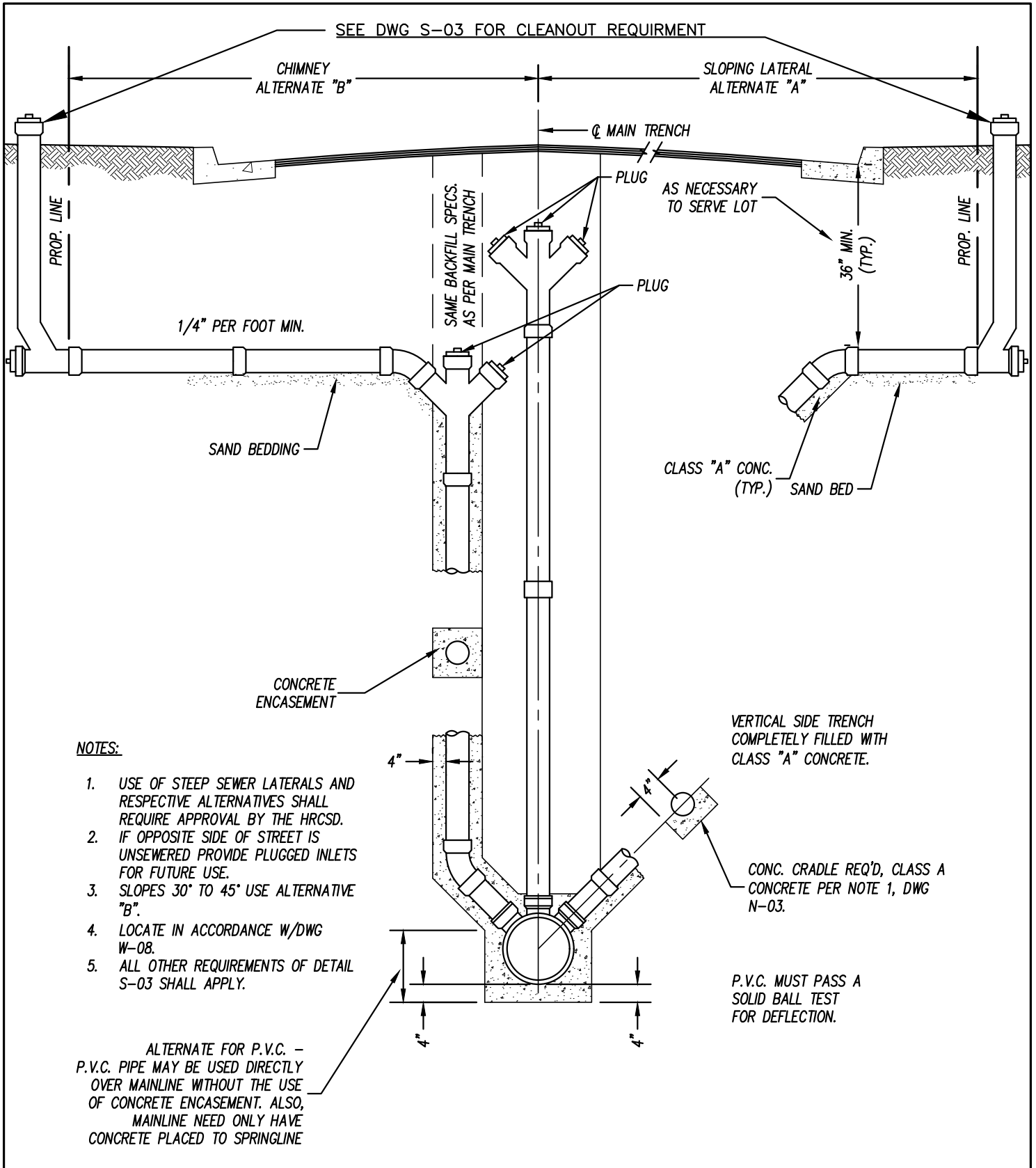
NOTES: (SEE DWG S-03.2)

Revisions	Appd.	Dates	HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING	SHEET: S-03.1
APPROVED BY THE DISTRICT ENGINEER			DATE	DRAWN BY: DRD
			SEWER LATERAL LOCATION SINGLE SERVICE	SCALE: N.T.S.

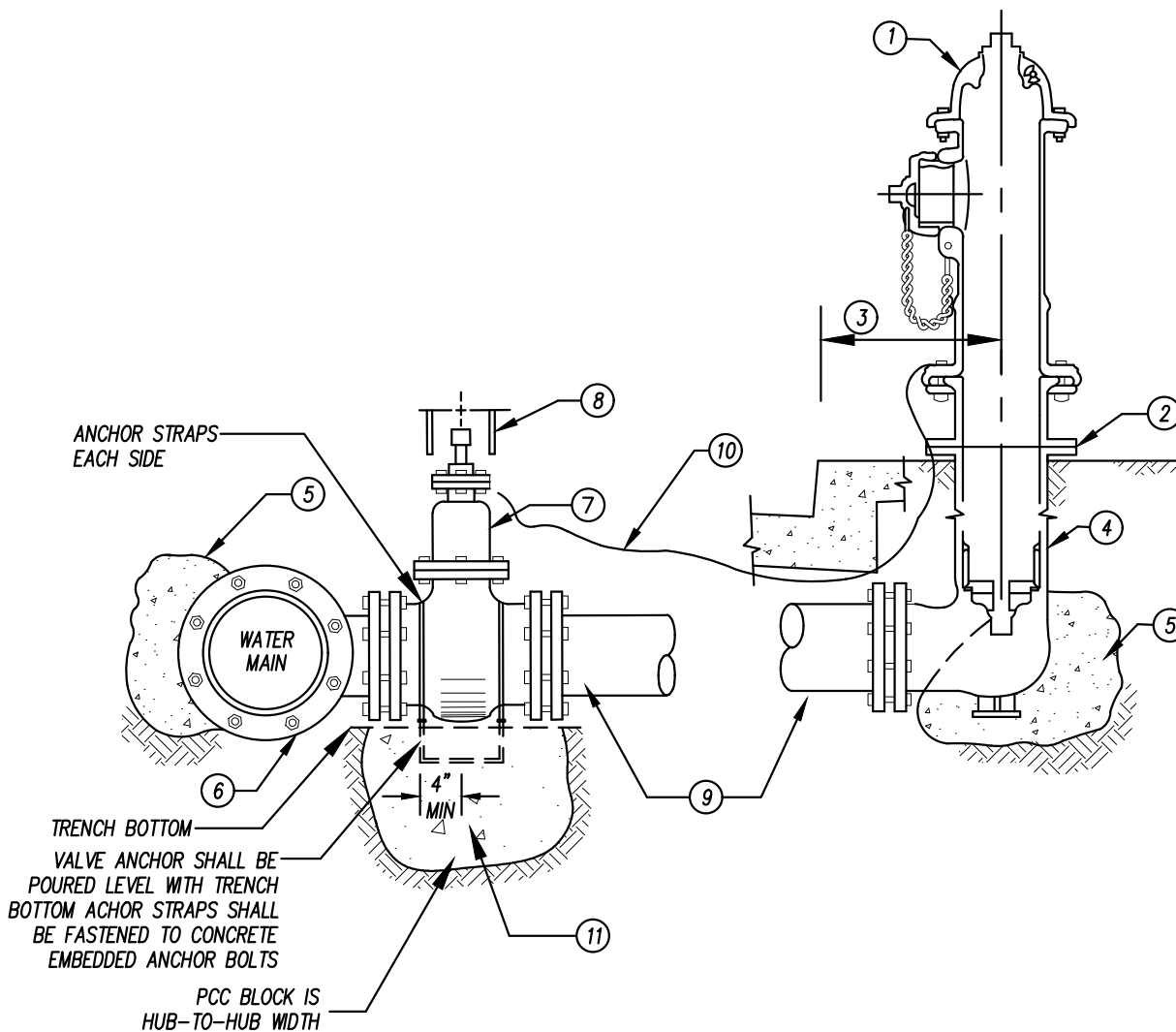
NOTES (FOR DWG S-03.1)

1. "S" SHALL BE MARKED ON CURB FACE OVER LATERAL WHEN CURB AND GUTTER ONLY IS TO BE CONSTRUCTED, OR EXISTS. IN THE CASE OF EXISTING OR NEW ASPHALT BERM, PROVIDE TRACER WIRE ALONG ENTIRE LENGTH OF SEWER LATERAL BETWEEN SEWER MAIN AND PROPERTY LINE CLEANOUT, SEE NOTE 10, DWG. W-01.
2. "S" SHALL BE MARKED ON BACK OF SIDEWALK OVER LATERAL WHEN BOTH CURB AND GUTTER AND SIDEWALK IS TO BE CONSTRUCTED, OR EXISTS.
3. THE "S" SHALL BE STAMPED INTO NEW CONCRETE AND SHALL BE CHISELED INTO EXISTING CONCRETE.
4. THE "S" SHALL BE NOT LESS THAN 3" HIGH, 2" WIDE, AND 3/16" DEEP.
5. SEWER LATERAL LOCATION TO CONFORM TO REQUIREMENTS OF W-08.
6. UNLESS SPECIFICALLY APPROVED BY DISTRICT, ALL LATERALS, FROM CLEANOUT TO MAIN, SHALL BE INSTALLED AT AN EXACT 90° ANGLE TO SEWER MAIN. IN CASES WHERE ALIGNMENT DEVIATES FROM THIS REQUIREMENT, INSTALL TRACER WIRE SAME AS REQUIRED FOR WATER SERVICE, DETAIL W-4.
7. LATERAL CONNECTION TO SEWER MAIN SHALL BE WITH A 1/8 (45°) BEND. BEND SHALL POINT DOWNSTREAM AND ENTER MAIN AT VERTICAL ANGLE OF NOT LESS THAN 5° OR MORE THAN 45°.
8. FOR SEWER LATERALS CONNECTING ONTO EXISTING SEWER MAIN, A SADDLE TEE-BRANCH MAY BE USED IF APPROVED BY THE DISTRICT.
9. SADDLE CONNECTIONS ARE NOT PERMITTED ON NEW SEWER MAINS.
10. SEWER LATERAL SHALL BE 4"Ø PVC PIPE AND SHALL MEET ASTM STANDARD D 3034, SDR 35.
11. MAINTAIN A 5' MINIMUM SEPARATION BETWEEN WATER AND SEWER SERVICE LATERALS.
12. SEWER LATERALS SHALL NOT BE LOCATED UNDER DRIVEWAYS.
13. PVC SEWER LATERAL MUST PASS A SOLID BALL TEST FOR DEFLECTION.
14. INSTALL WIRE OR METALLIC STRIP FOR LOCATING SEWER LATERALS, WHERE REQUIRED BY HRCSD.
15. UNDER NO CIRCUMSTANCES SHALL UTILITY LIDS AND CONCRETE COLLARS BE LOCATED WITHIN CURBS, GUTTERS, SIDEWALKS, DRIVEWAY APRONS, CURB RAMPS, OR CROSS GUTTERS.
16. ALL SEWER LATERAL TRANSITIONS SHALL AT A MINIMUM, MEET UNIFORM PLUMBING REQUIREMENTS, AND SHALL BE APPROVED BY HRCSD PRIOR TO INSTALLATION.

<i>Revisions</i>	<i>Appd.</i>	<i>Dates</i>	HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING	<i>SHEET:</i> S-03.2
				<i>DATE:</i> _____
				<i>DRAWN BY:</i> DRD
				<i>SCALE:</i> N.T.S.
APPROVED BY THE DISTRICT ENGINEER _____			SEWER LATERAL LOCATION SINGLE SERVICE	
DATE _____				



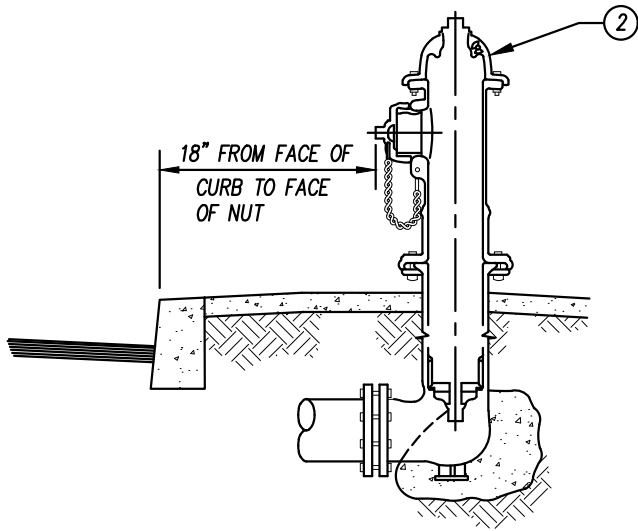
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Revisions</th> <th style="text-align: left;">Appd.</th> <th style="text-align: left;">Dates</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	Revisions	Appd.	Dates										<p>HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING</p> <p>STEEP SEWER SERVICE LATERALS</p>	<p>SHEET: S-04</p> <p>DATE: _____</p> <p>DRAWN BY: DRD</p> <p>SCALE: N.T.S.</p>
Revisions	Appd.	Dates												
<p>APPROVED BY THE DISTRICT ENGINEER DATE</p>														



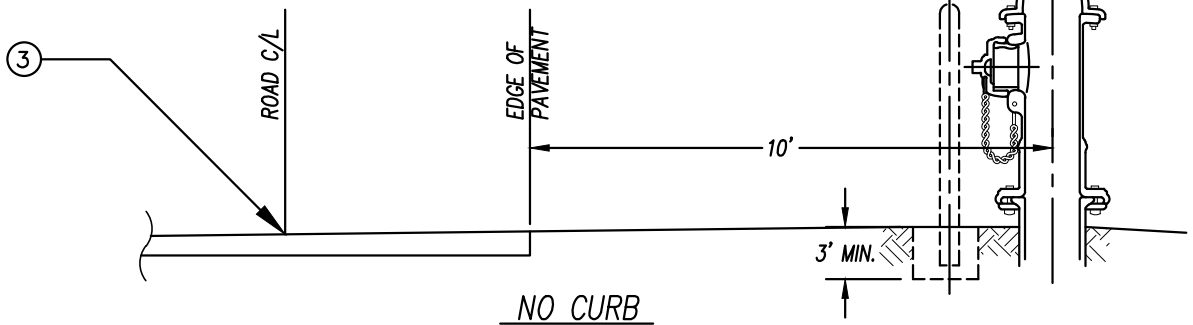
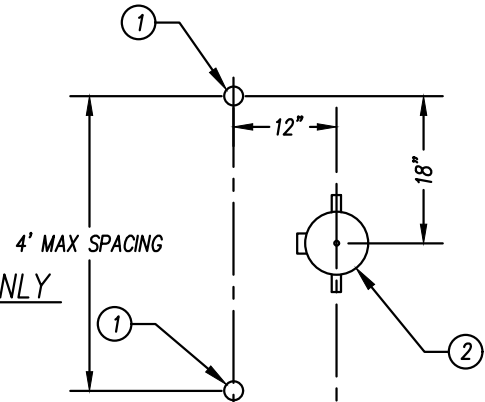
NOTES:

1. FIRE HYDRANT PER STD DWG W-17B, PAINTED SAFETY YELLOW.
2. 6" BREAKAWAY SPOOL - INSTALL HYDRANT TO PROVIDE 3" TO 4" CLEARANCE UNDER THE FLANGE. USE 5/8" X 3" BREAKAWAY BOLTS WITH BOLT HEADS ON BOTTOM BREAKAWAY SPOOL (SPOOL TO BE 4" MIN).
3. THE HYDRANT SHALL BE LOCATED PER DRAWING W-02.
4. STANDARD HYDRANT BURY.
5. THRUST BLOCK PER DRAWING W-16, SHIELD CONCRETE FROM FLANGES AND BLOTS. CONCRETE PER NOTE 1, DRAWING N-03.
6. FLANGED TEE.
7. VALVE PER DRAWING W-03.
8. VALVE BOX PER DRAWING W-03.
9. MINIMUM 6" DIAMETER PVC OR DIP HYDRANT LATERAL WITH MECHANICAL JOINT AT EACH END.
10. NO. 12 INSULATED TRACER WIRE SHALL RUN CONTINUOUSLY OVER MAINS AND SERVICES AND BROUGHT UP TO THE SURFACE IN VALVE WELLS AND METER BOXES.
11. VALVE ANCHOR AS SHOWN, CONCRETE PER NOTE 1, DRAWING N-03.

Revisions	Appd.	Dates	HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING	SHEET: W-01
				DATE: _____
				DRAWN BY: <i>DRD</i>
APPROVED BY THE DISTRICT ENGINEER			FIRE HYDRANT ASSEMBLY	SCALE: N.T.S.
DATE				



CONCRETE CURB, GUTTER AND SIDEWALK OR CURB ONLY



NO CURB

NOTES

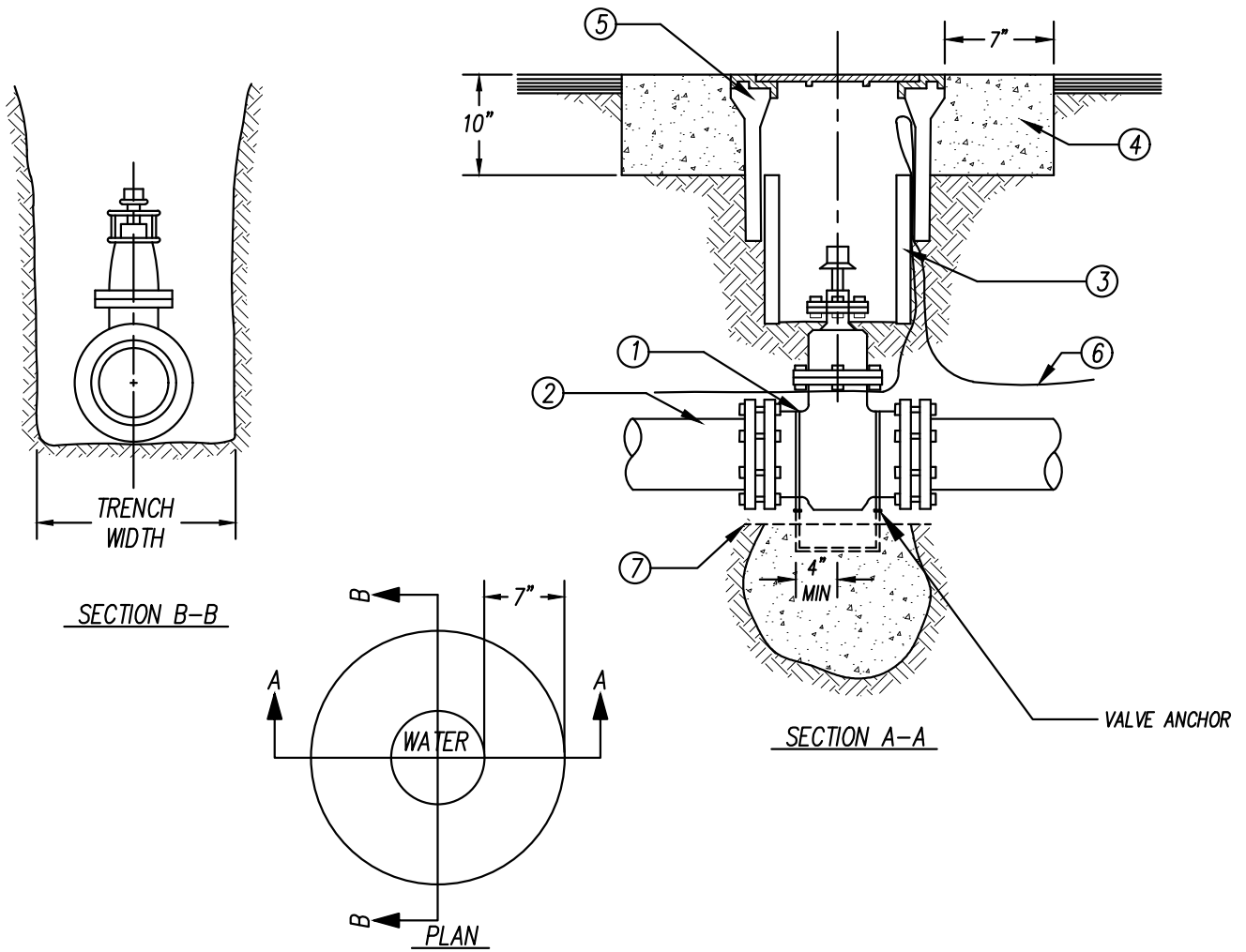
1. WHERE SHOWN ON PLANS, 6" STEEL BOLLARD FILLED WITH CONCRETE. EXTEND 36" ABOVE GROUND, SET IN 36" DEEP, 18" DIAMETER CONCRETE FOOTING. NOTE: BOLLARD CONSTRUCTION AND PLACEMENT SHALL MEET CALIFORNIA FIRE CODE SECTION 312.
2. FIRE HYDRANT ASSEMBLY PER W-01 SHALL BE PLACED WITHIN A DEDICATED PUBLIC RIGHT-OF-WAY APPROVED EASEMENT.
3. PROVIDE BLUE RETROREFLECTIVE MARKER AT ROAD MIDPOINT OR CENTERLINE, MEETING CALTRANS 2015 STANDARD SPECIFICATIONS FOR MATERIALS AND INSTALLATION.
4. ALL FIRE HYDRANT LOCATIONS SHALL BE APPROVED BY HRCSD PRIOR TO PLACEMENT IN FIELD.

Revisions	Appd.	Dates
APPROVED BY THE DISTRICT ENGINEER		DATE

**HERITAGE RANCH
COMMUNITY SERVICES DISTRICT
STANDARD DRAWING**

FIRE HYDRANT LOCATION

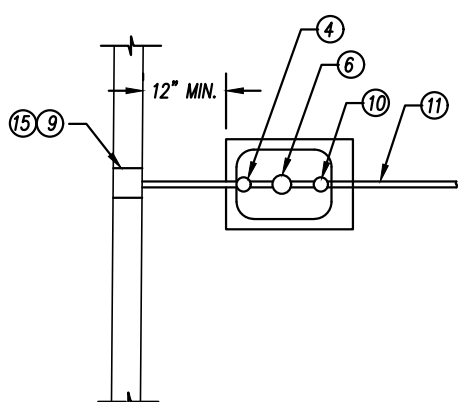
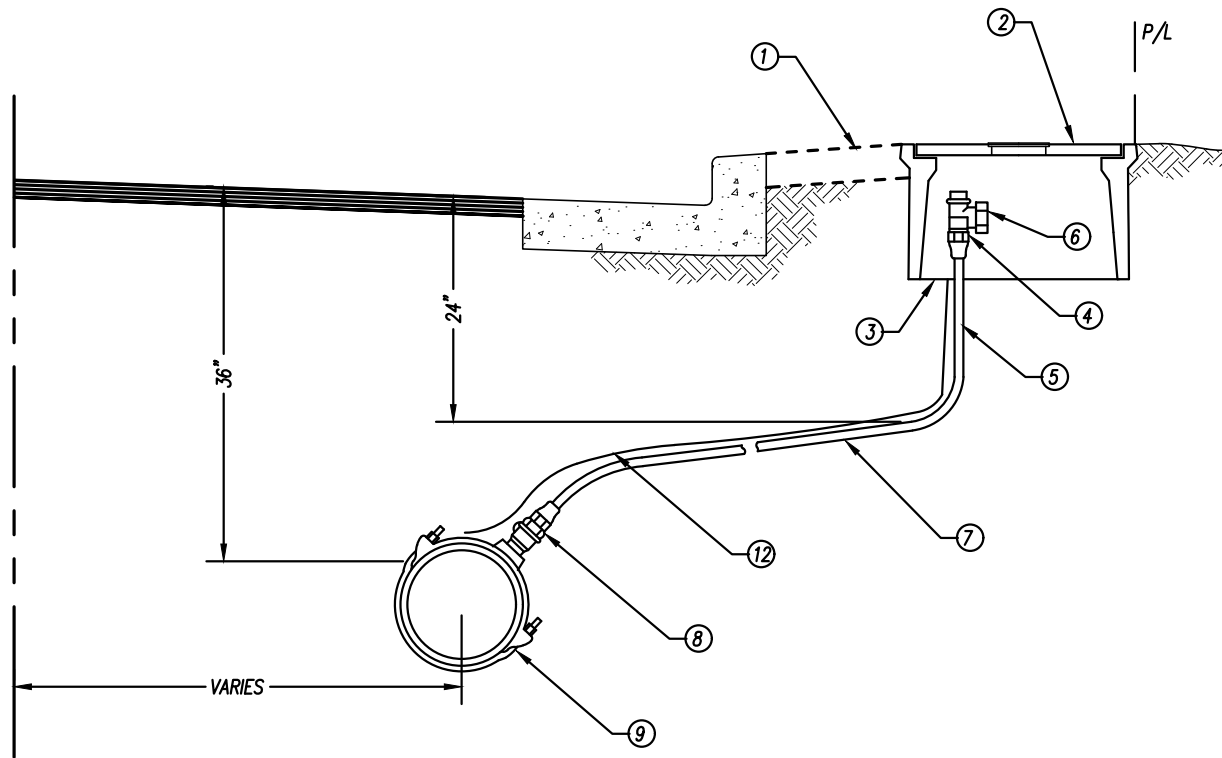
SHEET: **W-02**
 DATE: _____
 DRAWN BY: DRD
 SCALE: N.T.S.



NOTES:

1. WATER VALVE, FOR 12 INCH AND SMALLER MAINS, THE VALVE SHALL BE AS FOLLOWS:
 - GATE VALVE, MJ X MJ.
 - RESILIENT SEATED.
 - EPOXY COATED INSIDE AND OUTSIDE.
 - FULL-SIZE WATERWAY.
 - NON-RISING WATERWAY.
 - NON RISING STEM, OPEN TO THE LEFT, WITH O-RING SEALS.
2. WATER MAIN.
3. RISER, 6 INCH MINIMUM DIAMETER. USE ONE CONTINUOUS SECTION OF MINIMUM SDR 35 PVC.
4. CONCRETE COLLAR PER DRAWING N-03.
5. TRAFFIC VALVE WELL AND COVER. CHRISTY G-5 OR APPROVED EQUAL WITH LID MARKED "WATER."
6. NO. 12, INSULATED THW COPPER WIRE SHALL RUN CONTINUOUSLY OVER MAINS AND BROUGHT UP TO THE SURFACE IN VALVE WELLS AND METER BOXES.
7. WRAP ALL BOLTS IN PLASTIC TO PREVENT ENCASING BOLTS IN CONCRETE.

<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Revisions</th> <th style="text-align: left;">Appd.</th> <th style="text-align: left;">Dates</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	Revisions	Appd.	Dates										<p>HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING</p>	<p>SHEET: W-03</p> <p>DATE: _____</p> <p>DRAWN BY: DRD</p> <p>SCALE: N.T.S.</p>
Revisions	Appd.	Dates												
<p>APPROVED BY THE DISTRICT ENGINEER _____ DATE _____</p>	<p>WATER VALVE</p>													

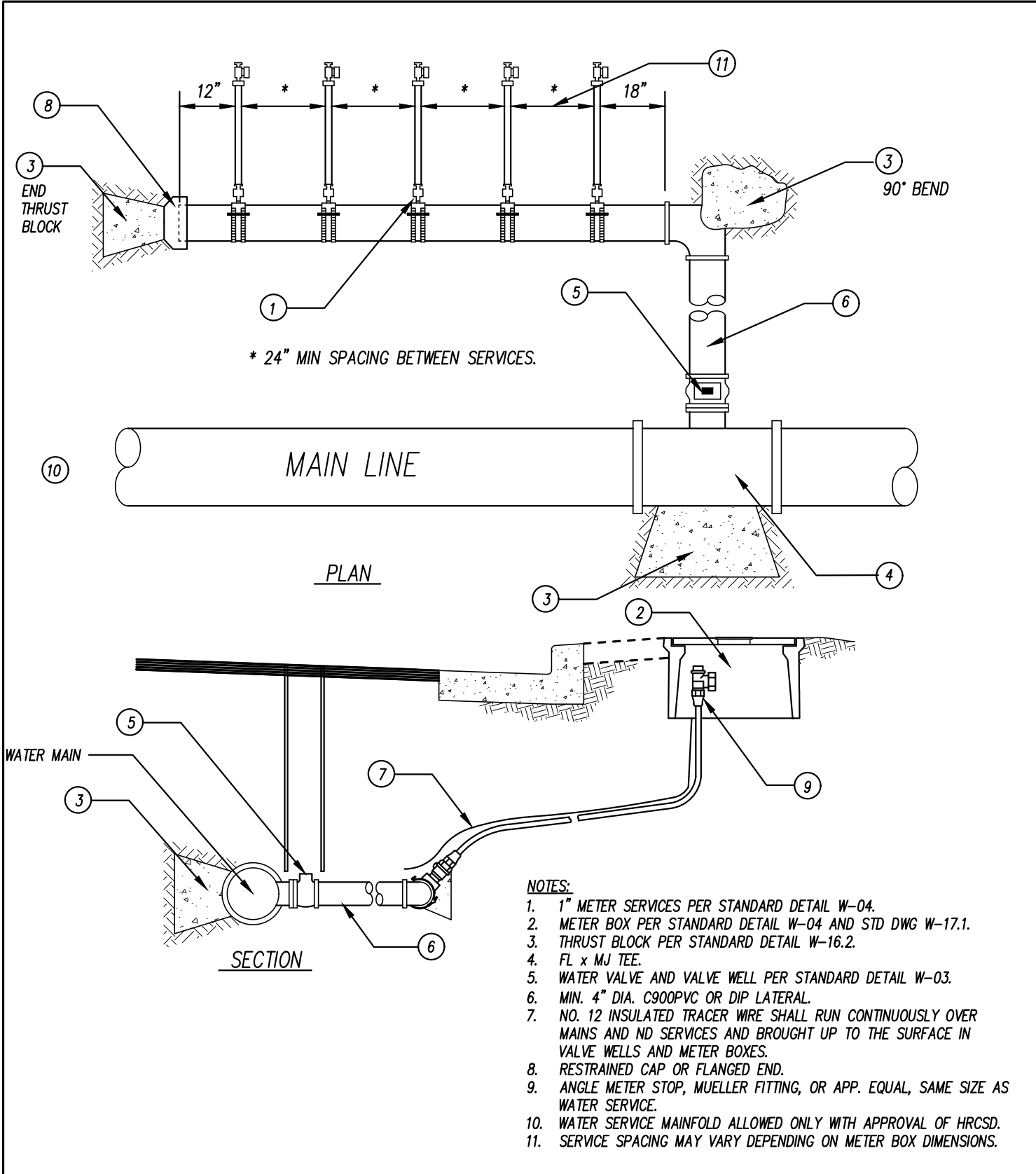


NOTES:

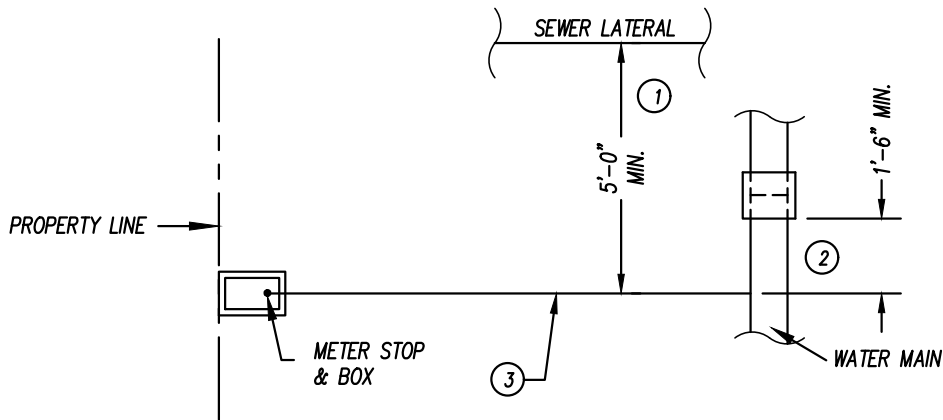
1. IN UNPAVED AREAS, SET BOX 1" ABOVE SURROUNDING GRADE, LEVEL. SEE DWG W-06 FOR SERVICE LOCATION IN UNPAVED AREAS.
2. METERBOX (USE CHRISTY B-24 BOX TYP). SEE STD DWG W-17.1.
3. 1/2" HARDWARE CLOTH UNDER BOX.
4. ANGLE METER STOP; MUELLER FITTING, OR APP. EQUAL, SAME SIZE AS WATER SERVICE.
5. POLYETHYLENE OR APPROVED PVC CLASS TO BE SAME AS MAIN OR BETTER.
6. WATER METER - BY HRCSD.
7. 1" MIN. I.D. SEE DETAIL W-17.1.
8. 1" CORP. STOP; MUELLER FITTING, OR APP. EQUAL.
9. DOUBLE CLAMP (EPOXY-COATED 30455 PER W-17.1).
10. 1" BALL VALVE - PROVIDED BY OWNER/DEVELOPER.
11. SERVICE PIPE - PROVIDED BY CONTRACTOR.
12. NO 12 INSULATED TRACER SHALL RUN CONTINUOUSLY OVER MAINS AND SERVICES AND BROUGHT UP TO THE SURFACE IN VALVE WELLS AND METER BOXES.
13. IN UNPAVED AREAS, A 4" THICK X 12" WIDE PCC PAD SHALL BE PLACED AROUND BOX.
14. UNLESS OTHERWISE SHOWN, SERVICE LATERALS SHALL BE INSTALLED AT 90° ANGLE TO WATER MAIN
15. COMPLY WITH SEPARATION REQUIREMENTS, NOTES 1 AND 2, DETAIL W-06.

ALL MATERIALS AND INSTALLATION SHALL CONFORM WITH APPLICABLE SECTIONS OF THE HRCSD STANDARD. EXCEPT WHERE SPECIFIED, ALL MATERIALS SHOWN PROVIDED BY DEVELOPER / HOME OWNER.

<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Revisions</th> <th style="text-align: left;">Appd.</th> <th style="text-align: left;">Dates</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	Revisions	Appd.	Dates										<p>HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING</p>	<p>SHEET: W-04</p> <p>DATE: _____</p> <p>DRAWN BY: DRD</p> <p>SCALE: N.T.S.</p>
Revisions	Appd.	Dates												
<p>APPROVED BY THE DISTRICT ENGINEER _____ DATE _____</p>	<p>WATER SERVICE CONNECTION</p>													

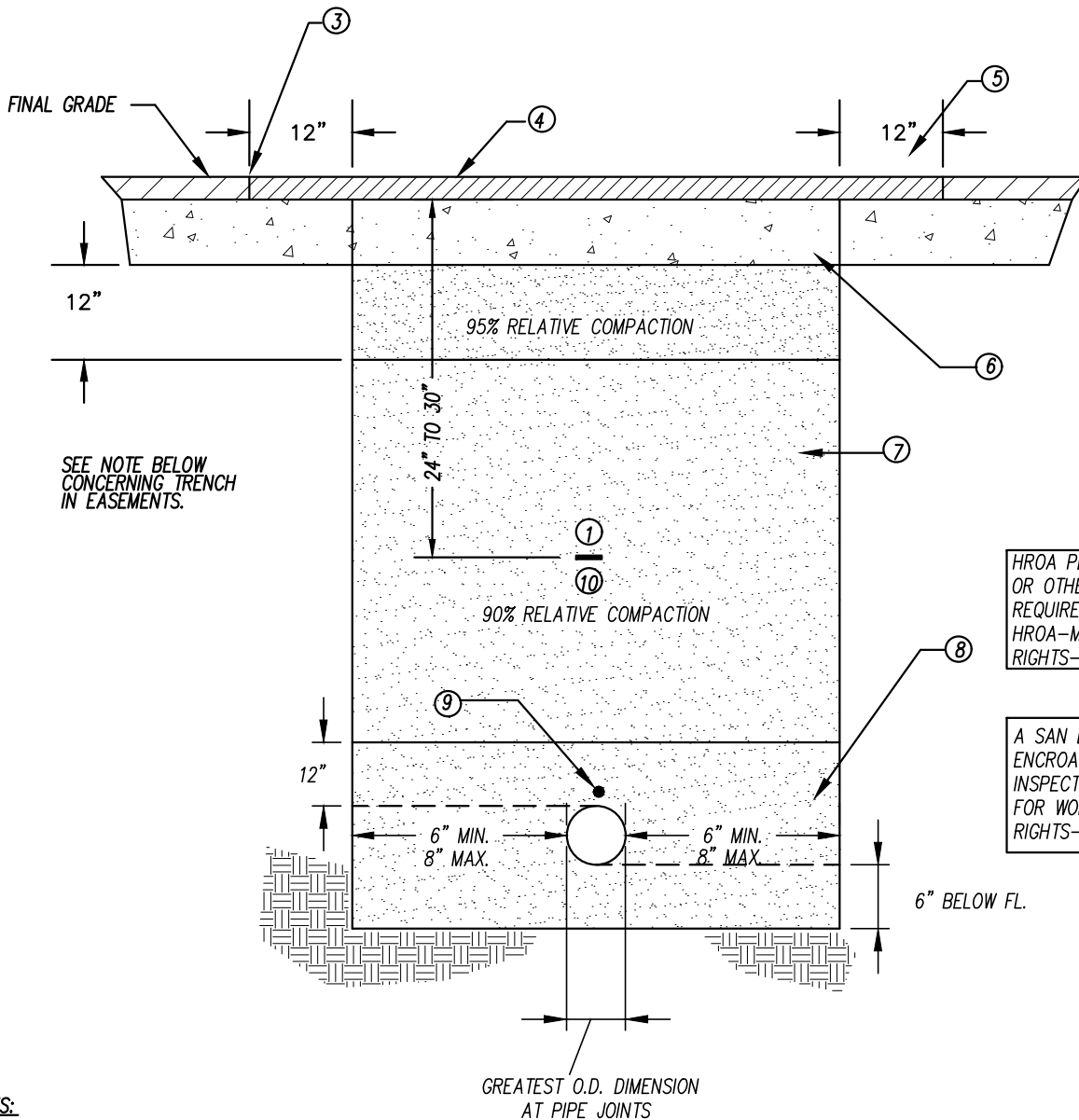


<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Revisions</th> <th style="text-align: left;">Appd.</th> <th style="text-align: left;">Dates</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	Revisions	Appd.	Dates										<p>HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING</p>	<p>SHEET: W-05</p> <p>DATE: _____</p> <p>DRAWN BY: DRD</p> <p>SCALE: N.T.S.</p>
Revisions	Appd.	Dates												
<p>APPROVED BY THE DISTRICT ENGINEER _____ DATE _____</p>	<p>WATER SERVICE MANIFOLD [5 OR MORE SERVICES]</p>													



- NOTE: ALL BOXES ARE STANDARD METER BOXES (SINGLE AND DOUBLE SERVICE USE CHRISTI B-24 TYP).
1. WATER LATERAL SHALL BE 5 FEET MINIMUM FROM A SEWER LATERAL UNLESS APPROVED OTHERWISE.
 2. WATER CONNECTION SHALL BE 1 ½ FEET MINIMUM FROM A WATER MAIN JOINT.
 3. METER BOX AND SERVICE PER DRAWING W-04
 4. WATER SERVICE CONNECTIONS TO THE MAIN SHALL BE SEPERATED BY AT LEAST 24 INCHES.

Revisions	Appd.	Dates	HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING	SHEET: W-06
				DATE: _____
				DRAWN BY: <i>DRD</i>
				SCALE: <i>N.T.S.</i>
APPROVED BY THE DISTRICT ENGINEER _____ DATE _____			WATER SERVICE LOCATION - NO CURB AND SIDEWALK	



NOTES:

1. A MINIMUM OF 90% RELATIVE COMPACTION IS PERMITTED IN A NON-ROADWAY TRENCH WHEN NO STRUCTURES (PAVEMENT, FLATWORK) ARE TO BE BUILT OVER THE TRENCH. IF STRUCTURES ARE TO BE BUILT OVER THE TRENCH, USE RELATIVE COMPACTIONS SHOWN ON THE TRENCH SECTION ABOVE.
2. PAVEMENT AND BASE SECTIONS ARE MINIMUMS. PAVEMENT AND BASE SECTIONS SHOWN IN THIS STANDARD DRAWING SHALL BE NO LESS THAN EXISTING STRUCTURAL SECTIONS, AND SHALL BE AS REQUIRED BY HROA OR SAN LUIS OBISPO COUNTY ROADS.
3. CUT EXISTING ROADWAY TO PROVIDE VERTICAL SURFACES AND SQUARE CORNERS. CUT EDGES SHALL BE STRAIGHT AND NEAT IN APPEARANCE.
4. MINIMUM 2 INCHES ASPHALT, OR OTHERWISE MATCH EXISTING.
5. PROVIDE MIN 12" BENCH INTO UNDISTRIBUTED ROAD BED (BOTH SIDES).
6. MIN 6" CLASS 2 AGGREGATE BASE.
7. SELECT BACKFILL FREE FROM DEBRIS AND DELETERIOUS MATERIAL.
8. COMPACTED SAND OR APPROVED GRANULAR MATERIAL.
9. NO 12 INSULATED TRACER WIRE SHALL RUN CONTINUOUSLY OVER WATER MAINS AND SEWER FORCE MAINS, AND BROUGHT UP TO THE SURFACE IN VALVE WELLS AND METER BOXES.
10. 3" WIDE POLYETHYLENE UTILITY WARNING TAPE, MARKED AND COLOR CODED PER DESIGN STANDARDS/SPECIFICATIONS.
11. SEE HRCSD STD. SPEC. PARA. 4.6 TRENCHING AND BACKFILL REGARDING USE OF SLURRY BACKFILL.

Revisions	Appd.	Dates	HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING	SHEET: W-07
APPROVED BY THE DISTRICT ENGINEER			DATE	DRAWN BY: DRD
			WATER AND SEWER TRENCH	SCALE: N.T.S.

CRITERIA FOR THE SEPARATION OF WATER MAINS, SANITARY SEWERS, AND STORM DRAINS

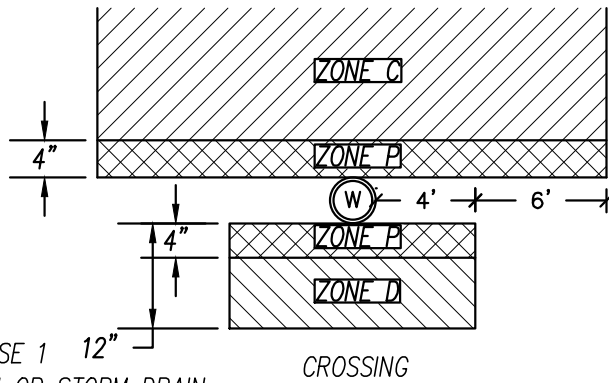
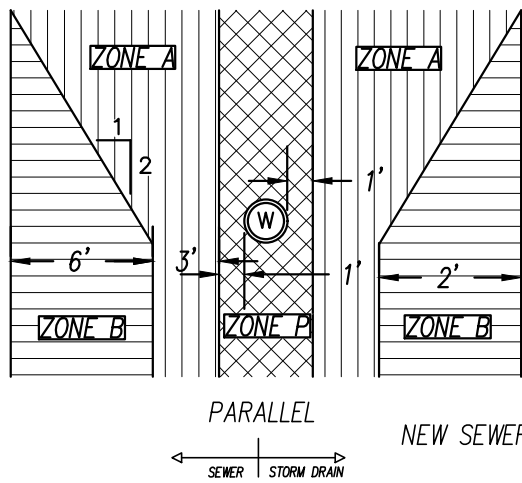
CASE 1
NEW SEWER MAIN OR STORM DRAIN BEING INSTALLED
(See Figure 1 / W-9)

ZONE	SPECIAL CONSTRUCTION REQUIRED FOR SEWER AND STORM DRAIN:
A	Sewer lines and storm drains parallel to water mains shall not be permitted in this zone without approval from the responsible health agency and water supplier.
B	A sewer line placed <u>parallel</u> to a water line shall be constructed of: 1. Plastic sewer pipe with rubber ring joints (per ASTM D3034) or equivalent. 2. Cast or Ductile iron pipe with compression joints.
C	A sewer line <u>crossing</u> a water main shall be constructed of: 1. Ductile iron pipe with hot dip bituminous coating and mechanical joints. 2. A continuous section of Class 200 (DR 14 per AWWA C900) plastic pipe, or equivalent. centered over the pipe being crossed. 3. Any sewer pipe within a continuous sleeve.
D	A sewer line <u>crossing</u> a water main shall be constructed of: 1. A continuous section of ductile iron pipe with hot dip bituminous coating. 2. A continuous section of Class 200 (DR 14 per AWWA C900) plastic pipe or equivalent. centered over the pipe being crossed. 3. Any sewer pipe within a continuous sleeve. 4. Any sewer pipe separated by a ten-foot by ten-foot, four-inch thick reinforced concrete slab.

CASE 2
NEW WATER MAIN BEING INSTALLED
(See Figure 2 / W-9)

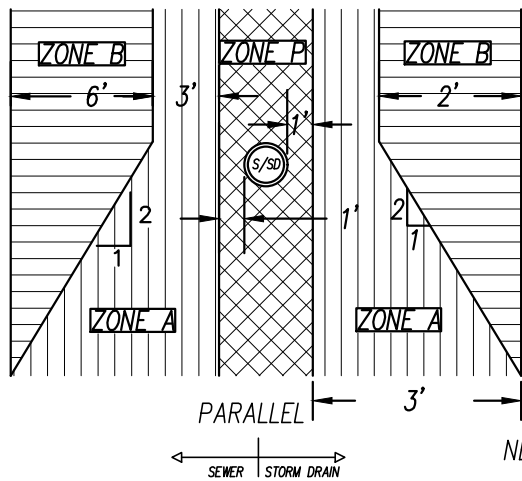
ZONE	SPECIAL CONSTRUCTION REQUIRED FOR WATER:
A	No water mains parallel to service shall be constructed without approval from the health agency.
B	If the sewer or storm drain <u>paralleling</u> the water main does not meet the Case 1, Zone B requirements, the water main shall be constructed of: 1. Ductile iron pipe with hot dip bituminous coating. 2. Dipped and wrapped one-fourth-inch-thick welded steel pipe. 3. Class 200 pressure rated plastic water pipe (DR 14 per AWWA C900) or equivalent. 4. Reinforced concrete pressure pipe, steel cylinder type, per AWWA (C300-74, C301-79 or C303-70). 5. Class 200, Type II, asbestos-cement pressure pipe.
C	If the sewer or storm drain <u>crossing</u> the water main does not meet the Case 1, Zone C requirements, the water main shall have no joints in Zone C and be constructed of: 1, 2, 3 or 4 as in Zone B, above.
D	If the sewer or storm drain <u>crossing</u> the water main does not meet the Case 1, Zone D requirements, the water main shall have no joints within four feet from either side of the sewer and shall be constructed of: 1, 2, 3 or 4 as in Zone B, above.

Revisions	Appd.	Dates	HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING	SHEET: W-08
				DATE:
				DRAWN BY: DRD
				SCALE: N.T.S.
APPROVED BY THE DISTRICT ENGINEER		DATE	WATER AND SEWER SEPARATION NOTES	

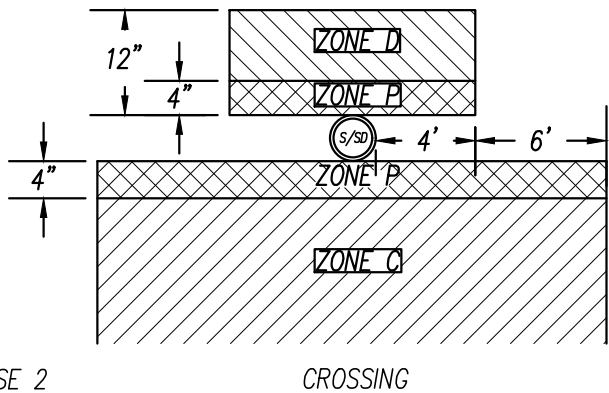


CASE 1
NEW SEWER MAIN OR STORM DRAIN
Figure 1

ZONE P is a prohibited zone,
Section 64630(e)(2) California
Administrative Code, Title 22.



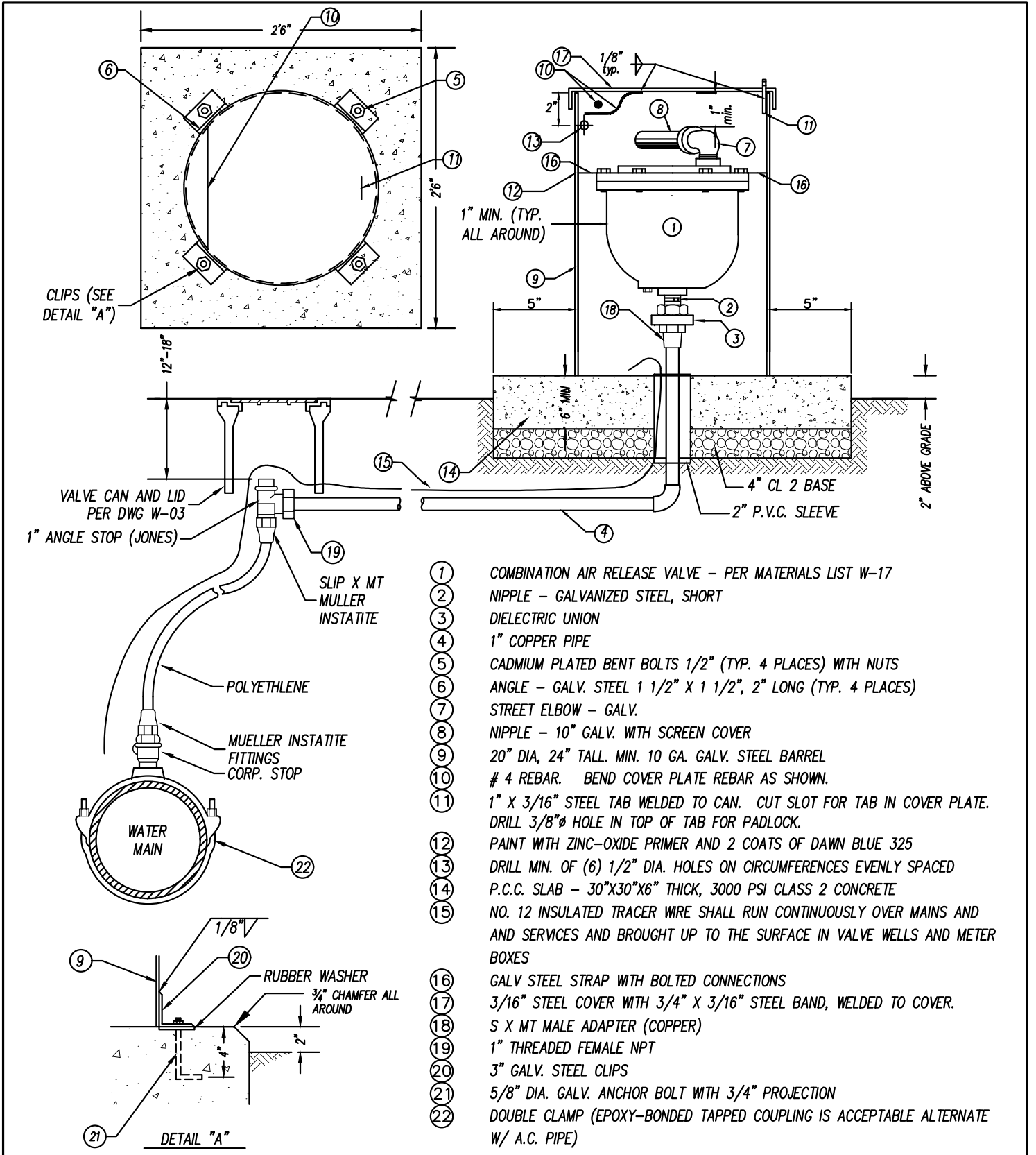
CASE 2
NEW WATER MAIN
Figure 2



NOTES AND 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.
- **DIMENSIONS** are from the outside of water main to outside of sewer line or manhole.
- **FUSED JOINT** – The joining of sections of pipe using thermal or chemical bonding processes.
- **GROUND WATER** – Subsurface water found in the saturation zone.
- **HEALTH AGENCY** – The State Department of Health Services. For those water systems supplying less than 200 service connections, the local health officer shall act for the Department of Health Services.
- **HOUSE LATERAL** – A sewer pipe connecting the building drain and the main sewer line.
- **LOW HEAD WATER MAIN** – Any water main which has a pressure of 5 psi or less at any time at any point in the main.
- **MECHANICAL JOINT** – Bolted joint
- **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.
- **SLEEVE** – A protective tube of steel with a wall thickness of not less than one-fourth inch into which a pipe is inserted.
- **WATER SUPPLIER** – Any person who owns or operates a public water system

Revisions	Appd.	Dates	HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING	SHEET: W-09
				DATE:
			WATER AND SEWER SEPARATION DIAGRAM	DRAWN BY: DRD
APPROVED BY THE DISTRICT ENGINEER		DATE		SCALE: N.T.S.

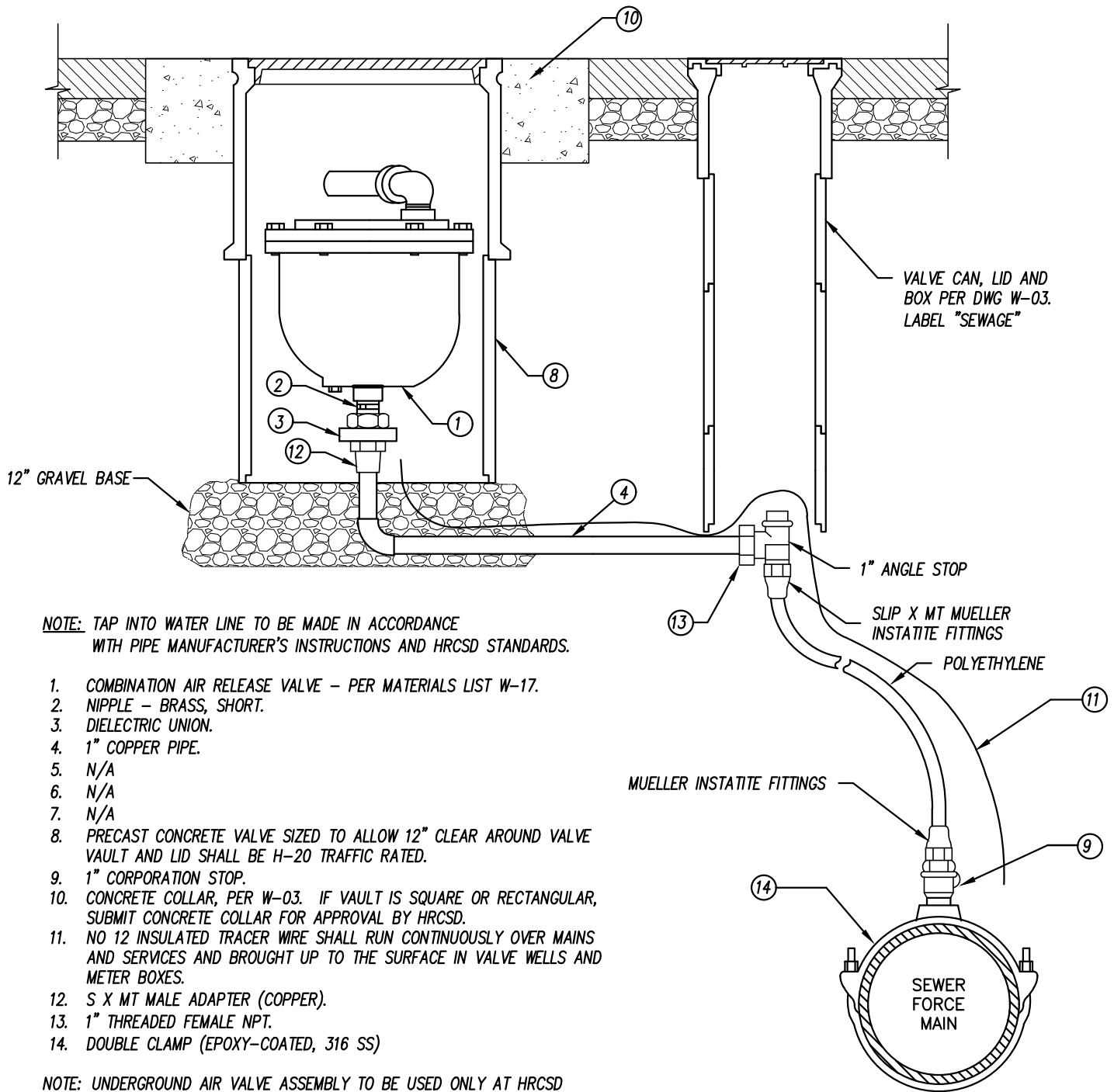


Revisions	Appd.	Dates
APPROVED BY THE DISTRICT ENGINEER		DATE

**HERITAGE RANCH
COMMUNITY SERVICES DISTRICT
STANDARD DRAWING**

1" COMBINATION AIR VALVE ASSEMBLY
ABOVE GROUND

SHEET:	W-10
DATE:	
DRAWN BY:	DRD
SCALE:	N.T.S.



Revisions	Appd.	Dates
APPROVED BY THE DISTRICT ENGINEER		DATE

**HERITAGE RANCH
COMMUNITY SERVICES DISTRICT
STANDARD DRAWING**

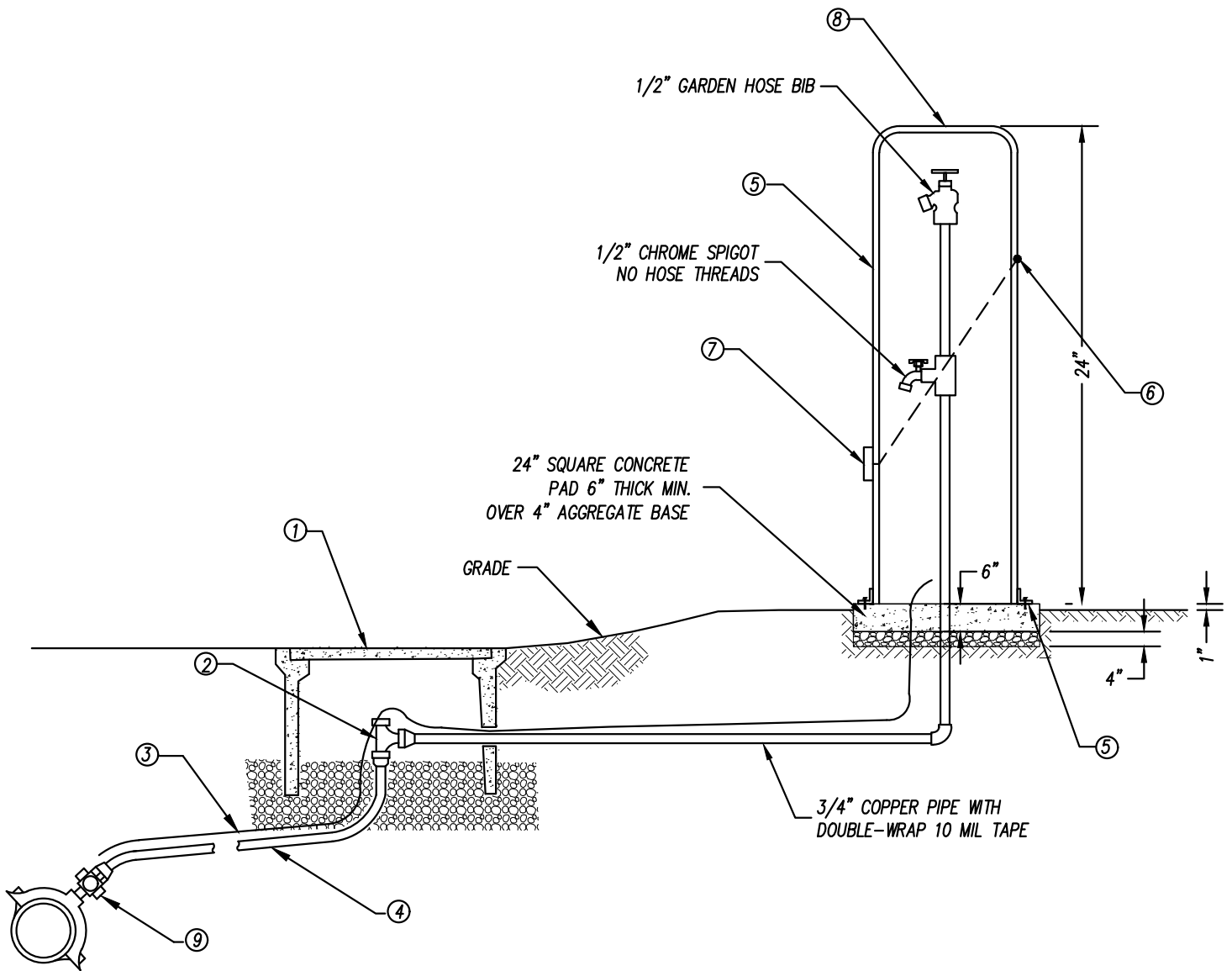
1" COMBINATION AIR VALVE ASSEMBLY
UNDERGROUND SEWAGE A&V

SHEET: W-11

DATE: _____

DRAWN BY: DRD

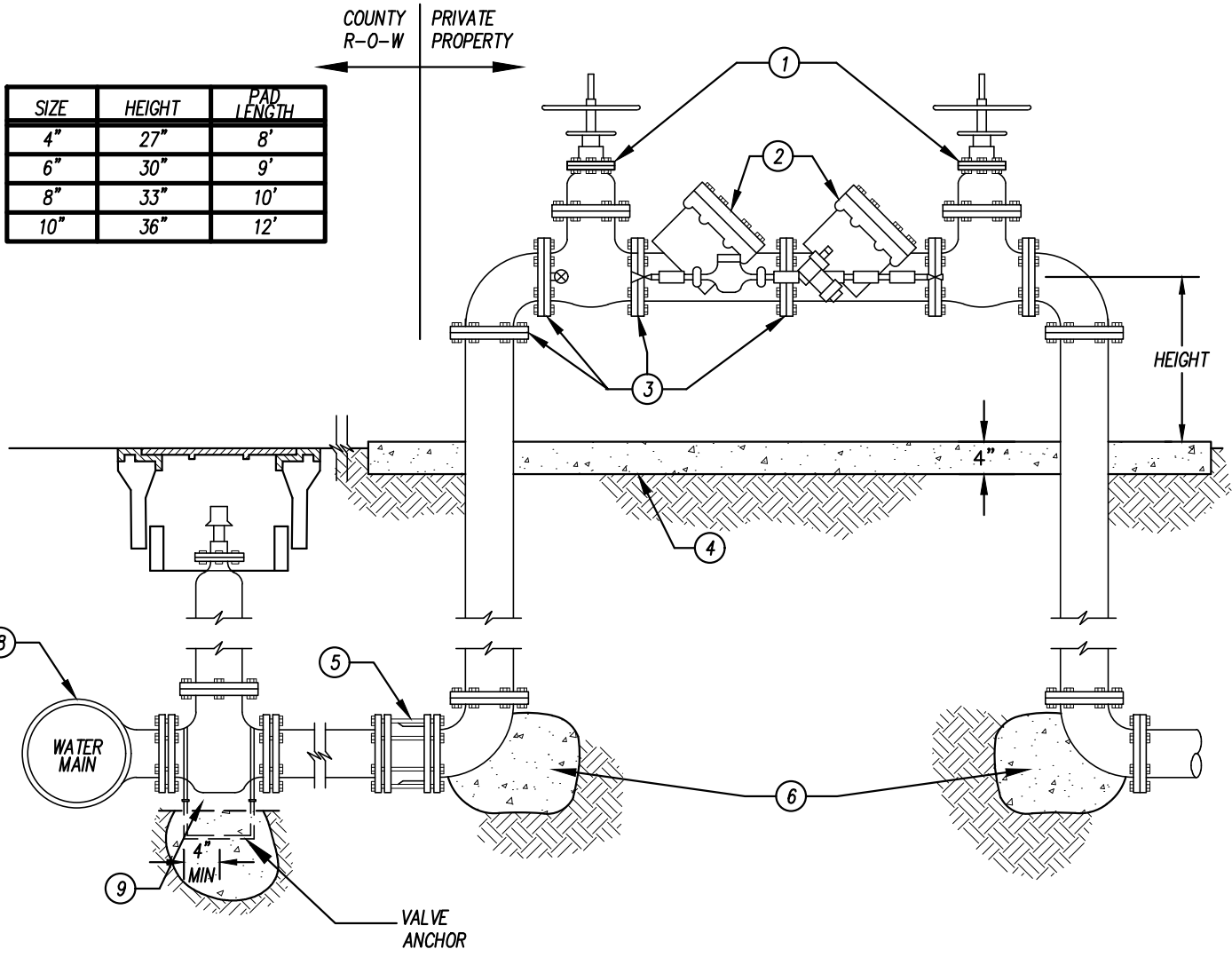
SCALE: N.T.S.



NOTES:

1. METER BOX PER DWG W-04. METER BOX TO BE INSTALLED AT LOCATION APPROVED BY HRCSD, OUTSIDE OF TRAVEL WAY.
2. ANGLE METER VALVE PER W-04
3. NO. 12 INSULATED TRACER WIRE SHALL RUN CONTINUOUSLY OVER MAINS AND SERVICES AND BROUGHT UP TO THE SURFACE IN VALVE WELLS AND METER BOXES.
4. 1" SERVICE PER DETAIL W-04
5. CLIPS PER W-10 DETAIL "A"
6. HINGE
7. CLASP FOR PAD LOCK
8. BOLT DOWN METAL CAN WITH TOP HATCH. CAN TO BE PAINTED WITH ZINC-OXIDE PRIMER AND 2 COATS OF DAWN BLUE 325.
9. CORP STOP PER STD. DWG. W-04

Revisions	Appd.	Dates	HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING	SHEET: W-12
				DATE: _____
APPROVED BY THE DISTRICT ENGINEER _____ DATE _____			WATER SAMPLING STATION	DRAWN BY: DRD
				SCALE: N.T.S.

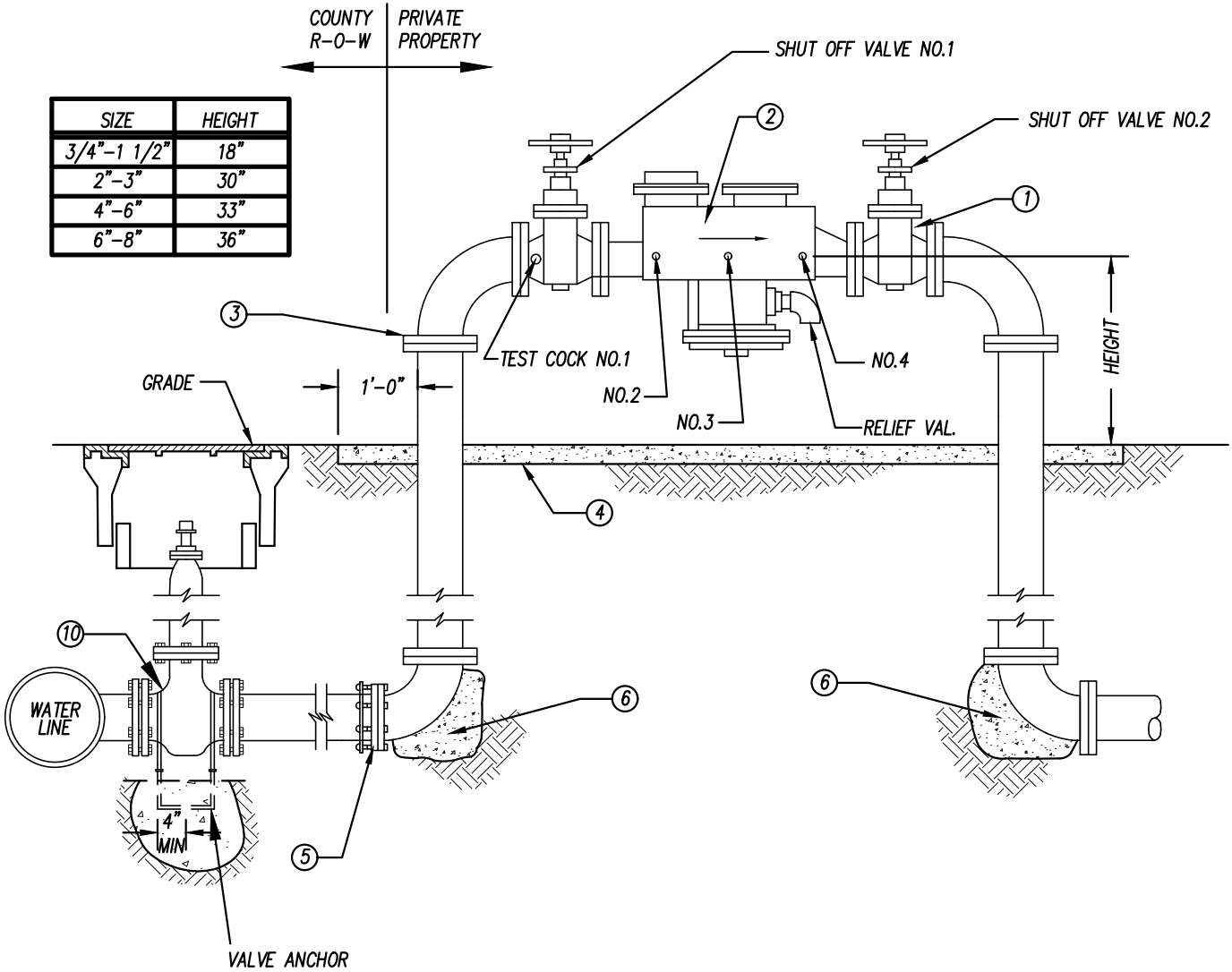


NOTES:

1. OS&Y GATE VALVE WITH FULLY-ENCAPSULATED RESILIENT SEAT - CLOW, MUELLER, OR AVK. (CONFORMING TO THE LATEST EDITION OF THE AWWA STANDARD C509-80).
2. ASC APPROVED DOUBLE DETECTOR CHECK VALVE BACKFLOW PREVENTER ASSEMBLY, WITH 3/4" NON-VALVED BYPASS METER ASSEMBLY. ASSEMBLY LOCATION SHALL BE APPROVED BY HRCSD PRIOR TO PLACEMENT.
3. ALL RISERS AND ABOVE-GROUND MAINLINE FITTINGS SHALL BE DIP FLANGE-TYPE.
4. PCC PAD, 12" MINIMUM AROUND RISERS, CONCRETE PER NOTE 1, DWG N-03.
5. MJ X FLANGE ADAPTOR (OR MJ X FLANGE 90° ELL).
6. THRUST BLOCKS PER DWG W-16.2.
7. OS&Y GATE VALVES AND BACKFLOW PREVENTER TO HAVE FACTORY APPLIED EPOXY COATING.
8. NO 12 INSULATED TRACER WIRE SHALL RUN CONTINUOUSLY OVER MAINS AND SERVICES AND BROUGHT UP TO THE SURFACE IN VALVE WELLS AND METER BOXES.
9. WATER VALVE BOX AND LID PER W-03.

Revisions	Appd.	Dates	HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING	SHEET: W-13
				DATE: _____
				DRAWN BY: DRD
APPROVED BY THE DISTRICT ENGINEER _____ DATE _____			DOUBLE CHECK VALVE ASSEMBLY	SCALE: N.T.S.

SIZE	HEIGHT
3/4"-1 1/2"	18"
2"-3"	30"
4"-6"	33"
6"-8"	36"



NOTES:

1. 4" & LARGER, USE O.S.&Y. GATE VALVE WITH FULLY-ENCAPSULATED RESILIENT SEAT - CLOW, MUELLER, OR A.V.K. (CONFORMING TO THE LATEST EDITION OF THE AWWA STANDARD C509-80).
2. USC APPROVED OR AVK (CONFORMING TO THE LATEST EDITION OF THE AWWA STANDARD C509-80) WITH 3/4" NON-VALVED BYPASS METER ASSEMBLY.
3. FOR 4" LARGER, ALL RISERS AND ABOVE-GROUND MAINLINE FITTINGS SHALL BE FLANGE-TYPE.
4. PCC PAD 18" MINIMUM AROUND RISERS, 5-SACK.
5. MJ X FLANGE TYPE ADAPTOR (OR MJ X FLANGE 90° ELL)
6. THRUST BLOCK PER DWG W-16.2.
7. FOR 4" AND SMALLER, USE GALVANIZED IRON PIPE FITTINGS.
8. OS&Y GATE VALVES AND BACKFLOW PREVENTER TO HAVE FACTORY APPLIED EPOXY COATING.
9. NO 12 INSULATED TRACER WIRE SHALL RUN CONTINUOUSLY OVER MAINS AND SERVICES AND BROUGHT UP TO THE SURFACE IN VALVE WELLS AND METER BOXES.
10. WATER VALVE PER W-03.

Revisions	Appd.	Dates
APPROVED BY THE DISTRICT ENGINEER		DATE

**HERITAGE RANCH
COMMUNITY SERVICES DISTRICT
STANDARD DRAWING**

REDUCED PRESSURE VALVE
ASSEMBLY

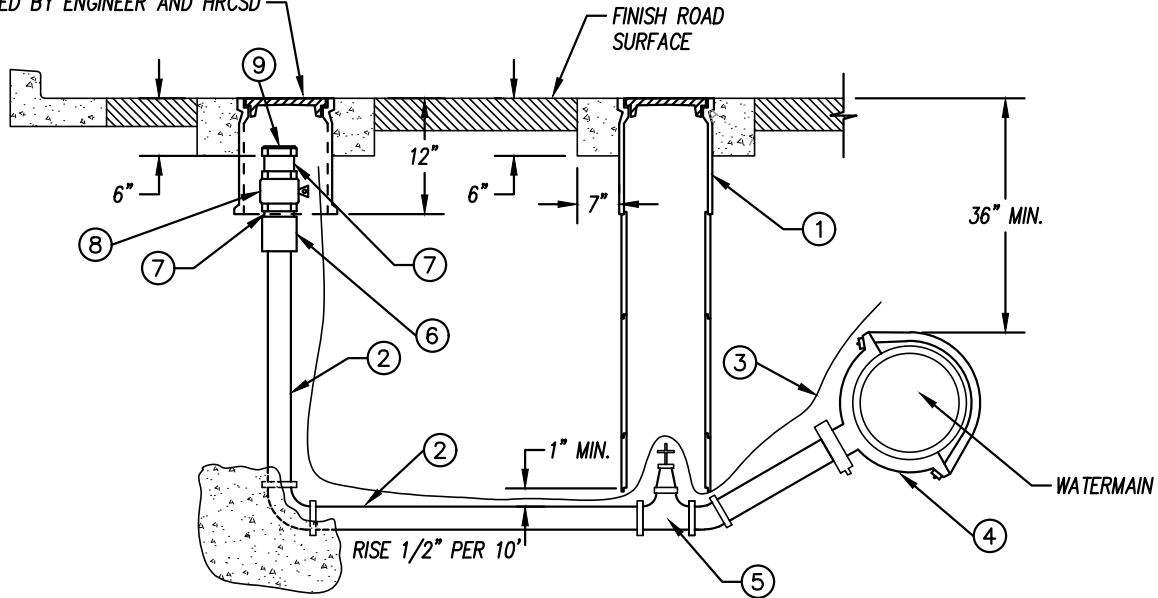
SHEET: **W-14**

DATE: _____

DRAWN BY: DRD

SCALE: N.T.S.

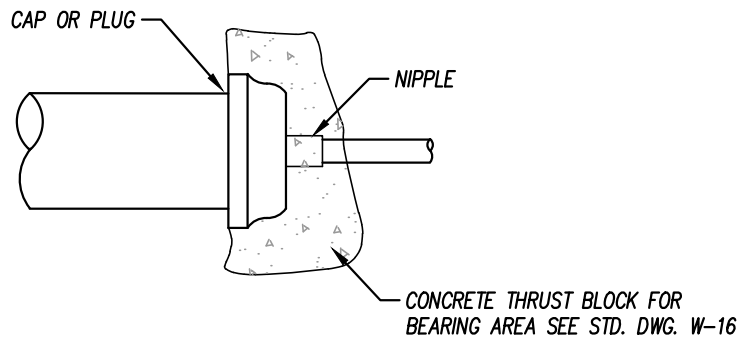
LOCATION TO BE APPROVED BY ENGINEER AND HRCSD



ON-RUN CONNECTION OR DEAD-END



PLUG
 DRILLED FOR 2" BLOW-OFF ON 4" - 8" WATER MAIN
 FOR 10" OR LARGER, BLOW-OFF SIZE AND LOCATION TO BE DETERMINED BY DISTRICT ENGINEER



DEAD-END CONNECTION

NOTES:

1. STANDARD VALVE BOX AND COLLAR, SEE STANDARD DWG W-03 AND DWG N-03.
2. SCH 80 PVC PIPE, 2" OR 4" TO MATCH BO SIZE.
3. NO. 12 INSULATED THW COPPER WIRE SHALL RUN CONTINUOUSLY OVER MAINS AND SERVICES AND BROUGHT UP TO THE SURFACE IN VALVE WELLS AND METER BOXES.
4. SERVICE CLAMP FOR IN-LINE BO, USE DEAD-END CONNECTION ON DEAD-ENDS.
5. GATE VALVE (2").
6. 2" ADAPTER - IP THREAD X PVC SLIP.
7. 2" IP GALVANIZED NIPPLE.
8. 2" CURB STOP - JAMES JONES J-40, MUELLER H-10012, OAE.
9. 2" IP GALVANIZED CAP.

Revisions	Appd.	Dates	HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING	SHEET: W-15
				BLOW - OFF ASSEMBLY
			DRAWN BY: DRD	
APPROVED BY THE DISTRICT ENGINEER _____ DATE _____				SCALE: N.T.S.

TABLE 1

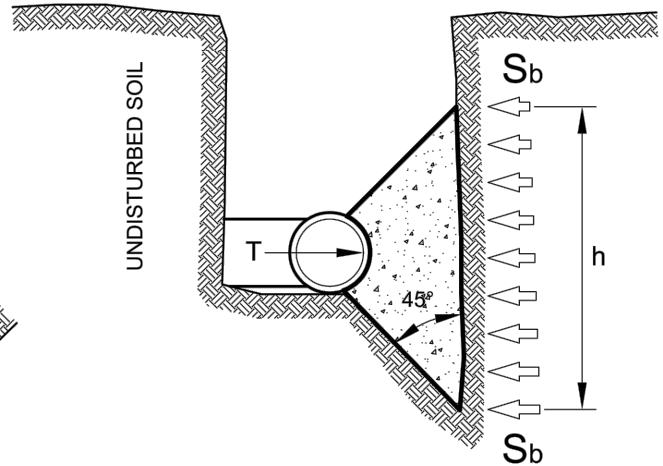
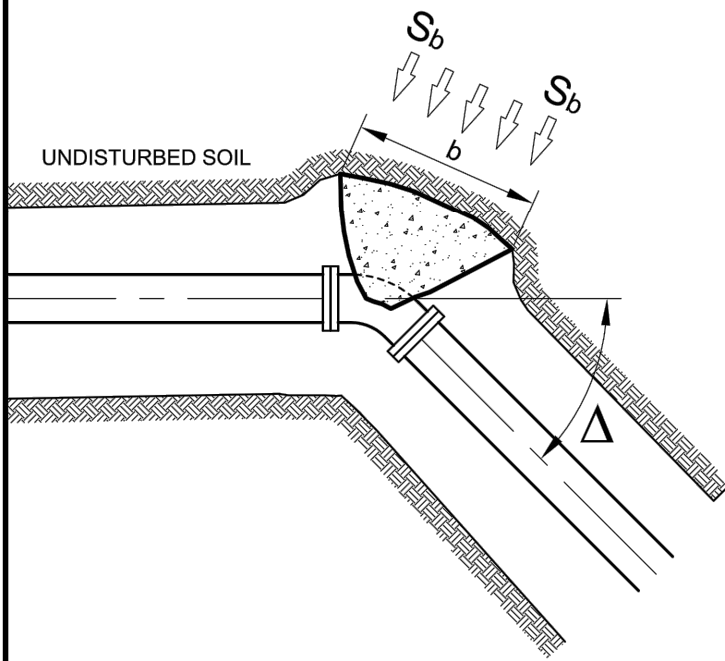
Pipe Dia (in)	Pipe Class	Nom. I.D. (in)	Area (A) (sq in)	THRUST (T) AT FITTING, lbs				
				TEES	90° BEND	45° BEND	22.5° BEND	11.25° BEND
4"	PVC Class 165 (DR 25)	4.39	15	3,254	4,602	2,491	1,270	638
4"	PVC Class 235 (DR 18)	4.23	14	4,005	5,664	3,065	1,563	785
4"	PVC Class 305 (DR 14)	4.07	13	4,619	6,532	3,535	1,802	905
6"	PVC Class 165 (DR 25)	6.31	31	6,723	9,508	5,146	2,623	1,318
6"	PVC Class 235 (DR 18)	6.09	29	8,302	11,740	6,354	3,239	1,627
6"	PVC Class 305 (DR 14)	5.86	27	9,574	13,540	7,328	3,736	1,877
8"	PVC Class 165 (DR 25)	8.28	54	11,577	16,372	8,861	4,517	2,269
8"	PVC Class 235 (DR 18)	7.98	50	14,254	20,158	10,910	5,562	2,794
8"	PVC Class 305 (DR 14)	7.68	46	16,445	23,257	12,587	6,417	3,224
10"	PVC Class 165 (DR 25)	10.16	81	17,431	24,651	13,341	6,801	3,417
10"	PVC Class 235 (DR 18)	9.79	75	21,454	30,340	16,420	8,371	4,206
10"	PVC Class 305 (DR 14)	9.42	70	24,741	34,989	18,936	9,654	4,850
12"	PVC Class 165 (DR 25)	12.08	115	24,641	34,848	18,860	9,615	4,831
12"	PVC Class 235 (DR 18)	11.65	107	30,380	42,964	23,252	11,854	5,956
12"	PVC Class 305 (DR 14)	11.2	99	34,975	49,462	26,768	13,646	6,856
AWWA PVC C-900 PIPE				BASED ON P = 165 + 50 = 215 psi BASED ON P = 235 + 50 = 285 psi BASED ON P = 305 + 50 = 355 psi				

TABLE 2

HORIZONTAL BEARING STRENGTHS FOR COMMON SOILS	
SOIL TYPE	HORIZONTAL BEARING STRENGTH (S _b), lbs/sf
MUCK	0
SOFT CLAY	500
SAND	1,000
SAND & GRAVEL	1,500
SAND & GRAVEL CEMENTED WITH CLAY	2,000

- ALTHOUGH THE ABOVE BEARING STRENGTH VALUES HAVE BEEN USED SUCCESSFULLY IN THE DESIGN OF THRUST BLOCKS AND ARE CONSIDERED TO BE CONSERVATIVE, THEIR ACCURACY IS TOTALLY DEPENDENT ON ACCURATE SOIL IDENTIFICATION AND EVALUATION. THE ULTIMATE RESPONSIBILITY FOR SELECTING THE PROPER BEARING STRENGTH OF A PARTICULAR SOIL TYPE SHALL BE THE RESPONSIBILITY OF THE PROJECTS ENGINEER.
- ALL THRUST BLOCK AREAS SHALL BE PROVIDED ON THE APPROVED PLANS.
- CONCRETE THRUST BLOCKS SHALL CONFORM TO STATE STANDARD 90-1.01, 470 LBS/CY CEMENTITIOUS MATERIAL [5 SACK].
- THRUST RESTRAINT FOR VERTICAL BENDS SHALL USE RESTRAINED JOINT FITTINGS INSTEAD OF THRUST BLOCKS. SUBMIT RESTRAINED JOINT CALCULATIONS PREPARED BY CALIFORNIA REGISTERED CIVIL ENGINEER FOR APPROVAL BY HRCSD.
- THIS THRUST BLOCK DETAIL IS FROM SLO COUNTY DPW, STANDARD W-1.

Revisions	Appd.	Dates	HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING	SHEET: W-16.1
APPROVED BY THE DISTRICT ENGINEER			THRUST BLOCK REQUIREMENTS	DATE: _____
DATE				DRAWN BY: DRD
				SCALE: NONE



LEGEND:

- T = THRUST AT FITTING (lbs) [TABLE 1]
- S_b = SOIL BEARING PRESSURE (psf) [TABLE 2]
- A = INTERNAL AREA (sq in) [TABLE 1]
- P = INTERNAL PRESSURE (psi)
- Δ = HORIZONTAL DEFLECTION ANGLE (degrees)
- S_f = FACTOR OF SAFETY [1.5 FOR THRUST BLOCK DESIGN, TYP]
- h = THRUST BLOCK HEIGHT (ft)
- b = THRUST BLOCK WIDTH (ft)
- A_b = MINIMUM THRUST BLOCK AREA (sq ft)

EQUATIONS:

THRUST AT FITTINGS:

[1] $T = (P)(A)$

THRUST AT HORIZONTAL BEND:

[2] $T = 2(P)(A) \sin(\Delta/2)$

MINIMUM BEARING (THRUST) BLOCK AREA:

[3] $A_b = (h)(b) = [(S_f)(T)]/S_b$

1. THIS THRUST BLOCK CALCULATION IS FROM SLO COUNTY DPW, STANDARD W-1A.

EXAMPLE: DETERMINE THE THRUST BLOCK AREA FOR A 90° BEND, 8" CLASS 165 PIPE IN SAND.

(STEP 1): PRESSURE = 165 + 50 (TEST PRESSURE) = 215 psi. CHOOSE T = 16,372 lbs FROM TABLE 1 SHEET 1/2 (USE EQUATION [2] IF PIPE HAS DIFFERENT INSIDE DIAMETER).

(STEP 2): DETERMINE S_b FROM TABLE 2, SHEET 1/2.

(STEP 3): USE INFORMATION TO CALCULATE A_b USING EQUATION [3]

RESULT: $A_b = [S_f(T)]/S_b = [(1.5)(16,372)]/1,000 = 24.6$ sq ft

Revisions	Appd.	Dates

**HERITAGE RANCH
COMMUNITY SERVICES DISTRICT
STANDARD DRAWING**

SHEET: **W-16.2**

DATE:

DRAWN BY: DRD

SCALE: NONE

APPROVED BY THE DISTRICT ENGINEER

DATE

THRUST BLOCK
REQUIREMENTS

1" WATER SERVICE

PER DRAWING W-04

1" SERVICES SHALL BE INSTALLED FOR SERVICE TO 5/8", 3/4", AND 1" METERS

SERVICE SADDLE

- A. SADDLES FOR C900 PVC WATER MAINS; 1" IP (FIPT) THREADS, BRASS WITH EPOXY COATED 304SS DOUBLE STRAPS; JONES J-969, MUELLER BR2S, FORD 202BS
- B. SADDLES FOR AC, CAST IRON, OR DUCTILE IRON WATER MAINS; 1" IP (FIPT) THREADS, BRASS WITH EPOXY COATED 304SS DOUBLE STRAPS; JONES J-969, MUELLER BR2B, FORD 202B

CORPORATION STOP

1" CC INLET THREAD x 1" I.P. OUTLET THREAD; JONES J-45, MUELLER H15000, FORD F400-4

SERVICE PIPE

SCHEDULE 80 PVC OR POLYETHYLENE, 1" DIAMETER

ANGLE METER STOP

FOR 5/8" AND 3/4" METERS, USE 1" x 3/4" SIZE.
FOR 1" METERS, USE 1" x 1" SIZE JONES J-4202, FORD KV63-342W, FORD KV63-444W, MUELLER 14266

BALL VALVE

FOR 3/4" BALL VALVE; MUELLER 300 BALL VALVE, JONES SUPER STOP, FORD

METER BOX

METER BOXES FOR 5/8", 3/4", AND 1" METERS; METER BOX: CHRISTY B-24, BROOKS 36 SERIES. LID: B24E LID UNLESS OTHERWISE SPECIFIED; PROVIDE B24-61G LID WHEN REQUIRED BY HRCSD STAFF

AIR & VACUUM RELIEF VALVE ASSEMBLY

PER DRAWING W-10

SERVICE SADDLE

- A. SADDLES FOR C900 PVC WATER MAINS; 1", CC THREADS, BRONZE WITH DOUBLE STAINLESS STEEL STRAPS; JONES J-969, A.Y. MCDONALD 3845
- B. SADDLES FOR AC, CAST IRON, OR DUCTILE IRON WATER MAINS; 1" CC THREADS, BRONZE WITH DOUBLE STRAPS; JONES J-979, A.Y. MCDONALD 3825

CORPORATION STOP

1" CC INLET THREAD x 1" I.P. OUTLET THREAD; JONES J-45, A.Y. 3128

SERVICE PIPE

SCHEDULE 80 PVC OR POLYETHYLENE, 1" DIAMETER AND 1" COPPER PER PLAN

COMBINATION AIR AND VACUUM RELIEF VALVE

APCO VALVE AND PRIMER CORPORATION 143C, CRISPIN C10 OR APPROVED EQUAL

ANGLE METER STOP

FOR 5/8" AND 3/4" METERS, USE 1" x 3/4" SIZE.
FOR 1" METERS, USE 1" x 1" SIZE JONES J-4202, FORD KV63-342W, FORD KV63-444W, MUELLER 14266

<i>Revisions</i>	<i>Appd.</i>	<i>Dates</i>	HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING	SHEET: W-17.1
				DATE: _____
				DRAWN BY: DRD
				SCALE: NONE
APPROVED BY THE DISTRICT ENGINEER _____			HRCSD APPROVED MATERIALS LIST	
DATE _____				

WATER VALVE AND VALVE WELL

PER DRAWING W-03

3" THROUGH 12" VALVES
GATE VALVE ONLY;
MUELLER RESILIENT WEDGE A2360, CLOW
RESILIENT WEDGE

12" AND LARGER VALVES
BUTTERFLY VALVES ONLY;
PRATT GROUNDHOG WITH INTERIOR AND
EXTERIOR EPOXY COATING, MUELLER
LINESEAL III

VALVE BOX
CHRISTY G-5
BROOKS 3RT

FIRE HYDRANT ASSEMBLY

PER DRAWING W-01

FIRE HYDRANTS SHALL HAVE TWO 2 1/2" AND ONE 4" OUTLETS
FIRE HYDRANTS SHALL HAVE A 6 HOLE BOLT PATTERN

JONES J-3765 W/ METAL CAPS
CLOW 2060 W/ METAL CAPS

BREAK OFF BOLTS SHALL BE 5/8" x 3 1/2" CADMIUM PLATED BREAK
AWAY BOLTS.

FIRE HYDRANTS SHALL CONFORM TO CDF REQUIREMENTS. CDF FIRE
HYDRANT REQUIREMENTS WILL SUPERSEDE THESE DRAWINGS.

MISCELLANEOUS WATER
SYSTEM MATERIALS

TAPPING SLEEVES
ROMAC SST WITH DUCTILE FLANGE
MUELLER H 304 WITH DUCTILE FLANGE
FORD - FAST

WATERTIGHT WIRE CONNECTORS
SPEARS DS 400

FITTING HARDWARE
ALL VALVE AND FITTING CONNECTIONS SHALL
BE MADE WITH 304 STAINLESS STEEL NUTS AND
BOLTS, 316 STAINLESS STEEL, IF REQUIRED BY DISTRICT
ENGINEER. BOLT THREADS SHALL BE COATED WITH ANTI
SEIZE COMPOUND PRIOR TO TIGHTENING.

FITTING COATING
SEE STANDARD SPECIFICATION 4.5.D.3 REGARDING BURIED
FITTINGS/FLANGES. SEE STANDARD SPECIFICATION 4.5.F
REGARDING PROTECTION OF FITTINGS AND PIPE FROM
CONCRETE ENCASEMENT.

Revisions	Appd.	Dates	HERITAGE RANCH COMMUNITY SERVICES DISTRICT STANDARD DRAWING	SHEET: W-17.2	
				DATE: _____	
				DRAWN BY: DRD	
				SCALE: NONE	
APPROVED BY THE DISTRICT ENGINEER			DATE	HRCSD APPROVED MATERIALS LIST	