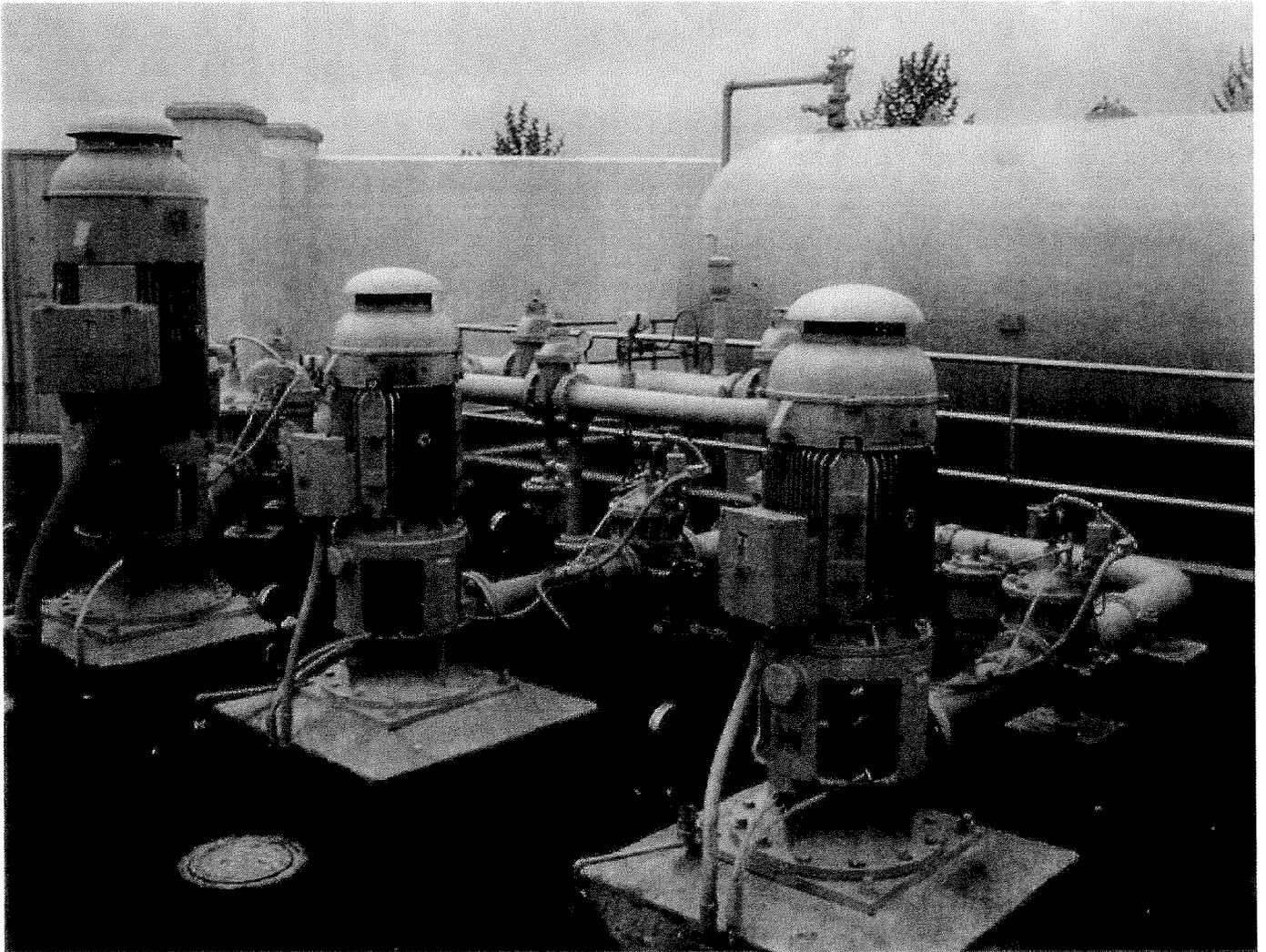


City of Camarillo Water Division



Spanish Hills Pumping Station

Standard Specifications

Revised July 2005

**CAMARILLO WATER DIVISION
CAMARILLO, CALIFORNIA**

**MANUAL OF
STANDARD SPECIFICATIONS**

DESIGN AND CONSTRUCTION STANDARDS

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Revised: July 2005

Note: Owner of this Standard Specification book is responsible for its continual updating.

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FOREWORD

The "City of Camarillo Water Division Standard Plans and Specifications" establishes uniform methods and procedures for the design and construction of City facilities.

This manual is not a textbook or a substitute for engineering knowledge, experience or judgment. Neither does it impose any standard of conduct or duty to the public. Instead, the methods and procedures contained in this manual should be reviewed by the engineer using them to determine applicability to the project on which he is working. When methods and procedures are not applicable, the engineer should request guidance from the City of Camarillo Department of Public Works.

SECTION I – INTRODUCTION

A. Definitions

“Or approved equal” or “Or Director approved equivalent”	Whenever in the specifications or upon the plans the words “or approved equal” or “or Director approved equivalent” appear, it shall be understood that the item referred to may be substituted for by another item if this item is approved by the Director for the particular use intended.
“City”	The City of Camarillo
“Contractor”	The person, firm or corporation entering into an agreement with the City or developer for the performance of work and the construction of facilities to be accepted by the City, or agent appointed to act for said party in the performance of the work.
“County”	The County of Ventura.
“Developer”	An individual or group proposing to subdivide or improve land within the City.
“Director”	Director shall mean the Director of Public Works of the City, or other person designated by the Director to act as his agent.
“Easement”	A recorded document in which the land owner gives the City permanent rights to construct and maintain water mains and/or facilities across private property.
“Engineer”	A professional engineer or a firm of professional civil engineers appointed by and acting for the Department of Public Works.
“Inspector”	An employee or agent of the City engaged to observe and record field compliance with design criteria, plans, and construction standards.

“Laboratory”	The laboratory designated by the Director to test materials and work involved in the contract.
“Plans”	The official plans, profiles, typical cross-sections, working drawings, detail drawings, and supplemental drawings, or exact reproductions thereof, approved by the Department of Public Works, which show the locations, character, dimensions and details of the work to be done.
“Specifications”	The directions, provisions, requirements, and standard drawings pertaining to the method and manner of performing the work and to the qualities of materials to be furnished for acceptance by the City.
“Sub-Contractor”	The person, firm or corporation supplying labor, or labor and materials at the site of the work as a part of the contractor’s obligation under the agreement.
“Department of Public Works”	The department established by the City to maintain the water systems and road systems, and provides review and final approval for all public and private infrastructure (excluding private buildings).

B. Drawings

The following drawings are included as part of this manual.

Standard Drawings

Index:

W-1	Standard Symbols
W-2	Separation Requirements for Water and Wastewater Lines
W-3	Temporary and Permanent Blow-Off Installation
W-4	2" Temporary and Permanent Water Point
W-5	1" and 2" Combination Air and Vacuum Release Valve Assembly
W-6	Water Test Station
W-7	Fire Hydrant Installation
W-8	Fire Hydrant Guidelines

- W-9 Fire Hydrant Installation in Unimproved Areas
- W-10 Fencing Around Fire Hydrant and Water Meters
- W-11 1" and ¾" Water Meter and Service Line Installation
- W-11A Typical Domestic Water Service for Dual ¾" Water Meters
- W-12 Typical Domestic Water Service for 1½" and 2" Water Meters
- W-13 1½" and 2" Water Meter Service Installation with Reduced Pressure Backflow Assembly (RP)
- W-14 3" Turbo Domestic Water Meter Installation
- W-15 4" Turbo Domestic Water Meter Installation
- W-16 3" Turbo Landscape Water Meter Installation
- W-17 4" Turbo Landscape Water Meter Installation
- W-18 3" and Larger Above Ground Water Meter Installation with Backflow Prevention Device
- W-19 Typical Remote Read Water Meter System Installation
- W-20 Water Service for 1½" - 2" Special Installation
- W-21 Water Meter Box for ¾" Water Meter Installation
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- W-22 Water Meter Box for 1" Meter Installation
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- W-24 Water Meter Box for 1½" and 2" Domestic Water Meters
- W-25 Water Meter Box for 3", 4" and 6" Domestic and Landscape Water Meter Installation
- W-26 Typical Fire Line with Double Check Detector Backflow Prevention Assembly (DCDA)
- W-27 Backflow Prevention Assemblies, General Application Terms
- W-28 Reduced Pressure Principle Backflow Prevention Assembly (RP)
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W-55	Hypochlorite Requirement and Guide for New Water Main Disinfection
W-56	Flow Guide for Flushing Newly Installed Water Mains
W-57	Backflow Prevention Requirements for Water Tanker Vehicles
W-58	Trench Terminology and Standard Dimension
W-59	Tapping Sleeves
W-60	Protective Enclosure for Backflow Prevention Assemblies ¾" to 2" in size
W-61	Adjustable Pipe Support
W-62	General Water Plan Notes
E-10.1	(Rev. C) Utility Trench within Pavement

C. Other Requirements

Ordinances, requirements, and applicable standards of governmental agencies having the jurisdiction within the area served by the City's Water Division shall be observed in the design and construction of water mains and facilities. Such requirements include, but are not limited to, current revisions of the following:

1. "Standard Specifications for Public Works Construction," latest edition, including all applicable supplements, prepared and promulgated by the Southern California Chapter of the American Public Works Association and the Associated General Contractors of America.
2. City Drawing No. W-2 regulating the separation between water supply and sewerage facilities.
3. The Uniform Plumbing Code, Latest Edition, as amended by City Ordinance No. 843.
4. Road encroachment regulations of the City/County.
5. American Water Works Association Standards.
6. Title 17 and 22 of the State Health and Safety Code regulating cross connection control and back-flow prevention and City Ordinance No. 809, regulating cross connections for the City Water System.

SECTION II - GENERAL PROVISIONS

A. General Requirements

1. Scope: The design and construction of water mains, facilities and other appurtenances in the City shall comply with these standard specifications, or permit requirements of various governing bodies, except where specific modifications have been approved by the Director in writing. All submitted plans shall be signed by a registered civil engineer and all work shall be in accordance with good engineering practice.
2. Standard Criteria: The City of Camarillo Water Design and Construction Standards set forth the procedure for designing and preparing plans and specifications for water mains, facilities and appurtenances to be built within the City's water service area.

B. Enforcement

Provisions of these Design and Construction Standards shall be enforced by the Director.

C. Construction Plans

1. Sheet Size: Overall dimensions 24" x 36".
2. Materials: Ink on Mylar.
3. Margins: 1 ½" on left, ½" all others ½"
4. Scale: Horizontal 1" = 40 feet.
Vertical 1" = 4 feet.
5. Approval: All drawing sheets shall be provided with title and signature blocks that agree with those currently in use by the Department of Public Works. The approval of the Department of Public Works shall appear on each sheet of the construction plans. Any changes to the drawings after approval by the Director shall be shown as revisions and shall be approved by the Director. The map of the first phase must be accompanied by a tentative map of the complete project.
6. Key Map Sheet
 - (a) This sheet shall contain an overall plan at a scale of 1" = 100 ft. showing general layout, water lines and sizes, valves, named streets, tract boundaries, lot boundaries, and numbers, and a sheet index. The water plan shall be on a separate sheet.
 - (b) A vicinity map with a scale of 1" = 1,000 ft. showing tract boundaries, streets, adjacent tracks, major street outside of tract boundaries and the location of the bench mark.
 - (c) Bench marks used in the project shall be graphically shown on this sheet and the elevations, descriptions, locations, etc., spelled out as illustrated below:

B.M. No. _____ Elev. _____ F.B. _____ Page _____
Type of Marker _____
Location _____

All elevations used in preparation of standard plans shall be based on the current National Geodetic Survey (NGS).

- (d) General Notes shall be shown on the Key Map and need not be shown on the other sheets. The General Notes shall include a note requiring compliance with City construction standards and two-day notice prior to beginning construction.

D. Plan and Profile Sheets

- (a) Graphic Scale and North Arrow. All scales on the plans shall be illustrated graphically so that a true representation is produced when the plans are reduced in size. Every plan drawing shall include a north arrow.
- (b) Plan of Water Main. Plan drawings shall show the location of water mains. These drawings shall include waterline stationing (increase from left to right across sheet where possible); line bearings in easements only; curve data; angle points and their station (show deflection and angles, right or left moving up station); show all station line valves, fire hydrants, blow-offs, air and vacuum valves and/or other miscellaneous appurtenances; water service lines; street or roadway centerlines; curb lines, boundary lines, and names; lot boundary lines, numbers and elevations. For these drawings, north arrow shall point to the top of page or to the left where possible. Show all water line easement boundaries and locate any prominent surface feature or structure.
- (c) Underground Pipes and Utilities. Show and label on the plans and profile the size and ownership of all existing underground utilities that cross or parallel the water main. Non-existing but planned improvements for underground utilities shall also be shown. Any pipe line which crosses the water main and especially the water, sewer, storm drains, open channels, gas, telephone, power, television and oil lines, shall be shown and labeled on the profile with station and elevation. Contractor shall contact utilities for exact location of existing utilities. The City is not responsible for the accuracy of the location of these underground lines, and approval of water main and/or facilities plans by the city does not constitute a representation as to the accuracy of the location, or the existence or non-existence of any underground utility, pipe, or structure within the limits of the project.
- (d) Profile of Water Main. The profile portion of the waterline drawings shall show existing and proposed ground and/or street surface

profiles with appropriate designations of actual surface elevations. For all water transmission mains and other important water lines as designated by the Director, the profile shall contain the maximum and minimum Hydraulic Grade Lines (HGL) for the waterline shown. The profile shall show the waterline, its size, material makeup, pressure class, stationing, and grade. For waterlines 12-inches in diameter and smaller, show top of pipe only. For waterlines 14-inches in diameter and larger, show both top of pipe and invert. On the profile show and locate all line valves, fire hydrants, blow-offs, air and vacuum valves, centerlines of intersecting streets and other appurtenances with both station and elevation where applicable. At every change in pipe slope and in vertical curves, show elevations to top vertical of pipe. The type of bedding or encasement required to carry loads on the pipe shall also be shown and specified. For each section of water main the profile shall show alternate pipe materials that are permissible or whether only one material is acceptable. Show the elevations to nearest 0.01 foot of top of pipe.

SECTION III - DESIGN CRITERIA

A. Water Main Pressures, Capacities, and Sizes

1. Quantity of Domestic Flow. Water needs shall be determined from maximum potential population and land use of the area to be served. For design purposes, the design domestic flow shall equal the peak hour demand. In order to determine the design domestic flow, the following criteria shall be used, unless otherwise approved by the Director:
 - (a) 3.5 persons per residential unit;
 - (b) 220 gal./cap./day;
 - (c) Quantity of fire flow.
 - (d) Peaking factors:

	<u>% of Average Daily Flow</u>
Maximum Day Demand	200
Peak Hour Demand	600

For residential, commercial, manufacturing and industrial, the Director shall be contacted for approval of values to be used.

2. Quantity of Fire Flow. Fire flow shall be determined using the Insurance Services Office Guide for Determination of Required Fire Flow, latest edition, and AWWA-M-31 - Distribution Systems Requirement for Fire Protection. Design criteria for applying fire flows shall require system pressures at the point of delivery to be at least 20 pounds per square inch under maximum day demand conditions.
3. Pressure. Water mains shall be designed so that service pressures range between 40 and 100 psi, except under fire flow conditions where a residual pressure of 20 psi is allowable. In cases where the water main pressures are between 80 and 130 psi, individual pressure regulating valves are required on the customer side of the meter connection. When water main pressures exceed 130 psi, it is required that a pressure regulating valve be installed on the City side of meter connection.
4. Velocity. Water mains shall be designed to provide a mean velocity not more than five (5) feet per second under Maximum Daily Demand flow.
5. Head Loss. Water mains shall be designed to provide a mean head loss of not more than five (5) feet per thousand feet of pipe under Maximum Daily Demand flow.
6. Hazen-Williams "C". Pipe analysis shall be performed by assuming a value of 120 for the Hazen-Williams co-efficient "C" for all pipes up to and including 10-inch diameter pipes. For all pipes 12-inch diameter and larger, assume a "C" Value of 130.
7. Minimum Water Main Size. Water mains shall have an inside diameter of eight (8) inches or more, where fire flow is to be transported. Six (6) inch mains may be permitted by the Director for cul-de-sacs when no fire hydrant is connected to the main.

8. Oversizing. Oversizing of local system improvements and water main extensions shall be in accordance with the City ordinance pertaining to the Water Department.
- B. Location of Combination Air Release and Vacuum Valve Assemblies
Combination air release and vacuum valve assemblies shall be located at all points where air pockets may form and where necessary to prevent vacuums during draining operations at locations shown and/or established by the Director.
 - C. Location of Blow-Off Assemblies
Blow-off assemblies shall be located at low points, dead ends and cul-de-sacs where sediment may collect. Fire hydrants may be substituted for blow-off assemblies. Design class shall be compatible with the pipeline working pressure.
 - D. Fire Hydrant Assemblies
Location of, and fire flow rate at, fire hydrant assemblies shall be approved by the Ventura County Fire Department and the City prior to approval of plans by the Director.
 - E. Water Main Location and Easements
 1. Water Main Location in Roads or Streets. The centerline of water mains shall be located in public streets parallel to and five feet north or west of the street center line whenever possible.
 2. Curved Water Main Requirements. In curved streets, the water main shall not cross the centerline, but shall follow the street curvature.
 3. Joint Deflections for Curved Water Main. The maximum deflection of a curved water main shall not exceed that recommended by the pipe manufacturer.
 4. Water-Sewer Separation Ordinance. The provisions of Ventura County Ordinance Code Section 8600 et seq. shall be met in locating water mains. See Drawing No. W-2.
 5. Easements.
 - (a) Easements. The minimum width of a water main easement shall be 20 feet, unless otherwise approved by the Director of Public Works.
 - (b) Water Main Location in Easement. The water main shall be located 5 feet north or west of the centerline of the easement except where otherwise approved by the Director.
 - (c) Where Easements Follow Common Lot Lines. The full easement width shall be on one lot in such a manner that access to lines will not be obstructed by walls, trees or permanent improvements. Where this requirement cannot be met without interfering with existing buildings, easements may straddle lot lines, but the water line shall not be located on the lot lines.

- (d) Deeds for Easements. Deeds for easements shall provide for restrictions of permanent construction within the easement to provide ingress and egress for maintenance. A recent title report will be required prior to acceptance of the easement.
- (e) Dedication of Easements. Easements shall be provided as follows:
 - (e.1) For subdivision tracts - the owners of land included within the subdivision shall offer to dedicate for public use the water main easements so designated on the final map. The form of dedication shall be as follows: "The City of Camarillo hereby accepts for public use all water main easements delineated and designated on the map, when said map is approved and recorded."
 - (e.2) For other than subdivision tracts, easements for public water mains crossing private property shall occur by means of easement deeds in favor of the City on a form approved by the director.

CITY OF CAMARILLO

(Signature –Mayor)

- (e.2) For other than subdivision tracts, dedication of water main rights-of-way shall occur by means of deeds of conveyance to the City for all dedications other than those dedications created by subdivision tract maps on a form and as approved by the Director.
- (f) Valve Spacing. Valves shall be located so that not more than two adjacent fire hydrants will be out of water due to one break in the distribution system. Distance between valves shall not exceed 600 feet without approval from the Director.

F. Depth of Water Mains

1. Basic Requirements. Water mains shall be installed at a 42-inch minimum depth and in accordance with the Ventura County Ordinances Nos. 1457 and 1596 and City Standard Drawing No. W-2 regulating the separation between water supply and sewerage facilities.
2. Standard Depths. Minimum depth shall be 42 inches to top of pipe. Where the natural ground above the pipeline trench has been overexcavated and/or the pipeline is to be placed in the new embankment, embankment material shall be placed and compacted to an elevation of not less than 3 feet above the top of pipe prior to the trench excavation.
3. Exceptions. Designs not in accordance with subsection F.2 shall be submitted to the Director for approval together with evidence that it complies with subsection F.1.

G. Elbows

Elbows shall be placed at locations where coupling deflection would exceed the allowable, as specified in subsection E.3.

H. Structural Requirements

1. Buried Facilities. All structures and pipe placed underground shall be sufficient strength to support with an adequate factor of safety the following applicable loads: the backfill, road surfacing, H-20 truck loading with impact, high loading to be specified by the Department of Public Works or as required by good design. Calculations showing factor of safety may be required by the Director.
2. Other Pipes and Structures. Water lines designed to cross under other pipes or structures shall be protected from damage and shall be constructed so as not to endanger the other pipe or structure. Minimum clearance between outside of pipes or between pipes and other structures is 12 inches unless otherwise approved by the Director.
3. Flexible Joints. Flexible joints which allow for differential settlements or other movement of water, pipe facilities, adjacent pipe and adjacent structures shall be provided where water lines enter encasements or other structures. Flexible joints shall be within five feet and three inches of such structures. Any deviations from these requirements shall require approval of the Director. Additionally, a rubber wrap around the pipe shall be provided where the pipe enters any structure.
4. Thrust Blocks. Thrust blocks or anchor blocks are required in the following conditions:
 - (a) At abrupt changes in direction, such as elbows and tees.
 - (b) Where the water main changes in size, such as at reducers.
 - (c) Where the line stops.
 - (d) At locations where sudden thrust may be expected, such as valves.
 - (e) At locations required by the Director.
 - (f) When going down a slope which exceeds 30 percent.

SECTION IV - DESIGN CRITERIA FOR STORAGE TANKS

All storage tanks shall be designed by the City using the following criteria:

- A. General
Storage tanks shall be sized to contain emergency storage, regulatory storage and provision for transmission line outage. Emergency storage is principally for fire fighting. Regulatory storage is the volume required to supply the withdrawals from the system which exceed the average rate of production.
- B. Regulatory Storage
The minimum requirement for regulatory storage is volume equal to 80 percent of the maximum daily demands of the population served by the tank.
- C. Emergency Storage
The required emergency storage shall be computed from the information furnished by the Director.
- D. Transmission Line Outage
The amount of storage required shall be as determined from ISO (Insurance Services Office) latest guidelines and AWWA M31 - Distribution System Requirements for Fire Protection.
- E. Minimum Storage
The minimum reservoir storage required shall be as identified in the current City Water System Master Plan.

SECTION V - DESIGN CRITERIA FOR PUMPS

It is required that pump stations be designed with at least two pumps so that standby and emergency capabilities are available at each pump station. Each pump station shall be capable of supplying the maximum daily flow plus that flow necessary to replace the volume of one full fire flow in a period of 72 hours (3 days). Each pump station will have one standby pump with a capacity of the largest undivided pump at that station. At every pump station, it is required that a control system be set up so that each pump operates approximately the same amount of time in any given period. In analyzing pump horsepower requirements, it shall be assumed that the pump overall operating efficiency is at least 70 percent. Pump stations shall have telemetry compatibility with system telemetry.

SECTION VI - DESIGN CRITERIA FOR WATER METERS

The City shall determine the appropriate meter sizes and types based on the building plumbing plans and the landscape sprinkler plans furnished by the developer. Unless otherwise required by the Director, the aforementioned determination is not required for single-family residential units where a 3/4" meter for each unit is automatically required.

Apartment/Condominium Conversions:

Prior to obtaining zone clearance, the developer shall:

Agree to at his option, one of the following:

- a. Redesign and reconstruct the existing onsite water system eliminating the master meter system and installing individual water meters to each single family unit.
- b. Retain the existing master meter system with the understanding that all domestic water billings will be based on rates appropriate to individually metered single family living units.

New Condominiums - Townhouse Construction:

The developer shall design the onsite water system to provide individual water meters to each single family living unit.

SECTION VII – MATERIALS

- A. Requirements. Materials shall be chosen for their strength, durability and ease of maintenance, with due consideration for dead and live loads, beam strength and resistance to corrosion. Pipe joints shall be selected to provide sufficient flexibility to adjust to the residual conditions during and after construction. Only those materials listed in Section B below shall be used unless otherwise approved by the City.
- B. Pipe Materials. The following are acceptable materials for water line construction:
1. Polyvinyl Chloride Pipe (PVC).
 - (a) PVC pipe and fittings shall conform to the applicable sections of the standard specification for Public Works construction and AWWA C900 for pipe sizes 4-12 inches, AWWA C905 for pipe sizes 14-48 inches and AWWA M23 PVC Pipe Design and Installation manual.
 - (b) Class of Pipe is as follows and shall be approved for use by the Director.
C900 DR 18 Class 150
C900 DR 14 Class 200
C905 DR 25 Class 165
C905 DR 18 Class 235
 - (c) PVC solvent cement joints are not approved for use within the City distribution system.
 2. Steel Water Pipe and Fittings. Shall conform to the applicable section of the standard specification for Public Works construction and the following AWWA standards and design manual.
 - (a) C200-97 Steel Water Pipe - 6" and Larger
 - (b) C205-00 Cement - Mortar Protective Lining and Coating for Steel Water Pipe – 4 inch and Larger – Shop Applied
 - (c) C206-97 Field Welding of Steel Water Pipe
 - (d) C207-01 Steel Pipe Flanges for Waterworks Service – Sizes 4 in. Through 144 in.
 - (e) C208-01 Dimensions for Fabricated Steel Water Pipe Fittings
 - (f) C210-97 Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines
 - (g) C213-01 Fusion – Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines
 - (h) C218-02 Coating the Exterior of Above Ground Steel Water Pipelines and Fittings
 - (i) C219-01 Bolted, Sleeve-Type Couplings for Plain End Pipe
 - (j) C221-01 Fabricated Steel Mechanical Slip Type Expansion Joints
 - (k) AWWA M11 Steel Pipe - A Guide for Design and Installation

3. Cast Iron and Ductile Iron (DI) Pipe
- (a) Cast Iron or Ductile Iron Pipe and Fittings shall conform to the standard specifications for Public Works Construction and applicable AWWA standards.
 - (b) Cast Iron or Ductile Iron Pipe and Fittings shall be furnished in the sizes and classes, grade or nominal thickness, and joint types shown on the plans or in the specifications.
 - (c) Ductile Iron Pipe and Fittings shall comply with the following AWWA standards:
 - (1) C104/A21.4-95 Cement Mortar Lining for Ductile-Iron Pipe and Fitting.
 - (2) C105/A21.5-99 Polyethylene Encasement for Ductile-Iron Pipe Systems
 - (3) C110/A21.10-98 Ductile-Iron and Gray-Iron Fittings, 3 in. Through 48 in. for Water
 - (4) C111/A21.11-00 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
 - (5) C115/A21.15-99 Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
 - (6) C150/A21.50-02 Thickness Design of Ductile-Iron Pipe.
 - (7) C151/A21.51-02 Ductile-Iron Pipe, Centrifugally Cast for Water
 - (8) C153/A21.53-00 (Only with specific written approval by the Director) Ductile-Iron Compact Fittings, 3 in. Through 24 in. for Water Service
 - (9) AWWA Manual M41 Ductile-Iron Pipe Fittings.
 - (d) Fittings. All rubber gasket, push on, mechanical and flanged joint fittings for cast or ductile iron water pipe shall be manufactured in accordance with AWWA-C110/A21.10.
 - (e) Coating and Lining: Outside coating - the outside coating for use under normal conditions shall be an asphaltic coating approximately 10 mil thick. The coating shall be applied to the outside of all pipe unless otherwise specified. The finish coating shall be continuous, smooth, neither brittle when cold nor sticky when exposed to the sun, and shall be strongly adherent to the pipe.
 - (f) Cement Mortar Lining. Cement mortar lining shall be in accordance with the latest revision of AWWA C104/A21.4.
 - (g) Marking Pipe. The weight class or nominal thickness and casting period shall be shown on each pipe the manufacturer's mark, county where cast, year in which the pipe was produced and letters "DI" or Ductile Iron shall be cast or stamped on the pipe. All markings shall be clear and legible, and all cast marks shall be on or near the bell.

- (h) Polyethylene Encasement for External Corrosion Protection. When loose polyethylene encasement for the protection of Ductile Iron and Cast Iron Pipe and Fittings, valves, and appurtenances is specified in the plans or specifications, it shall be furnished and installed in accordance with the requirements of AWWA C105/A21.5-99.
- (i) Thickness Design for Ductile Iron Pipe shall comply with AWWA C150/A21.50-02.
- (j) Flanged Ductile Iron Pipe with threaded flanges shall comply with AWWA C115/A21.15-99.
- (k) Ductile Iron Compact Fittings when approved for use by the Director shall comply with AWWA C153/A21.53-00.

4. Steel Mortar Lined and Coated Pipe and Fittings Installation

- (a) Trenching, Bedding, Backfilling and Compaction. Trenching, bedding, backfilling and compaction for all pipe shall conform to Subsection 306-1 of the Standard Specifications as modified hereinbefore. Sand bedding shall be required.
- (b) Handling of Pipe and Fittings. Whenever a section of pipe or fitting is to be lifted or moved, it shall be handled with belt slings in such a manner as to not distort the dimensional integrity of joint configuration and pipe roundness or damage the lining or coating in any way. The belts shall be constructed so that no metal bears against the pipe and so as to provide uniform bearing thereon. The width of belts shall be adequate to prevent any damage to the coating. The pipe section or fittings may at no time be dropped, but shall be lowered carefully into position. The use of equipment which would damage the coating during handling is prohibited. No Steel Cable Slings will be permitted. Spreader bars must be used for lengths over 20 feet.

Pipe installed in the trench shall have uniform bearing along the bottom of the trench, except at bell holes for welded joints and at locations where excavation below grade has been performed to provide for required structures.

- (c) Welded Joints. Welded joints shall be lap welded - double lap welded for 24-inches and larger - or joined by butt-strap connection. Application of mortar on single lap joints shall conform to joining of rubber gasket joints hereinafter. Butt straps shall be furnished by the pipe manufacturer and shall be accurately fabricated to fit the outside diameter of the steel cylinders to be joined. The strap shall be shipped in two pieces with a handhole of sufficient size to permit mortar lining of the completed joint by hand. The welded joint shall produce a connection equaling or surpassing the strength of the adjacent pipe. Peening of the first weld pass

shall be performed to relieve stresses, unless otherwise directed by the Engineer. Welding shall comply with the requirements of AWWA Standard Specifications for "Field Welding of Steel Water Pipe" C206. The handhole shall be sealed by a threaded cast-iron plug. The outside joint recess shall be thoroughly cleaned by wire brushing. Hot applied coal tar enamel coating shall be applied to the metal surface to a minimum thickness of 1/8-inch, plus or minus 1/32-inch. The joint recess shall then be filled with reinforced mortar having a portion of one part cement or two parts of sand. Wire reinforcement for the mortar shall be 2-inch x 4-inch Number 12 gauge wire. All pipe joints above ground or vaults shall have welded joints unless otherwise directed by the City.

- (d) Joining with Rubber Gasket Joints. After the subgrade has been properly prepared, the pipe shall be carefully lowered into the trench. Before joining the spigot into the bell of the pipe previously laid, the spigot groove, the rubber gasket, and the bell shall be thoroughly cleaned. Then the spigot groove, the rubber gasket, and the first two inches of the bell shall be lubricated with a soft, vegetable soap compound. The gasket shall be positioned in spigot groove so that the rubber is distributed uniformly around the circumference, not twisted, rolled, cut, crimped or otherwise injured. Uniform distribution of gasket may be accomplished by passing a smooth, round steel rod under the gasket and up onto opposite edge of gasket groove, then moving the rod in this position around the entire circumference of the spigot. The pipe shall be joined together by inserting the spigot into the bell to provide the proper space between abutting ends of pipe. To maintain the proper laying length, the width of the space provided at the joint may be varied to compensate for the permissible manufacturing tolerance in pipe lengths of plus or minus 1/4 inch. For slight changes or corrections in alignment and grade, joints may be pulled on one side of pipe. The amount of deflection must not exceed that specified by the manufacturer of the pipe for the type of joint being used.

After a joint is assembled, a thin metal feeler gauge shall be inserted between the bell and spigot and the position of the rubber gasket checked around the complete circumference of the pipe. If the gasket is not in proper position, the pipe shall be withdrawn, the gasket checked to see that it is not cut or damaged, the pipe relaid and the gasket position again checked. At each rubber gasket joint that is not welded, continuity shall be established by welding two 1/4-inch copper jumper rods, 6-inches long, 90° apart. The rods shall be welded using the exothermic process so that at least 2-inches of the length of each copper rod shall be in continuous

contact with each end of the pipe. In lieu of copper rods, copper straps having the same cross section area may be used.

Prior to assembling the joint, the inside shoulder of the bell shall be "battered" with a mortar of the consistency of thick cream, consisting of 1 part of Portland Cement to 1-1/2 parts of sand. For 16-inch pipe and smaller an accessory such as a specially designed rubber ball wrapped with burlap shall be used to: (1) provide back-up against which the mortar is squeezed while the centered spigot is pushed "home" and (2) hold the mortar in place in the assembled joint while alignment and grade are adjusted as the next bell is "battered" and the next spigot is centered. The accessory shall screed off excess mortar to leave a smooth and continuous surface between pipe sections as it is drawn through the pipe.

Repair of mortar lining, if necessary, shall be accomplished by pulling a swab with mortar through the pipe until a smooth surface is obtained.

For 20-inch pipe and larger, the mortar shall be tightly packed into the joint recess and hand pointed by operators highly skilled in such work, and the interior surfaces of the joint shall be finished off flush with the adjoining surfaces and to a smoothness equal to that of the spun mortar lining.

- (e) Field Applied Mortar, Exterior. After joining mortar-coated pipe, a porous cloth diaper at least 14-inches in width shall be centered and secured over the exterior joint recess. The joint band shall be bound to the pipe by the use of steel box strapping or by an equivalent method and shall completely and snugly encase the outside joint except for an opening near the top where mortar grout is to be poured into the joint recess. After the joint band is properly secured, the joint recess shall be moistened with water and then filled with mortar consisting of 1 part Portland Cement and 2 parts of sand mixed with water to the consistency of thick cream. The cement used for this purpose shall be Type II conforming to Federal Specification SS-C-192. The mortar grout shall be poured on one side of the pipe only and shall be worked by patting the exterior of the cloth diaper to insure that the mortar shall completely fill the outside annular space between the ends of the pipe and around the complete circumference. After the recess has been filled, a joint band shall be placed over the opening left for pouring and the mortar allowed to set before bedding and backfilling at the joint. After the mortar has set, the pipe and its joint should be shaded with bedding material to protect it from extreme

temperature changes and as an aid for proper alignment when subsequent sections are laid.

5. Air and Vacuum Valve Assemblies

- (a) General. Air and vacuum assemblies shall be furnished and installed by the Contractor at all points where air pockets may form and at the locations shown and/or established in the field by the Director. The Contractor shall furnish all labor, materials, tools and equipment necessary to furnish and install, complete and ready for operation, the valve assemblies shown on the plans and herein specified.
- (b) Materials, Fabrication and Installation
 - (1) Materials, Fabrication and Installation shall be in accordance with Standard Drawing W-5.
- (c) Testing and Sterilization. Air and vacuum valve assemblies shall be tested and sterilized in accordance with the Standards for Field Testing and Sterilizing water mains.

6. Blow-Off Assemblies, Water Mains Less than 12" Diameter

- (a) General. Blow-off assemblies shall be furnished and installed by the Contractor at low points and dead ends, where sediment may collect, and at the locations shown on the plans. Design class shall be compatible with pipeline working pressure. The Contractor shall furnish all labor, materials, tools and equipment necessary to furnish and install, complete and ready for operation, the assemblies as shown on the plans and herein specified.
- (b) Materials, Fabrication and Installation
 - (1) Materials shall be those designated on the Standard Drawings or plans.
 - (2) Pipe and Fittings. Copper tubing shall be Type K soft covered with plastic sleeving. All copper tubing connections shall be made with solder fittings using MG 380 Brazing Alloy with 15% silver solder or equal. Brass pipe or compression fittings shall be as designated on the Standard Drawings.
 - (3) Pipe Sleeves and Covers. PVC pipe sleeves shall be used. Valve box covers shall be Christy G-3 or Director approved equivalent and marked "Water." Covers shall be seated flush with the surface of the natural ground or paved surface such that they may not be damaged by, nor present an obstruction or rough surface, to traffic.
 - (4) Painting. All exposed metal surfaces shall be painted and/or coated in accordance with these Standards for Earthwork and Backfill.
 - (5) Earthwork and Backfill. Earthwork and Backfill shall be in accordance with these Standards for Earthwork and Backfill.

- (c) Testing and Sterilization. Blow-off assemblies shall be tested and sterilized in accordance with these Standards for Field Testing and Sterilizing Water Mains.

7. Blow-Off Assemblies for Water Mains 12 Inches and Larger

- (a) General. Six-inch blow-off assemblies shall be furnished and installed by the contractor at the locations shown on the plans. The contractor shall furnish all labor, materials, tools and equipment necessary to furnish and install, complete and ready for operation, the assemblies as shown on the plans and herein specified.
- (b) Materials, Fabrication and Installation.
 - (1) Materials shall be those designated on the Standard Drawings or plans.
 - (2) Valves. Gate valves or Butterfly valves for blow-off assemblies shall be as specified hereinafter.
 - (3) Pipe and Fittings shall be 6-inch standard ductile and shall conform with AWWA Standard C104/A21.4-95 for ductile iron pipe. The pipe shall be lined and coated. Cement mortar lining shall be 1/4 inch in thickness. Field joints on the water main side of the gate valves shall be flanged. Field joints on the outlet side of the gate valve shall be flanged.
 - (4) Pipe Sleeves and Covers. PVC pipe sleeves shall be used. Valve box covers shall be Christy G-3 or Director approved equivalent and marked "Water." Covers shall be seated flush with the surface of the natural ground or paved surface, such that they may not be damaged by, nor present an obstruction or rough surface to, traffic.
 - (5) Painting. All exposed metal surfaces shall be painted and/or coated in accordance with the Standards for Painting. Paint colors shall be determined by the Director.
 - (6) Earthwork and Backfill. Earthwork and Backfill shall be in accordance with the standard for Earthwork and Backfill.
- (c) Testing and Sterilization. Six-inch Blow-off assemblies shall be tested and sterilized in accordance with the Standards for Field Testing and Sterilizing Water Mains.

8. Butterfly Valves

- (a) General. These specifications designate the requirements for the manufacture and installation of butterfly valves. The contractor shall furnish all labor, materials, tools and equipment necessary to furnish and install, complete and ready for operation, the valves as shown on the plans and herein specified.
- (b) Materials and Workmanship
 - (1) Butterfly Valve shall be of the short body type. They shall be tight closing, rubber seated valves conforming to the latest

revision of AWWA C504, except as herein modified. Valves shall be Class 150-B designed for tight shut off with a maximum differential pressure across the disc of 150 psi. Valve shafts shall consist of a one-piece unit extending completely through type 316 except where completely sealed from water in the valve. Valve disc fasteners shall be 18-8 stainless steel type 316. Valve discs shall be of alloy cast-iron, conforming to ASTM A 436, Type 1. Valve disc shall be rubber coated. The valve disc shall rotate 90° from fully open to the tightly shut position. All exposed cap screws, and fasteners on the valve body and flanges shall be 18-8 stainless steel, Type 316. Butterfly valves shall have flanged, mechanical, or push on joint ends.

- (2) Valve Operators shall be of the manual type. The operators shall be totally enclosed, self-locking, worm gear or screw type with adjustable stops to limit disc travel. The number of complete turns of the operator required to rotate the disc 90° shall be approximately the same as an equivalent size gate valve. All valve operators shall be fully gasketed, weather-proof and factory-packed with grease. Operators shall be of the size required for opening and closing the valve against 150 psi water pressure, and they shall have a torque rating not less than that shown in AWWA C504, Table 1, Class 150-B. Should the distance between the operating nut and the valve cover exceed 50 inches, an extension mast shall be installed in order that the operating nut not exceed 50 inches from the valve cover. Valve stem extension to be installed per Drawing No. W-47. Buried operators shall be worm gear or screw type and shall be equipped with standard AWWA two-inch operating nuts. All exposed fastenings shall be Type 316 stainless steel. Operators shall be specifically designed and suitable for permanent buried service.

Operators for valve(s) located above ground shall have disc-position indicators and a hand wheel.

- (3) Exterior Coating. Valve bodies and operator housings and extensions shall be coated with a minimum 8 mil epoxy coating. Application shall be at the place of manufacture. The coating shall be applied after the surface has been sandblasted to "commercial" standard as defined in SSPC Specification No. 6. The paint manufacturer's application recommendations shall be followed.
- (4) Earthwork shall be done in accordance with the Standard Specifications for Earthwork (Water Mains).

- (5) Valve Boxes, Nuts and Bolts, Gaskets and Marker Posts shall conform to the provisions specified herein for Gate Valves.
- (6) Painting. All exposed metal surfaces of valves installed above ground or in vaults shall be painted in accordance with the Standard Specifications for Painting. Paint colors shall be determined by the Director.
- (c) Testing and Sterilization. Butterfly valves shall be tested and sterilized in accordance with the Standards for Field Testing and Sterilizing water mains.

9. Fire Hydrant Assemblies

- (a) General. Fire hydrant assemblies shall be furnished and installed by the contractor at the locations shown on the plans and/or established in the field by the Director. The contractor shall furnish all labor, materials, tools and equipment necessary to furnish and install, complete and ready for operation, the assemblies as shown on the plans and herein specified.
- (b) Materials, Fabrication and Installation
 - (1) Materials shall be those designated on the Standard Drawings or plans.
 - (2) Fire Hydrants shall be in accordance with City Drawing Nos. W-7 and W-8. Fire hydrant heads shall meet the requirements of AWWA Standard C503-97.
 - (3) Guard Posts required except when fire hydrant assemblies are located behind curb.
 - (4) Hydrant Spools shall be cast-iron spools six inches in diameter. The exterior surface shall be painted in accordance with the Standards for Painting. Where there is no curb, the elevation of the top of the riser shall be equal to the center of the street elevation or as determined by the Director.
 - (5) Hydrant Bury and Spools shall be six-inch inside diameter cast iron. The exterior surface shall be coated with a corrosion resistant coal tar pitch varnish.
 - (6) Valves shall conform to the applicable provision of the Standard Specifications for RW gate valves and shall be bolted to the water main tee or flanged outlet.
 - (7) Nuts and Bolts shall conform to the applicable provisions of the Standards for Gate Valves, except that center notched alloy steel break-off bolts will attach fire hydrant to spool.
 - (8) Earthwork and Backfill shall conform to the provisions of the Standards for Earthwork and Backfill.
 - (9) Painting shall conform to the provisions of the Standards of Painting. Finish color shall be Rustoleum yellow #7644.

- (c) Testing and Sterilization. Fire hydrants shall be tested and sterilized in accordance with the Standards for Field Testing and Sterilizing water mains.

10. Gate Valve Assemblies

- (a) General. Gate valve assemblies shall be per AWWA Standard Specification C509 and shall be furnished and installed by the contractor at the locations shown and/or established in the field by the Director. The contractor shall furnish all labor, materials, tools and equipment necessary to furnish and install, complete and ready for operation, the valves as shown on the plans and herein specified.

- (b) Materials, Fabrication and Installation

- (1) Gate Valves. Gate valves, unless otherwise indicated, shall be the same size as the main or service in which they are installed. Valves shall be rated by the manufacturer for the working pressure of the pipeline in which they are installed. All gate valves shall be counter-clockwise opening. Buried gate valves shall be equipped with two-inch square cast iron operating nuts. Exposed gate valves shall have handwheels. Gate valves may be used on Class 400 service up to a maximum diameter of 6 inches. Gate valves, 2 inches through 10 inches, shall be Class 200 Mueller Series A-2360, or approved equal. Gate Valves 12-inches and larger shall be provided with a bypass.

- (1a) Gate Valves, 2 Inches Through 4 Inches. Gate valves shall meet the requirements of AWWA C509-94. Gate valves shall be non-rising stem, iron body, solid bronze internal working parts, parallel faced, with bottom wedging discs and O-ring stuffing box. The minimum designated water working pressure shall be 200 psi. Bronze for all internal working parts except stems shall be constructed of ASTM B62-60 (85-5-5-5) bronze. The stem bronze shall not contain more than 2% aluminum nor more than 7% zinc and shall have the additional strength requirements: a minimum tensile strength of 60,000 psi, and a minimum of 10% elongation in 2 inches.

- (1b) Resilient gate valves 4-Inch through 12-Inch. Resilient-seated gate valves finished and installed under these specifications shall comply with ANSI/AWWA C509 or C515 as augmented and modified herein and shall have iron or steel bodies, solid wedge, resilient seat, epoxy resin interior lining and exterior coating, nonrising stem, and

counterclockwise opening. Stem seal shall incorporate at least two O-rings. Thrust bearing washer shall be located at the thrust collar to reduce friction. Valves shall be furnished with a 2-inch square, cast iron operating nut. The operating nut shall be between 24 to 36 inches below finished grade and shall be protected by a valve box and cap. The use of approved valve stem extension is permitted. The wedge shall be cast iron or ductile iron, with guide bars or channels for controlled movement, and may have a bronze stem nut cast integrally. The wedge shall be ruggedly constructed for resistance to deflection. The wedge shall be fully encapsulated. If bonded, the method used for rubber to metal bond shall be in accordance with ANSI/ASTM D 429. The peel strength shall not be less than 75 psi. If mechanically attached, devices and hardware used to retain the resilient seat shall be of a corrosion resistant material. The wedge shall be accurately machined to receive the resilient seat. Cast iron shall meet the requirements of ANSI/ASTM A 126, Class B. Ductile iron shall meet the requirements of ANSI/ASTM D 395, Grade 65-45-12. Rubber for the valve seat shall be new, natural, or synthetic, and of a compound designed for water service application and shall be resistant to microbiological attack, copper poisoning, and ozone attack. Rubber seat compounds shall have a maximum compressive set value of 18 percent when tested in accordance with ANSI/ASTM D 395, Method B for 22 hours at 158°F. Reclaimed rubber shall not be used. Stems shall be made of "Ni-Vee," "NDZ," or other bronze of equal strength, corrosion resistant, and shall have a minimum tensile strength of 60,000 psi, minimum yield strength of 30,000 psi, and not over five percent zinc or over two percent aluminum. Flange ends shall be flat-faced for 200 psi working water pressure and shall conform in dimensions and drilling to ANSI B16.1 for 125 pound cast-iron flat faced flanges. Each valve shall be tested hydrostatically after application of epoxy resin interior lining at the specific WWP of 200 psi and at the fully hydrostatic test pressure of 400 psi. All valves are to be new and of the latest design. The following named valves or approved equivalents are acceptable when manufactured in accordance with

- these Specifications: Clow Corporation, Stockham, Kennedy Valve, American Flow Control, American AVK, or Engineer approved equivalent. The following information will be shown on the plans: Size, class, end types, and a description of any special requirements such as bypass size and mounting, position indicator, gears and cases, tracks and rollers, and any deviations from the above standard specification, operating nuts, hand wheels, etc.
- (1c) Interior and Exterior Coating. Valve bodies, except bronze, and operator housings and extension shall be epoxy coated. After all irregularities, burrs, and grease have been removed and immediately after surfaces to be coated have been sand blasted to white metal, followed by air blowing to remove dust, a 10 mil or thicker coat of holiday-free, high-impact, nonshattering, high-adhesion, tasteless, odorless, nontoxic epoxy resin shall be evenly applied on all interior waterway and exterior ferrous metal surfaces of the valves, according to the manufacturer's instructions and ANSI/AWWA C550. The epoxy resin shall be either "Scotchkote No. 302" or "Keysite 740," or approved equivalent.
- (2) Nuts and Bolts used for bolting flanged-end gate valves to pipeline flanges above ground, shall be hexagonal head machine bolts and hexagonal nuts conforming to ASTM A 307, Grade B. All buried flanged-end gate valves shall be bolted to the pipeline flanges with stainless steel nuts and bolts, Type 316 except that all nuts and bolts 1-1/8 inch and larger in diameter shall be cadmium plated alloy steel. All bolt threads shall be lubricated with graphite and oil.
- (3) Gaskets. Gaskets for flanged-end gate valves shall be ring face 1/8 inch "Cranite" or approved equal.
- (c) Testing and Sterilization. Gate valve assemblies shall be tested and sterilized in accordance with these Standards for Field Testing and Sterilizing Water Mains.
11. Corrosion Protection. All iron or steel surfaces such as valves, flanges, nuts, bolts, couplings, etc., that will be permanently in contact with earth or backfill shall be protected by coating with 1/8-inch thick coat of No-Ox-Id special rust preventative, protective coating manufactured by Deerborn Chemical Division, Lake Zurich, Illinois, and covered with clear plastic wrap. The coating and wrapping shall be repeated two more times to make a total of three layers of coating and wrap.

C. Painting

1. General. These specifications designate the requirements for the preparation of surfaces, and manufacture and application of paints. The Contractor shall furnish all labor, materials, tools, and equipment necessary to provide finished painted surfaces as indicated.
2. Contractor Submittals. The contractor shall provide six (6) copies of a coating materials list which indicates the manufacturer and the coating number for approval of the Director prior to or at the time of submittal of samples.
3. Manufacturer's Recommendations. Unless otherwise specified herein, the coating manufacturer's printed recommendations and instructions for thinning, mixing, handling, applying, and protecting his coating materials, and for preparation of surfaces for coating shall be strictly observed. No substitutions or other deviations will be permitted without written permission of the Director.
4. Preparation for Coating. All surfaces to receive protective coatings shall be cleaned as specified herein prior to application of said coatings. The Contractor shall examine all surfaces to be coated, and shall correct all surface defects before application of any coating material. All marred or abraded spots on shop-primed and on factory-finished surfaces shall receive touch-up restoration prior to any other coating application.
5. Surface Preparation
 - (a) The following referenced surface preparation specifications of the Steel Structures Painting Council shall form a part of these specifications.
 - (1) Solvent Cleaning (SSPC-SP1)
Removal of oil, grease, dirt, soil, salts, and contaminants by cleaning with solvent, vapor, alkali, emulsion or steam.
 - (2) Hand Tool Cleaning (SSPC-SP2)
Removal of loose rust, loose mill scale, and loose paint to degree specified, by hand chipping, scraping, sanding, and wire brushing.
 - (3) Power Tool Cleaning (SSPC-SP3)
Removal of loose rust, loose mill scale, and loose paint to degree specified, by power tool chipping, descaling, sanding, wire brushing, and grinding.

- (4) White Metal Blast Cleaning (SSPC-SP5)
Removal of all visible rust, mill, scale, paint, and foreign matter by blast cleaning, by wheel or nozzle (wet) using sand, grit, or shot.
- (5) Commercial Blast Cleaning (SSPC-SP6)
Blast cleaning until at least two-thirds of each element of surface area is free of visible residues.
- (6) Near-White Blast Cleaning (SSPC-SP10)
Blast cleaning nearly to white metal cleanliness, until at least 95% of each element of surface area is free of all visible residues, and achieves a 2-mil minimum anchor profile.

6. Materials and Application

- (a) Paints shall be those designated. All colors are to be selected by the Director. Materials shall be unadulterated and shall be delivered to the job site in original, unbroken packages bearing the brand and the manufacturer's name. They shall be opened and mixed at the job site.
- (b) Workmanship. Workmanship shall be of a kind and quality meeting the requirements of the best standards of the painting industry. All work shall be done by skilled and experienced painters. Surfaces to be painted shall first be thoroughly cleaned to remove dirt, loose scale, rust, oil, grease and/or other foreign matter immediately prior to painting. Cleaning shall be done with abrasives, scrapers, wire brushes and/or other means approved by the Director. Each coat shall be applied in such a manner as to assure an even, smooth, uniform adhering coat free from dirt, runs, brush marks and laps, and shall be applied as recommended by the manufacturer. Painting will not be permitted when freshly painted surfaces may become damaged by rain, fog, or condensation or when inclement weather can be anticipated. Fresh paint damaged by the elements shall be replaced by the Contractor at his expense. Drop cloths shall be used to protect floors, equipment, piping and other exposed surfaces from spattering and spillage. Paint shall be allowed to dry thoroughly between application of successive coats. The manufacturer's recommended time between coats will be used as a guide by the Director as to when the next coat of paint may be applied. The Director must give approval before successive coats are applied. The Contractor shall notify the Inspector after surface preparation and after the application of each successive coat of paint. Spray painting will not be permitted unless specifically authorized by the Director.
- (c) Colors. Colors of finish coats will be selected by the Director.
- (d) Acceptable Equals. Acceptable equals of certain of the paint products specified are manufactured by Tnemec, Devoe and

Rustoleum. Substitution can be made upon written approval of the Director.

- (e) Metal Surfaces. Metal surfaces after cleaning shall receive one primer coat of a minimum film thickness of 1.5 mils or equivalent conditioning or seal coat and two finish coats of 2 mil thickness each. Total dry film thickness must be a minimum of 5.5 mils.

- (e-1) Brass, Bronze, Aluminum and Galvanized Metal shall be cleaned but not painted unless it forms a small part of an entire installation that is being painted. If in non-submerged locations, after cleaning, prime with Tnemec Series 27.

Finish coats in vaults and other inside locations shall be two coats of Tnemec Series 66. Finish coats of outside locations shall be two coats of Tnemec Series 2H (alkyd).

- (e-2) Cast Iron. Cast iron and other bitumen coated metals shall be cleaned to remove loose bitumen material and primed with one coat of Tnemec Series 27. Finish coats in vaults and other inside locations shall be two coats of Tnemec Series 66. Finish coats for outside locations shall be two coats of Tnemec Series 2H.

- (e-3) Steel Surfaces. Surface preparation shall be Commercial blast cleaning as specified in these standards and shall receive one shop prime coat of Tnemec Series 27. Finish coats in vaults and other inside locations shall be two coats of Tnemec Series 66. Finish coats for outside locations shall be two coats of Tnemec Series 2H.

- (f) Wood Surfaces shall be cleaned of dirt, oil, or other foreign substances with mineral spirits, scrapers, sandpaper, or wire brushes. Finished surfaces exposed to view shall, if necessary, be made smooth by planing or sandpapering. Mill work shall be sandpapered where necessary, and given a coat of the specified primer on all sides before installation. Small, dry, seasoned knots shall be surface scraped, sandpapered, and thoroughly cleaned and shall be given a thin coat of Knot Sealer before application of the priming coat. Large, open, unseasoned knots and all beads or streaks of pitch shall be scraped off, or if the pitch is still soft, it shall be removed with mineral spirits or turpentine, and the resinous area shall be thinly coated with Knot Sealer. After priming, all holes and imperfections shall be filled with putty or plastic wood (colored to match the finish coat), allowed to dry, and sandpapered smooth. Painting of interior wood surfaces shall proceed, insofar as practicable, only after masonry work has dried.

Existing wood shall be cleaned of all loose or flaking paint and sandpapered as required.

(f-1) Exterior Locations shall receive one primer coat and two finish coats. Primer shall be one coat of Tnemec Series 36. Finish shall be two coats of Tnemec Series 6.

(f-2) Interior Wood Surfaces shall receive one primer coat and two finish coats. Primer shall be one coat of Tnemec Series 36. Finish coat shall be two coats of Tnemec Series 6.

(g) Masonry Surfaces must be dry at time of paint application.

(g-1) Exterior Surfaces shall receive one coat of Tnemec Series 6, and two coats Tnemec Series 6, color to be selected by the Director.

(g-2) Exterior Surfaces Below Ground shall receive two coats of Tnemec Series 46-465 (coal tar) 12 mils/coat, or approved equal.

(g-3) Interior Above Ground and Below Ground Surfaces such as in pressure reducing stations, meter vaults and pump stations shall receive a seal coat of Tnemec Series 6. After at least three days two coats of Tnemec Series 6 (modified epoxy) shall be applied.

7. Testing and Inspection

- (a) Thickness of paint and other coatings shall be checked with a non-destructive, magnetic type thickness gauge.
- (b) The Contractor shall furnish and make available for the Engineer's use at all times when painting and coating is being done and until final acceptance of all such coatings, coating inspection devices in good working condition for the detection of holidays and measurement of film thickness of paint and other coatings.
- (c) Acceptable devices include Tinker-Rasor low-voltage holiday-detector, Nordson Wet Film gauge No. 790010 for wet-film gauging, and a Microtest Unit for dry-film thickness gauging or Director required equal.

8. Cleanup

Upon completion of the work, staging, scaffolding, and containers shall be removed from the site or destroyed in an approved manner. Paint spots, oil or stains upon adjacent surfaces shall be removed and the entire job left clean. All damage to surfaces resulting from the work of the

Contractor shall be cleaned, repaired or refinished to the complete satisfaction of the Director at no cost to the Owner.

9. Guarantee

All materials and workmanship shall be guaranteed for a period of one (1) year from the date of acceptance of the project. All defective work shall be repaired in accordance with this specification as directed by the Director.

SECTION VIII - CONSTRUCTION STANDARDS

- A. Scope. These standards are intended to describe the materials and workmanship to be used in construction of a water system operated in the City. It is presumed that the developer or his engineer has prepared such general and special specifications as are necessary to define the nature and location of the work, contractual arrangements, payment for work, and any other matters concerning the owner or his contractor.
- B. General
1. Quality Control of Materials. The quality control of materials shall conform to the applicable sections of the Standard Specifications for Public Works Construction.
 2. Quality of Workmanship. All work will be done by persons experienced in the specific work, under competent supervision and in a first class manner to the Director's complete satisfaction.
 3. Connections to Existing Facilities. Connections shall be performed only in the presence of an inspector and coordinated by the Director after satisfactory hydrostatic pressure testing, disinfecting and flushing of all water lines.
 4. Defective Work. Any defective materials or workmanship which shall become evident within one year after the City assumes responsibility for the completed work shall be replaced or repaired without cost to the City. Refusal of the Contractor to correct defective work which is his responsibility will be considered just cause for excluding him from performing future work to be connected to the City's system. Such exclusion does not impair the City's right to bring legal action to correct the deficiencies.
 5. Public Relations. The Contractor shall conduct his affairs in such a manner which will cause least disturbance to residents in the vicinity of the work. He shall maintain the job site in a condition which shall bring no discredit to the City or its personnel, and he shall restore all affected private improvements to at least the original condition.
- C. Concrete Work. Concrete work shall conform to the applicable sections of the Standard Specifications for Public Works Construction.
- D. Construction Staking and "As-Built" Surveys. Construction stakes will be set parallel to the water main alignment at an offset distance and direction agreed upon with the contractor, but in no case shall construction stakes be offset more than 10 feet. Stakes will be set at no greater interval than 50 feet on straight alignments. For horizontally curved water mains, the stake interval shall be 25 feet. Cut or fill survey markings to be on stakes before starting trenching. For all street water mains, regardless of alignment or slope, the developer's engineer shall determine "As-Built" elevations at the top of pipe centerline at each change

in pipe grade and shall provide a written record of such elevations to the inspector.

- E. Earthwork and Backfill. Earthwork and backfill shall comply with the applicable sections of the Standard Specifications for Public Works Construction and Plate E-10.1 (Rev. C) Utility Trench Within Pavement.
- F. Corrosion Protection. A 6-inch envelope of washed sand shall be provided around valve and fittings.
- G. Detector Wire. An 8-gauge insulated copper detector location wire shall be affixed to the top of pipe and installed per Drawing No. W-36 and W-38.
- H. Portland Cement Concrete. This Section shall conform to the applicable sections of the Standard Specifications for Public Works Construction.
- I. Testing and Sterilization
 - 1. General. The specifications constituting this section designate the requirements for the procedure, materials, performance, and payment for testing and sterilization of water mains and appurtenances intended for the conveyance of potable water under pressure.
 - (a) Scope of Work. The Contractor shall furnish all labor, materials, tools, and equipment necessary to perform all the operations required to complete the testing and sterilization as herein specified.
 - (b) Intent. The work shall include providing complete tests and sterilization, including all chemicals, and equipment.
 - 2. Field Testing
 - (a) Hydrostatic Pressure Test. After the pipe and all appurtenances have been laid and the backfill has been placed and compacted, a hydrostatic pressure test shall be conducted for each reach between adjacent valves. Valves shall be in a closed position. The test time period shall be one hour and shall consist of subjecting the reach of pipeline being tested at a hydrostatic pressure of 225 p.s.i. In addition, a hydrostatic test shall be conducted on the entire pipeline for a period of four hours at a hydrostatic pressure of 150 p.s.i. All valves in the pipeline shall be in open position.
 - (b) Preparation. The line shall be filled with water at least 24 hours prior to testing. While filling and immediately prior to testing, all air shall be expelled from the pipeline. Where air valves or other suitable outlets are not available for introducing water or releasing air for test purposes, taps and fittings approved by the Director shall be installed and later securely plugged.
 - (c) Procedure. The pressure in the pipeline shall be pumped up to the specified test pressure. When the test pressure has been reached, the pumping shall be discontinued until the pressure in the line has

dropped 10 psi, at which time the pressure shall again be pumped up to the specified test pressure first applied. At the end of this period, the pressure shall be pumped up to the test pressure for the last time. The total quantity of water pumped to maintain pressure shall be measured. A test meter shall be furnished by the City.

- (d) Leakage shall not exceed the amount calculated, using Plates Nos. W-51, W-52, and W-53.
- (e) Tapping Sleeves and Valves shall be tested prior to tapping.

3. Sterilization. Prior to pressure testing and prior to acceptance of work, the entire pipeline including all valves, fittings, hydrants, service laterals, and other accessories shall be sterilized in accordance with AWWA Specification C651-99 which provides detail specifications for:

Limiting contaminated materials from entering the water mains during construction or repair.

Removing by flushing contaminating materials that may have entered the water main during construction or repair.

Disinfecting any residual contamination that may remain after cleaning.

Determining the bacteriologic quality of fresh water in the main after disinfecting the main.

All mains shall be flushed with potable water after completion of construction and prior to disinfection.

The Contractor shall provide a sufficient number of suitable outlets at the end(s) of the line(s) being sterilized in addition to those required by the plans to permit the main to be flushed with water at a velocity of at least 5 feet per second over its entire length, see Table of Required Openings to flush Pipelines (below).

TABLE OF REQUIRED OPENINGS TO FLUSH PIPELINES

(at 5 fps and 40 psi PRESSURE)

PIPE SIZE INCHES	FLOW G.P.M.	ORIFICE SIZE INCHES	HYDRANT OPENINGS SIZE		
			NO.	INCHES	
4"	200	1-3/8	1	2-1/2	
6"	440	2	1	2-1/2	
8"	780	2-1/2	1	2-1/2	
10"	1220	3-1/4	2	2-1/2	
12"	1760	3-3/4	2	2-1/2	
14"	2400	4-1/2	3	2-1/2	
			or:	1	4-1/2
16"	3130	5-1/4	1	2-1/2	
			and:	1	4-1/2

The Contractor shall furnish and install sufficient temporary pipe, valves and fittings to divert the flow of flushing water away from the open trench.

The outlets provided shall meet the requirements for fittings as specified for the type of main constructed. Drainage facilities shall be constructed so that the water lines cannot be contaminated through the flushing outlet. After flushing, chlorine gas or chlorine compound solution made with liquid chlorite solution shall be water mixed and introduced into the mains to form a chlorine concentration of approximately 100 ppm or that which will provide a minimum residual of 50 ppm in all parts of the line after 24 hours have elapsed. During the sterilization process, all valves, hydrants and other accessories shall be operated. After chlorination, the water shall be flushed from the line at its extremities until the replacement water tests are equal chemically and bacteriologically to those of the permanent source of supply. The placing of HTH capsules or powder in pipe sections during the laying process WILL NOT be considered adequate sterilization. The chlorine water solutions shall be diluted to a chlorine concentration of not more than 100 ppm and not less 50 ppm measured in the water lines. The Contractor shall keep adequate chlorine residual testing and indicating apparatus available on the site during the entire sterilization period. After final flushing, the flushing fittings shall be plugged with devices intended for this purpose at the pressure class of the pipe. Where water main is coated, plugs and outlets shall be similarly coated. In no case shall the chlorine water solution be allowed to remain in

the pipe or appurtenances without being flushed for a period of more than 72 hours.

Bacteriologic samples of water for the specified bacteriologic test shall be taken from each end of the sterilized main (located downstream of the point of introduction of chlorine disinfectant and at other locations as determined necessary by the Director). For mains over 2,500 feet in length, additional samples shall be taken at intermediate points in such a manner that at least one sample is taken for each 2,500 feet of main. Bacteriological samples to be taken 24 hours after flushing.

4. Water Service Assemblies (2 Inches and Smaller)

(a) General. Water service assemblies shall be furnished and installed by the Contractor at the locations shown on the plans or established in the field by the Director. The Contractor shall furnish all labor, materials, tools and equipment necessary to furnish and install, complete and ready for operation, the assemblies as shown on the plans and herein specified. The Contractor, shall, however, perform the installation of the lot services in accordance with Camarillo Plates Nos. W-11 and W-12 so that meters and meter boxes can be installed to the clearance and grades shown, without cutting or adjusting the services as installed by the Contractor.

(b) Materials, Fabrication, and Installation

- (1) Materials shall be those designated on the standard drawings or plans.
- (2) Pipe and Fittings. Service pipe shall be Type K soft copper tubing covered with plastic sleeving. Solder fittings shall be soldered with MG 380 brazing alloy with 15% silver solder or equal.

<u>Meter Size</u>	<u>Corp. Stop</u>	<u>Service Pipe</u>	<u>Lock Wing Type Angle Ball Valve</u>
¾"	1"	1"	1" x ¾"
1"	1"	1"	1" x 1"
1-½"	2"	2"	2" x 1½"
2"	2"	2"	2" x 2"

- (3) Meters. Meters shall be furnished and installed by the City.
- (4) Pressure Regulators shall be installed by developers on all water service assemblies where the maximum static pressure exceeds 80 psi. (Uniform Plumbing Code Section 1007).
- (5) Service Taps. In no case shall a service tap be made in a main closer than 18 inches to a bell coupling joint or fitting. Service taps shall not be less than 18 inches apart. Service

taps shall be located opposite the meter locations so that the service laterals will be perpendicular to the street centerline. Service tap locations varying more than two feet from the perpendicular must be approved by the Director prior to installation. Where dissimilar metals are joined, a dielectric connection, approved by the Director, shall be provided.

- (6) Meter Boxes. Meter boxes and covers shall be installed by the contractor as shown on Standard Drawings Nos. W-11, W-12 and W-21 through 25.
- (7) Cathodic Protection shall be installed on all copper pipe for meter services, air vacs and blow offs. Cathodic protection shall be a 9 lb., 5" x 18" high potential magnesium anode attached with bronze clamp – Maxmag 9D3GG or approved equal.
- (8) Earthwork and Backfill shall conform to the Standard Specifications for Earthwork and Backfill.
- (c) Testing and Sterilization. Water service assemblies shall be tested and sterilized in accordance with the Standards for Field Testing and Sterilizing Water Mains.

SECTION IX - PLAN CHECK FEES FOR SUBDIVISION FINAL MAP OR
PARCEL MAP WATER IMPROVEMENT PLAN

- A. Subdivision Final Map or Parcel Map Water Improvement Plan
(See City's Subdivision Ordinance No. 65).
- B. Standard Procedure for Subdivisions. The procedure for subdivisions shall be in accordance with the applicable sections of the Camarillo Municipal Code and the following Department of Public Works policies:
- Policy No. 89-03 – Submission of Tract Map/Parcel Map Minimal Submittal Requirements
 - Policy No. 89-06 – Improvement/Grading Plans Minimal Submittal Requirements for First Plan Check
 - Policy No. 92-5 – Plan Check Process
 - Current Public Works Fee Schedule



City Of Camarillo

NEW WATER MAIN		FLUSHOUT, LATERAL SIZE INDICATED	
EXISTING WATER MAIN		AIR RELEASE & VACUUM VALVE	
EXISTING DRAIN LINE		FLEXIBLE COUPLING	
GAS LINE		REDUCER	
SEWER		TEE	
STORM DRAIN		WYE	
ELECTRICAL CONDUIT		CROSS	
TELEPHONE CONDUIT		ELBOW	
TV CABLE		SERVICE CONNECTION	
TRAFFIC SIGNALS		WATER METER	
STREET LIGHTS		PIPELINE CONNECTED	
SLEEVE		PIPELINE NOT CONNECTED	
FLOW DIRECTION (PIPELINE)		PRESSURE GAUGE	
BELL FITTING		TAPPING SLEEVE	
FLANGED FITTING		DISTRICT BOUNDARY	
SCREWED FITTING		PROPERTY LINE	
VALVE (FLG'D)		EASEMENT	
PLUG VALVE (FLG'D)		MASONRY BLOCK WALL	
CHECK VALVE (FLG'D)		CHAIN-LINK FENCE	
PRESSURE REDUCING VALVE (FLG'D)		STEEL PIPE BARRICADES	
PRESSURE RELIEF VALVE (FLG'D)		POWER POLES	
FLOAT CONTROL VALVE (FLG'D)		TELEPHONE POLES	
PUMP CONTROL VALVE (FLG'D)		GUY WIRE & DEADMAN	
ALTITUDE VALVE (FLG'D)		SPRINKLER SYSTEM	
FIRE HYDRANT - 4" X 2-1/2"		THRUST BLOCKS	
FIRE HYDRANT - 6" X 2-1/2" X 4"		LANDSCAPING	
FIRE HYDRANT - 6" X 2-1/2" X 4" X 4"			
FIRE HYDRANT - 6" X 2-1/2" X 2-1/2" X 4" (MEDIUM PRESSURE)			

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JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		<h2>STANDARD SYMBOLS</h2>	DWG. NO. W-1	
REV.	DATE	BY	REVIEWED:			FILED	
			APPROVED:			SHT <u>1</u> OF <u>1</u>	
			CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005				



City Of Camarillo

DEPARTMENT OF HEALTH SERVICES, STATE OF CALIFORNIA
GUIDANCE MEMO NO. 2003-02

CRITERIA FOR THE SEPARATION OF WATER MAINS AND SANITARY SEWERS

CASE 1: NEW WASTEWATER LINE INSTALLED WITH NEW OR EXISTING WATER MAIN.

ZONE SPECIAL CONSTRUCTION REQUIREMENTS FOR WASTEWATER LINE

- A. WASTEWATER LINES PARALLEL TO WATER MAINS SHALL NOT BE PERMITTED IN THIS ZONE WITHOUT APPROVAL FROM THE RESPONSIBLE HEALTH AGENCY AND WATER SUPPLIER.
- B. A WASTEWATER LINE PLACED PARALLEL TO A WATER MAIN SHALL BE CONSTRUCTED OF :
2. EXTRA STRENGTH VITRIFIED CLAY PIPE WITH COMPRESSION JOINTS. CLASS 4000, TYPE II, ASBESTOS-CEMENT PIPE WITH RUBBER GASKET JOINTS.
 3. PLASTIC WASTEWATER PIPE WITH RUBBER RING JOINTS (PER ASTM D3034) OR EQUIVALENT.
 5. CAST OR DUCTILE IRON PIPE WITH COMPRESSION JOINTS. REINFORCED CONCRETE PRESSURE PIPE WITH COMPRESSION JOINTS (PER AWWA C302-95).
- C. A WASTEWATER LINE CROSSING A WATER MAIN SHALL BE CONSTRUCTED OF:
1. DUCTILE IRON PIPE WITH HOT DIP BITUMINOUS COATING AND MECHANICAL JOINTS.
 - A CONTINUOUS SECTION OR CLASS 200 (DR14 PER AWWA C900) PLASTIC PIPE OR EQUIVALENT, CENTERED OVER THE PIPE BEING CROSSED.
 3. A CONTINUOUS SECTION OF REINFORCED CONCRETE PRESSURE PIPE (PER AWWA C302-95) CENTERED OVER THE PIPE BEING CROSSED.
 - ANY WASTEWATER PIPE WITHIN A CONTINUOUS SLEEVE.
- D. A WASTEWATER LINE CROSSING A WATER MAIN SHALL BE CONSTRUCTED OF:
1. A CONTINUOUS SECTION OF DUCTILE IRON PIPE WITH HOT TIP BITUMINOUS COATING.
 2. A CONTINUOUS SECTION OF CLASS 200 (DR 14 PER AWWA C900) PLASTIC PIPE OR EQUIVALENT CENTERED ON THE PIPE BEING CROSSED.
 3. A CONTINUOUS SECTION OF REINFORCED CONCRETE PRESSURE PIPE (PER AWWA C302-95) CENTERED ON THE PIPE BEING CROSSED.
 4. ANY WASTEWATER PIPE WITHIN A CONTINUOUS SLEEVE.
 5. ANY WASTEWATER PIPE SEPARATED BY A TEN-FOOT BY TEN-FOOT, FOUR-INCH THICK REINFORCED CONCRETE SLAB.

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JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		SEPARATION REQUIREMENTS FOR WATER AND WASTEWATER LINES	DWG. NO. W-2	
REV.	DATE	BY	REVIEWED: <i>Tom P. Smith</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>Muffak Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>5</u>	



City Of Camarillo

CASE 2: NEW WATER MAIN INSTALLED WITH EXISTING WASTEWATER LINE

ZONE SPECIAL CONSTRUCTION REQUIREMENTS FOR WATER MAIN

- A. NO WATER MAINS PARALLEL TO WASTEWATER LINES SHALL BE CONSTRUCTED WITHOUT APPROVAL FROM THE RESPONSIBLE HEALTH AGENCY.
- B. IF THE WASTE WATER LINE PARALLELING 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 BITUMINOUS COATING.
 2. DIPPED AND WRAPPED ONE-FOURTH-INCH-THICK WELDED STEEL PIPE.
 3. CLASS 200, TYPE II, ASBESTOS-CEMENT PRESSURE PIPE.
 4. CLASS 200 PRESSURE RATED PLASTIC WATER PIPE (DR14 PER AWWA C900) OR EQUIVALENT.
 5. REINFORCED CONCRETE PRESSURE PIPE, STEEL CYLINDER TYPE, PER AWWA C300-97, OR C301-99, OR C303-95.
- C. IF THE WASTEWATER LINE CROSSING 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. 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 (DR14 PER AWWA C900) OR EQUIVALENT.
 4. REINFORCED CONCRETE PRESSURE PIPE, STEEL CYLINDER PIPE, PER AWWA C300-97, OR C301-99, OR C303-95.
- D. IF THE WASTEWATER LINE CROSSING THE WATER MAIN DOES NOT MEET THE REQUIREMENTS FOR ZONE D, CASE 1, THE WATER MAIN SHALL HAVE NO JOINTS WITHIN FOUR FEET FROM EITHER SIDE OF THE WASTEWATER LINE AND SHALL BE CONSTRUCTED OF:
1. DUCTILE IRON PIPE WITH HOT BITUMINOUS COATING.
 2. DIPPED AND WRAPPED ONE-FOURTH-INCH-THICK WELDED STEEL PIPE.
 3. CLASS 200 PRESSURE RATED PLASTIC WATER PIPE (DR14 PER AWWA C900) OR EQUIVALENT.
 4. REINFORCED CONCRETE PRESSURE PIPE, STEEL CYLINDER TYPE, PER AWWA C300-97, OR C301-99, OR C303-95.

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JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		<h2 style="margin: 0;">SEPARATION REQUIREMENTS FOR WATER AND WASTEWATER LINES</h2>	DWG. NO.
REV.	DATE	BY	REVIEWED:	 <small>WATER SUPERINTENDENT</small>		W-2
			APPROVED:	 <small>CITY ENGINEER</small>		FILED
				R.C.E. 50878 EXPIRES 9/30/2005		SHT <u>2</u> OF <u>5</u>

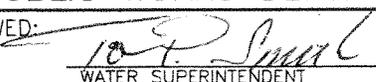
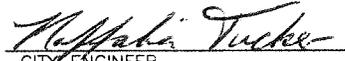


City Of Camarillo

DEFINITIONS

1. HEALTH AGENCY – THE DEPARTMENT OF HEALTH SERVICES, STATE OF CALIFORNIA. FOR WATER SYSTEMS SUPPLYING FEWER THAN 200 SERVICE CONNECTIONS, THE LOCAL HEALTH OFFICER SHALL ACT FOR THE DEPARTMENT OF HEALTH SERVICES.
2. 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.
3. COMPRESSION JOINT – A PUSH-ON JOINT THAT SEALS BY MEANS OF THE COMPRESSION OF RUBBER RING OR GASKET BETWEEN THE PIPE AND A BELL OR COUPLING.
4. MECHANICAL JOINT – BOLTED JOINTS.
5. RATED WORKING PRESSURE OR PRESSURE CLASS – A PIPE CLASSIFICATION SYSTEM BASED UPON THE INTERNAL WORKING PRESSURE OF THE FLUID IN THE PIPE, TYPE OF PIPE MATERIAL, AND THE THICKNESS OF THE PIPE WALL.
6. FUSED JOINT – THE JOINING OF SECTIONS OF PIPE USING THERMAL OR CHEMICAL BONDING PROCESS.
7. SLEEVE – A PROTECTIVE TUBE OF STEEL WITH A WALL THICKNESS OF NOT LESS THAN ONE-FOURTH INCH INTO WHICH A PIPE IS INSERTED.
8. GROUNDWATER – SUBSURFACE WATER FOUND IN THE SATURATION ZONE.
9. HOUSE LATERAL – A WASTEWATER LINE CONNECTING THE BUILDING DRAIN AND THE MAIN WASTEWATER LINE.

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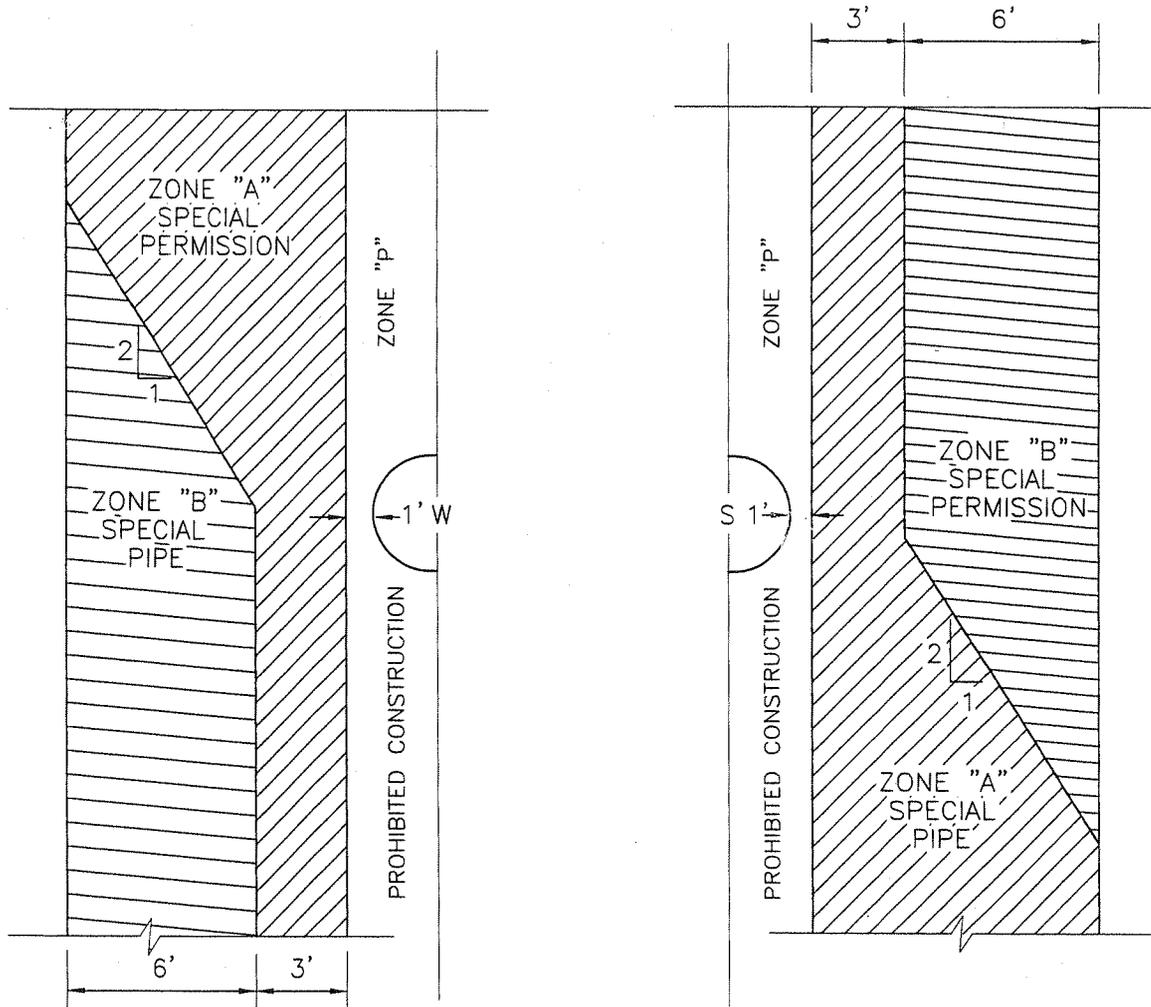
JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		<h3>SEPARATION REQUIREMENTS FOR WATER AND WASTEWATER LINES</h3>	DWG. NO.
REV.	DATE	BY	REVIEWED:	 WATER SUPERINTENDENT		W-2
			APPROVED:	 CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005		FILED
						SHT <u>3</u> OF <u>5</u>



City Of Camarillo

PARALLEL CONSTRUCTION

FIGURE 1



CASE 1
NEW SEWER

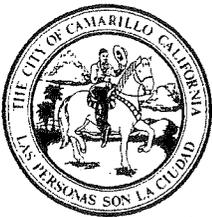
CASE 2
NEW WATER

NOTE: ZONES ARE IDENTICAL ON EITHER SIDE OF CENTER LINES.

ZONE "P" IS A PROHIBITED CONSTRUCTION ZONE, SECTION 64630 (E) (2) CALIFORNIA ADMINISTRATIVE CODE, TITLE 22.

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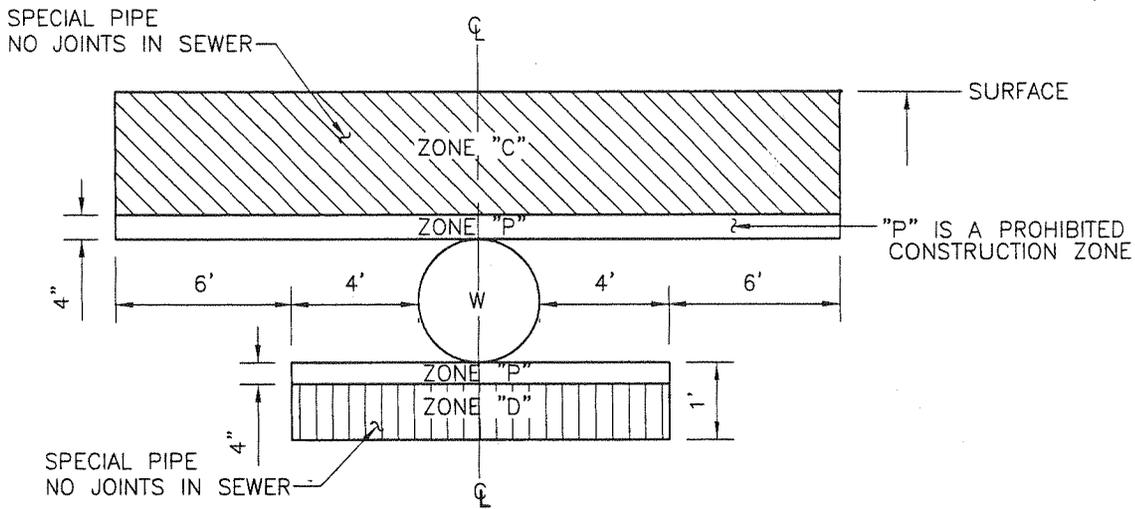
JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		SEPARATION REQUIREMENTS FOR WATER AND WASTEWATER LINES	DWG. NO. W-2	
REV.	DATE	BY	REVIEWED: <i>10 P Smith</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>Hoffaba Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>4</u> OF <u>5</u>	



City Of Camarillo

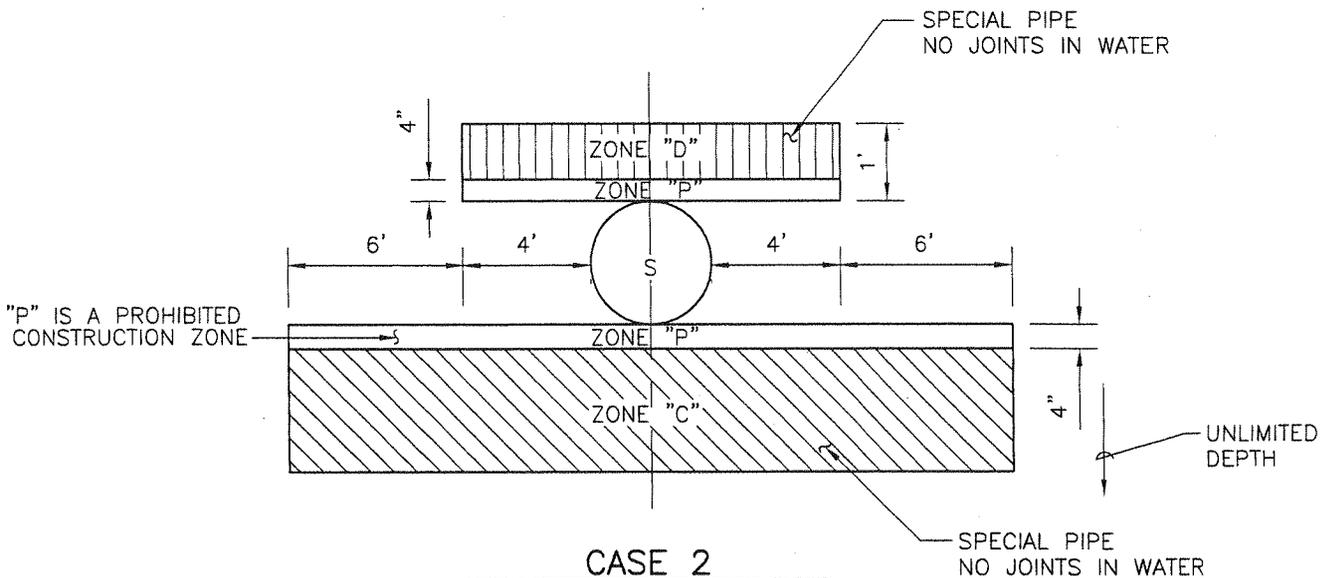
CROSSINGS

FIGURE 2



CASE 1

NEW SEWER CROSSING WATER



CASE 2

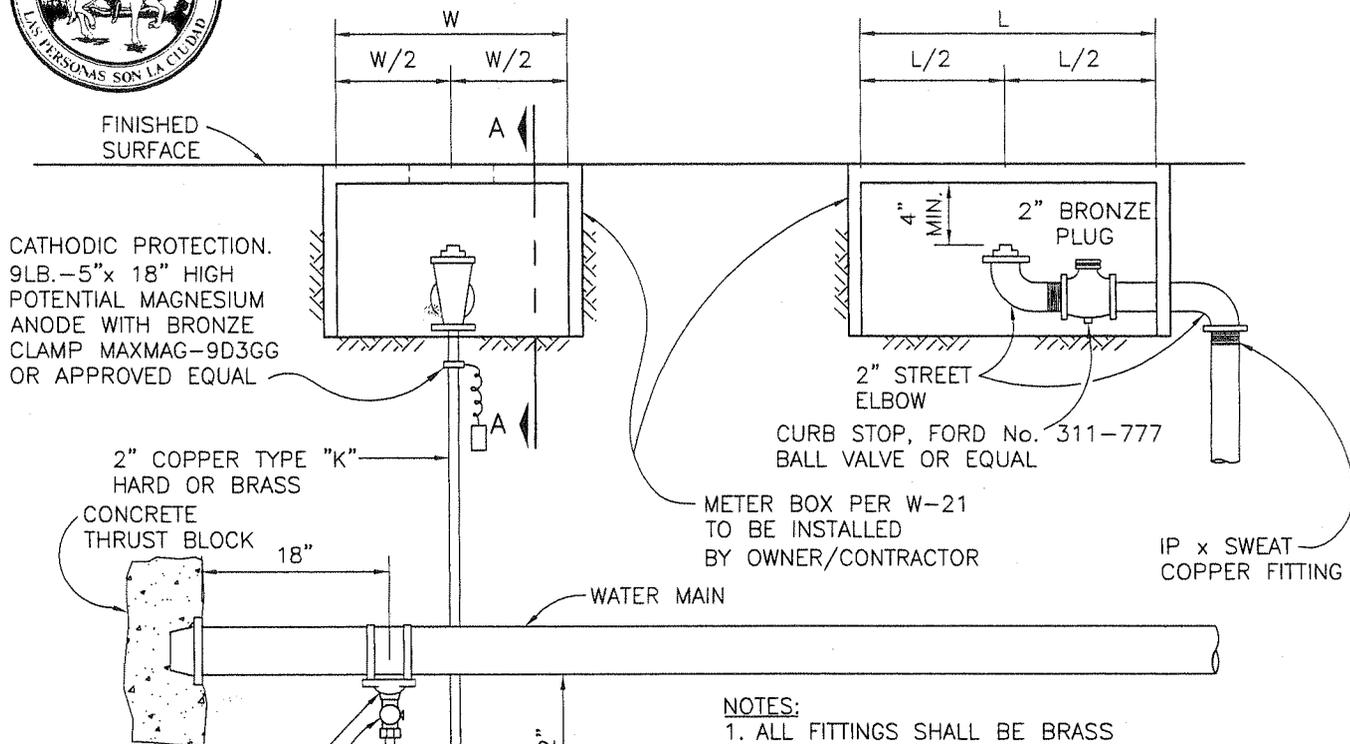
NEW WATER CROSSING SEWER

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JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		SEPARATION REQUIREMENTS FOR WATER AND WASTEWATER LINES	DWG. NO. W-2
REV.	DATE	BY	REVIEWED: <i>10 P. Smith</i> WATER SUPERINTENDENT			FILED
			APPROVED: <i>Melba Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>5</u> OF <u>5</u>



City Of Camarillo



CATHODIC PROTECTION.
9LB.-5"x 18" HIGH
POTENTIAL MAGNESIUM
ANODE WITH BRONZE
CLAMP MAXMAG-9D3GG
OR APPROVED EQUAL

2" COPPER TYPE "K"
HARD OR BRASS

CONCRETE
THRUST BLOCK 18"

WATER MAIN

METER BOX PER W-21
TO BE INSTALLED
BY OWNER/CONTRACTOR

IP x SWEAT
COPPER FITTING

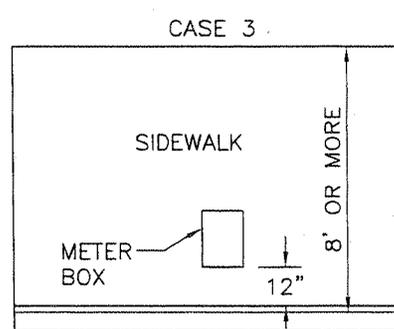
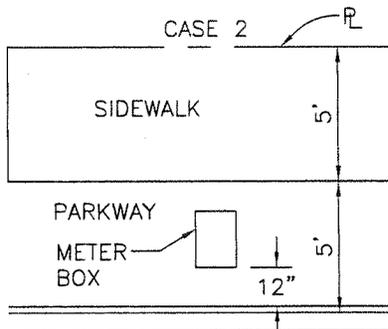
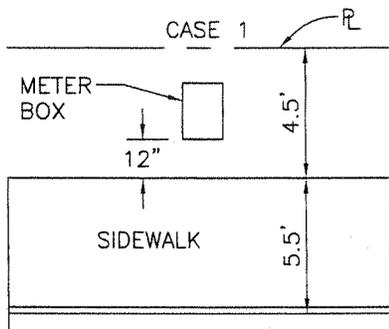
ACP WATER PIPE
USE DOUBLE STRAP
BRONZE SADDLE
FORD 202 B OR EQUAL

2" CORPORATION STOP
FORD FB-1000 OR EQUAL

PVC C-900 WATER PIPE
USE FORD 202BS OR
APPROVED EQUAL

NOTES:

1. ALL FITTINGS SHALL BE BRASS
2. ALL COPPER TUBING CONNECTIONS SHALL BE MADE WITH SOLDER FITTINGS USING MG 380 BRAZING ALLOY WITH 15% SILVER OR EQUAL.
3. INSTALL BLOW-OFF PER CASE No. 1, CASE No. 2 OR CASE No. 3.
4. ALL COPPER PIPE SHALL BE BEDDED IN 6" OF WASHED SAND ON TOP, BOTTOM, AND SIDES.
5. ALL COPPER PIPE SHALL BE COVERED WITH 6 MIL PLASTIC SLEEVING WITH ENDS SEALED WITH 10 MIL TAPE. PLASTIC SLEEVING SHALL BE SPECIALTY PRODUCTS P-3016 OR APPROVED EQUAL.



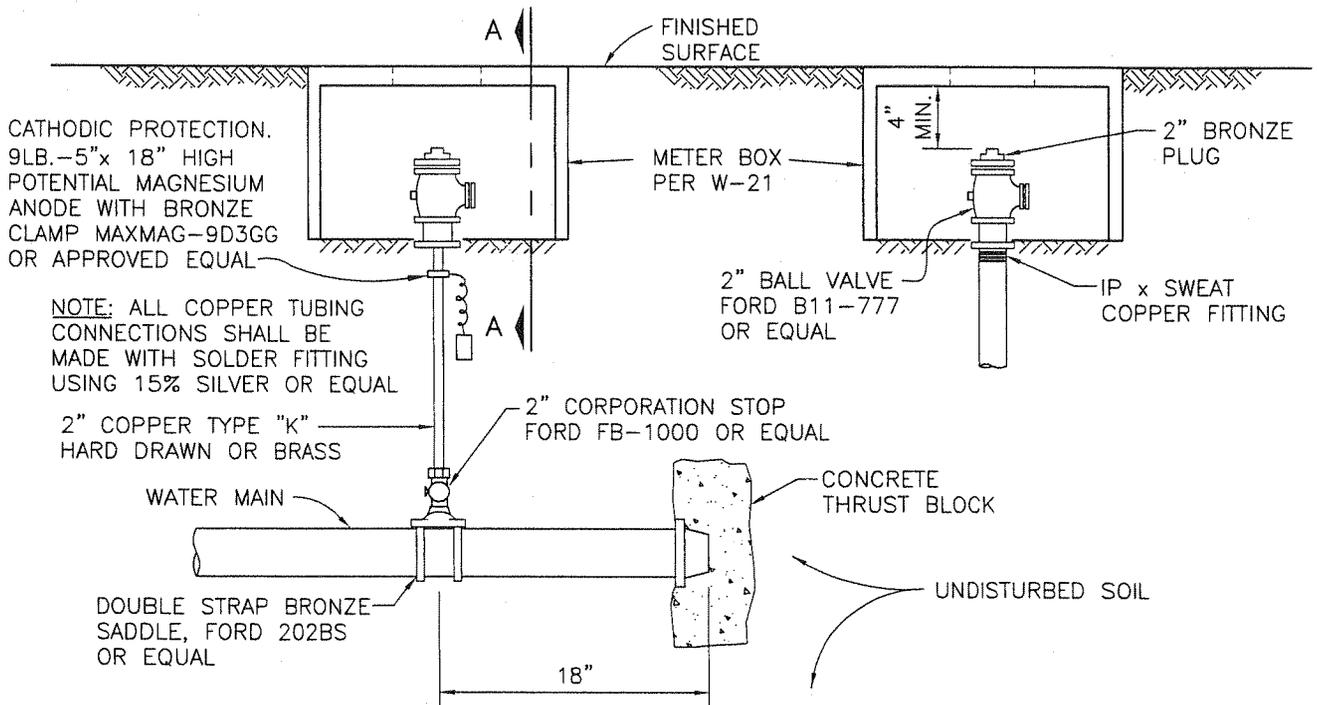
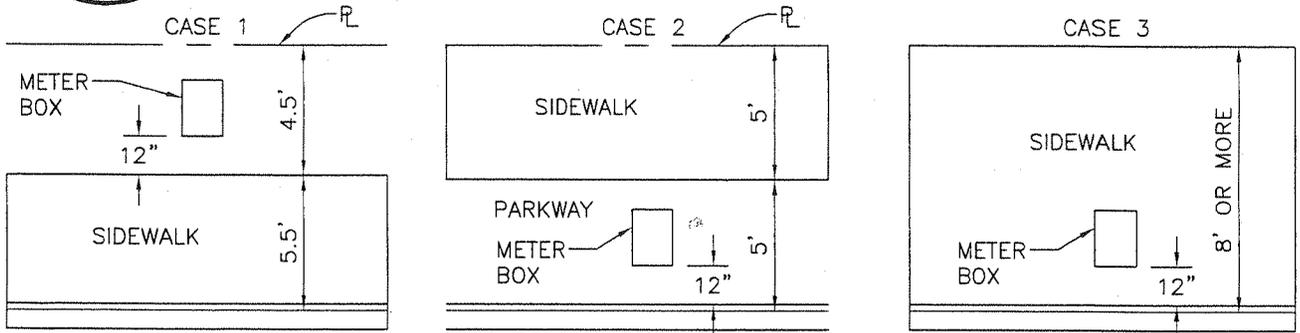
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JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		TEMPORARY AND PERMANENT BLOW-OFF INSTALLATION	DWG. NO. W-3	
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	



City Of Camarillo

NOTE: INSTALL METER BOX PER CASE No. 1, 2 OR 3 OR AS SPECIFIED BY DIRECTOR.



NOTES:

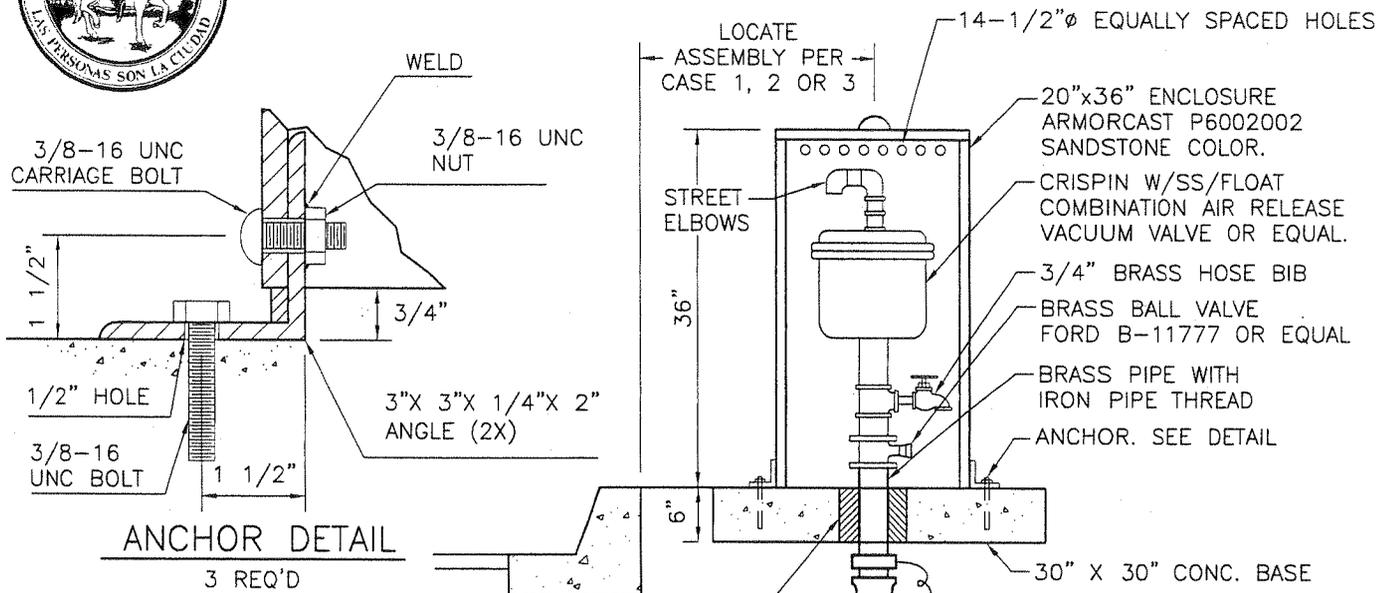
1. ALL PIPE FITTINGS SHALL BE BRASS
2. ALL PIPING SHALL BE 2" COPPER TUBING TYPE "K" HARD DRAWN OR BRASS.
3. ALL COPPER PIPE SHALL BE BEDDED IN 6" OF WASHED SAND ON TOP, BOTTOM, AND SIDES.
4. INSTALL WATER POINT WHERE DESIGNATED ON PROJECT PLAN AND AS APPROVED BY THE DIRECTOR.
5. ABANDON THE WATER POINT (WHEN SPECIFIED) AT THE CORPORATION STOP. REMOVE TUBING AND / OR BRASS PIPE AND METER BOX. CLOSE CORPORATION STOP AND INSTALL 2-INCH BRASS CAP ONTO CORPORATION STOP.
6. ALL COPPER PIPE SHALL BE COVERED WITH 6 MIL PLASTIC SLEEVING WITH ENDS SEALED WITH 10 MIL TAPE. PLASTIC SLEEVING SHALL BE SPECIALTY PRODUCTS P-3016 OR APPROVED EQUAL.

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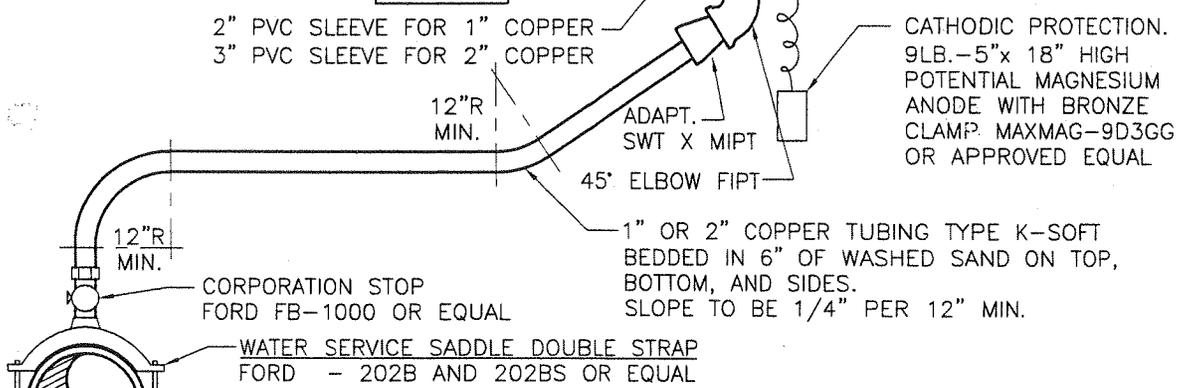
JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		2" TEMPORARY & PERMANENT WATER POINT	DWG. NO. W-4	
REV.	DATE	BY	REVIEWED: <i>Tom P. Smith</i> WATER SUPERINTENDENT			FILED	SHT <u>1</u> OF <u>1</u>
			APPROVED: <i>Maffie Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005				



City Of Camarillo

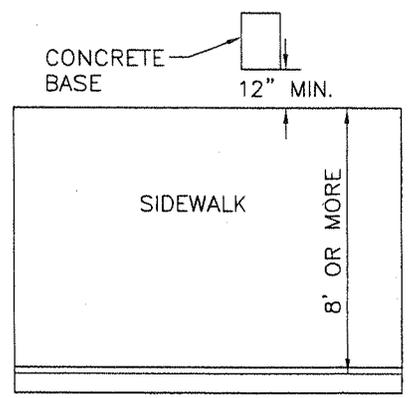
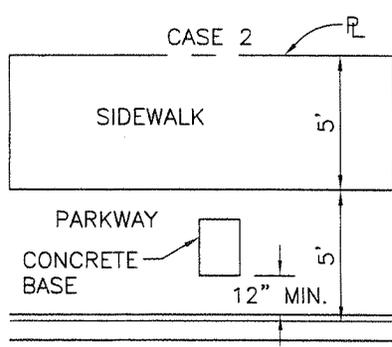
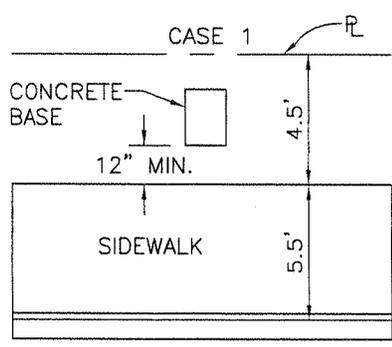


ANCHOR DETAIL
3 REQ'D



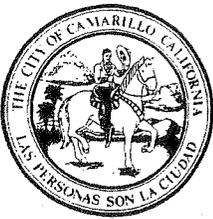
NOTE:
ALL COPPER PIPE SHALL BE COVERED WITH 6 MIL PLASTIC SLEEVING WITH ENDS SEALED WITH 10 MIL TAPE. PLASTIC SLEEVING SHALL BE SPECIALTY PRODUCTS P-3015 FOR 3/4" AND 1" PIPE AND P-3016 FOR 2" AND 2 1/2" PIPE.

NOTE:
FOR 2" VACUUM AIR RELEASE USE 2" FITTINGS W/ SWEAT JOINTS. DO NOT BEND 2" TUBING.



N:\0550\0868\01\Cadd\WATER-STD\W-05.DWG 06/29/2005 10:48

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		1" & 2" COMBINATION AIR & VACUUM RELEASE VALVE ASSEMBLY	DWG. NO. W-5	
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	



City Of Camarillo

FEATURES

- 1 1/4" 90° ELBOW, BRASS
- 2 1/4" NIPPLE, 3-1/2" LG, BRASS (2 REQ'D)
- 3 1" X 1/4" REDUCER, BRASS
- 4 1" TEE, 3-WAY, BRASS
- 5 1" MALE CLOSED BRASS COUPLING
- 6 1/4" STRAIGHT COUPLING, BRASS
- 7 1/4" BRASS SAMPLING PETCOCK
- 8 1" BALL VALVE, W/1" PLUG, BRASS
- 9 CORE ANCHOR 1/2"-13UNC x 5" LG (316 SST)
- 10 BASE PLATE 11" SQ. x .188 THICK (6061-T6 ALUM.)

LOCATE ASSEMBLY PER DWG. W-5 CASE 1, 2 OR 3

FASTENERS TAMPER PROOF (304L SST #6 AND #10)

HINGE (304L SST 2" LEAF w/.188 RIN, 7-7/8" LG)

AMERICAN MACHINE & CONVEYOR CORP. VENTURA CA. EZ WATER SAMPLING STATION EZ-01

CATHODIC PROTECTION. 9LB.-5"x 18" HIGH POTENTIAL MAGNESIUM ANODE WITH BRONZE CLAMP MAXMAG-9D3GG OR APPROVED EQUAL

LOCK (BRONZE SERIALIZED MASTER LOCK #1714 WITH TWO KEYS)

LID IN CLOSED POSITION

24" X 24" CONC. BASE

INTERNAL ANGLE AND SHELF (6063-T6 ALUM., .075 THICK)

45° ELBOW FIPT

ADAPT. SWT X MIPT

1" OR 2" COPPER TUBING TYPE K-SOFT BEDDED IN 6" OF WASHED SAND ON TOP, BOTTOM, AND SIDES. SLOPE TO BE 1/4" PER 12" MIN.

CORPORATION STOP FORD FB-1000 OR EQUAL

DOUBLE STRAP SERVICE SADDLE "C-900" - 2 PC ONLY FORD -202BS OR EQUAL

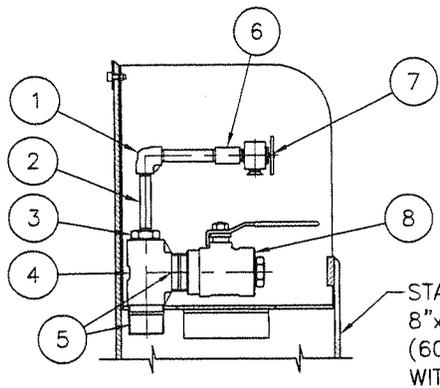
11/16" DIA. HOLE (4 PLCS)

6" DIA HOLE THRU CONCRETE PAD

CONCRETE PAD 8" THICK

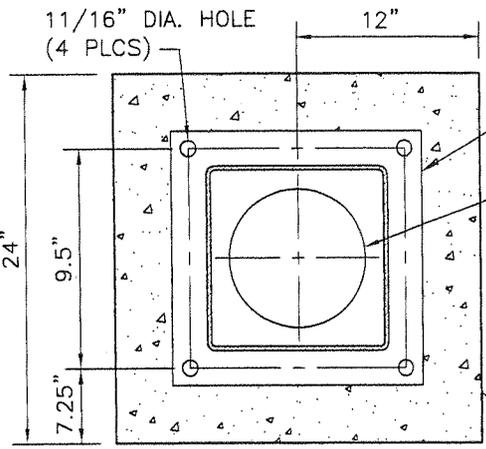
NOTE:

ALL COPPER PIPE SHALL BE COVERED WITH 6 MIL PLASTIC SLEEVING WITH ENDS SEALED WITH 10 MIL TAPE. PLASTIC SLEEVING SHALL BE SPECIALTY PRODUCTS P-3015 OR APPROVED EQUAL.



1" FLUSH VALVE ASSEMBLY

STATION BODY, 8"x8"x.188 WALL (6063-T52 ALUM. WITH LID SUPPORT)



SECTION A-A

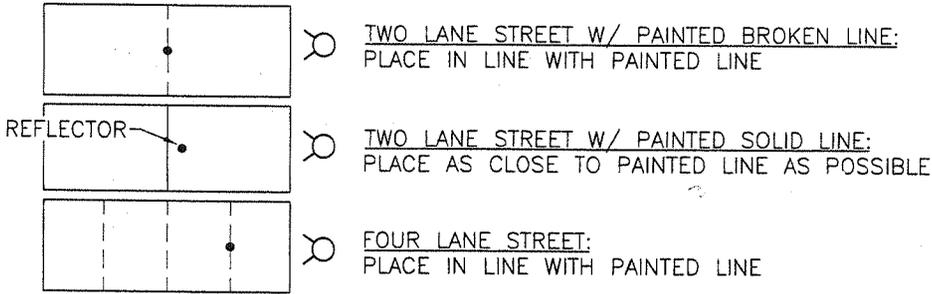
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JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		<h2>WATER TEST STATION</h2>	DWG. NO.	
						W-6	
REV.	DATE	BY	REVIEWED: <i>Tom P. Smith</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>Nellie Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT 1 OF 1	



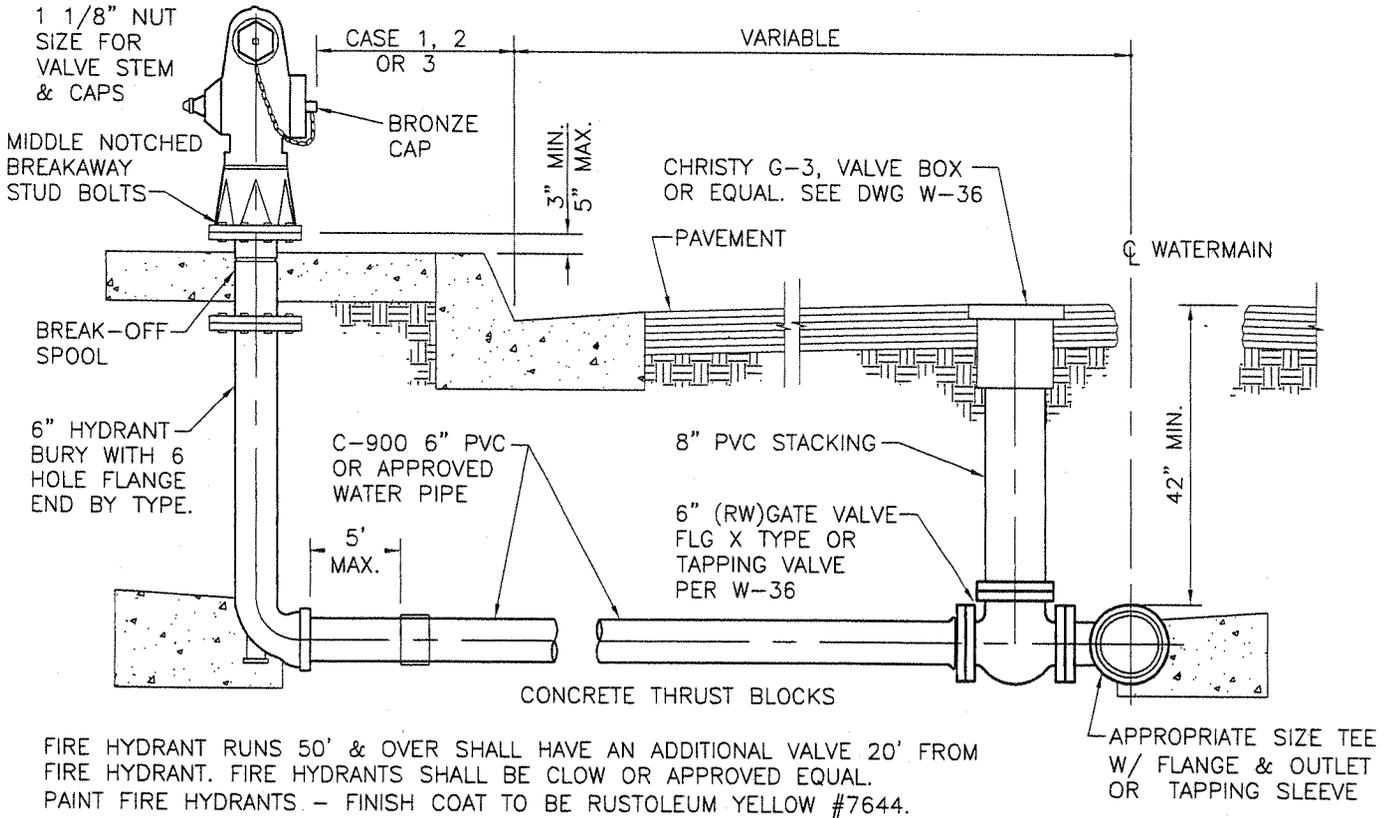
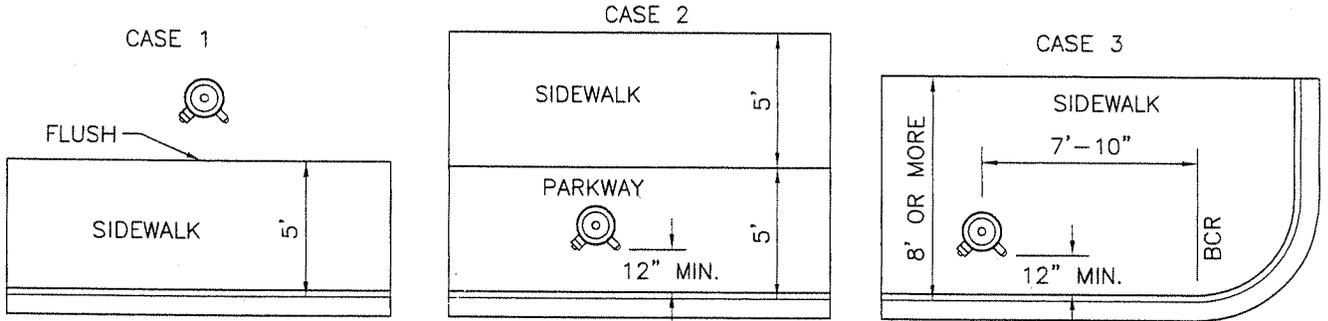
City Of Camarillo

REFLECTOR MARKERS: (ALL FIRE HYDRANTS SHALL HAVE REFLECTORS)
 LOCATION OF ALL REFLECTORS SHALL BE AS CLOSE TO THE CENTERLINE OF THE STREET AS POSSIBLE, OR LANE LINES, BUT NEVER IN THE TRAVEL LANE.



OTHER MARKERS IN THE STREET:
 WHEN THERE ARE TRAFFIC MARKERS ALREADY IN THE STREET, FIRE DEPARTMENT REFLECTORS SHOULD NOT BE USED ON THIS STREET AT ALL.

REFLECTIVE MARKERS SHALL BE TYPE D, 2-WAY BLUE.



FIRE HYDRANT RUNS 50' & OVER SHALL HAVE AN ADDITIONAL VALVE 20' FROM FIRE HYDRANT. FIRE HYDRANTS SHALL BE CLOW OR APPROVED EQUAL. PAINT FIRE HYDRANTS - FINISH COAT TO BE RUSTOLEUM YELLOW #7644.

N:\0550\0868\01\Cadd\WATER-STD\W-07.DWG 06/29/2005 10:46

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		FIRE HYDRANT INSTALLATION	DWG. NO.	
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			W-7	
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			FILED	
						SHT <u>1</u> OF <u>1</u>	



City Of Camarillo

THE FOLLOWING GUIDELINES SHALL BE UTILIZED IN DETERMINING HYDRANT LOCATIONS AND MINIMUM FLOW REQUIREMENTS BASED ON LAND USE. THE ACTUAL GPM REQUIREMENTS AND HYDRANT SPACING WILL BE DETERMINED BY THE VENTURA COUNTY FIRE DEPT. AT TIME OF IMPROVEMENT PLAN CHECK.

NOTE: ALL FIRE HYDRANTS SHALL HAVE METAL CAPS AND SHALL HAVE INDEPENDENT VALVING FOR EACH OUTLET WITH SWIVEL OPERATING ASSEMBLIES.
PAINT ALL FIRE HYDRANTS FINISH COAT TO BE RUSTOLEUM YELLOW NO. 7644.

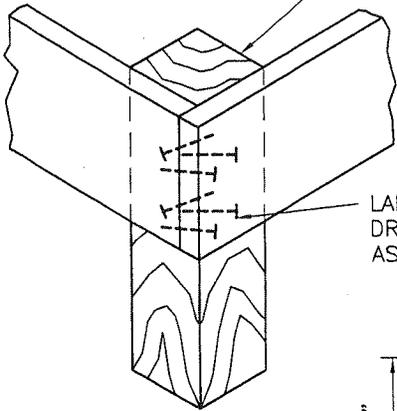
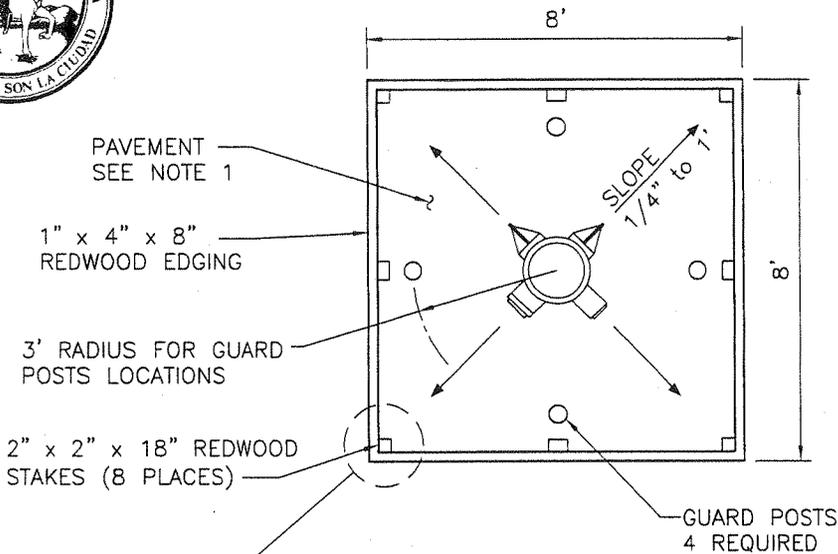
KEY POINT	TEXT
RESIDENTIAL CLOW - 2050 OR APPROVED EQUAL	<p>.....SINGLE AND DUPLEX UNITS</p> <p>.....FIRE FLOW - 1,000 GPM MINIMUM INDIVIDUAL HYDRANT FLOW</p> <p>.....HYDRANT SPACING - 500'</p> <p>.....HYDRANT - 6" WET BARREL TYPE WITH ONE 4" AND ONE 2-1/2" N.S. OUTLETS</p>
COMMERCIAL, INDUSTRIAL & MOBILE HOME PARKS CLOW - 2060 OR APPROVED EQUAL	<p>.....COMMERCIAL USES, MULTI-RESIDENTIAL STRUCTURES CONTAINING THREE OR MORE UNITS, LIGHT INDUSTRIAL AND MOBILE HOME PARKS.</p> <p>.....FIRE FLOW - 1,500 GPM MINIMUM INDIVIDUAL HYDRANT FLOW</p> <p>.....HYDRANT SPACING - 300'</p> <p>.....HYDRANT - 6" WET BARREL TYPE WITH ONE 4" AND TWO 2-1/2" N.S. OUTLETS</p>
HEAVY INDUSTRIAL CLOW - 2065 OR APPROVED EQUAL	<p>.....WHERE A TOTAL REQUIRED FIRE FLOW EXCEEDS 3,000 GPM</p> <p>.....FIRE FLOW - 1,750 GPM MINIMUM INDIVIDUAL HYDRANT FLOW</p> <p>.....HYDRANT SPACING - 300'</p> <p>.....HYDRANT - 6" WET BARREL TYPE WITH TWO 4" AND ONE 2-1/2" N.S. OUTLETS</p>

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JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		<h2>FIRE HYDRANT GUIDELINES</h2>	DWG. NO. W-8	
REV.	DATE	BY	REVIEWED: <i>Tom P. Smith</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>Moffatt Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	



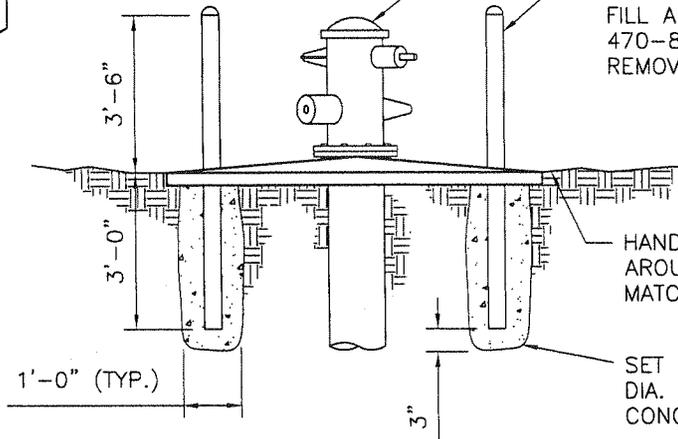
City Of Camarillo



LAP EDGING, TOE NAIL DRIVE, 3d-14 GA. NAIL AS SHOWN

PAINT FIRE HYDRANT AND GUARD POSTS RUST-O-LEUM YELLOW No. 7644

RED OXIDE PRIMER PIPE & PAINT RUST-O-LEUM YELLOW. FILL ALL GUARD POSTS WITH 470-8-2000 CONCRETE, ROD TO REMOVE AIR VOIDS, DOME FINISH TOP.



HAND TAMP EXISTING EARTH AROUND FORM PRIOR TO PAVING. MATCH EXISTING GROUND LEVEL.

SET GUARD POSTS IN 1'-0" DIA. FOOTING 470-8-2000 CONCRETE.

NOTES:

1. FILL REDWOOD FORM WITH 3/4" MINUS UNTREATED ROCK BASE TO WITHIN 1" OF THE FORM TOP AND TAMP. PAVE WITH HOT ASPHALT CONCRETE. USE A 1" LIFT AT FORM EDGES TO 2" LIFT AT CENTER OF PAD. HAND FINISH HOLDING DRAIN SLOPES OF 1/4" TO 1' TO EDGES.
2. UNLESS OTHERWISE NOTED, FIRE HYDRANT INSTALLATION SHALL CONFORM TO STD. DWG. W-7.

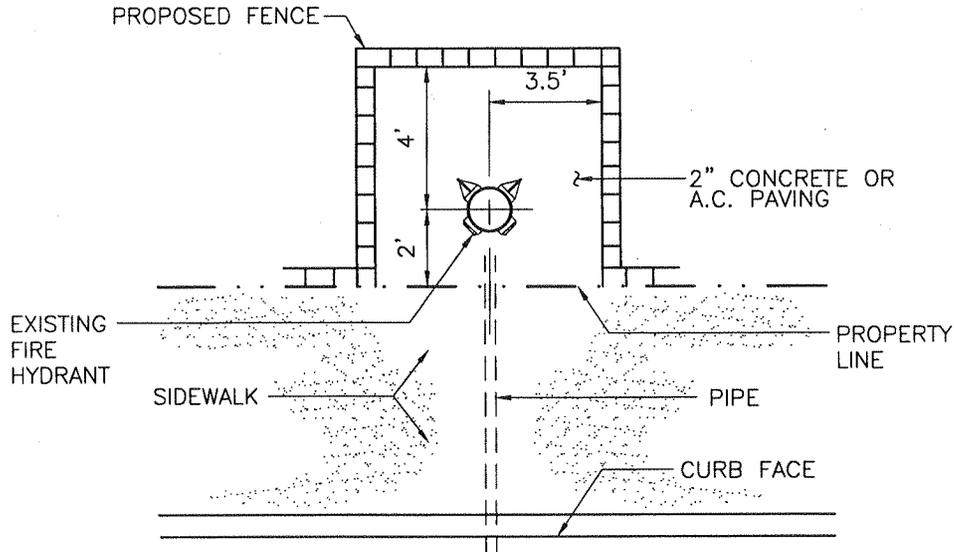
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JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		FIRE HYDRANT INSTALLATION IN UNIMPROVED AREAS	DWG. NO. W-9		
REV.	DATE	BY	REVIEWED: <i>Tom P. Smith</i> WATER SUPERINTENDENT			FILED	SHT <u>1</u> OF <u>1</u>	
			APPROVED: <i>Hoffman Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005					

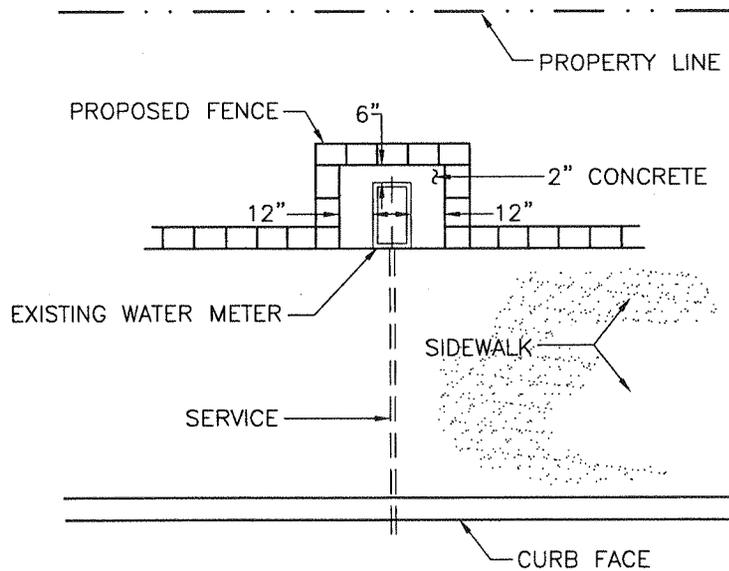


City Of Camarillo

FENCE AROUND A FIRE HYDRANT



FENCE AROUND WATER METER



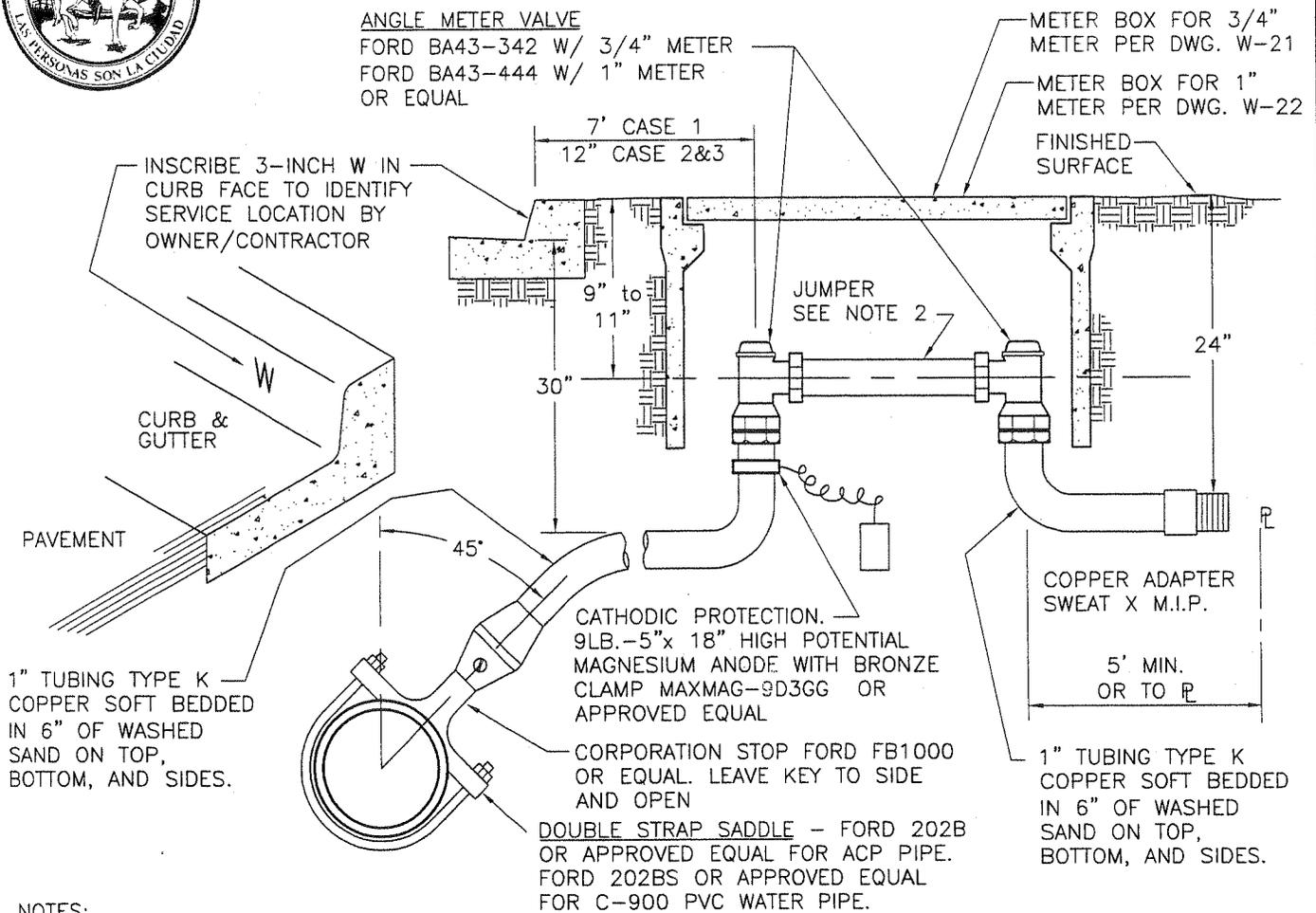
N:\0550\0868\01\Cadd\WATER-STD\W-10.DWG 08/30/2005 09:51

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		FENCING AROUND FIRE HYDRANT AND WATER METERS	DWG. NO. W-10	
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	



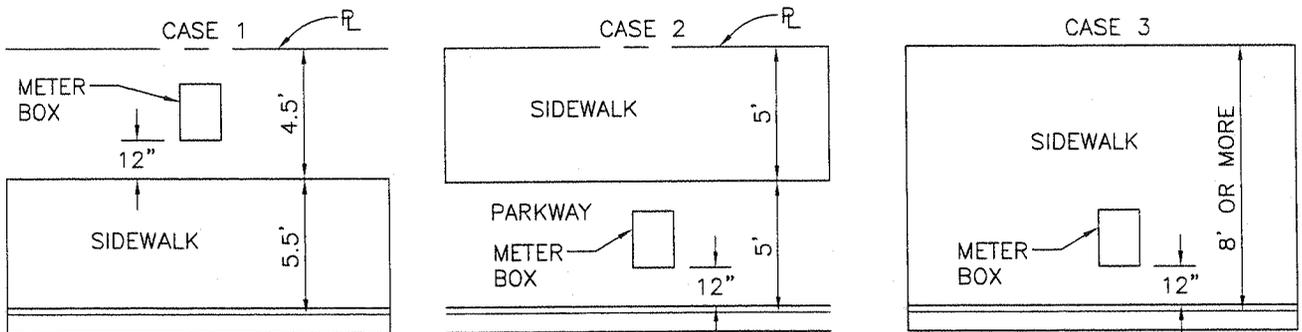
City Of Camarillo

ANGLE METER VALVE
 FORD BA43-342 W/ 3/4" METER
 FORD BA43-444 W/ 1" METER
 OR EQUAL



NOTES:

1. WATER SERVICES AND METER BOXES TO BE INSTALLED BY THE CONTRACTOR AND APPROVED AND INSPECTED BY CITY. METER TO BE INSTALLED BY THE WATER DIVISION AND PAID FOR BY THE DEVELOPER/OWNER.
2. THE 1-INCH METER SERVICE WILL REQUIRE A 1 1/4" X 10 3/4" JUMPER, THE 3/4" METER WILL REQUIRE A 1" X 7 1/2" LONG JUMPER; WATER METER JUMPERS TO BE PROVIDED BY WATER DEPARTMENT.
3. ALL COPPER PIPE SHALL BE COVERED WITH 6 MIL PLASTIC SLEEVING WITH ENDS SEALED WITH 10 MIL TAPE. PLASTIC SLEEVING SHALL BE SPECIALTY PRODUCTS P-3016 OR APPROVED EQUAL.

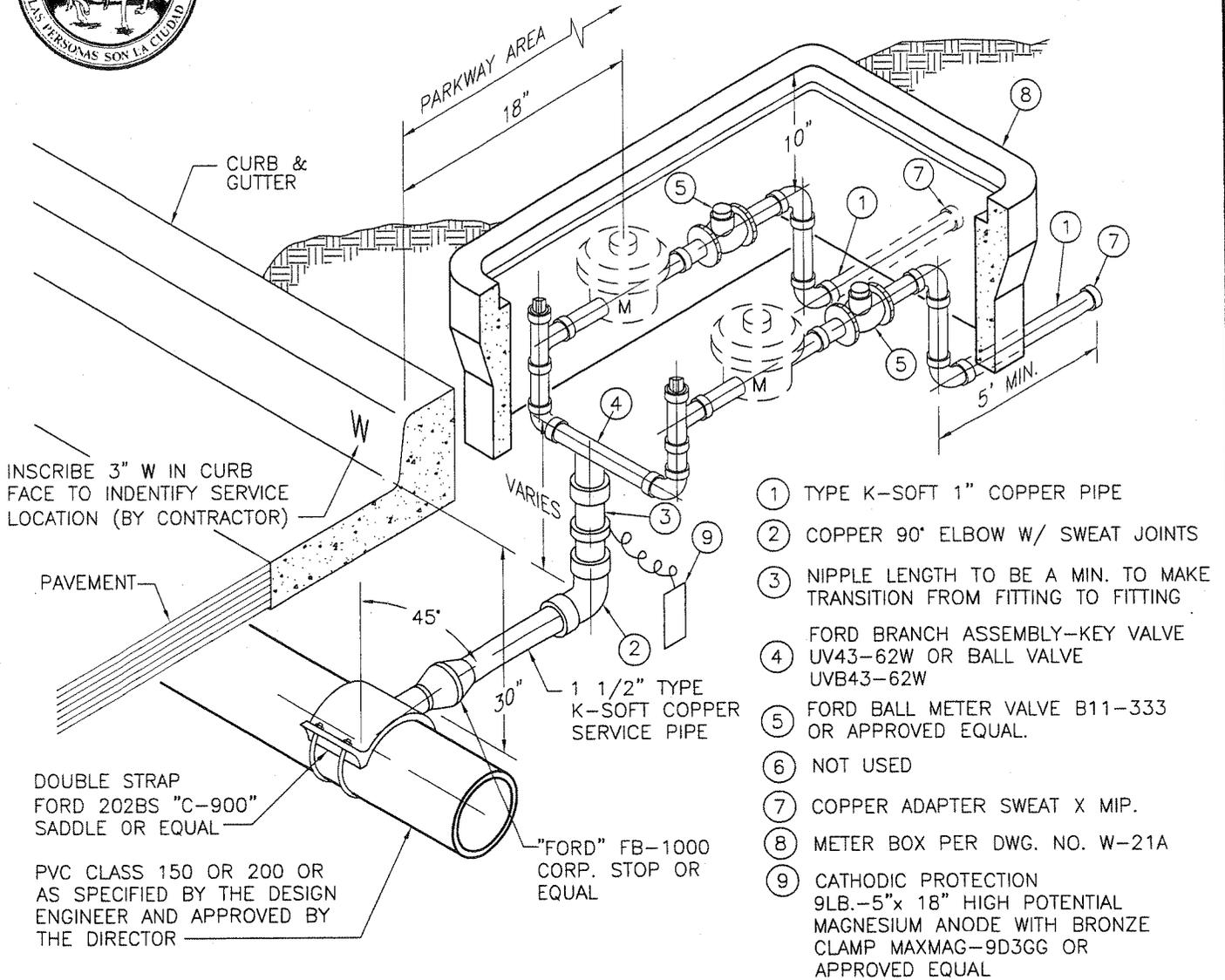


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JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		1 & 3/4 INCH WATER METER & SERVICE LINE INSTALLATION	DWG. NO. W-11	
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	



City Of Camarillo



NOTES:

1. THE REQUIRED SIZE OF THE SERVICE MUST BE APPROVED BY THE CITY (1 1/2" MIN.).
2. ALL FITTINGS SHALL BE SWEAT FITTINGS EXCEPT AS NOTED.
3. THE WATER SERVICE SHALL EXTEND PERPENDICULAR TO THE CENTERLINE OF THE STREET.
4. THE WATER METER TO BE INSTALLED BY THE CITY. THE METER BOX TO BE FURNISHED AND INSTALLED BY THE OWNER CONTRACTOR.
5. THE WATER METER LOCATION SHALL BE IN ACCORDANCE WITH DWG. No. W-11.
6. JUMPERS TO BE PROVIDED BY WATER DEPARTMENT AND INSTALLED BY CONTRACTOR.
7. USE M.G. 380 BRAZING. ALLOW WITH 15% SILVER ON ALL SOLDER FITTINGS OR EQUAL.
8. ALL COPPER PIPE SHALL BE BEDDED IN 6" OF WASHED SAND ON TOP, BOTTOM, AND SIDES.
9. ALL COPPER PIPE SHALL BE COVERED WITH 6 MIL PLASTIC SLEEVING WITH ENDS SEALED WITH 10 MIL TAPE. PLASTIC SLEEVING SHALL BE SPECIALTY PRODUCTS P-3016 OR APPROVED EQUAL.

N:\0550\0868\01\Cadd\WATER-STD-W-11A.dwg 06/29/2005 11:12

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		TYPICAL DOMESTIC WATER SERVICE FOR DUAL 3/4" WATER METERS	DWG. NO. W-11A
REV.	DATE	BY	REVIEWED:	<i>Tom Smith</i> WATER SUPERINTENDENT		FILED
			APPROVED:	<i>Nephe Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005		SHT <u>1</u> OF <u>1</u>



City Of Camarillo

TURBINE WATER METERS IRRIGATION ONLY

PACK JOINT FORD
BFA43-666W=1 1/2"
BFA43-777W=2"
OR EQUAL.

TYPE K SOFT
COPPER TUBING

METER BOX PER
DRWG. NO. W-23

CUSTOMER HAND VALVE
FORD BF13-666W = 1 1/2"
OR BF13-777W = 2" WITH
HH-67 HANDLE OR EQUAL

METER BOX EXTENSION

TURBINE DISPLACEMENTS WATER METERS

ANGLE METER STOP WITH
LOCK WING FORD
BFA43-666W=1 1/2"
FORD BFA43-777W=2"
OR EQUAL

CATHODIC PROTECTION.
9LB.-5"x 18" HIGH POTENTIAL
MAGNESIUM ANODE WITH BRONZE
CLAMP MAXMAG-9D3GG OR
APPROVED EQUAL

METER BOX PER
DRWG. NO. W-23

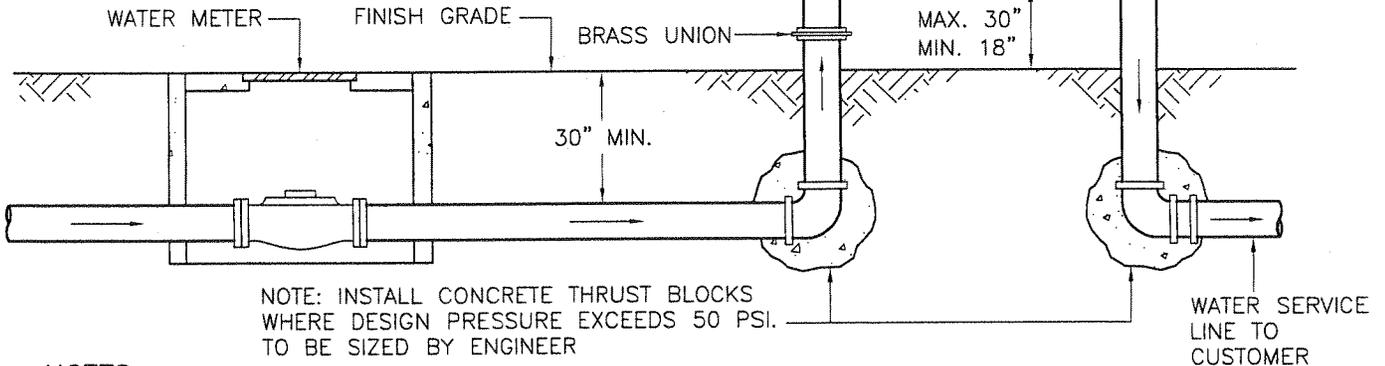
CUSTOMER HAND VALVE
FORD BF13-666W = 1 1/2"
OR BF13-777W = 2" WITH
HH-67 HANDLE OR EQUAL
TO BACKFLOW DEVICE

BACKFLOW DEVICE

WILKINS OR EQUAL "Y"
STRAINER WITH 100-MESH
SCREEN

REDUCED PRESSURE
BACKFLOW DEVICE

BRASS ELBOW
& NIPPLES AS
REQUIRED



NOTE: INSTALL CONCRETE THRUST BLOCKS
WHERE DESIGN PRESSURE EXCEEDS 50 PSI.
TO BE SIZED BY ENGINEER

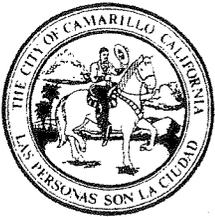
WATER SERVICE
LINE TO
CUSTOMER

NOTES:

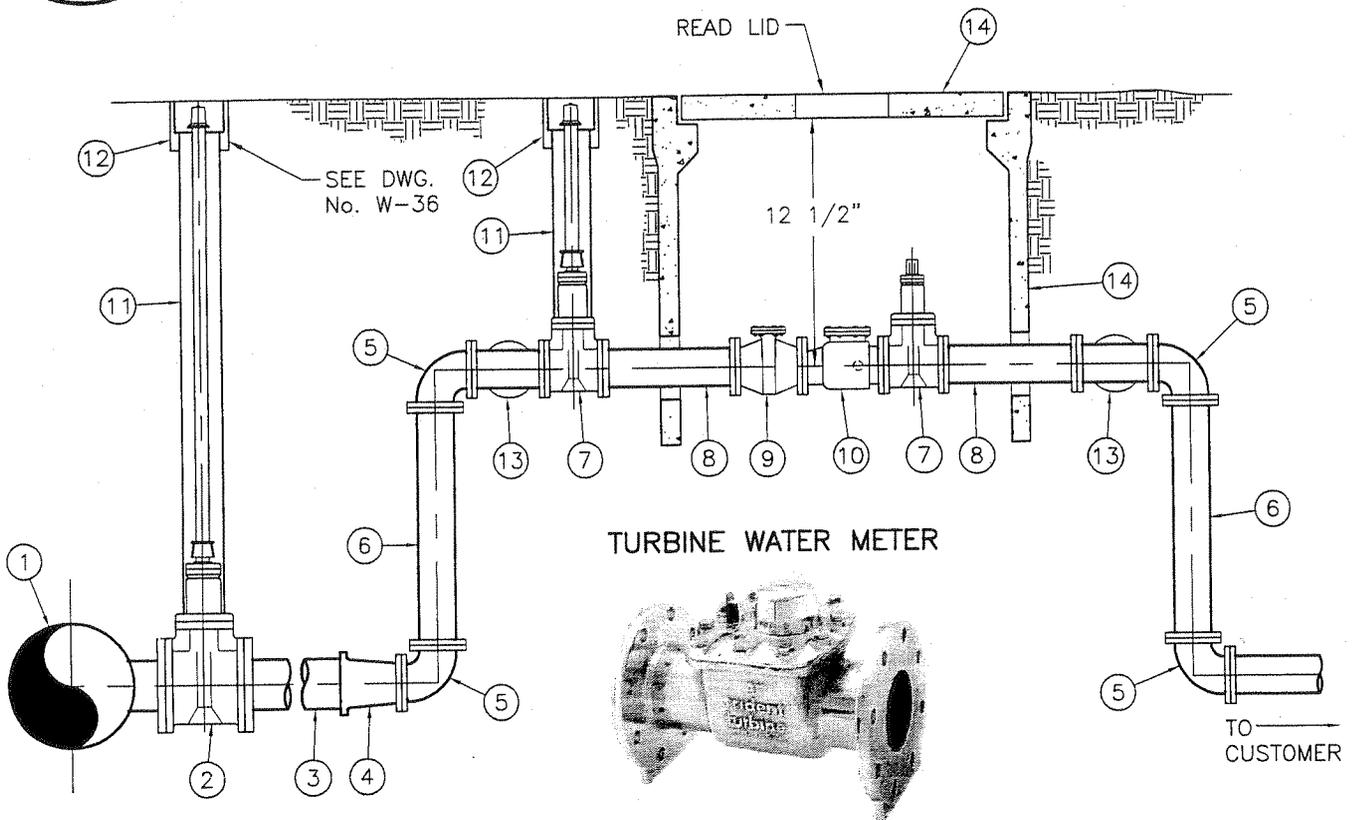
- METER SIZE AND TYPE TO BE DETERMINED BY THE ENGINEER AND VERIFIED BY THE WATER DIVISION.
- BACKFLOW DEVICE TO BE SELECTED FROM CURRENT APPROVED LIST. THE DEVICE SHALL BE TESTED BY A CERTIFIED TESTER PRIOR TO ACCEPTANCE BY THE WATER DIVISION.
- THE DEVICE TO BE LOCATED AS CLOSE AS PRACTICAL TO THE USER'S CONNECTION.
- METER JUMPERS TO BE PROVIDED BY WATER DEPT. 2"WM=17" LONG; 1 1/2WM=13" LONG
- LOCATE WATER METERS PER DRWG. NO. W-11 CASE 1, 2, OR 3.
- WATER METER STRAINER TO BE INSTALLED WITH EACH TURBINE WATER METER.
- THE FOLLOWING DETAILS ARE FOR GENERAL INSTALLATION CONDITIONS ONLY. EACH INDIVIDUAL INSTALLATION SHALL BE APPROVED BY THE DIRECTOR PRIOR TO CONSTRUCTION.
- ALL COPPER PIPE SHALL BE BEDDED IN 6" OF WASHED SAND ON TOP, BOTTOM, AND SIDES.
- ALL COPPER PIPE SHALL BE COVERED WITH 6 MIL PLASTIC SLEEVING WITH ENDS SEALED WITH 10 MIL TAPE. PLASTIC SLEEVING SHALL BE SPECIALTY PRODUCTS P-3015 FOR 3/4" & 1" PIPE, AND P-3016 FOR 2" & 2 1/2" PIPE OR APPROVED EQUAL.

N:\0550\0868\01\Cadd\WATER-STD.W-13.DWG 06/29/2005 11:10

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		1 1/2" & 2" WATER METER SERVICE INSTALLATION WITH REDUCED PRESSURE (RP) BACKFLOW ASSEMBLY	DWG. NO. W-13
REV.	DATE	BY	REVIEWED:	<i>Tom Smith</i> WATER SUPERINTENDENT		FILED
			APPROVED:	<i>W. Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005		SHT <u>1</u> OF <u>1</u>



City Of Camarillo



- ① WATER MAIN POINT OF CONNECTION
- ② 4" (RW) GATE VALVE (FLG X MJ) PER W-36
- ③ 4" PVC WATER PIPE CL-200 LENGTH VARIES
- ④ 4" X 3" REDUCER (MJ X FLG)
- ⑤ 3" FLG'D 90° ELBOW
- ⑥ 3" FLG'D D.I.P. SPOOL (LENGTH VARIES)
- ⑦ 3" FLG'D (RW) GATE VALVE (WITH 2" OPERATING NUT)
- ⑧ 3" FLG'D D.I.P. SPOOL (12" LONG)
- ⑨ 3" FLG'D WATER METER STRAINER
- ⑩ 3" WATER METER-TURBO
- ⑪ 8" DIA. NON-FERROUS VALVE STACK
- ⑫ CHRISTY G-3 VALVE BOX LID - MARKED WATER
- ⑬ 3" FLG'D TEE WITH COMPANION FLANGE WITH TAPPED 2" F.I.P.T.
- ⑭ METER BOX PER DRWG. NO. W-25

NOTES:

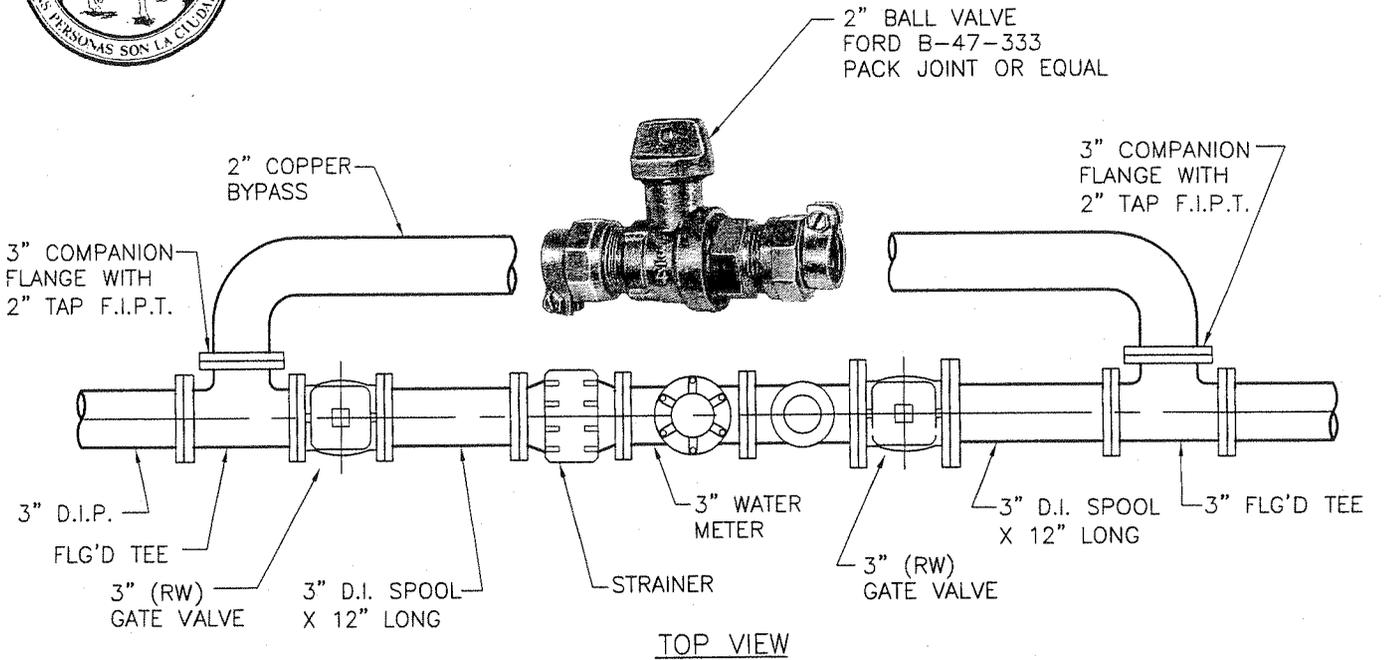
1. THE OVERALL LAYING LENGTH FOR THE 3-INCH WATER METER ASSEMBLY IS ±8 FT.
2. SELECT A LOCATION WHICH WILL ACCOMODATE THE WATER METER ASSEMBLY AND WHERE THE SURFACE IS RELATIVELY FLAT.
3. THE 3-INCH DUCTILE IRON FLANGED WATER METER SERVICE SHALL BE AS SHOWN PER STD. DRWG. No. W-11 & STD. DRWG. No. W-14, SHT. 2 WITH A 2-INCH COPPER BYPASS AND A 2-INCH BALL VALVE WITH VALVE BOX AND STACK.

N:\0550\0868\01\Cadd\WATER-STD\W-14-1.DWG 06/29/2005 11:09

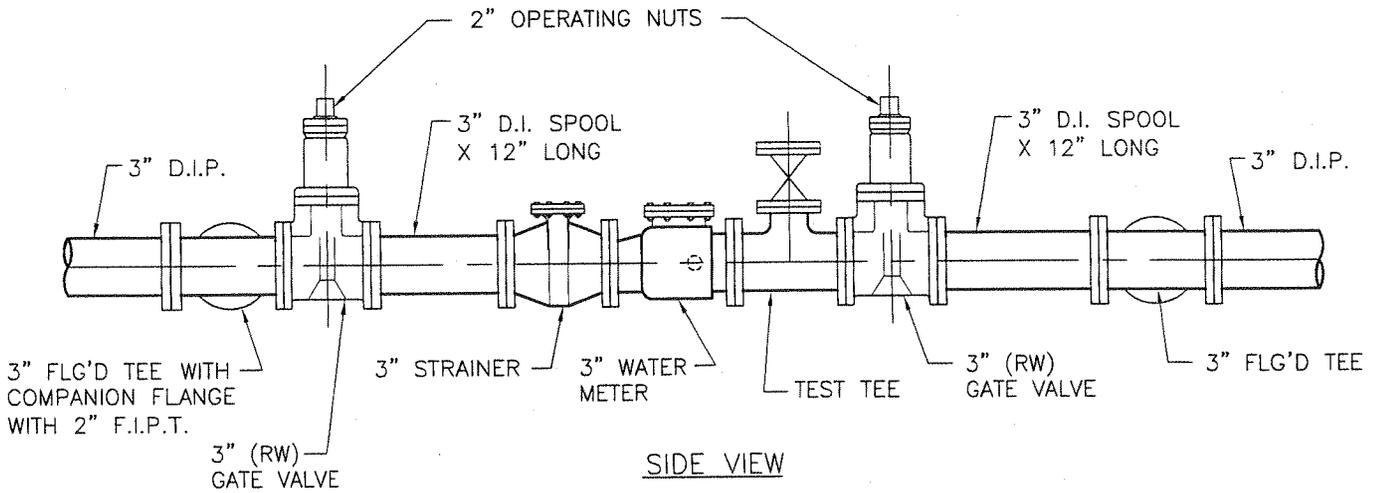
JULY 2005		CITY OF CAMARILLO PUBLIC WORKS DEPT.		<h2 style="margin: 0;">3" TURBO DOMESTIC WATER METER INSTALLATION</h2>	DWG. NO. W-14	
REV.	DATE	BY	REVIEWED:			FILED
			 <small>WATER SUPERINTENDENT</small>			SHT <u>1</u> OF <u>2</u>
			APPROVED: <small>CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005</small>			



City Of Camarillo



TOP VIEW



SIDE VIEW

NOTES:

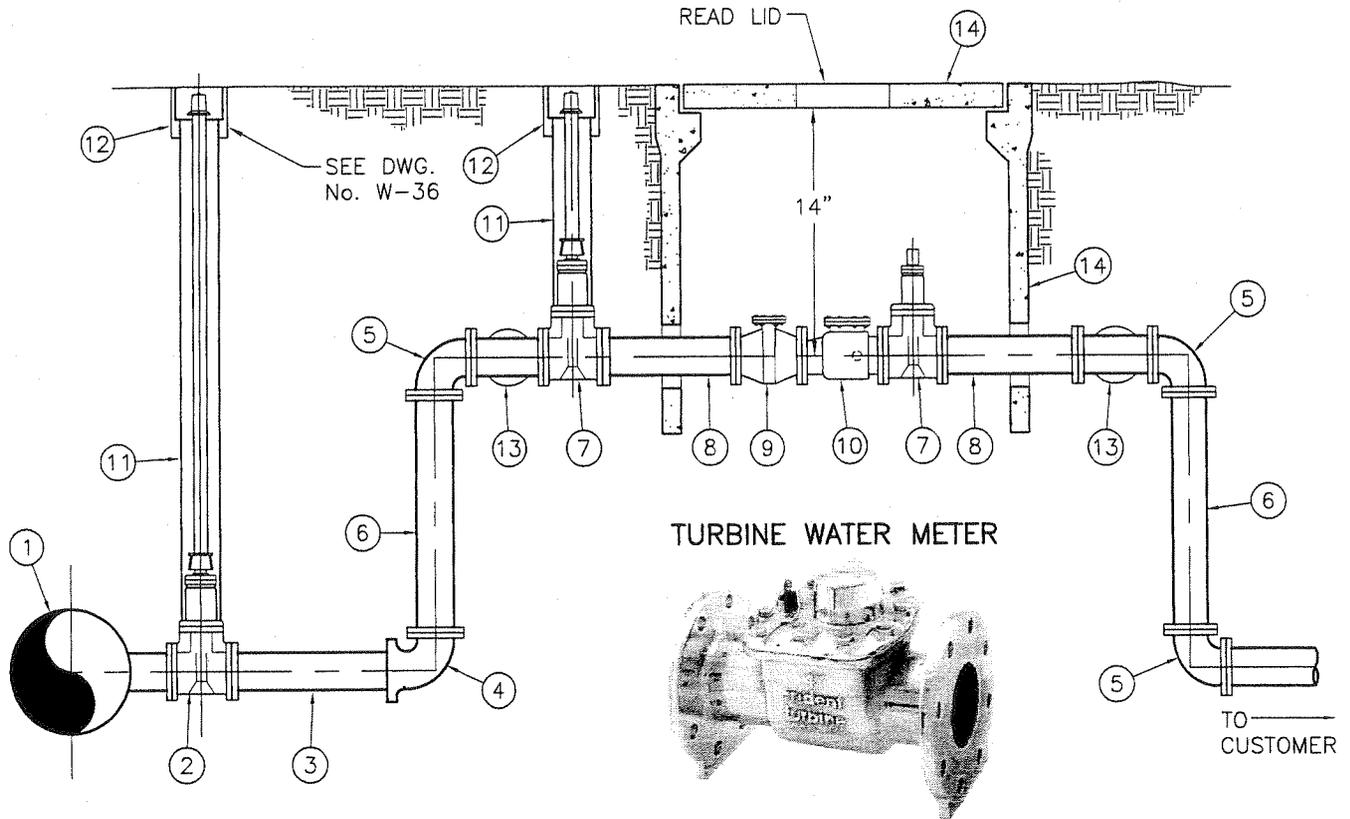
1. THE 2" BYPASS TO BE INSTALLED OUTSIDE OF THE METER BOX (SEE STD. DWG. No. W-25 FOR METER BOX DIMENSION) AND WITHIN A CHRISTY G-3 WATER VALVE BOX.
2. WATER DEPARTMENT WILL PROVIDE DEVELOPER/CONTRACTOR WITH 18 1/4" D.I.P. METER JUMPER. METER WITH STRAINER AND TEST TEE WILL BE INSTALLED BY WATER DEPARTMENT.

N:\0550\0868\01\Cadd\WATER-STD\W-14-2.DWG 06/29/2005 11:08

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		3" TURBO DOMESTIC WATER METER INSTALLATION	DWG. NO. W-14		
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED	SHT <u>2</u> OF <u>2</u>	
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005					



City Of Camarillo



- | | |
|--|--|
| <ul style="list-style-type: none"> ① WATER MAIN POINT OF CONNECTION ② 4" (RW) GATE VALVE (FLG X MJ) PER W-36 ③ 4" PVC WATER PIPE CL-200 LENGTH VARIES ④ 4" 90° ELBOW (MJ X FLG) ⑤ 4" FLG'D 90° ELBOW ⑥ 4" FLG'D D.I.P. SPOOL (LENGTH VARIES) ⑦ 4" FLG'D (RW) GATE VALVE (WITH 2" OPERATING NUT) | <ul style="list-style-type: none"> ⑧ 4" FLG'D D.I.P. SPOOL (12" LONG) ⑨ 4" FLG'D WATER METER STRAINER ⑩ 4" WATER METER-TURBO ⑪ 8" DIA. NON-FERROUS VALVE STACK ⑫ CHRISTY G-3 VALVE BOX LID - MARKED "WATER" ⑬ 4" FLG'D TEE WITH 2" TAPPED F.I.P.T. COMPANION FLANGE. ⑭ METER BOX PER DRWG. NO. W-25 |
|--|--|

NOTES:

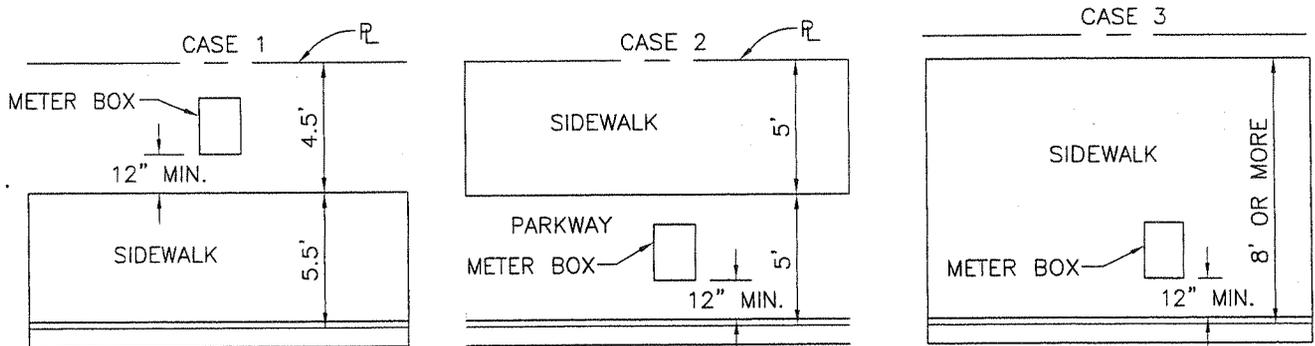
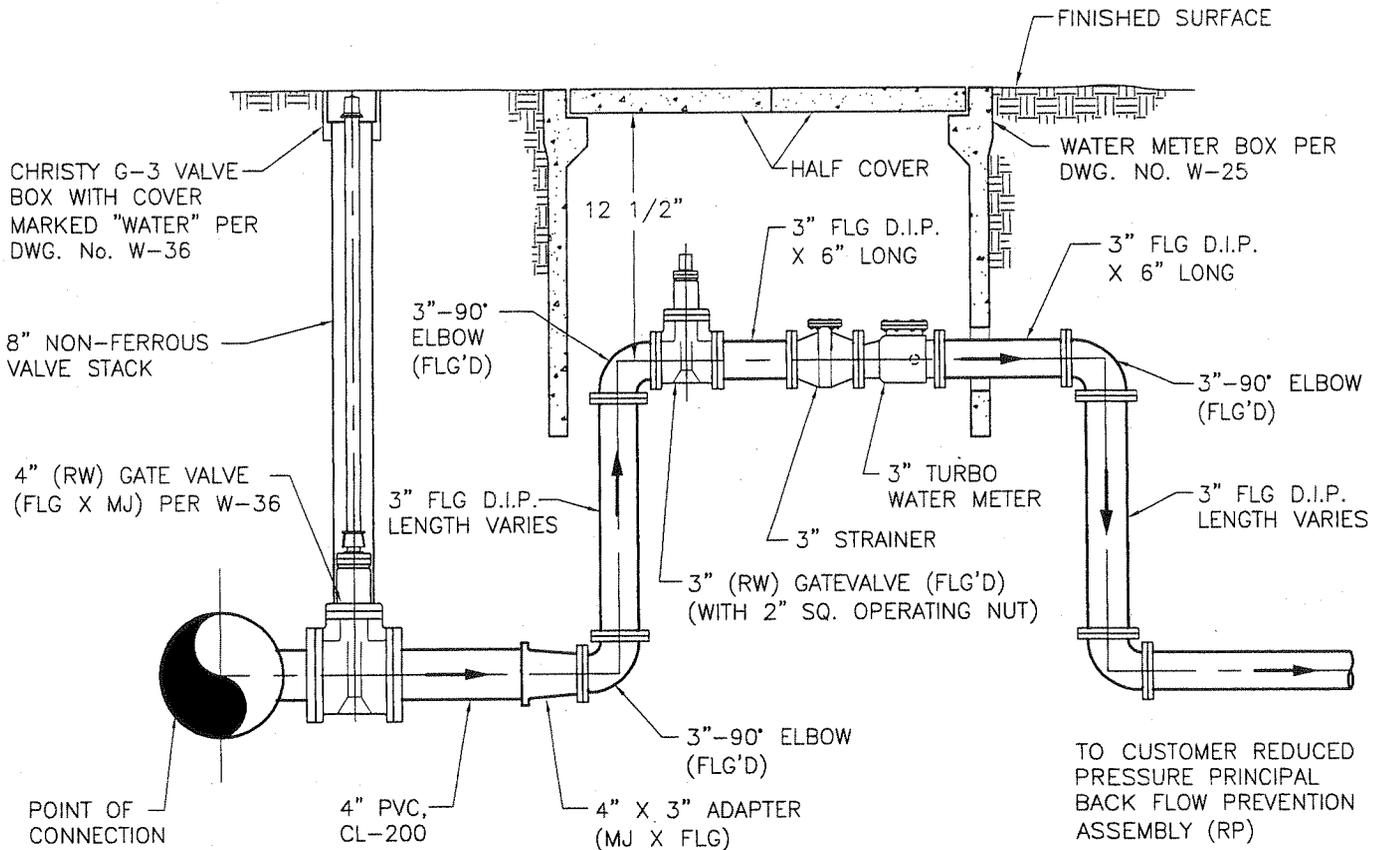
1. THE OVERALL LAYING LENGTH FOR THE 4-INCH WATER METER ASSEMBLY IS ±8 FT.
2. SELECT A LOCATION WHICH WILL ACCOMODATE THE WATER METER ASSEMBLY AND WHERE THE SURFACE IS RELATIVELY FLAT.
3. THE 4-INCH DUCTILE IRON FLANGED WATER METER SERVICE SHALL BE AS SHOWN PER STD. DWG. No. W-11 & STD. DWG. No. W-15, SHT. 2 WITH A 2-INCH COPPER BYPASS AND A 2-INCH BALL VALVE WITH VALVE BOX AND STACK.
4. ALL COPPER PIPE SHALL BE BEDDED IN 6" OF WASHED SAND ON TOP, BOTTOM, AND SIDES.

N:\0550\0868\01\Cadd\WATER-STD.W-15-1.DWG 06/29/2005 11:07

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		<h2 style="margin: 0;">4" TURBO DOMESTIC WATER METER INSTALLATION</h2>	DWG. NO. W-15
REV.	DATE	BY	REVIEWED: <i>W.P. Smith</i> WATER SUPERINTENDENT			FILED
			APPROVED: <i>M. Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			
						SHT <u>1</u> OF <u>2</u>



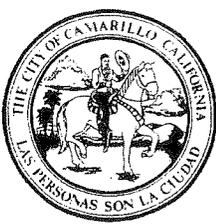
City Of Camarillo



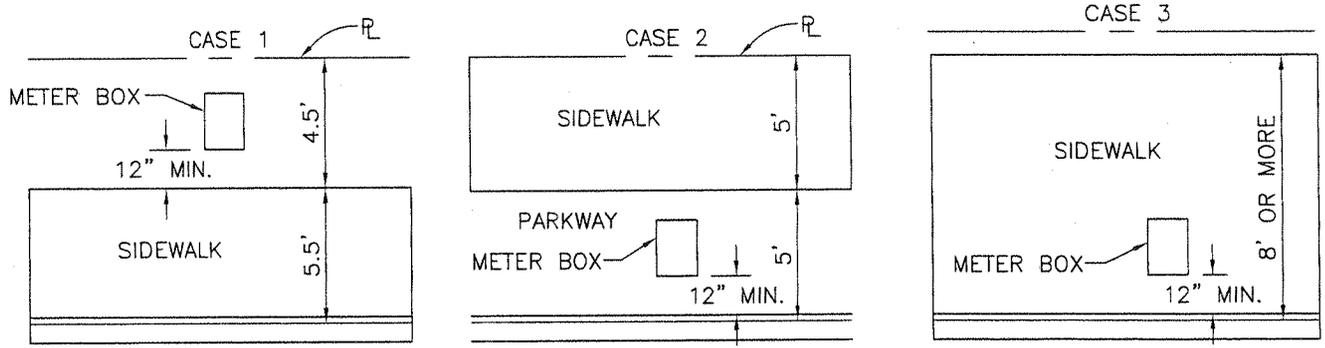
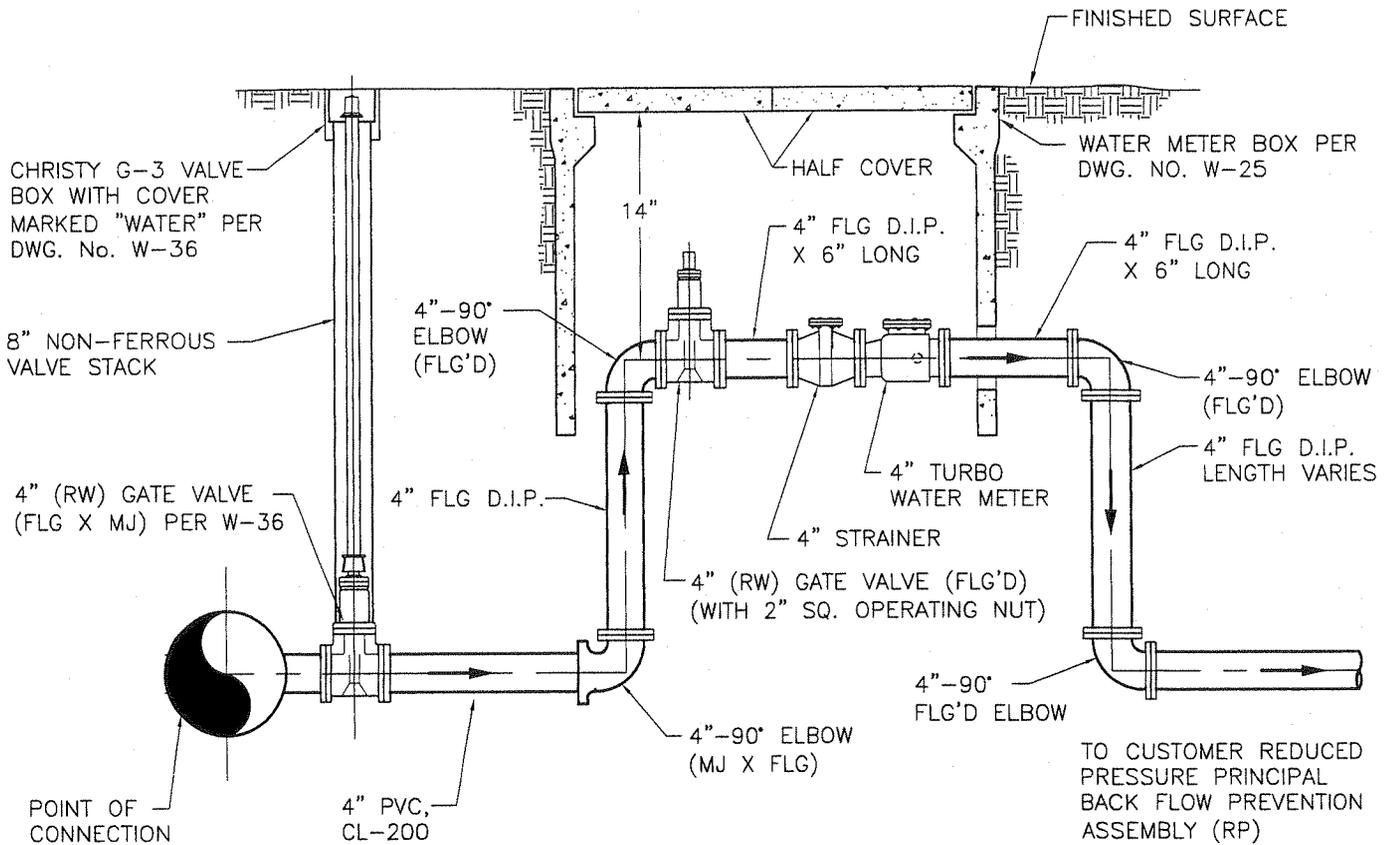
NOTE: LOCATE METER BOX PER CASE No. 1, 2 OR 3 AND PER STD. DWG. No. W-25.

N:\0550\0868\01\Cadd\WATER-STD\W-16.DWG 06/29/2005 11:05

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		3" TURBO LANDSCAPE WATER METER INSTALLATION	DWG. NO. W-16	
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	



City Of Camarillo



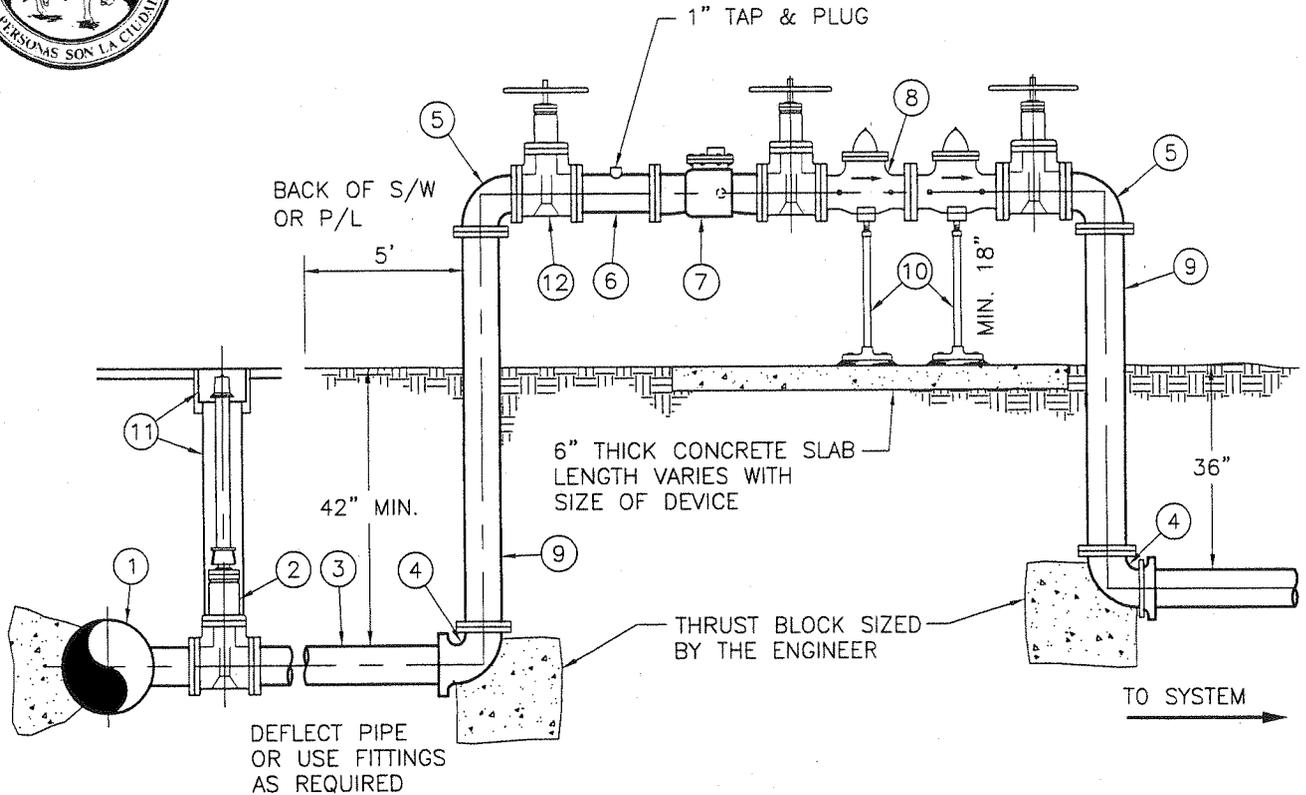
NOTE: LOCATE METER BOX PER CASE No. 1, 2 OR 3 AND PER STD. DWG. No. W-25.

N:\0550\0868\01\Cadd\WATER-STD\W-17.DWG 06/29/2005 11:05

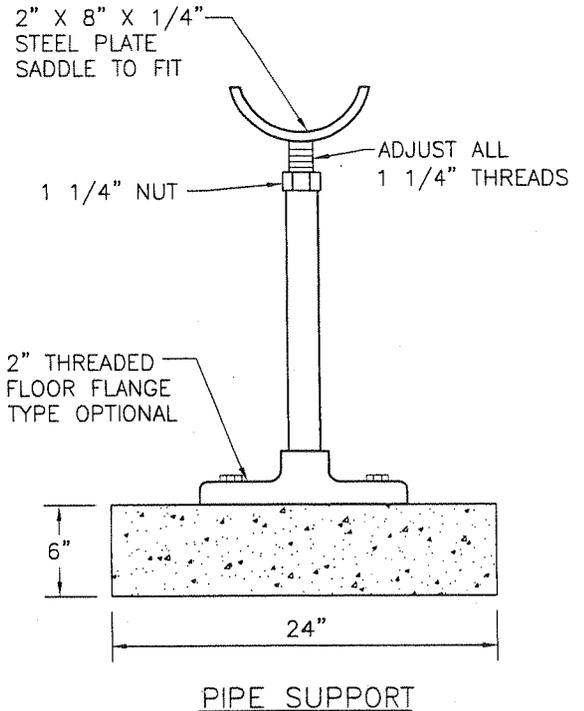
JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		<h2>4" TURBO LANDSCAPE WATER METER INSTALLATION</h2>	DWG. NO. W-17	
REV.	DATE	BY	REVIEWED: <i>100 P. Smith</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>M. H. Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	



City Of Camarillo



- ① FLG'D OUTLET TEE/TAPPING SLEEVE
- ② RW GATE VALVE (FLG X MJ) PER W-36
- ③ PVC, CL-150/200; 4" CL-200
- ④ 90° ELBOW (MJ X FLG) 2 REQ'D
- ⑤ 90° ELBOW (FLG X FLG) 2 REQ'D
- ⑥ FLG'D D.I. SPOOL - 5X METER SIZE
- ⑦ METER WITH STRAINER
- ⑧ R.P. BACKFLOW PREVENTER (APPROVED)
- ⑨ FLG'D D.I. SPOOL - LENGTH VARIES
- ⑩ PIPE SUPPORT (2 REQ'D)
- ⑪ CHRISTY G-3 VALVE BOX WITH COVER MARKED "WATER" & 8" PVC VALVE STACK
- ⑫ RW GATE VALVE (FLG'D)

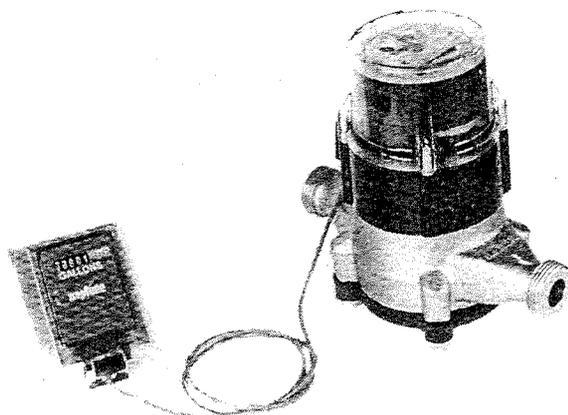


N:\0550\0868\01\Cadd\WATER-STD\W-18.DWG 06/29/2005 11:04

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		3" & LARGER ABOVE GROUND WATER METER INSTALLATION w/BACKFLOW PREVENTION DEVICE	DWG. NO. W-18
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT 1 OF 1



City Of Camarillo



NEPTUNE
PULSER-RM
REMOTE READ WATER
METER SYSTEM OR
EQUIVALENT

SYSTEM SPECIFICATIONS

PULSE OUTPUT:

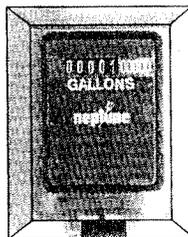
6 VOLT OUTPUT OPERATES THROUGH A LINE RESISTANCE OF UP TO 15 OHMS.

CONNECTING WIRE:

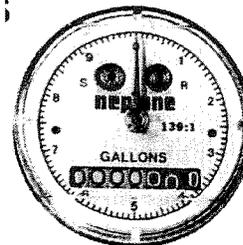
DISTANCES UP TO 300 FEET (91 METERS)-AWG #22

DISTANCES FROM 300 TO 500 FEET (91 TO 152 METERS)-AWG #20

DISTANCES FROM 500 TO 800 FEET (152 TO 244 METERS)-AWG #18



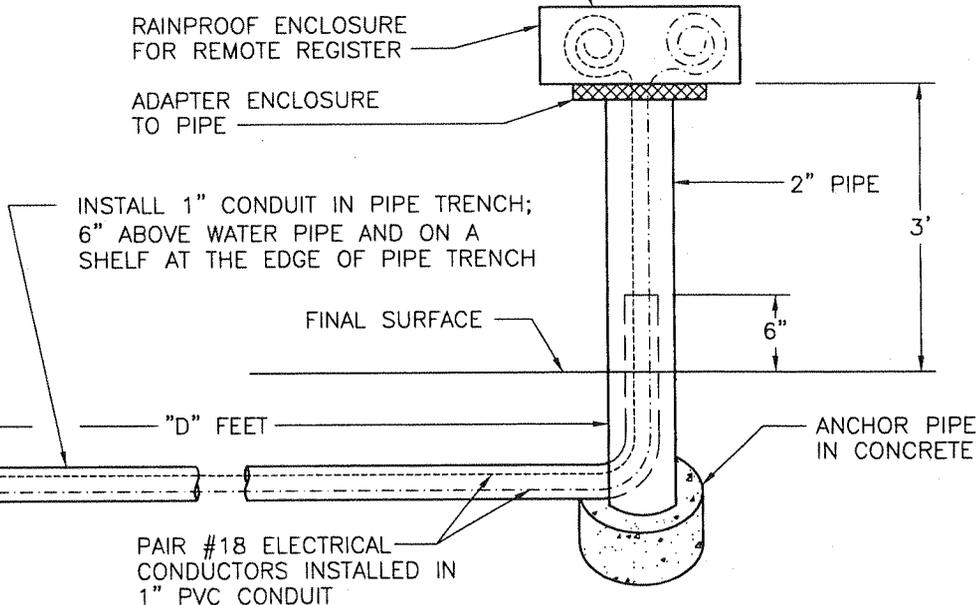
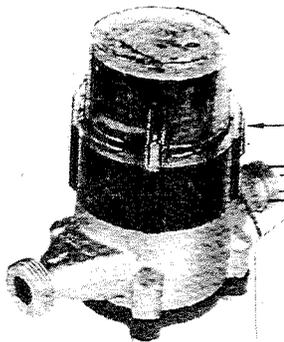
REMOTE DIAL



PULSER DIAL

INSTALL A LOCKABLE HOFFMAN TYPE RAIN PROOF ENCLOSURE CATALOG NO. A-6R64HCR SIZE 6X6X4 OR APPROVED EQUAL

REMOTE READ WATER METER



REMOTE READ REGISTER PANEL INSTALLATION

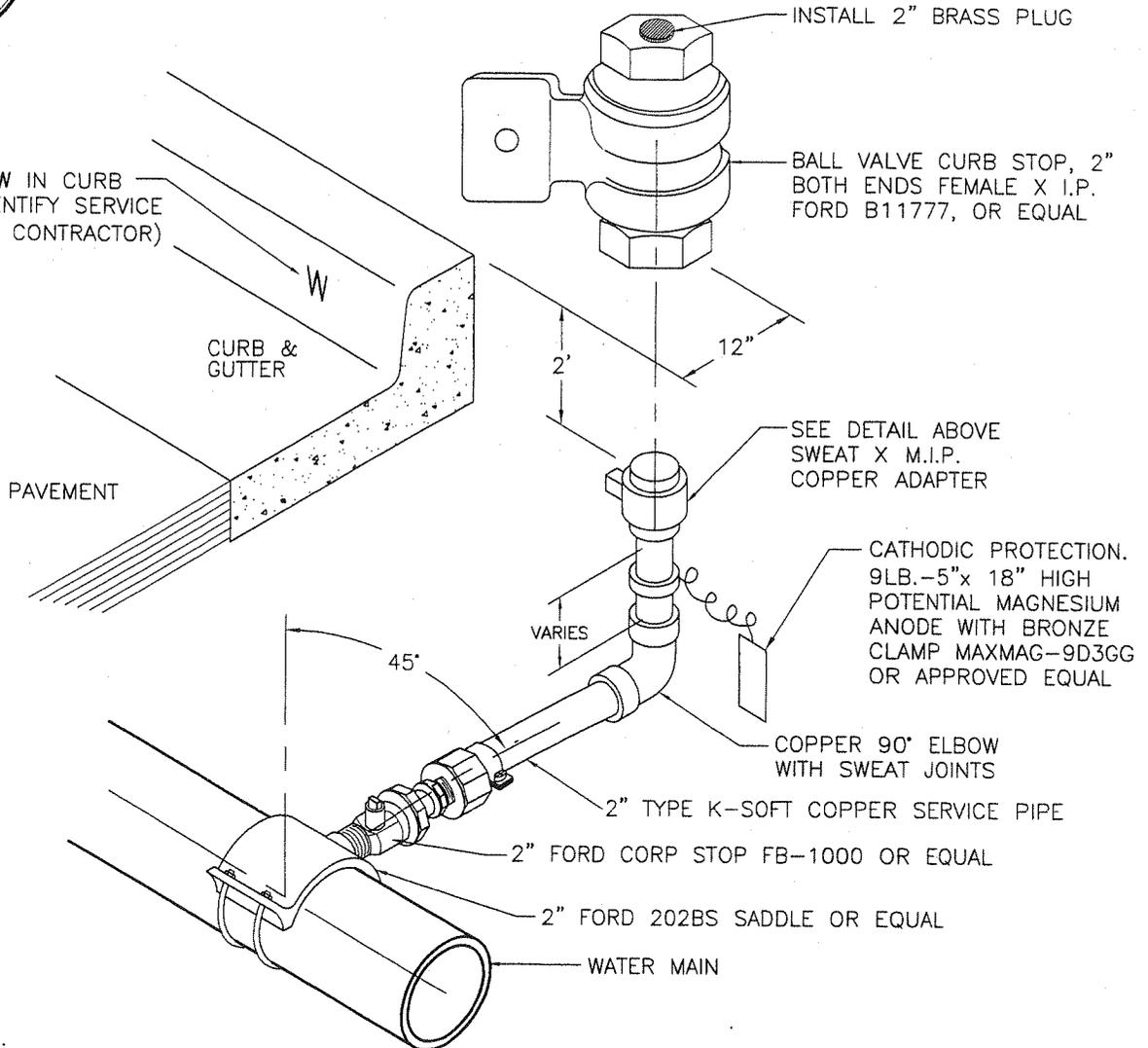
N:\0550\0868\01\Cadd\WATER-STD\W-19.DWG 08/30/2005 09:55

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		TYPICAL REMOTE READ WATER METER SYSTEM INSTALLATION	DWG. NO. W-19	
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	



City Of Camarillo

INSCRIBE 3" W IN CURB
FACE TO IDENTIFY SERVICE
LOCATION (BY CONTRACTOR)

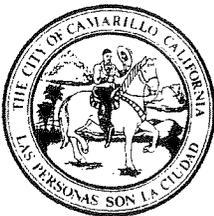


NOTES:

1. THE REQUIRED SIZE OF THE SERVICE MUST BE APPROVED BY THE CITY (2" MIN.).
2. ALL FITTINGS SHALL BE SWEAT FITTINGS EXCEPT AS NOTED.
3. THE WATER SERVICE SHALL EXTEND PERPENDICULAR TO THE CENTERLINE OF THE STREET FROM THE WATER MAIN TO THE METER STOP.
4. THE WATER METER TO BE INSTALLED BY WATER DIVISION . THE METER BOX TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
5. THE WATER METER LOCATION SHALL BE AS SHOWN UNLESS OTHERWISE SPECIFIED BY THE CITY.
6. USE M.G. 380 BRAZING. ALLOW WITH 15% SILVER ON ALL SOLDER FITTINGS OR EQUAL.
7. ALL COPPER PIPE SHALL BE BEDDED IN 6" OF WASHED SAND ON TOP, BOTTOM, AND SIDES.
8. ALL COPPER PIPE SHALL BE COVERED WITH 6 MIL PLASTIC SLEEVING WITH ENDS SEALED WITH 10 MIL TAPE. PLASTIC SLEEVING SHALL BE SPECIALTY PRODUCTS P-3015 FOR 3/4" & 1" PIPE, AND P-3016 FOR 2" & 2 1/2" PIPE OR APPROVED EQUAL.

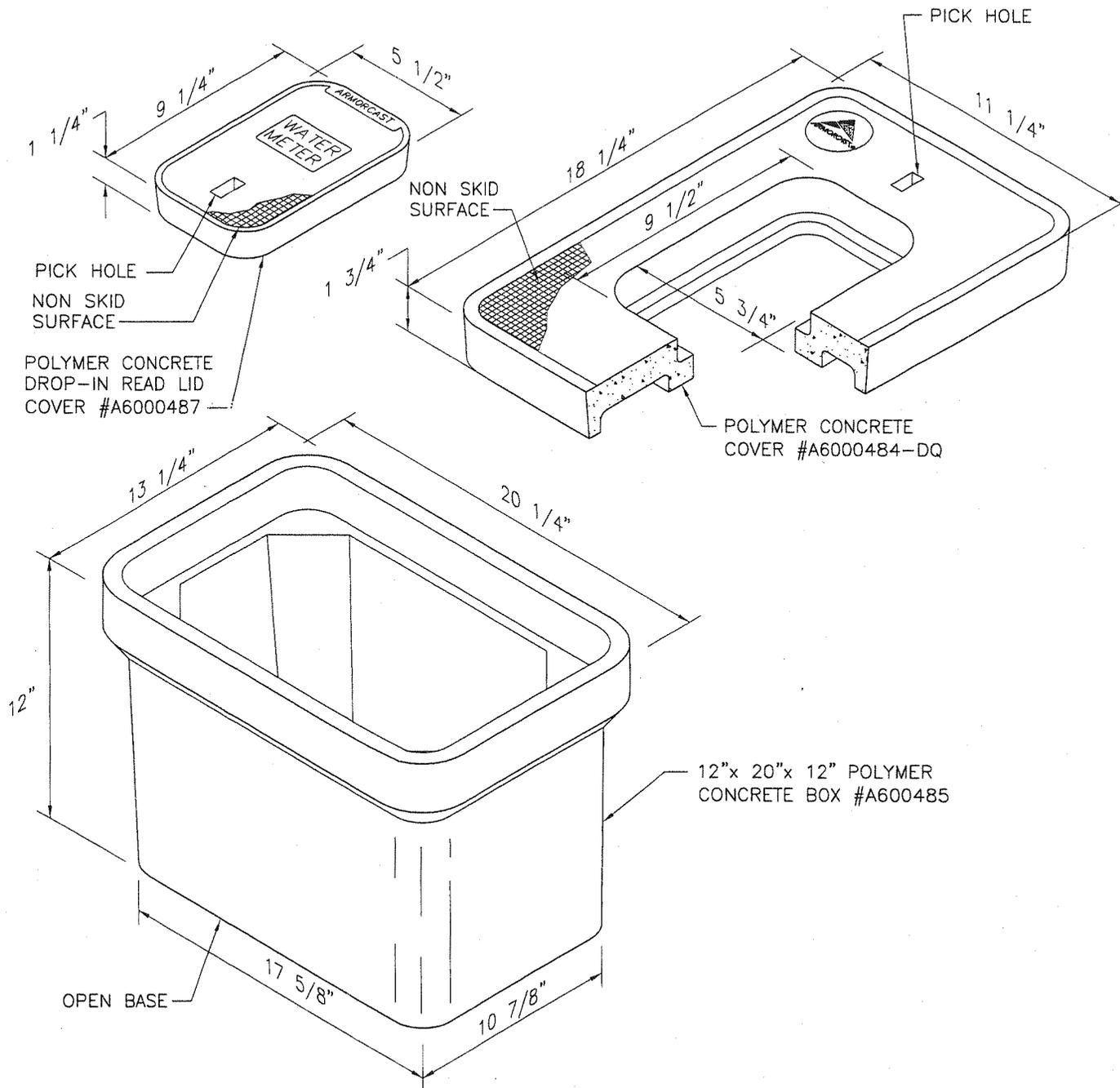
N:\0550\08668\01\Cadd\WATER-STD\W-20.DWG 06/29/2005 11:36

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		WATER SERVICE FOR 1 1/2" - 2" SPECIAL INSTALLATION	DWG. NO.
REV.	DATE	BY	REVIEWED: <i>Tom P. Smith</i> WATER SUPERINTENDENT			W-20
			APPROVED: <i>Muffalo Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			FILED
					SHT <u>1</u> OF <u>1</u>	



City Of Camarillo

ARMORCAST #A6000485 WATER METER BOX OR APPROVED EQUAL



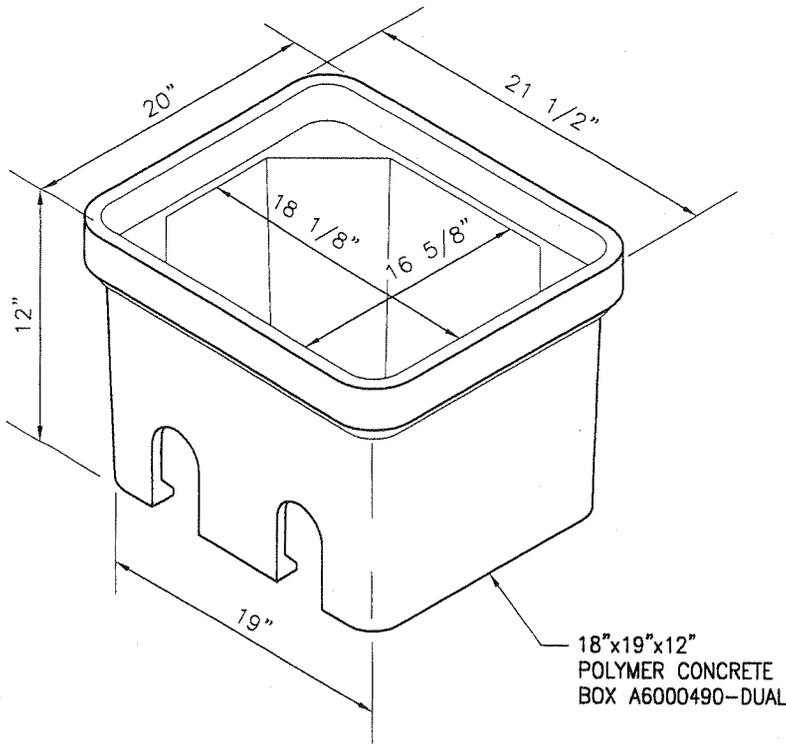
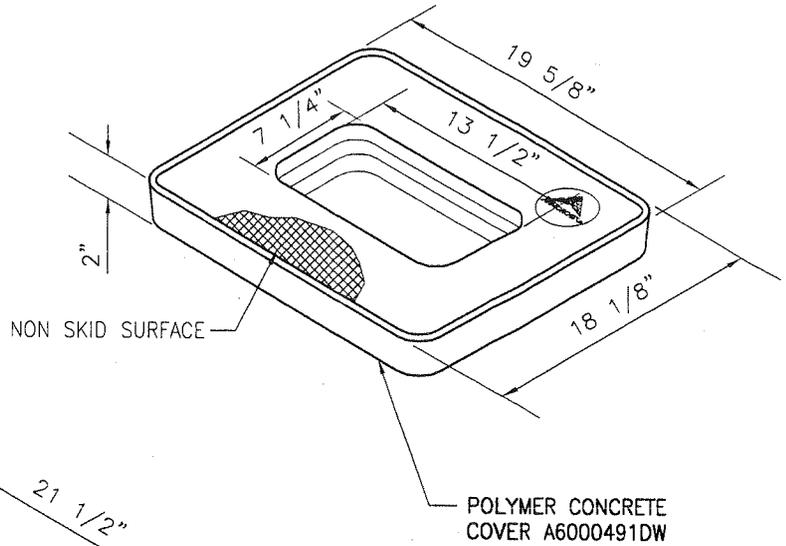
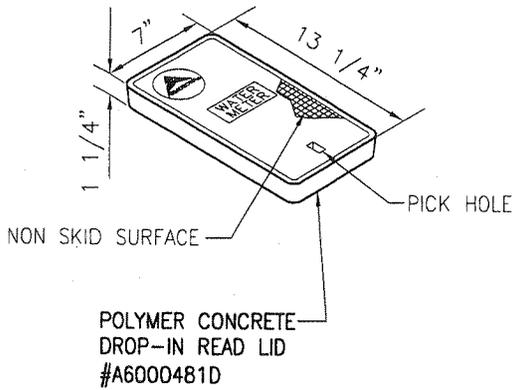
N:\0550\0868\01\Cadd\WATER-STD\W-21.DWG 06/29/2005 12:01

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		WATER METER BOX FOR 3/4" WATER METER INSTALLATION	DWG. NO. W-21	
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	



City Of Camarillo

ARMORCAST #A6000490 DUAL WATER METER BOX OR APPROVED EQUAL



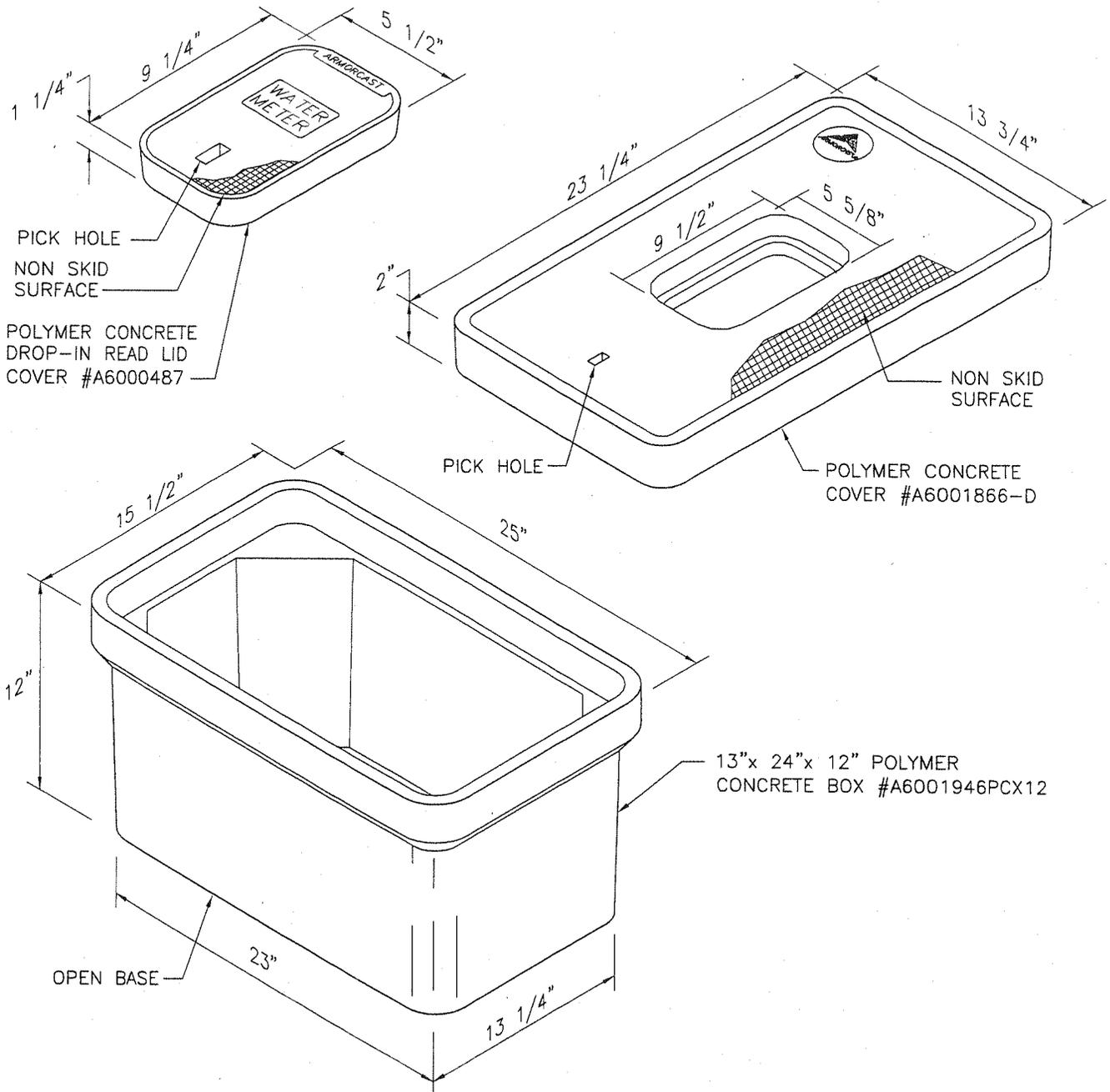
N:\0550\0868\01\Cadd\WATER-STD\W-21A.dwg 06/29/2005 12:00

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		WATER METER BOX FOR DUAL 3/4" WATER METER INSTALLATION	DWG. NO. W-21A	
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	



City Of Camarillo

ARMORCAST #A6001946PCX12 WATER METER BOX OR APPROVED EQUAL



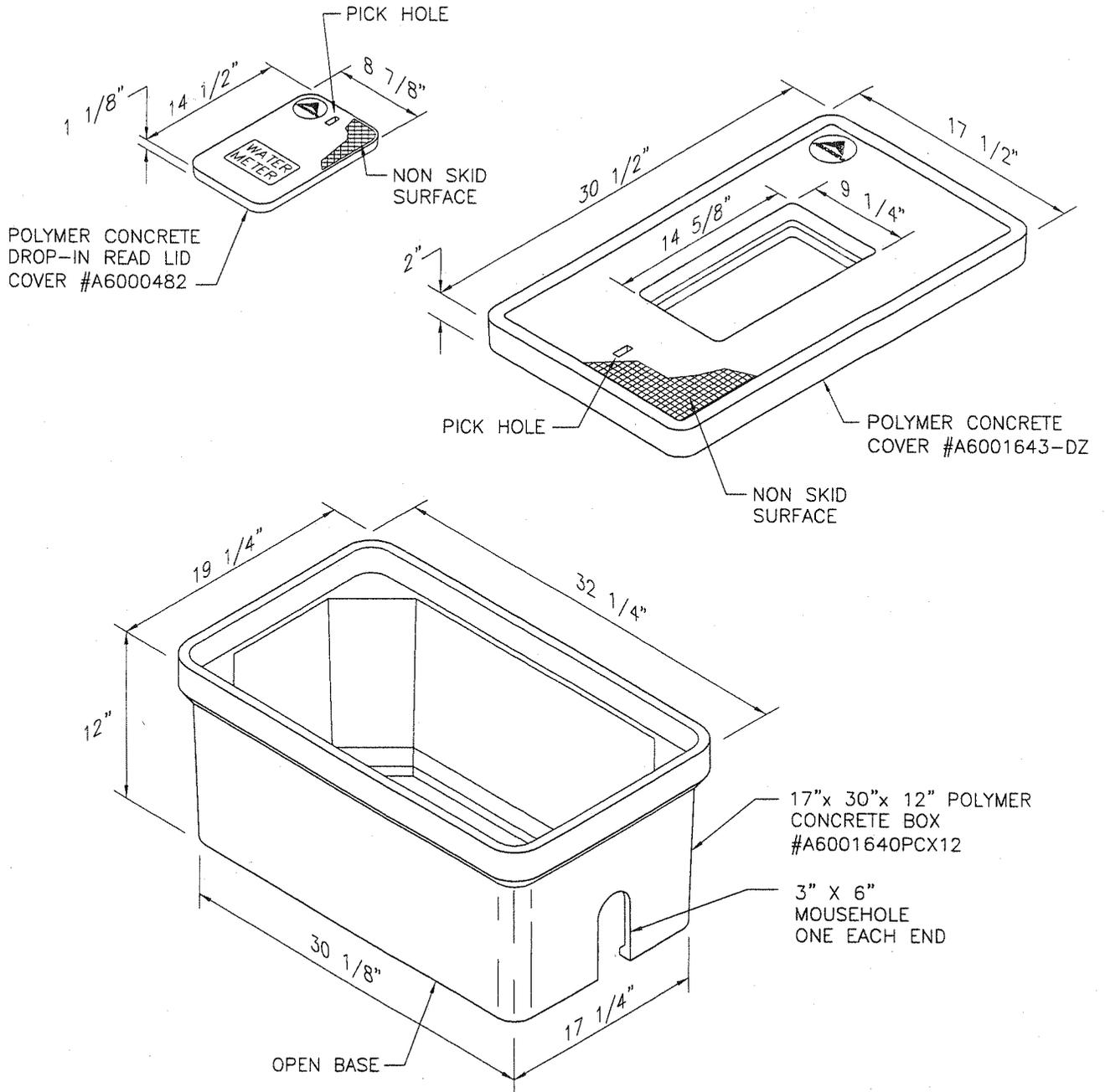
N:\0550\0868\01\Cadd\WATER-STD\W-22.DWG 06/29/2005 11:59

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		WATER METER BOX FOR 1" WATER METER INSTALLATION	DWG. NO. W-22	
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	



City Of Camarillo

ARMORCAST #A6001640PCX12 WATER METER BOX OR APPROVED EQUAL



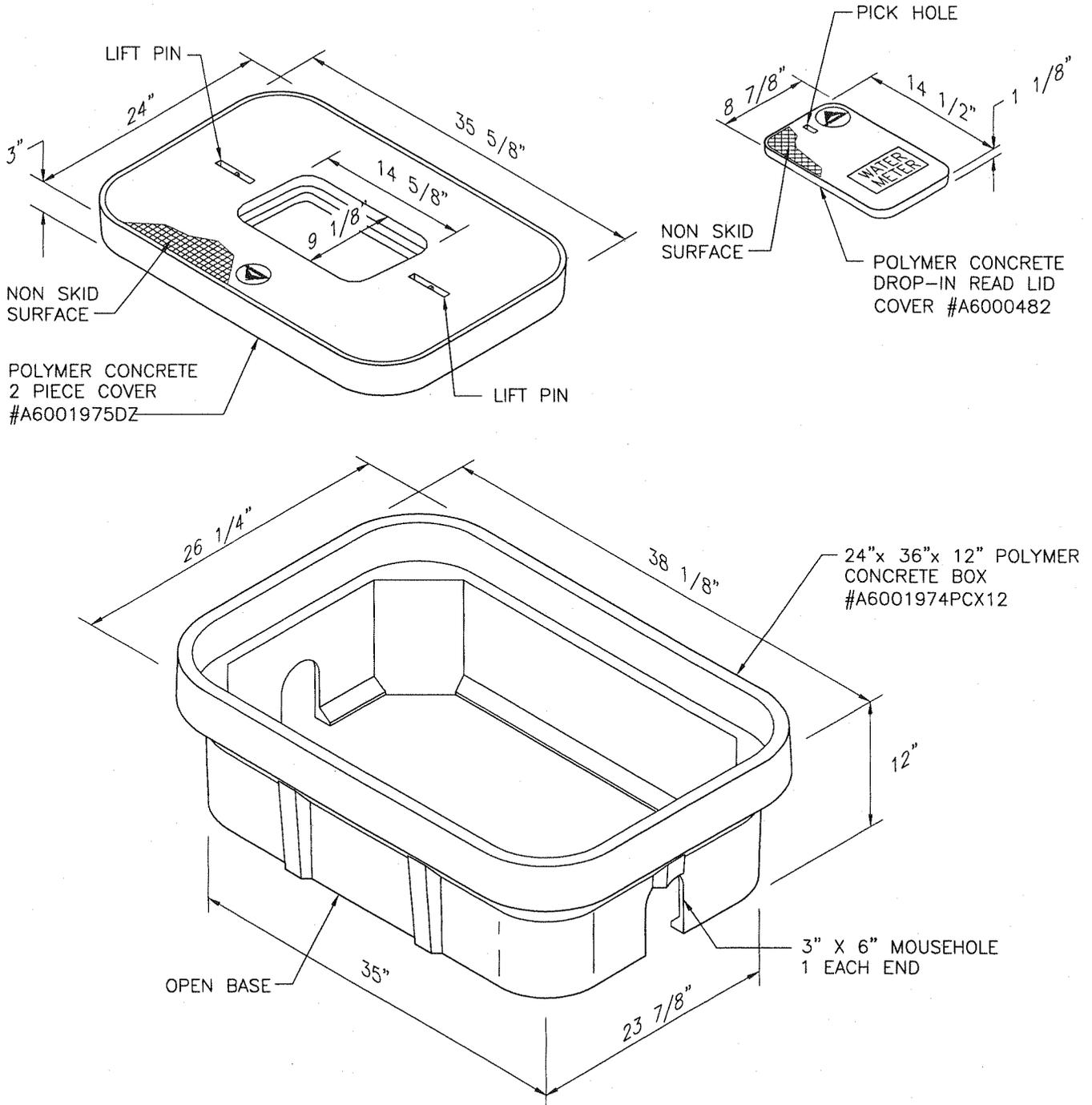
N:\0550\0868\01\Cadd\WATER-STD\W-23.DWG 06/29/2005 11:40

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		WATER METER BOX FOR 1 1/2" AND 2" LANDSCAPE WATER METER	DWG. NO. W-23
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT 1 OF 1



City Of Camarillo

ARMORCAST #A6001974PCX12 WATER METER BOX OR APPROVED EQUAL



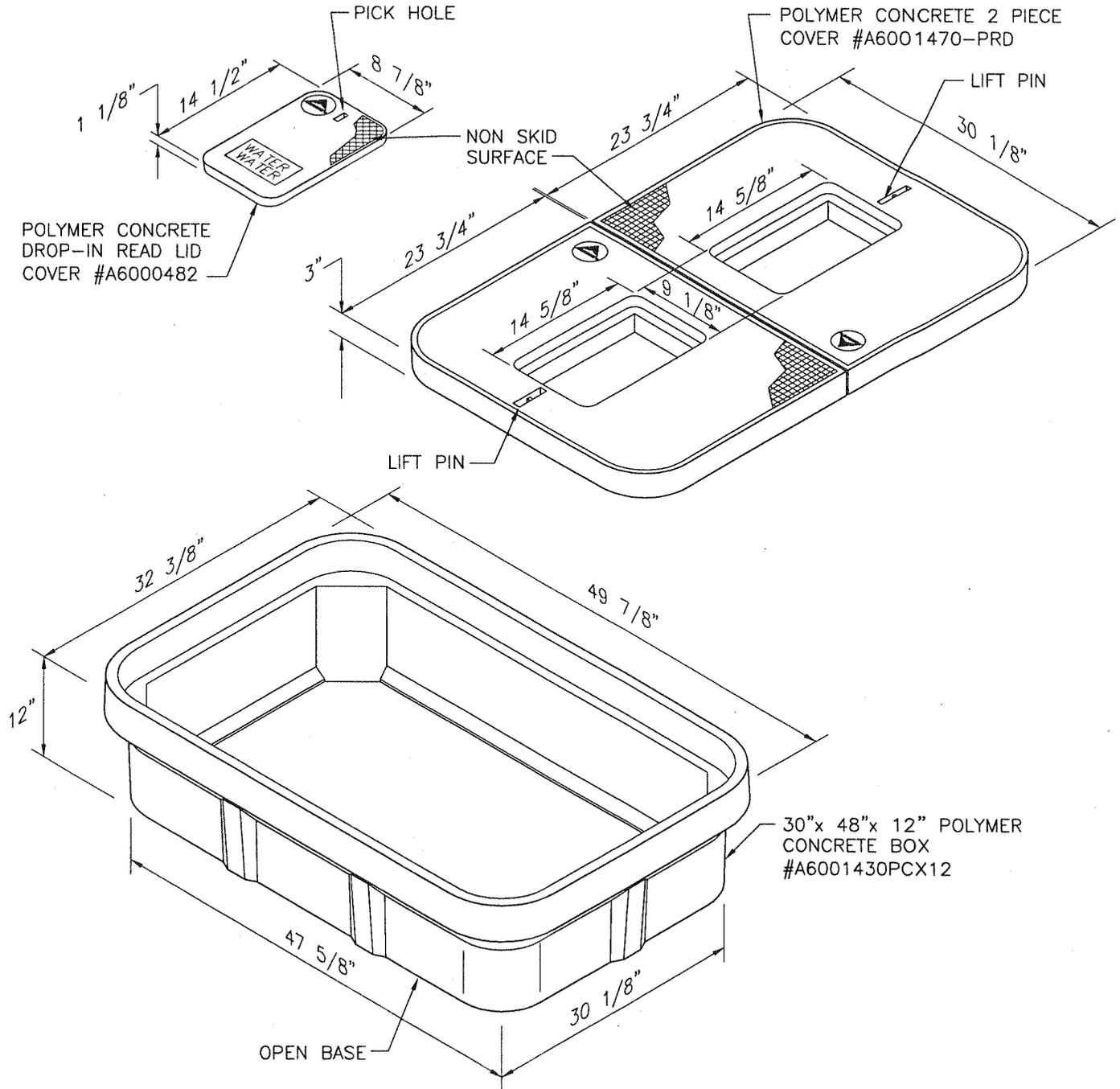
N:\0550\0868\01\Cadd\WATER-STD\W-24.DWG 08/30/2005 09:52

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		WATER METER BOX FOR 1 1/2" AND 2" DOMESTIC WATER METERS	DWG. NO. W-24	
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	



City Of Camarillo

ARMORCAST #A6001430PCX12 WATER METER BOX OR APPROVED EQUAL

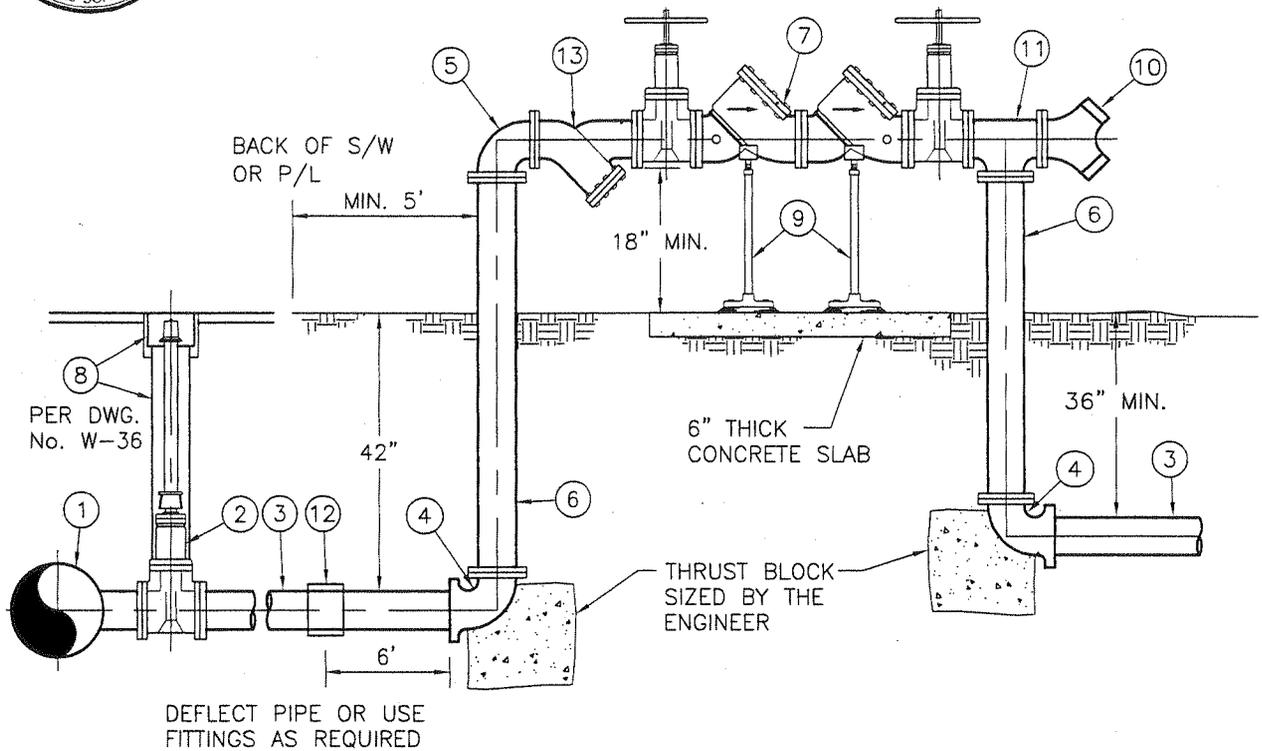


N:\0550\0868\01\Cadd\WATER-STD\W-25.DWG 08/30/2005 09:53

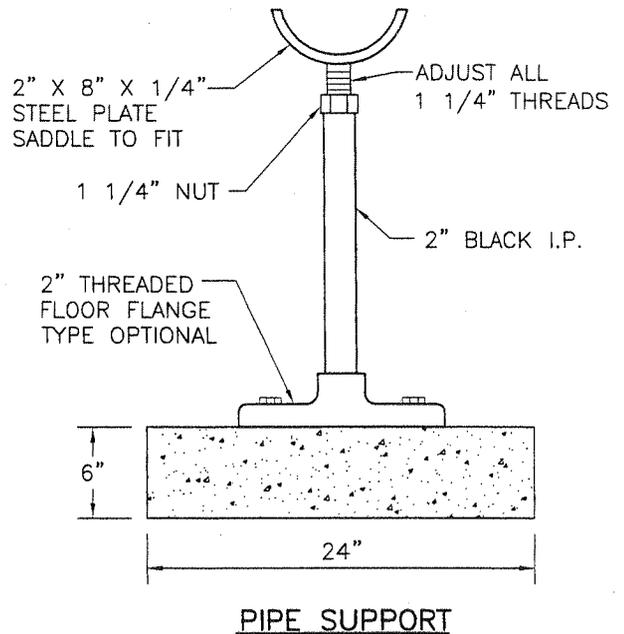
JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		WATER METER BOX FOR 3", 4" & 6"	DWG. NO. W-25
REV.	DATE	BY	REVIEWED:	<i>10/1/05</i> WATER SUPERINTENDENT		DOMESTIC & LANDSCAPE WATER METER INSTALLATION
			APPROVED:	<i>Mephie Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005		SHT <u>1</u> OF <u>1</u>



City Of Camarillo



- ① TAPPING SLEEVE OR TEE
- ② TAPPING VALVE (RW GATE VALVE FLG X MJ) PER W-36
- ③ PVC WATER PIPE, CL-150 & 200 (4" TO BE CL-200)
- ④ 90° ELBOW (FLG X MJ) PIPE CONNECTION (2 REQ'D)
- ⑤ 90° ELBOW (FLG X FLG)
- ⑥ FLG'D D.I. SPOOL - LENGTH VARIES
- ⑦ DOUBLE CHECK DETECTOR ASSEMBLY
- ⑧ CHRISTY G-3 VALVE BOX AND 8" NON-FERROUS VALVE STACK (8" PVC)
- ⑨ PIPE SUPPORT (2 REQ'D)
- ⑩ FIRE DEPT. CONNECTION (PER FIRE DEPT. SPEC.)
- ⑪ FLANGED TEE
- ⑫ PIPE COUPLING/FLEX JOINT
- ⑬ STRAINER (FLG X FLG) (OPTIONAL)



N:\0550\0868\01\Cadd\WATER-STD\W-26.DWG 06/29/2005 11:38

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		TYPICAL FIRE LINE WITH DOUBLE CHECK DETECTOR BACKFLOW PREVENTION ASSEMBLY (DCDA)	DWG. NO. W-26
REV.	DATE	BY	REVIEWED:	<i>[Signature]</i> WATER SUPERINTENDENT		FILED
			APPROVED:	<i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005		SHT <u>1</u> OF <u>1</u>



City Of Camarillo

BACKFLOW PREVENTION ASSEMBLY GENERAL APPLICATIONS*

	NON-HEALTH HAZARD (POLLUTANT)		HEALTH HAZARD (CONTAMINANT)		SEWAGE	
	BACKSIPHONAGE	BACKPRESSURE	BACKSIPHONAGE	BACKPRESSURE	BACKSIPHONAGE	BACKPRESSURE
AIR GAP	X	X	X	X	X	X
RP	X	X	X	X		
DC	X	X				
PVB	X		X			
SVB	X		X			
AVB	X		X			

* NOTE: THESE ARE GENERAL GUIDELINES. CHECK WITH LOCAL ADMINISTRATIVE AUTHORITY(S) FOR LOCAL APPLICATIONS.

ADMINISTRATIVE AUTHORITY

TERMS 1. THE TERM "ADMINISTRATIVE AUTHORITY" SHALL MEAN THE INDIVIDUAL OFFICIAL, BOARD, DEPARTMENT, OR AGENCY ESTABLISHED AND AUTHORIZED BY A STATE, COUNTY, CITY, OR OTHER POLITICAL SUBDIVISION CREATED BY LAW TO ADMINISTER AND ENFORCE THE PROVISIONS OF THE CROSS-CONNECTION CONTROL PROGRAM.

BACKPRESSURE

2. THE TERM "BACKPRESSURE" SHALL MEAN ANY ELEVATION OF PRESSURE IN THE DOWNSTREAM PIPING SYSTEM (BY PUMP, ELEVATION OF PIPING, OR STREAM AND/OR AIR PRESSURE) ABOVE THE SUPPLY PRESSURE AT THE POINT OF CONSIDERATION WHICH WOULD CAUSE, OR TEND TO CAUSE, A REVERSAL OF THE NORMAL DIRECTION OF FLOW.

BACKSIPHONAGE

3. THE TERM "BACKSIPHONAGE" SHALL MEAN A FORM OF BACKFLOW DUE TO A REDUCTION IN SYSTEM PRESSURE WHICH CAUSES A SUBATMOSPHERIC PRESSURE TO EXIST AT A SITE IN THE WATER SYSTEM.

CROSS-CONNECTION

4. THE TERM "CROSS-CONNECTION" SHALL MEAN ANY UNPROTECTED ACTUAL OR POTENTIAL CONNECTION OR STRUCTURAL ARRANGEMENT BETWEEN A PUBLIC OR A CONSUMER'S POTABLE WATER SYSTEM AND ANY OTHER SOURCE OR SYSTEM THROUGH WHICH IT IS POSSIBLE TO INTRODUCE INTO ANY PART OF THE POTABLE SYSTEM ANY USED WATER, INDUSTRIAL FLUID, GAS, OR SUBSTANCE OTHER THAN THE INTENDED POTABLE WATER WITH WHICH THE SYSTEM IS SUPPLIED. BYPASS ARRANGEMENTS, JUMPER CONNECTIONS, REMOVABLE SECTIONS, SWIVEL OR CHANGE-OVER DEVICES AND OTHER TEMPORARY OR PERMANENT DEVICES THROUGH WHICH OR BECAUSE OF WHICH BACKFLOW CAN OCCUR ARE CONSIDERED TO BE CROSS-CONNECTIONS.

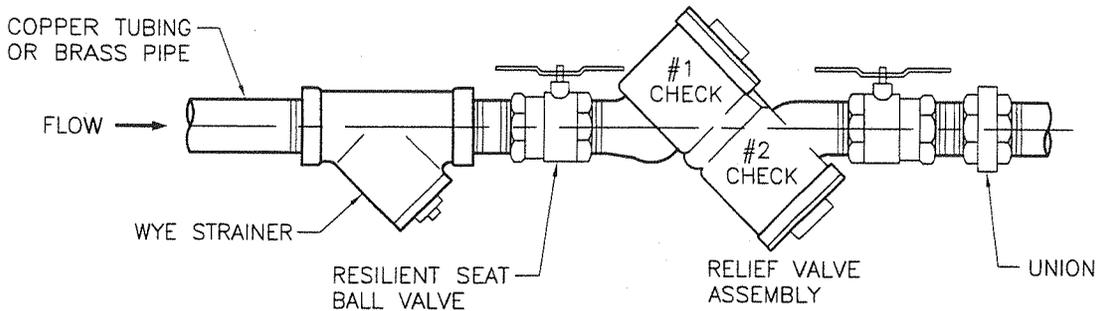
N:\0550\0868\01\Cadd\WATER-STD\W-27.DWG 06/29/2005 11:38

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		BACKFLOW PREVENTION ASSEMBLIES, GEN. APPLICATION TERMS	DWG. NO. W-27	
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	

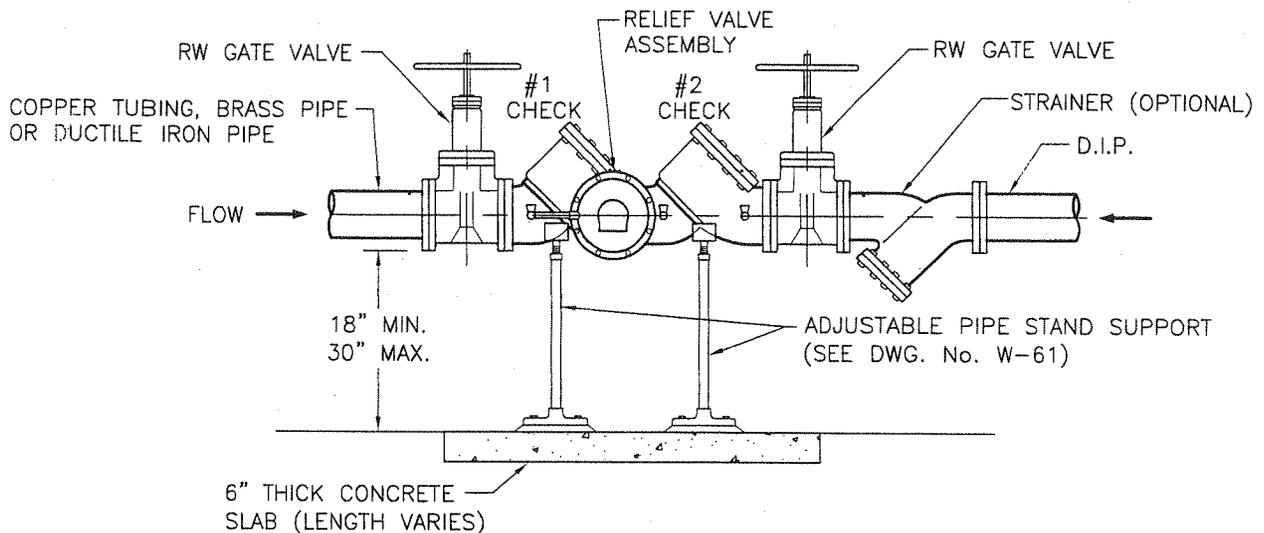


City Of Camarillo

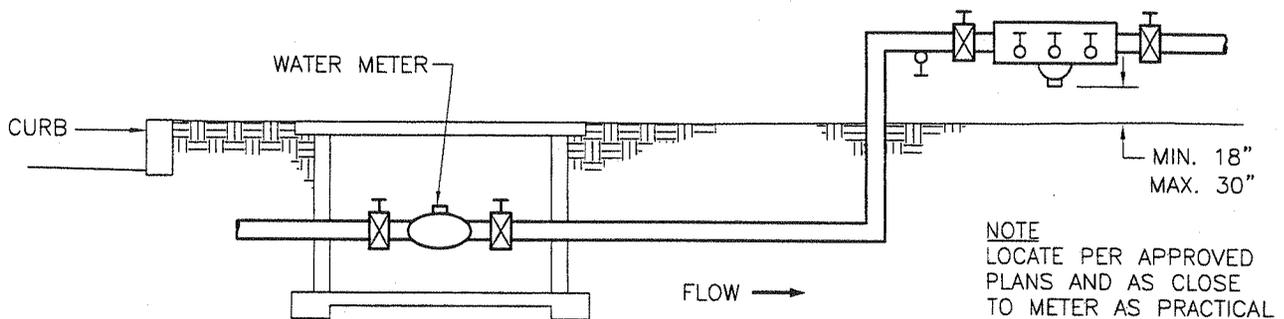
3/4" TO 2" REDUCED PRESSURE PRINCIPAL BACKFLOW PREVENTION ASSEMBLY



2 1/2" & LARGER REDUCED PRESSURE PRINCIPAL BACKFLOW PREVENTION ASSEMBLY



RP INSTALLATION



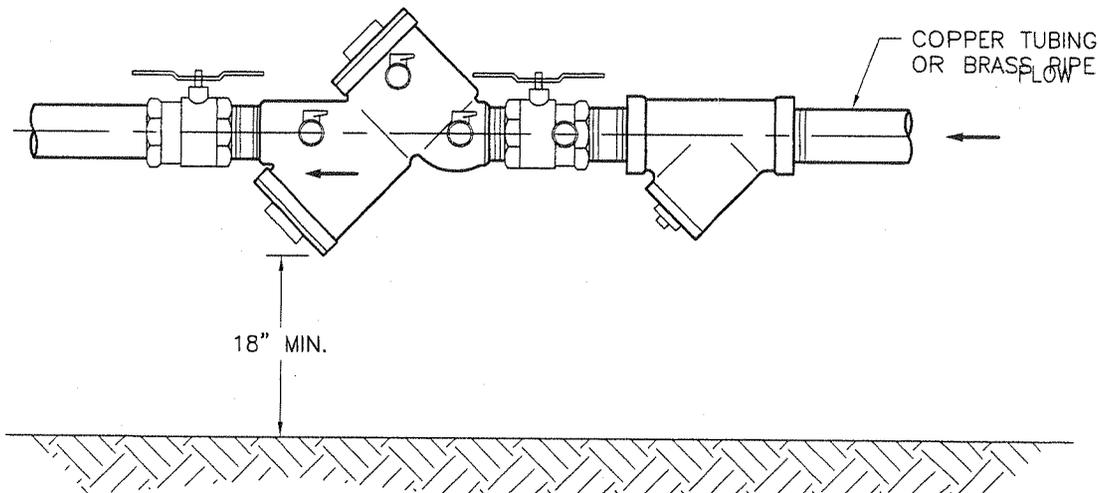
N:\0550\0868\01\Cadd\WATER-STD.W-28.DWG 06/29/2005 11:37

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		REDUCED PRESSURE PRINCIPAL BACKFLOW PREVENTION ASSEMBLY (RP)	DWG. NO. W-28	
REV.	DATE	BY	REVIEWED: <i>Tom P. Smith</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>Melba Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	

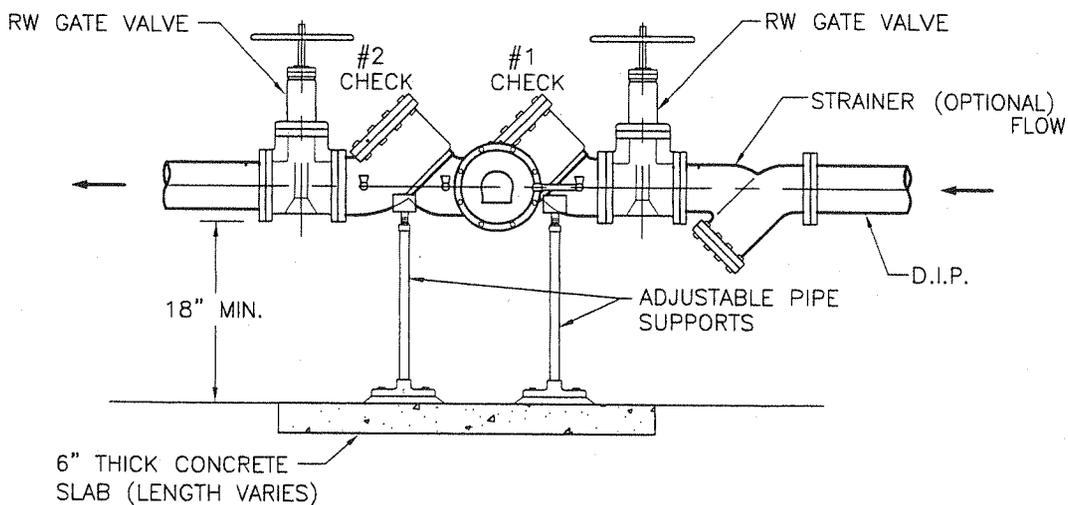


City Of Camarillo

3/4" TO 2" DOUBLE CHECK VALVE BACKFLOW PREVENTION ASSEMBLY (DC)



2 1/2" & LARGER DOUBLE CHECK DETECTOR BACKFLOW PREVENTION ASSEMBLY (DCDA)



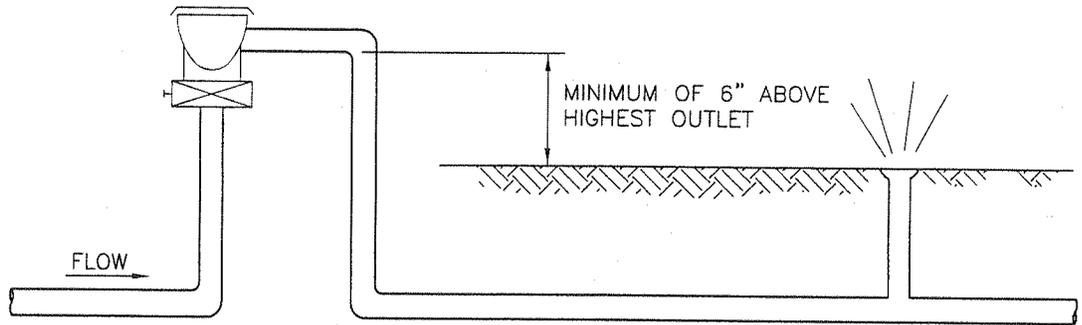
N:\0550\0868\01\Cadd\WATER-STD\W-29.DWG 06/29/2005 12:01

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		DOUBLE CHECK VALVE & DOUBLE CHECK DETECTOR BACKFLOW PREVENTION ASSEMBLY INSTALLATION	DWG. NO. W-29
REV.	DATE	BY	REVIEWED:	<i>[Signature]</i> WATER SUPERINTENDENT		FILED
			APPROVED:	<i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005		SHT <u>1</u> OF <u>1</u>



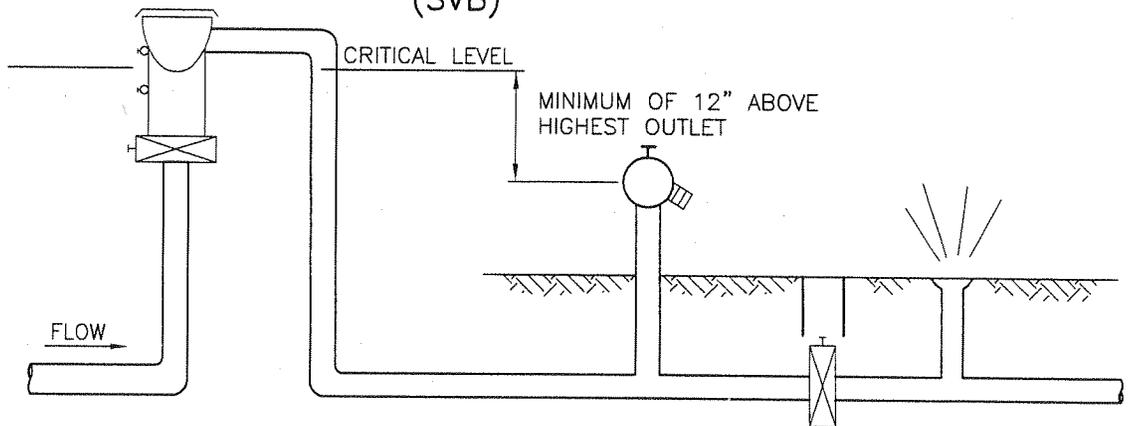
City Of Camarillo

TYPICAL INSTALLATION FOR AN ATMOSPHERIC VACUUM BREAKER BACKSIPHONAGE PREVENTION ASSEMBLY AVB



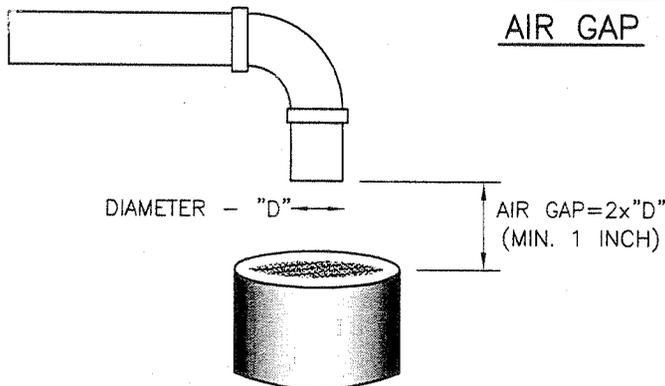
ABSOLUTELY NO MEANS OF SHUT-OFF ON THE DISCHARGE SIDE OF THE VACUUM BREAKER

SPILL RESISTANT VACUUM BREAKER BACKSIPHONAGE PREVENTION ASSEMBLY (SVB)



DOWNSIDE OF VACUUM BREAKER MAY BE MAINTAINED UNDER PRESSURE BY A VALVE. BUT, THERE MAY BE ABSOLUTELY NO MEANS OF IMPOSING PRESSURE BY PUMP OR OTHER MEANS

AIR GAP



EXAMPLE:

PIPE DIAMETER: 3-INCHES (76 MM)
AIR GAP: 2 x 3-INCHES=6-INCHES (152 MM)

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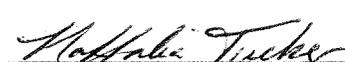
JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		TYP. INSTALL OF AIR GAP, AVB & SVB BACK FLOW PREVENT. ASSEM.	DWG. NO. W-30	
REV.	DATE	BY	REVIEWED:	<i>[Signature]</i> WATER SUPERINTENDENT		FILED	
			APPROVED:	<i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005		SHT <u>1</u> OF <u>1</u>	

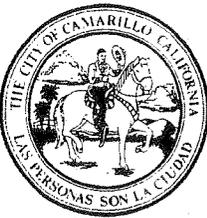


City Of Camarillo

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JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		NOT USED	DWG. NO. W-31
REV.	DATE	BY	REVIEWED:	 WATER SUPERINTENDENT		FILED
			APPROVED:	 CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005		SHT <u>1</u> OF <u>1</u>



City Of Camarillo

REDUCED PRESSURE PRINCIPAL BACK FLOW PREVENTION ASSEMBLY (RP)

NOTES:

PROPER INSTALLATION OF THE ASSEMBLY IS ESSENTIAL TO THE PROTECTION OF THE WATER SUPPLY. THE FOLLOWING ARE IMPORTANT CHARACTERISTICS OF A PROPER INSTALLATION.

1. THE ASSEMBLY SHALL BE INSTALLED IN A HORIZONTAL POSITION WITH A MINIMUM CLEARANCE OF 18" AND MAXIMUM OF 30" BETWEEN THE RELIEF VALVE DISCHARGE PART AND FLOOR OR GRADE, AND A MINIMUM OF 24" HORIZONTAL CLEARANCE AROUND THE UNIT FOR ACCESS AND EASE OF TESTING AND MAINTENANCE OF THE RELIEF VALVE.
2. A REDUCED PRESSURE ASSEMBLY SHALL NOT BE INSTALLED IN A PIT. FLOODING OF THE PIT CAN RESULT IN CROSS-CONNECTION CONTAMINATION.
3. PLACEMENT OF THE ASSEMBLY SHOULD BE PLANNED WHERE WATER DISCHARGED FROM THE RELIEF PORT WILL NOT BE OBJECTIONABLE.
4. THE ASSEMBLY MUST BE PURCHASED AND INSTALLED WITH RESILIENT SEAT VALVES AS APPROVED BY THE UNIVERSITY OF CALIFORNIA FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH (USC). CAUTION: OPEN AND CLOSE RESILIENT SEALED SHUT-OFFS SLOWLY TO PREVENT WATER HAMMER DAMAGE TO THE SYSTEM AND ASSEMBLY.
5. SINCE THE REDUCED PRESSURE ASSEMBLY IS DESIGNED TO BE SERVICED WHILE IN LINE, THE UNIT NEED NOT BE REMOVED FROM THE LINE DURING SERVICING. UNION CONNECTIONS BETWEEN THE SHUT-OFF VALVES ARE RECOMMENDED FOR EASE OF REMOVAL FOR DAMAGED UNITS 2" AND SMALLER.
6. INSURE THE SUPPLY WATER PRESSURE DOES NOT EXCEED THE MANUFACTURER'S MAXIMUM WATER PRESSURE RATING OF THE ASSEMBLY TO AVOID DAMAGE TO THE SYSTEM OR THE ASSEMBLY CAUSED BY SYSTEM PRESSURE. IN ADDITION, PROTECTION MUST BE PROVIDED AGAINST THERMAL WATER EXPANSION, EXTREME BACKPRESSURE AND/OR WATER HAMMER.
7. MOST FIELD PROBLEMS OCCUR BECAUSE DIRT OR DEBRIS PRESENT IN THE SYSTEM AT THE TIME OF INSTALLATION BECOMES TRAPPED IN THE FIRST CHECK SEATING AREA, RESULTING IN CONTINUOUS DISCHARGE FROM THE RELIEF VALVE IN A STATIC OR BACKFLOW CONDITION. THE SYSTEM SHOULD BE FLUSHED BEFORE THE ASSEMBLY IS INSTALLED. IF DEBRIS IN THE WATER SYSTEM CONTINUES TO CAUSE FOULING, A STRAINER CAN BE INSTALLED UPSTREAM OF THE ASSEMBLY.

N:\0550\0868\01\Cadd\WATER-STD\W-32-1.DWG 06/29/2005 12:12

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.	INSTALLATION NOTES FOR BACKFLOW PREVENTION ASSEMBLIES	DWG. NO. W-32	
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005		FILED	SHT <u>1</u> OF <u>2</u>



City Of Camarillo

DOUBLE CHECK VALVE AND DOUBLE CHECK DETECTOR BACKFLOW PREVENTION ASSEMBLIES (DC & DCDA).

NOTES:

1. THE DOUBLE CHECK VALVE ASSEMBLY MUST BE INSTALLED WHERE IT IS ACCESSIBLE FOR PERIODIC TESTING AND MAINTENANCE.
2. PRIOR TO INSTALLING IN LINE, FLUSH SUPPLY LINE OF ALL FOREIGN MATERIAL. FAILURE TO FLUSH THE LINES COMPLETELY MAY CAUSE THE CHECKS TO BECOME FOULED AND REQUIRE DISASSEMBLY FOR CLEANING.
3. THE DEVICE SHALL NOT BE INSTALLED IN A VERTICAL POSITION. IT SHALL BE INSTALLED IN THE HORIZONTAL POSITION.
4. WHEN THREADING THE DEVICE IN LINE, PLACE WRENCH ONLY ON BALL VALVE HEX ENDS. KEEP PIPE DOOP OFF INTERIOR SURFACES OF VALVE. ON 2-1/2" AND LARGER DEVICES, DO NOT LIFT THE DEVICE WITH GATE VALVE HANDWHEELS OR STEMS. ALSO, DO NOT SUPPORT DEVICE FROM ONLY ONE END.
5. AFTER INSTALLATION, FILL DEVICE AND BLEED AIR FROM UNIT. TEST TO INSURE PROPER OPERATION. IF EITHER CHECK FAILS TO HOLD 1 PSI, IT IS MOST LIKELY DUE TO FOULING. THE CAP MUST BE REMOVED AND THE SEAT AND/OR SEAT DISC CLEANED.
6. THE DEVICE MUST BE PROTECTED FROM FREEZING. THERMAL WATER EXPANSION AND/OR WATER HAMMER DOWNSTREAM OF THE BACKFLOW PREVENTER CAN CAUSE EXCESSIVE PRESSURE INCREASES. EXCESSIVE PRESSURE SITUATIONS SHOULD BE ELIMINATED TO AVOID POSSIBLE DAMAGE TO THE SYSTEM AND DEVICE.
7. ALL FIRE LINES WILL BE REQUIRED TO HAVE DOUBLE CHECK DETECTOR CHECK.

GENERAL

ALL BACKFLOW PREVENTION DEVICES TO BE TESTED BY CERTIFIED BACKFLOW PREVENTION DEVICE TESTERS AND THE PASSING TEST RESULTS PROVIDED TO CAMARILLO WATER DIVISION ADMINISTRATION AUTHORITY FOR APPROVAL AND ACCEPTANCE OF THE INSTALLATION.

N:\0550\0868\01\Cadd\WATER-STD\W-32-2.DWG 06/29/2005 12:12

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		INSTALLATION NOTES FOR BACKFLOW PREVENTION ASSEMBLIES	DWG. NO. W-32
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED
			APPROVED: <i>[Signature]</i> CITY ENGINEER			SHT <u>2</u> OF <u>2</u>
			R.C.E. 50878 EXPIRES 9/30/2005			



City Of Camarillo

SUGGESTED TRENCH WIDTHS FOR DUCTILE-IRON MAINS

NOMINAL PIPE SIZE IN.	TRENCH WIDTH IN.	NOMINAL PIPE SIZE IN.	TRENCH WIDTH IN.
4	28	20	44
6	30	24	48
8	32	30	54
10	34	36	60
12	36	42	66
14	38	48	72
16	40	54	78
18	42		

SUGGESTED TRENCH WIDTHS FOR PVC PIPE

PIPE DIAMETER IN.	TRENCH WIDTH	
	MINIMUM IN.	MAXIMUM IN.
4	18	29
6	18	31
8	21	33
10 AND ABOVE	1 FT GREATER THAN OUTSIDE DIAMETER OF PIPE	2 FT GREATER THAN OUTSIDE DIAMETER OF PIPE

SUGGESTED TRENCH WIDTHS FOR AC PIPE

PIPE DIAMETER IN.	TRENCH WIDTH	
	MINIMUM IN.	MAXIMUM IN.
4	18	28
6 OR 8	20	32
10 OR 12	24	36
14 OR 16	30	42

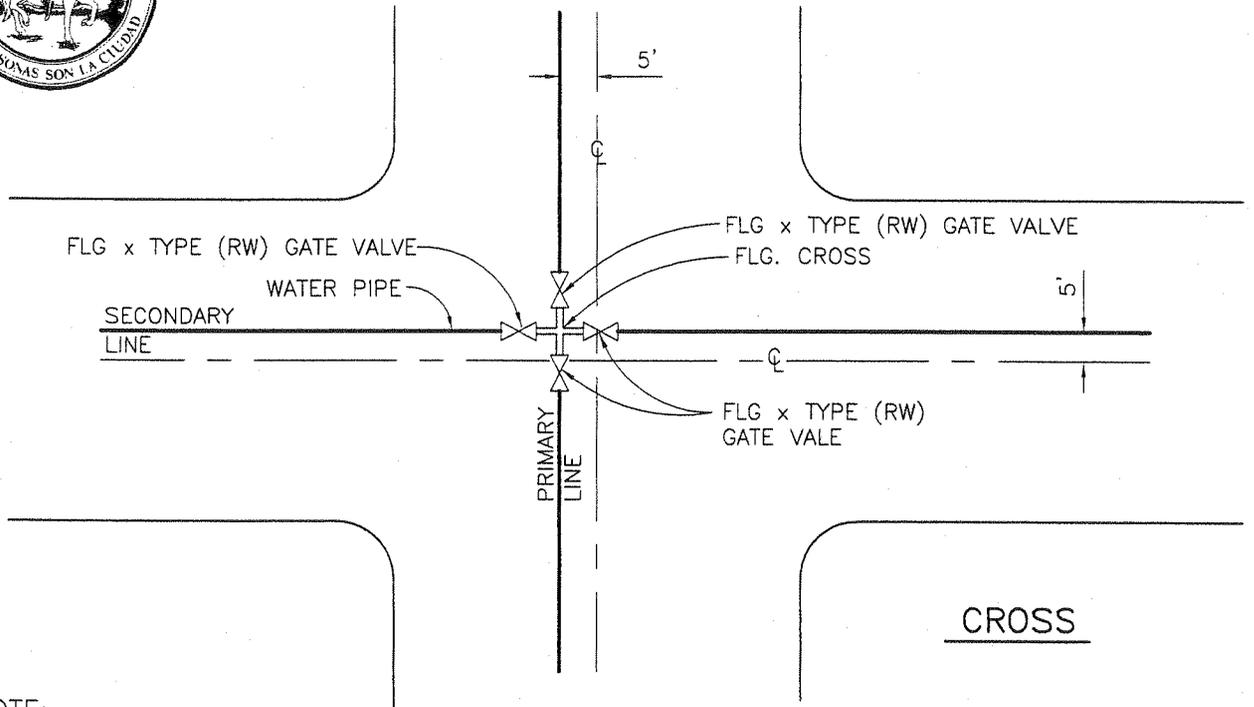
* ALL TRENCH REPAIR SHALL CONFORM TO CITY OF CAMARILLO
STANDARD PLATE NO. E-10.1 (REV. C)

N:\0550\0868\01\Cadd\WATER-STD\W-33.DWG 08/30/2005 09:53

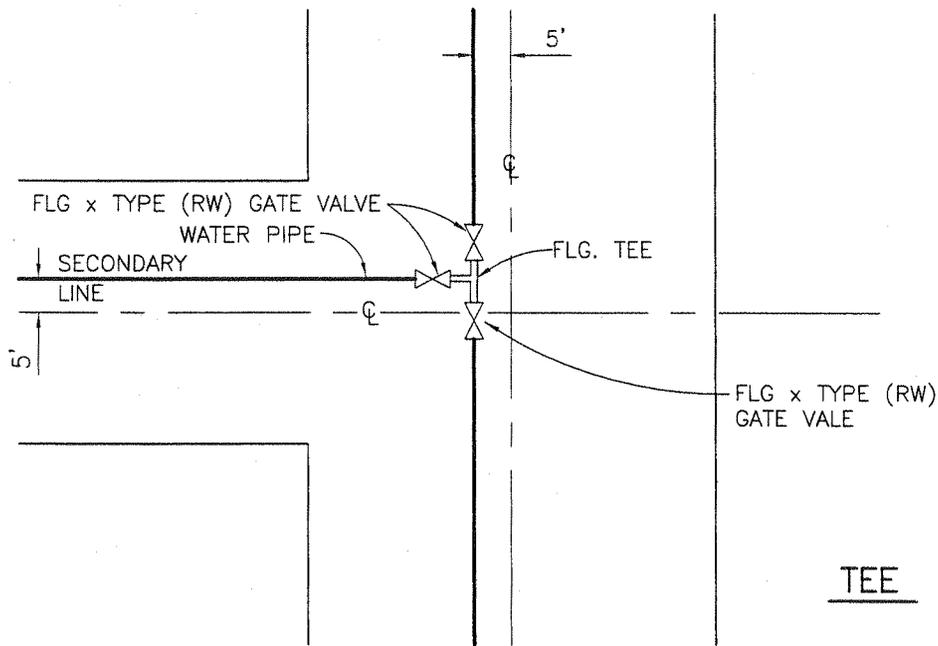
JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		SUGGESTED TRENCH WIDTH FOR: DIP, PVC WATER PIPE & AC WATER PIPE	DWG. NO. W-33	
REV.	DATE	BY	REVIEWED: <i>Lee R. Smith</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>Muffah Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	



City Of Camarillo



NOTE:
 DISTANCE BETWEEN VALVES SHALL NOT EXCEED 600' WITHOUT APPROVAL OF DIRECTOR



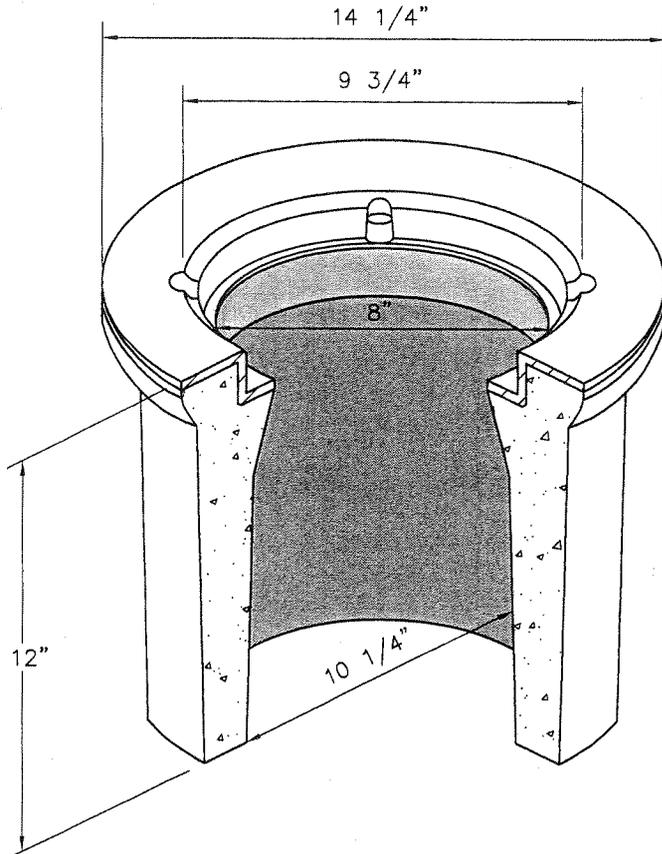
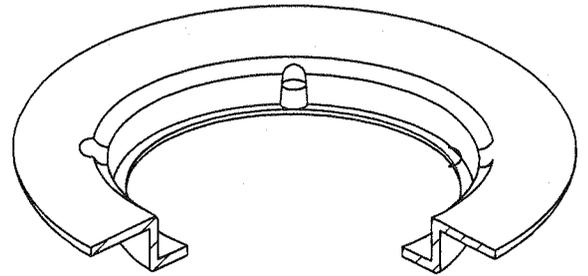
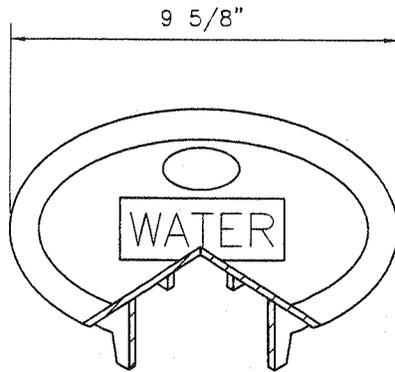
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JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		TYPICAL WATER VALVES INSTALLATION AT INTERSECTION	DWG. NO. W-34
REV.	DATE	BY	REVIEWED: <i>Tom P. Smith</i> WATER SUPERINTENDENT			FILED
			APPROVED: <i>Melba Tucker</i> CITY ENGINEER			SHT <u>1</u> OF <u>1</u>
			R.C.E. 50878 EXPIRES 9/30/2005			



City Of Camarillo

G3 TRAFFIC VALVE BOX 10" X 12"
(CHRISTY OR EQUAL)



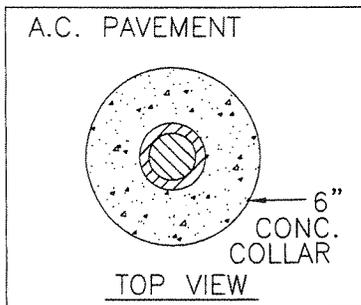
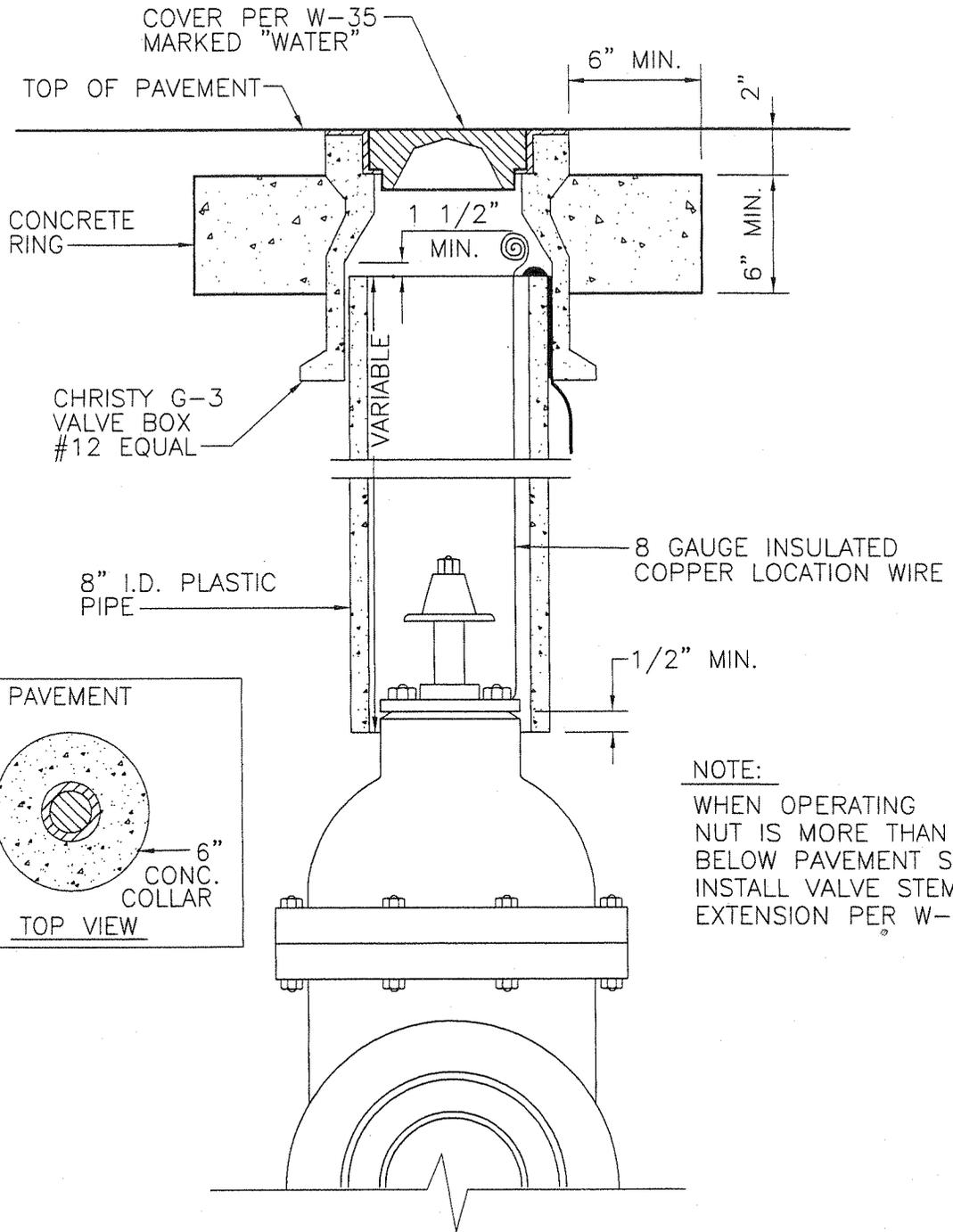
VANDAL RESISTANCE IS OPTIONAL
AT EXTRA COST BY THE ADDITION
OF HOLD DOWN SCREWS

N:\0550\0868\01\Cadd\WATER-STD\W-35.DWG 06/29/2005 12:10

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		TRAFFIC VALVE BOX WITH LID MARKED "WATER"	DWG. NO. W-35	
REV.	DATE	BY	REVIEWED: <i>Tom P. Smith</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>Hefahie Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT 1 OF 1	



City Of Camarillo



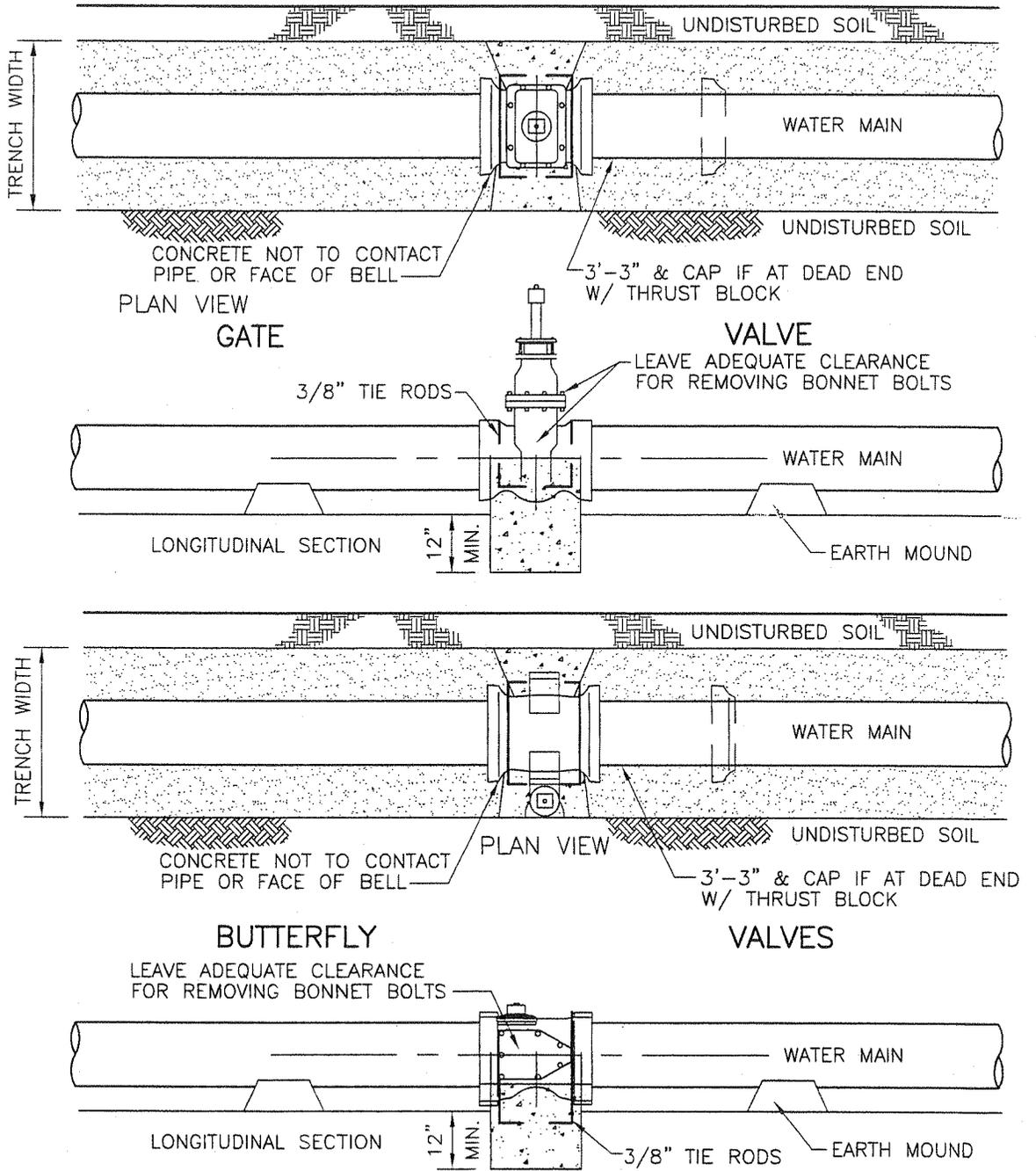
NOTE:
WHEN OPERATING
NUT IS MORE THAN 60"
BELOW PAVEMENT SURFACE
INSTALL VALVE STEM
EXTENSION PER W-47

N:\0550\0868\01\Cadd\WATER-STD\W-36.DWG 06/29/2005 12:09

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		WATER VALVE BOX AND VALVE BOX INSTALLATION	DWG. NO. W-36	
REV.	DATE	BY	REVIEWED: <i>Tom P. Smith</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>Melba Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	



City Of Camarillo



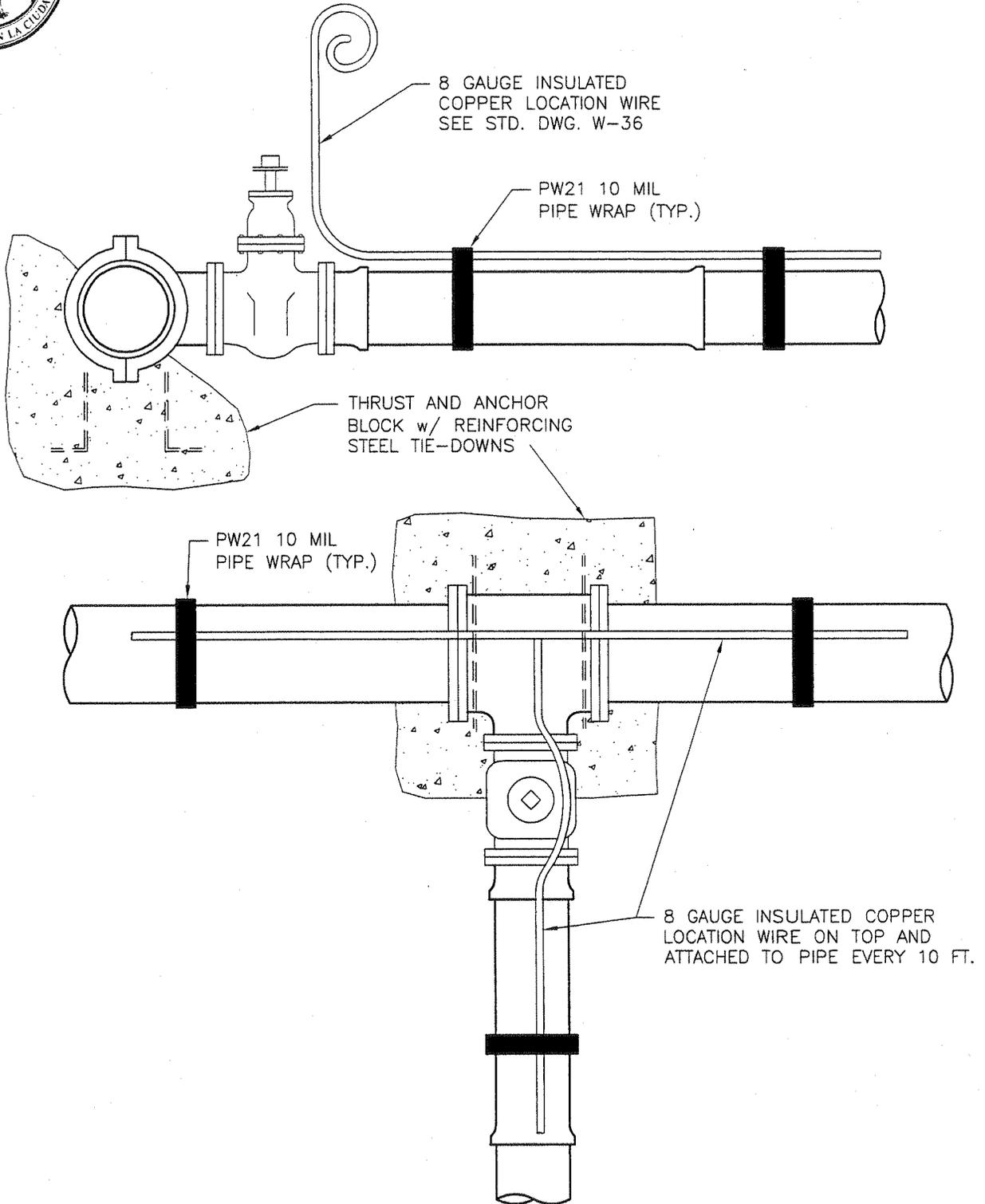
- NOTES:**
1. BUTTERFLY VALVE OPERATING NUT SHALL BE PLACED ON NORTH OR WEST SIDE
 2. RESTRAINING RODS SHALL BE COATED WITH ASPHALT MATERIAL

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JULY 2005		CITY OF CAMARILLO PUBLIC WORKS DEPT.		VALVE ANCHOR FOR BUTTERFLY AND FOR GATE VALVES	DWG. NO. W-37
REV.	DATE	BY	REVIEWED: <i>Tom P. Smith</i> WATER SUPERINTENDENT		FILED
			APPROVED: <i>Melba Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005		SHT <u>1</u> OF <u>1</u>



City Of Camarillo



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JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		LOCATION (TRACE) WIRE INSTALLATION	DWG. NO. W-38
REV.	DATE	BY	REVIEWED:	<i>Tom P. Smith</i> WATER SUPERINTENDENT		FILED
			APPROVED:	<i>Mollie Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005		SHT <u>1</u> OF <u>1</u>



City Of Camarillo

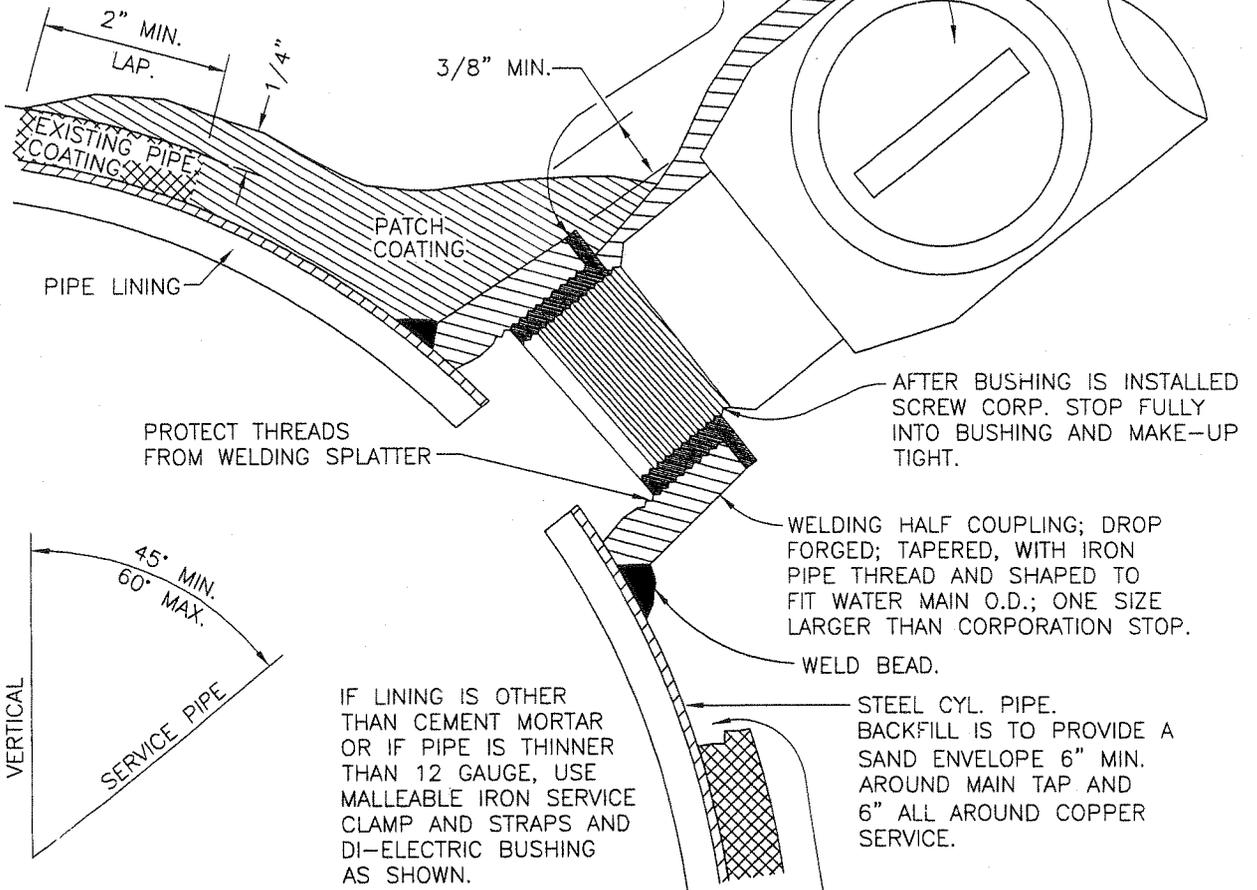
TWO LAYERS 50% LAP EACH, OF 10 MIL TAPE (PVC) WITH PRIMER. APPLY AFTER PRESSURE TESTING ON HOT TAPS.

HEX HEAD MAYCO NYLON DI-ELECTRIC BUSHING. APPLY ORDINARY PIPE DOPE TO INSIDE AND OUTSIDE THREADS OF BUSHING SCREW. SCREW BUSHING TIGHT IN COUPLING (STEEL PIPE) PIPE OR IN CLAMP ON (CAST OR DUCTILE IRON PIPE) BEFORE INSERTING CORPORATION STOP BUSHING MUST BE COMPLETELY SCREWED INTO COUPLING.

FOR STEEL OR CAST OR DUCTILE IRON PIPE

CORP. STOP SAME SIZE AS COPPER TUBING.

WRAP 24" OF COOPER TUBE WITH PVC TAPE



AFTER BUSHING IS INSTALLED SCREW CORP. STOP FULLY INTO BUSHING AND MAKE-UP TIGHT.

WELDING HALF COUPLING; DROP FORGED; TAPERED, WITH IRON PIPE THREAD AND SHAPED TO FIT WATER MAIN O.D.; ONE SIZE LARGER THAN CORPORATION STOP.

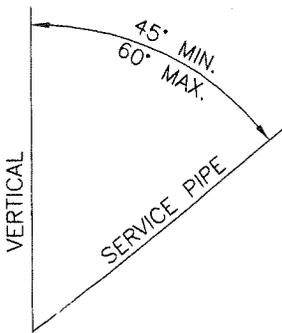
WELD BEAD.

STEEL CYL. PIPE. BACKFILL IS TO PROVIDE A SAND ENVELOPE 6" MIN. AROUND MAIN TAP AND 6" ALL AROUND COPPER SERVICE.

PATCH SOMASTIC, COAL-TAR ENAMEL, OR HOT ASPHALT, WITH TYPE NO. 1750 HOT ASPHALT PIPE COATING. PATCH CEMENT-MORTAR COATING PER AWWA C205.

FOR BARE PIPE (OTHER THAN ASBESTOS CEMENT PIPE) COAT SURFACE OF PIPE IN AREA OF TAP (ALL AROUND) WITH CEMENT MORTAR COATING PER AWWA C205.

IF LINING IS OTHER THAN CEMENT MORTAR OR IF PIPE IS THINNER THAN 12 GAUGE, USE MALLEABLE IRON SERVICE CLAMP AND STRAPS AND DI-ELECTRIC BUSHING AS SHOWN.

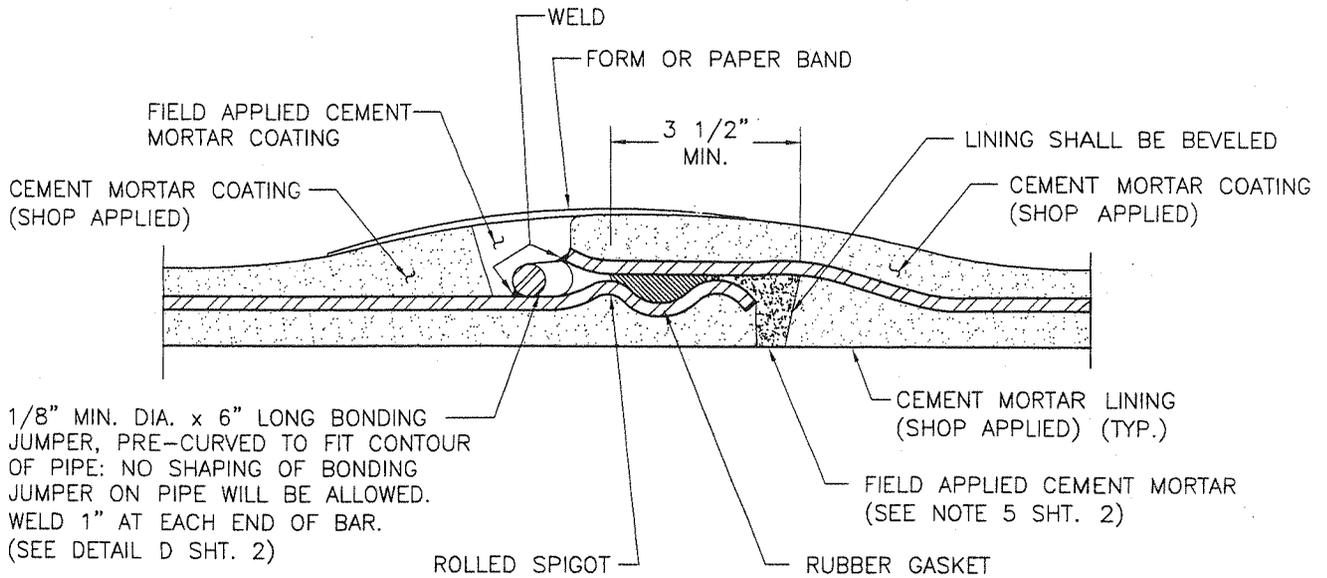


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JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		SERVICE TAP (STEEL WATER MAIN) 2" AND SMALLER	DWG. NO. W-39
REV.	DATE	BY	REVIEWED:	<i>[Signature]</i> WATER SUPERINTENDENT		FILED
			APPROVED:	<i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005		SHT <u>1</u> OF <u>1</u>

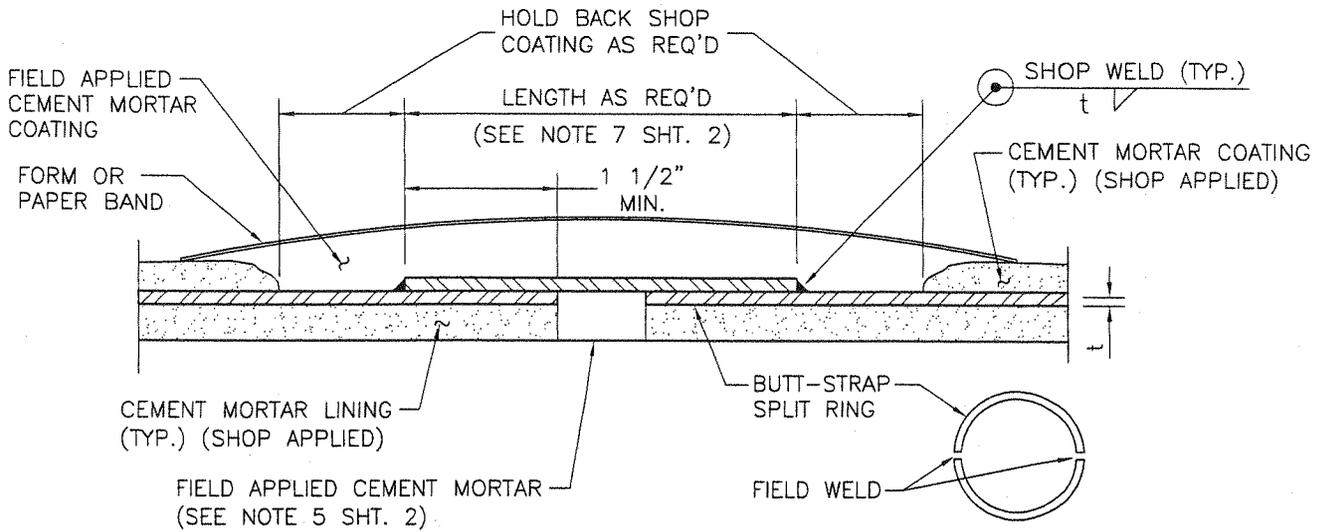


City Of Camarillo



1/8" MIN. DIA. x 6" LONG BONDING JUMPER, PRE-CURVED TO FIT CONTOUR OF PIPE: NO SHAPING OF BONDING JUMPER ON PIPE WILL BE ALLOWED. WELD 1" AT EACH END OF BAR. (SEE DETAIL D SHT. 2)

DETAIL A - RUBBER GASKET JOINT



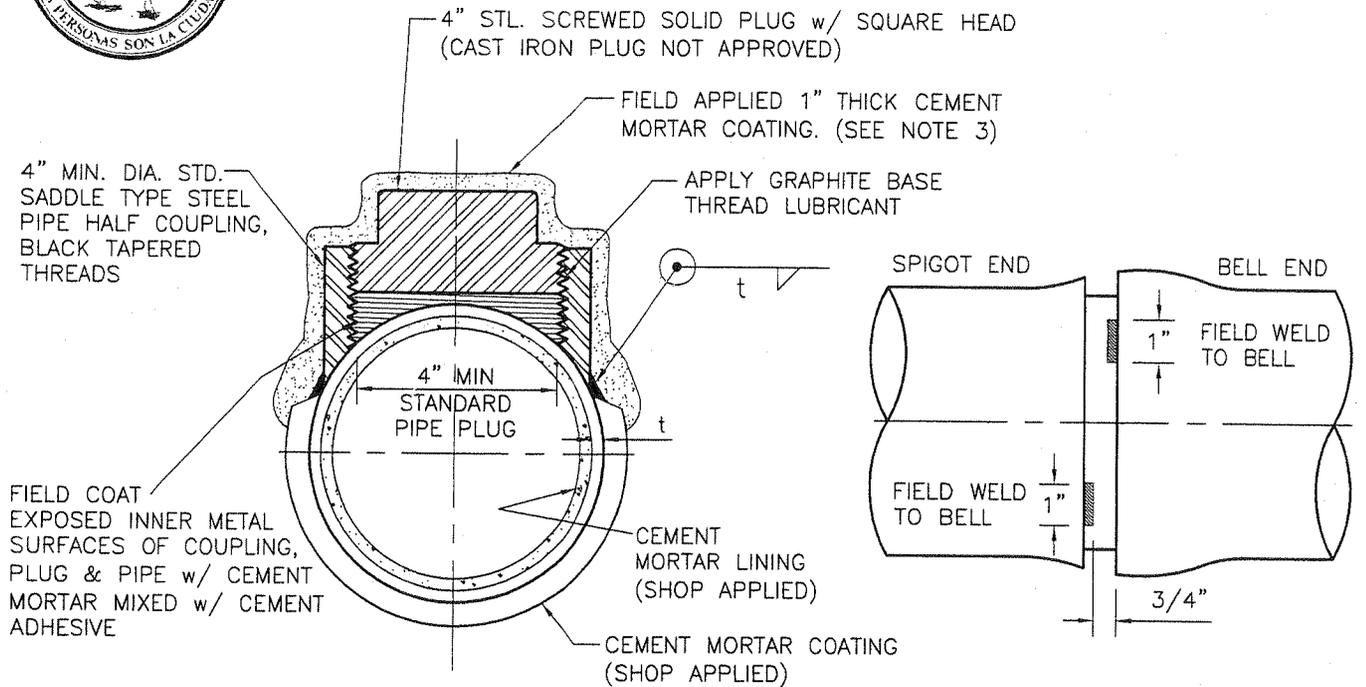
DETAIL B - FIELD WELDED BUTT-STRAP JOINT

N:\0550\0868\01\Cadd\WATER-STD\W-40-1.DWG 06/29/2005 12:51

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		DWG. NO. W-40
REV.	DATE	BY	REVIEWED: <i>Tom P. Smith</i> WATER SUPERINTENDENT		
			APPROVED: <i>Meghan Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005		FILED
STEEL PIPE JOINT DETAIL					SHT <u>1</u> OF <u>2</u>



City Of Camarillo



DETAIL C - POINTING HANDHOLE

DETAIL D - BONDING JUMPER

NOTES:

WELD ONE BOND BAR AT EACH JOINT

- CEMENT MORTAR SHALL BE APPLIED TO WELDED JOINTS ONLY AFTER THE HEAT OF THE WELDING HAS DISSIPATED. JOINT WELDS SHALL NOT BE COOLED BY QUENCHING.
- THE INTERIOR SURFACE OF JOINTS TO BE LINED w/ CEMENT MORTAR SHALL BE CLEANED AND BRUSHED w/ APPROVED CEMENT ADHESIVE IMMEDIATELY BEFORE THE MORTAR IS APPLIED.
- CEMENT MORTAR FOR THE INTERIOR OF JOINTS CONSIST OF ONE PART CEMENT, ONE PART SAND, WATER AND AN APPROVED CEMENT ADHESIVE ADDED ACCORDING TO MFR. RECOMMENDATIONS.
- CEMENT MORTAR FOR THE EXTERIOR OF JOINTS SHALL CONSISTS OF ONE PART CEMENT, ONE PART SAND AND WATER AND SHALL BE POURED INTO ONE SIDE OF FORM ONLY.
- THE INTERIOR OF ALL JOINTS SHALL BE SWABBED BY MEANS OF BALL AND ROD.
- THE POINTING HANDHOLE SHALL BE INSTALLED ADJACENT TO A RUBBER GASKET JOINT, OR CENTERED OVER A BUTT-STRAP JOINT AND SHALL BE USED AS NOTED ON PLANS OR WHERE A BALL AND ROD SWAB CANNOT BE USED.
- FOR POINTING MANHOLE, THE MINIMUM LENGTH OF THE BUTT STRAP SHALL BE 9-INCHES FOR ALL PIPE SIZES LISTED IN TABLE BELOW. WITHOUT HANDHOLE, THE MINIMUM LENGTH OF STRAP SHALL BE AS SHOWN IN THE FOLLOWING TABLE:

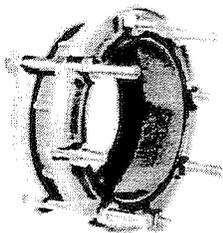
PIPE SIZES IN INCHES	MINIMUM LENGTH OF BUTT STRAP REQUIRED, IN INCHES
6 THRU 24	4
26 THRU 36	5
- A BOLTED FLANGED JOINT MAY BE USED AS AN ACCEPTABLE ALTERNATIVE TO THE RUBBER GASKET OR THE BUTT-STRAP JOINT.

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JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		STEEL PIPE JOINT DETAIL	DWG. NO. W-40
REV.	DATE	BY	REVIEWED:	<i>Lo P. Smith</i> WATER SUPERINTENDENT		FILED
			APPROVED:	<i>Muffalo Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005		SHT <u>2</u> OF <u>2</u>

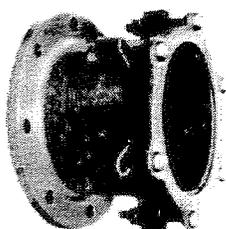


City Of Camarillo



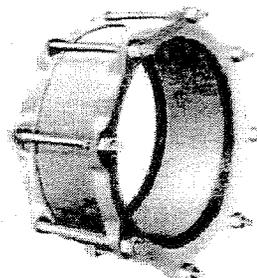
912 FLANGED
COUPLING ADAPTER
CAST IRON

CONNECT ALL TYPES OF PLAIN END PIPE TO
FLANGED EQUIPMENT, METERS AND FITTINGS SIZES
3" THRU 12" NOMINAL. GAIN FLEXIBILITY AND
COMPACTNESS. EACH UNIT SHIPPED COMPLETE
WITH BOLTS, NUTS, AND GASKETS - READY TO
INSTALL.



913 FLANGED
COUPLING ADAPTER
STEEL

FABRICATED STEEL FLANGED COUPLING ADAPTERS
ARE IDEAL FOR CONNECTING BUTTERFLY OR WATER
VALVES AND INSTALLATIONS INVOLVING HARNESS
ASSEMBLIES.

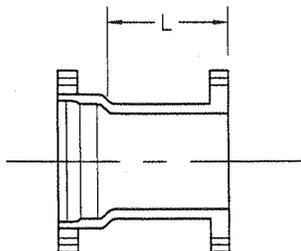


TRANSITION COUPLING
2" THRU 16"

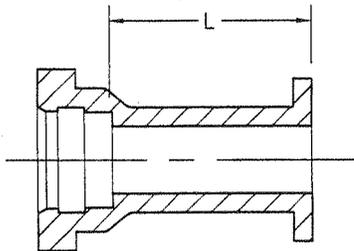
NOTE:

LONG BARREL COUPLING / ADAPTERS SHALL BE USED FOR PIPE SIZES 12" AND GREATER.

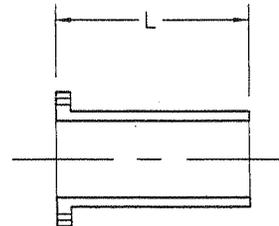
ADAPTERS



M.J. X FLG.



AC X FLANGE



FLANGE X PE

N:\0550\0868\01\Cadd\WATER-STD\W-41.DWG 06/29/2005 12:56

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.	
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT	
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005	

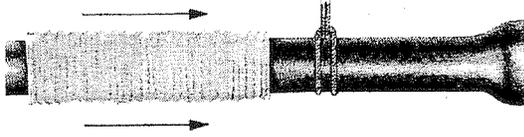
TYPICAL
DISSIMILAR PIPE
CONNECTIONS

DWG. NO. W-41
FILED
SHT <u>1</u> OF <u>1</u>



City Of Camarillo

Method A for Normal Dry Trench Conditions



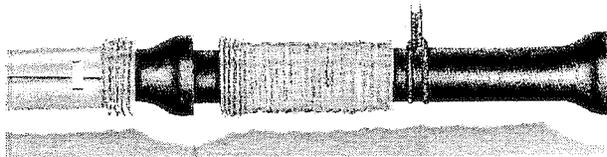
Step 1

Cut a section of polyethylene tube approximately two feet longer than the pipe section. Remove all lumps of clay, mud, cinders, or other material that might have accumulated on the pipe surface during storage. Slip the polyethylene tube around the pipe, starting at the spigot end. Bunch the tube accordion-fashion on the end of the pipe. Pull back the overhanging end of the tube until it clears the pipe end.



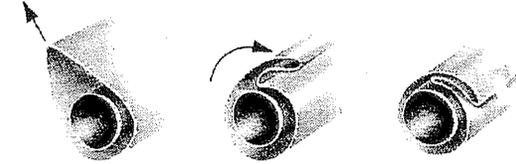
Step 5

Overlap the secured tube end with the tube end of the new pipe section. Secure the new tube end in place.



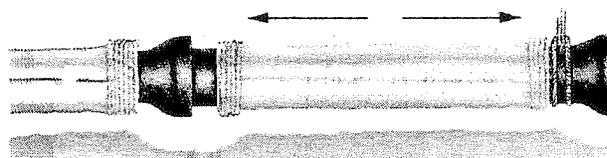
Step 2

Dig a shallow bell hole in the trench bottom at the joint location to facilitate installation of the polyethylene tube. Lower the pipe into the trench and make up the pipe joint with the preceding section of pipe.



Step 6

Take up slack in the tube along the barrel of the pipe to make a snug, but not tight fit. Fold excess polyethylene back over the top of the pipe.



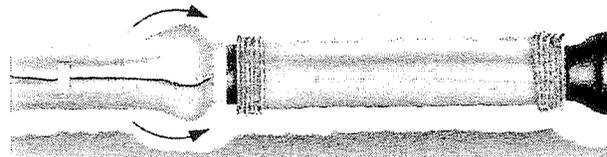
Step 3

Move the cable to the bell end of the pipe and lift the pipe slightly to provide enough clearance to easily slide the tube. *Note: Make sure that no dirt or other bedding material becomes trapped between the wrap and the pipe.*



Step 7

Secure the fold at several locations along the pipe barrel (approximately every three feet).



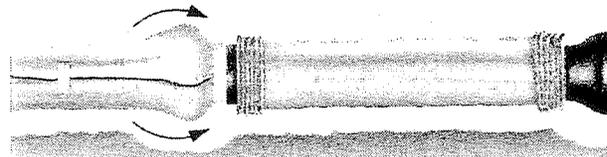
Step 4

Make the overlap of the polyethylene tube by pulling back the bunched polyethylene from the preceding length of pipe and securing it in place. *Note: The polyethylene may be secured in place by using tape, string, or any other material capable of holding the polyethylene encasement snugly against the pipe.*



Step 8

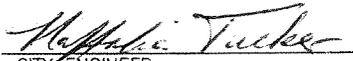
Repair all small rips, tears, or other tube damage with adhesive tape. If the polyethylene is badly damaged, repair the damaged area with a sheet of polyethylene and seal the edges of the repair with adhesive tape.



Step 9

Carefully backfill the pipe according to the AWWA C600 standard for backfill procedure. To prevent damage during backfilling, allow adequate slack in the tube at the joint. Backfill should be free of cinders, rocks, boulders, nails, sticks, or other materials that might damage the polyethylene. Avoid damaging the polyethylene when using tamping devices.

N:\0550\0868\01\Cadd\WATER-STD\W-42.DWG 06/29/2005 12:56

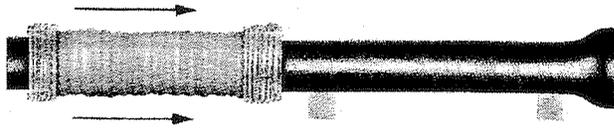
JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		POLYETHYLENE ENCASEMENT FOR D.I.P. SYSTEMS "DRY TRENCH CONDITION"	DWG. NO. W-42		
REV.	DATE	BY	REVIEWED:  WATER SUPERINTENDENT			FILED	SHT 1 OF 1	
			APPROVED:  CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005					



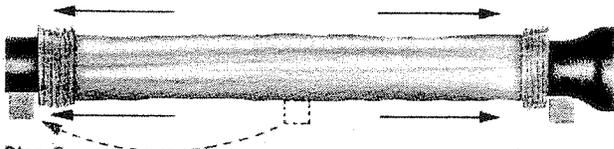
City Of Camarillo

Alternate Method A for Wet Trench Conditions

In wet sloppy trench conditions, the pipe should be completely covered by the polyethylene tube before it is lowered into the trench. This alternate method is illustrated below.



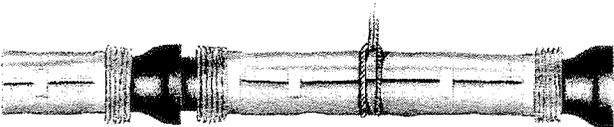
Step 1.
Cut the polyethylene tube to a length approximately two feet longer than that of the pipe section. Slip the tube over the pipe.



Step 2.
Spread the tube over the entire barrel of the pipe, pushing back both ends of the tube until they clear both pipe ends. Make sure the tube is centered on the pipe to provide a one-foot overlap at each end.



Step 3.
Take up slack in the tube to make a snug, but not tight, fit. (See Step 6 above.) Secure the fold at several locations along the pipe barrel (approximately every three feet). Wrap a piece of tape completely around the pipe at each end to seal the polyethylene, leaving ends free to overlap the adjoining sections of pipe.



Step 4.
Lower pipe into trench and make up pipe joint. Be careful not to damage the polyethylene when handling or jointing the pipe. Complete installation following Steps 4, 5 (taking care to seal ends of overlap by wrapping tape completely around the pipe at each end), 8, and 9 above. *Note: When lifting polyethylene-encased pipe, use a fabric-type sling or a suitably padded cable or chain to prevent damage to the polyethylene.*

If you have any problems or questions about installing polyethylene encasement, contact DIPRA or one of its member companies.

TABLE FOR MINIMUM FLATTENED
POLYETHYLENE TUBE WIDTHS

NOMINAL PIPE SIZE (INCHES)	RECOMMENDED POLYETHYLENE FLAT TUBE WIDTH (INCHES)
3	14
4	16
6	20
8	24
10	27
12	30
14	34
16	37
18	41
20	45
24	54
30	67
36	81
42	95
48	108
54	121

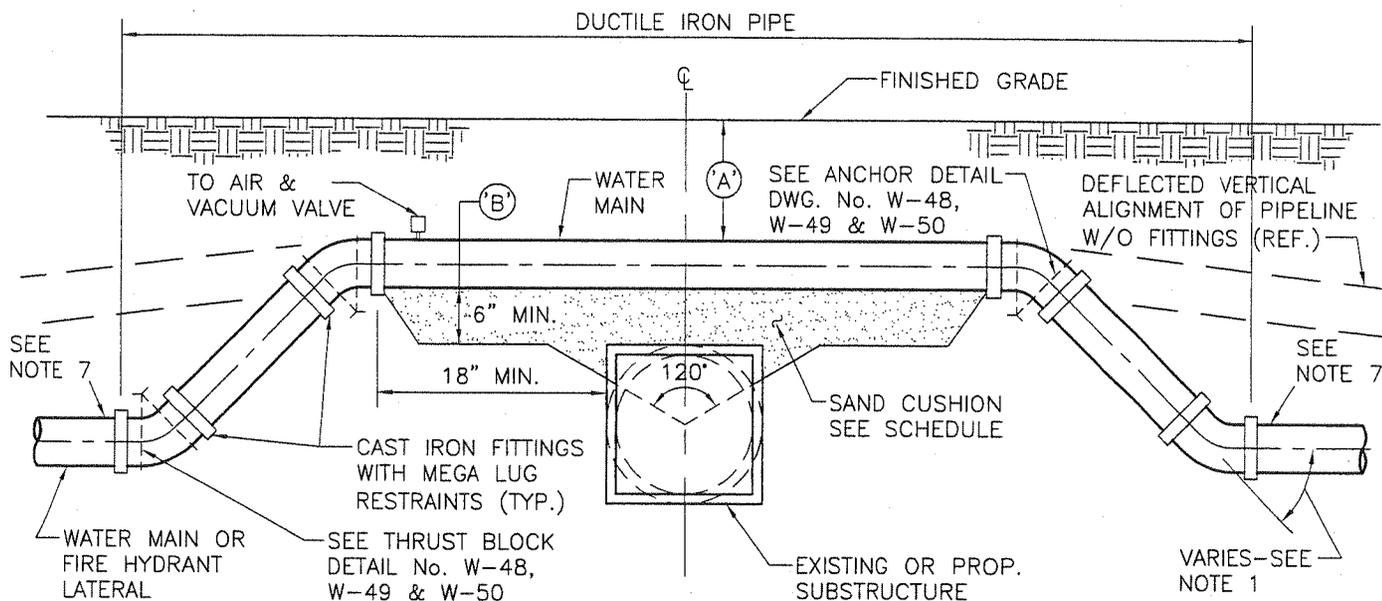
NOTE: PROVIDE P.E. WRAP AT ALL VALVES AND FITTINGS PER AWWA C105/A21.5-88

N:\0550\0868\01\Cadd\WATER-STD\W-43.DWG 06/29/2005 12:55

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		POLYETHYLENE ENCASEMENT FOR D.I.P. SYSTEMS "WET TRENCH CONDITION"	DWG. NO. W-43		
REV.	DATE	BY	REVIEWED: <i>Tom P. Smith</i> WATER SUPERINTENDENT			FILED	SHT <u>1</u> OF <u>1</u>	
			APPROVED: <i>Maffabie Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005					



City Of Camarillo



SAND CUSHION SCHEDULE - DIMENSION 'B'	
'B'	DIMENSION SHALL BE MINIMUM OF 6" IF 'A' DIMENSION IS 3' OR LESS
'B'	DIMENSION SHALL BE MINIMUM OF 12" IF 'A' DIMENSION IS IN EXCESS OF 3'

NOTES:

1. MAXIMUM ALLOWABLE ANGLE OF FITTING = 45°
2. MAXIMUM ALLOWABLE PIPE JOINT DEFLECTION SHALL BE MFR. RECOMMENDATION LESS 1", ±1/2"
3. IF RETURN TO DESIGNED PIPE DEPTH BY DEFLECTION CANNOT ACCOMPLISHED WITHIN 2 STANDARD PIPE LENGTHS (36'), PIPE FITTINGS AND APPURTENANCES WILL BE REQUIRED UNLESS OTHERWISE NOTED OR DIRECTED IN THE FIELD.
4. AIR VACUUM RELEASE ASSEMBLY INSTALLATION MAY BE REQUIRED WHEN VERTICAL DISTANCE IS ONE PIPE DIAMETER OR MORE, OR DICTATED BY ENGINEERING DESIGN.
5. USE DUCTILE IRON PIPE UNLESS OTHERWISE SPECIFIED.
6. NO VALVES IN DEFLECTED AREA.
7. IF LOW POINT IN SYSTEM, INSTALL 2" BLOW-OFF PER STD. DWG. W-3.
8. FINAL DESIGN TO BE APPROVED BY DIRECTOR OF PUBLIC WORKS.

N:\0550\0868\01\Cadd\WATER-STD\W-44.DWG 06/29/2005 12:53

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		STANDARD CULVERT CROSSING (OVER STORM DRAIN)	DWG. NO. W-44
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>



City Of Camarillo

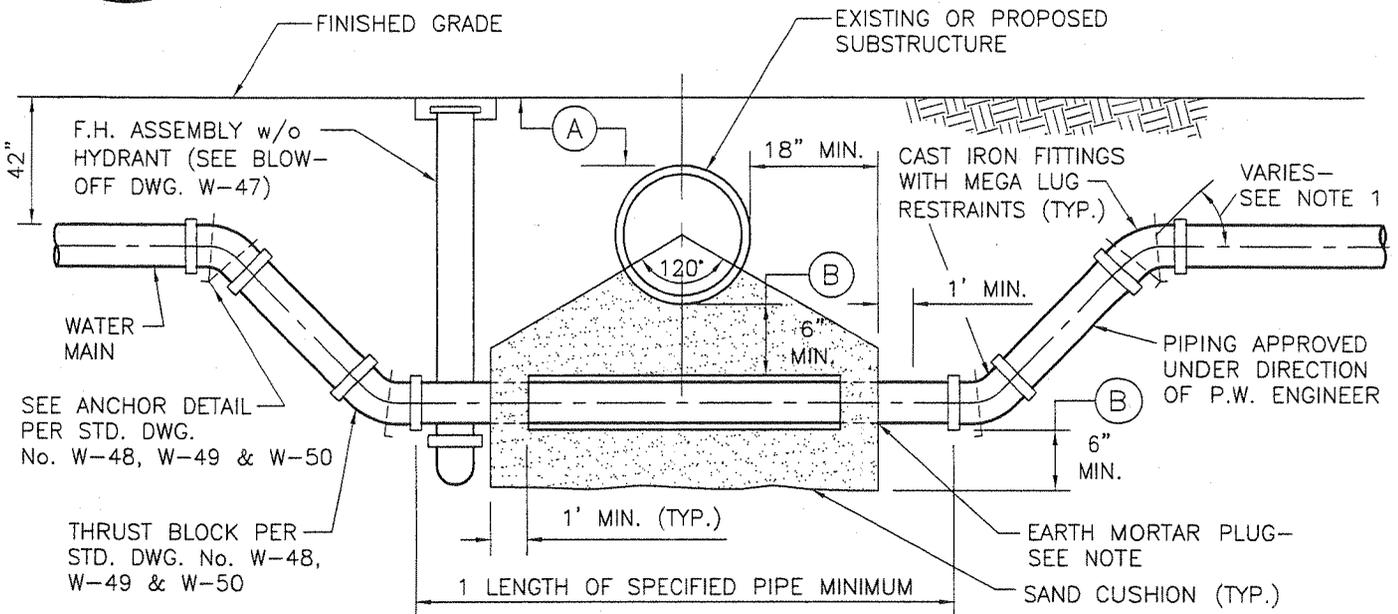


TABLE I

WATER MAIN	CASING—INSIDE DIAMETER	WALL THICKNESS
6 INCHES	12 INCHES	1/4 INCH
8 INCHES	16 INCHES	1/4 INCH
10 INCHES	18 INCHES	3/8 INCH
12 INCHES	20 INCHES	3/8 INCH
16 INCHES	24 INCHES	3/8 INCH
LARGER THAN 16"	REQUIRES ENGINEERING APPROVAL	

SAND CUSHION SCHEDULE — DIMENSION 'B'

PIPE DEPTH	LESS THAN 3'	'B' DIMENSION SHALL BE MINIMUM OF 12" IF 'A' DIMENSION IS 3' OR LESS
	MORE THAN 3'	'B' DIMENSION SHALL BE MINIMUM OF 6" IF 'A' DIMENSION IS IN EXCESS OF 3'

NOTES:

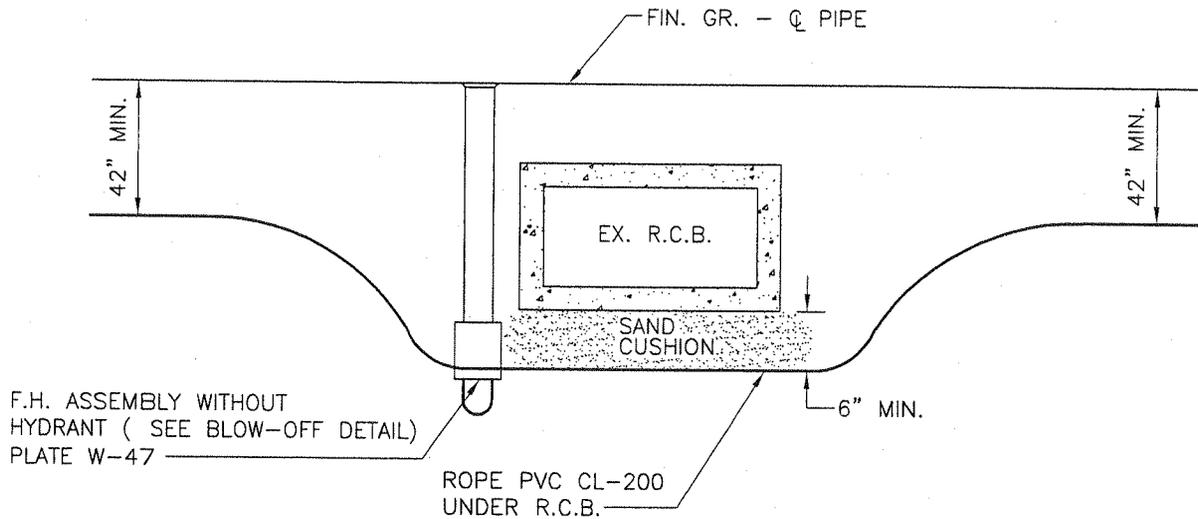
1. MAXIMUM ALLOWABLE ANGLE OF FITTINGS = 45°
2. EARTH MORTAR PLUG SHALL BE MADE OF 1 PART CEMENT AND 3 PARTS EARTH AND SHALL PENETRATE THE ENDS OF THE CASING SURROUNDING THE WATER MAIN TO MINIMUM DEPTH OF 1 FOOT.
3. ACP/PVC PIPE 5' OR LOWER SHALL BE CLASS 200.
4. FINAL DESIGN TO BE APPROVED BY DIRECTOR OF PUBLIC WORKS.

N:\0550\0868\01\Cadd\WATER-STD\W-45.DWG 06/29/2005 12:53

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		STANDARD CULVERT CROSSING (UNDER STORM DRAIN)	DWG. NO. W-45
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>



City Of Camarillo



NOTE:

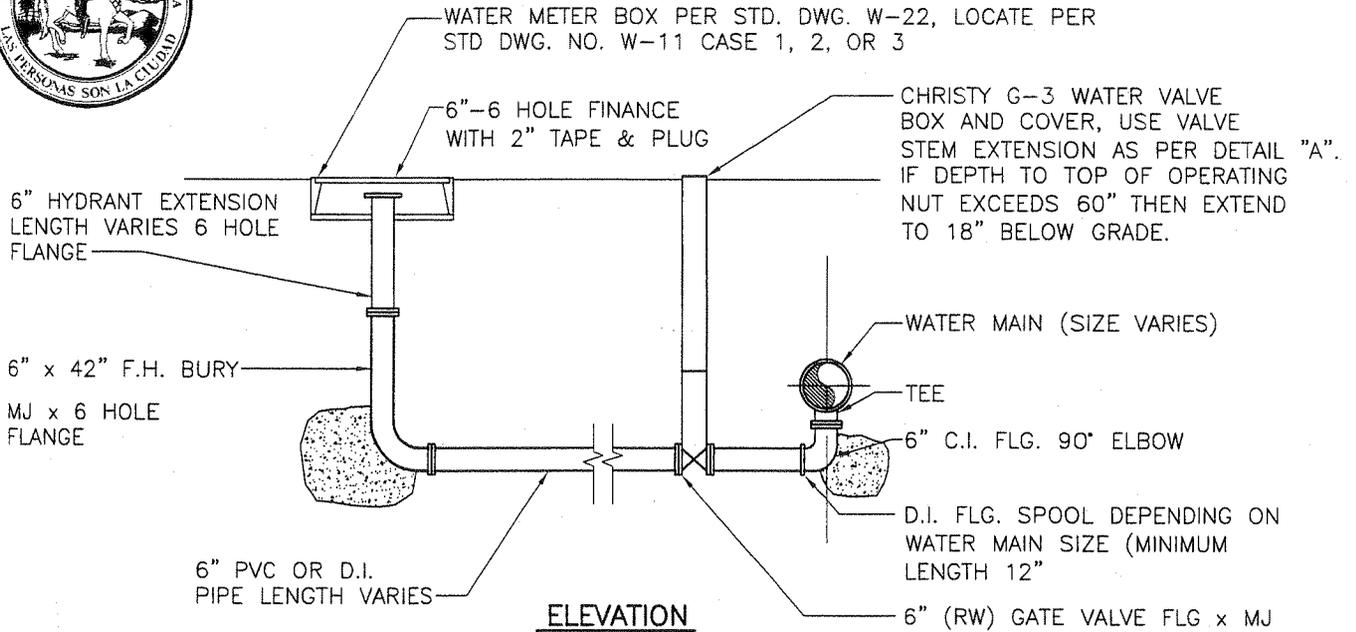
1. PVC PIPE 5' OR LOWER SHALL BE CLASS 200
2. SEE STANDARD CULVERT CROSSING PLATE W-45 SAND CUSHION BACKFILL, OR IMPROVEMENT PLAN DETAIL
3. MAXIMUM ALLOWABLE PIPE JOINT DEFLECTION SHALL BE MANUFACTURER'S RECOMMENDATION LESS 1 DEGREE, $\pm 1/2$ DEGREE

N:\0550\0868\01\Cadd\WATER-STD\W-46.DWG 06/29/2005 12:52

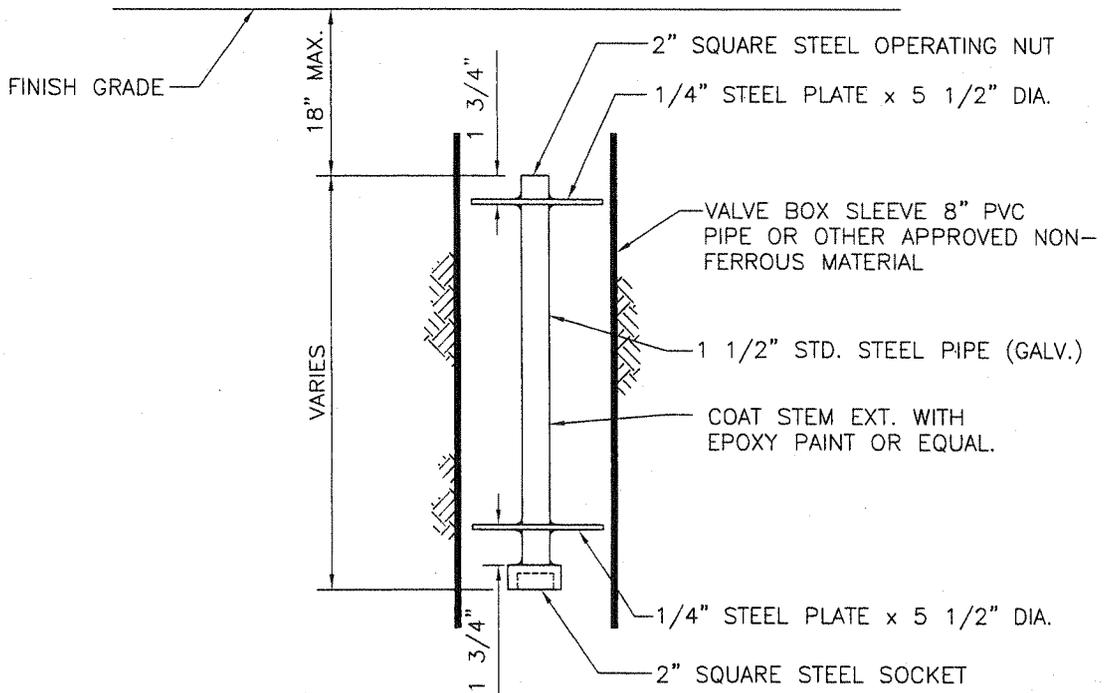
JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		STANDARD DEFLECTED (ROPED) STORM DRAIN CROSSING	DWG. NO. W-46	
REV.	DATE	BY	REVIEWED: <i>Tom P. Smith</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>Stephanie Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	



City Of Camarillo



6" BLOW-OFF ASSEMBLY



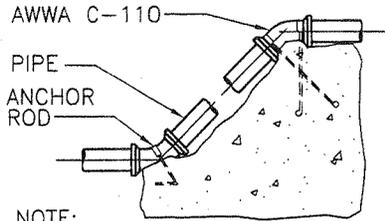
DETAIL "A"
VALVE STEM EXTENSION

N:\0550\0868\01\Cadd\WATER-STD\W-47.DWG 06/29/2005 12:52

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		6 INCH BLOW-OFF AND VALVE STEM EXTENSION DETAIL	DWG. NO. W-47
REV.	DATE	BY	REVIEWED:	<i>Tom P. Smith</i> WATER SUPERINTENDENT		FILED
			APPROVED:	<i>Maffia Trucke</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005		SHT <u>1</u> OF <u>1</u>

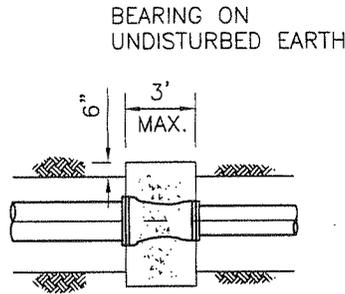


City Of Camarillo

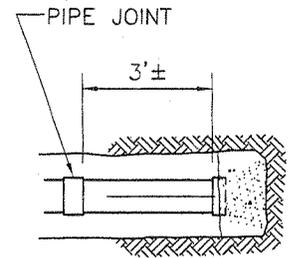


NOTE:
ANCHOR STRAPS TO BE COAT
EXPOSED METAL WITH BITUMASTIC
AFTER INSTALLATION. SPECIAL
DESIGN IN FIELD MAY BE
REQUIRED.

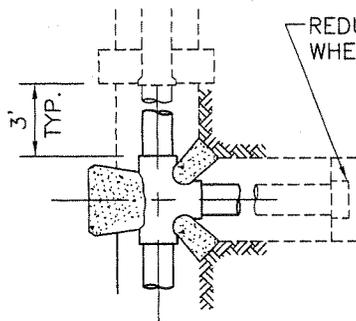
VERTICAL ANCHORS



REDUCER

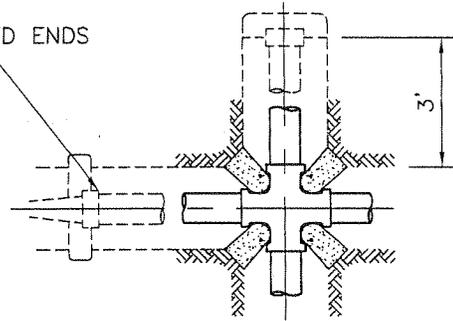


PLUG OR CAPPED END



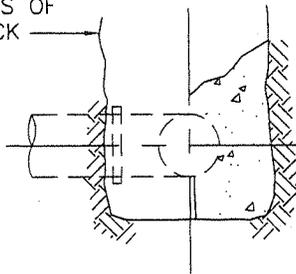
TEE

REDUCERS AND CAPPED ENDS
WHERE INDICATED

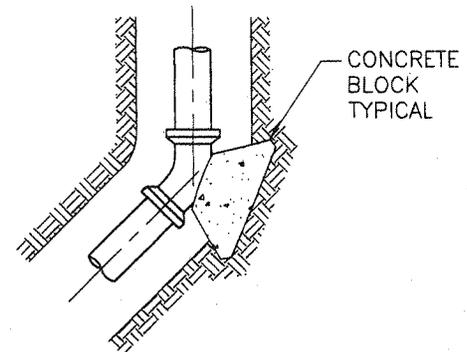


CROSS

45° MAX. SLOPE
TOP & ENDS OF
CONC. BLOCK



SECTION OF THRUST BLOCK



PLAN VIEW OF THRUST BLOCK

NOTES:

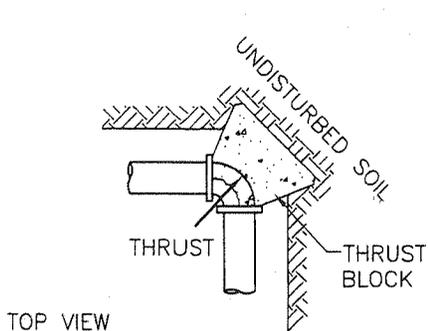
1. ALL FITTINGS SHALL BE AWWA C-110
2. CONCRETE BLOCKS SHALL BEAR ON UNDISTURBED EARTH
3. FOR SIZES OF CONCRETE BLOCKS, SEE DWG NO. W-50

N:\0550\0868\01\Cadd\WATER-STD\W-48.DWG 06/29/2005 12:51

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		AWWA C-110 THRUST PIPE AND THRUST BLOCK LAYOUT	DWG. NO. W-48	
REV.	DATE	BY	REVIEWED:	<i>[Signature]</i> WATER SUPERINTENDENT		FILED	SHT <u>1</u> OF <u>1</u>
			APPROVED:	<i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			

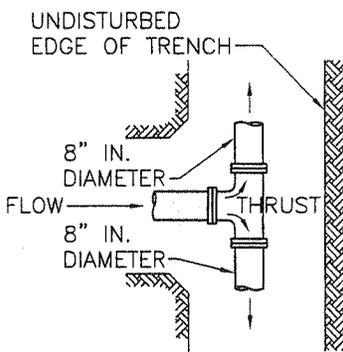


City Of Camarillo

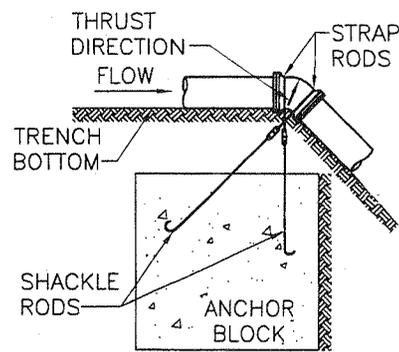


TOP VIEW

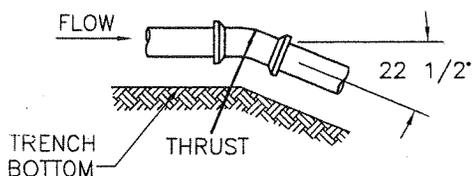
THRUST BLOCK 90° BEND



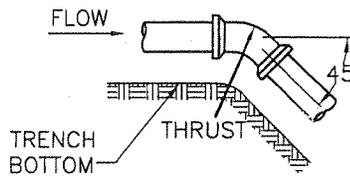
TEE



THRUST BLOCK 45° BEND



22 1/2° BEND



45° BEND

FITTING THRUST IN POUNDS AT 100 psig WATER PRESSURE

DIAMETER INCHES	TYPE OF FITTINGS				
	11 1/4-DEG BEND	22 1/2-DEG BEND	45-DEG BEND	90-DEG BEND	TEES AND DEAD ENDS
3	140	280	540	1,000	710
4	250	490	960	1,800	1,300
6	550	1,100	2,200	4,000	2,800
8	990	2,000	3,800	7,000	5,000
10	1,500	3,100	6,000	11,100	7,900
12	2,200	4,400	8,700	16,000	11,300
14	3,000	6,000	11,800	21,800	15,400
16	3,900	7,800	15,400	28,400	20,100
18	5,000	9,900	19,500	36,000	25,400
20	6,200	12,300	24,000	44,400	31,400
24	7,500	14,800	29,100	53,800	38,000
30	13,900	27,600	54,100	100,000	70,700
36	20,000	40,000	77,900	144,000	102,000
42	27,000	54,100	106,000	196,000	139,000
48	35,000	70,600	138,000	256,000	181,000
54	44,900	89,400	175,000	324,000	229,000
60	55,400	110,000	216,000	400,000	283,000

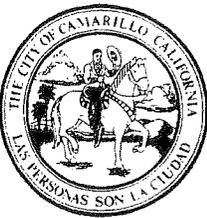
NOTE:
THRUST BLOCK SIZE SHALL
BE PER ENGINEER CALCULATION
AND DESIGN.

ESTIMATED BEARING LOAD

SOIL TYPE	lb/sq ft	N/m ²
MUCK, PEAT, ETC	0	0
SOFT CLAY	500	23,940
SAND	1,000	47,881
SAND AND GRAVEL	1,500	71,821
SAND AND GRAVEL WITH CLAY	2,000	95,761
SAND AND GRAVEL CEMENTED WITH CLAY	4,000	191,523
HARD PAN	5,000	239,403

N:\0550\0868\01\Cadd\WATER-STD\W-49.DWG 06/29/2005 12:57

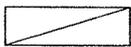
JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		<h2>THRUST DYNAMIC DEVELOPMENT AND ESTIMATE OF BEARING LOAD</h2>	DWG. NO. W-49	
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	



City Of Camarillo

THRUST BLOCK SIZES

PIPE DIA.	PIPE CLASS	PRESSURE P.S.I.	AREA		SQ. FT.									
			TEE	CAP	LINE VALVE	90 BEND	45 BEND	22 1/2 BEND	11 1/4 BEND					
4														
	150	125	3	2	3	2	3	2	4	3	2	2	1	1
	150	150	3	3	3	3	3	3	4	3	3	2	2	1
	200	175	4	3	4	3	4	3	5	4	3	2	2	1
	200	200	4	3	4	3	4	3	6	4	3	3	2	2
6														
	150	125	5	4	5	4	5	4	7	6	4	4	2	2
	150	150	6	4	6	4	6	4	9	7	5	4	3	2
	200	175	7	6	7	6	7	6	10	8	6	4	3	3
	200	200	8	6	8	6	8	6	11	9	6	5	3	3
8														
	150	125	9	7	9	7	9	7	12	9	7	5	4	3
	150	150	10	8	10	8	10	8	14	11	8	6	4	3
	200	175	12	9	12	9	12	9	17	13	9	7	5	4
	200	200	14	10	14	10	14	10	19	14	11	8	6	4
10														
	150	125	14	10	14	10	14	10	19	15	11	8	6	4
	150	150	17	13	17	13	17	13	23	18	13	10	7	5
	200	175	19	15	19	15	19	15	27	20	15	11	8	6
	200	200	22	17	22	17	22	17	31	23	17	13	9	7
12														
	150	125	20	15	20	15	20	15	27	21	15	11	8	6
	150	150	23	18	23	18	23	18	33	25	18	14	9	7
	200	175	27	20	27	20	27	20	38	29	21	16	11	8
	200	200	31	23	31	23	31	23	44	33	24	18	12	9



SIZE FOR 1500 LB. PER SQ. FT. BRG. SOIL.
 SIZE FOR 2000 LB. PER SQ. FT. BRG. SOIL.

NOTE: USE SIZES FOR 1500 LB. PER SQ. FT. BRG. SOIL UNLESS HIGHER VALUE IS SUBSTANTIATED BY APPROVED SOILS REPORT. A SPECIAL DESIGN MUST BE SUBMITTED FOR THE DIRECTOR'S APPROVAL FOR ALL VERTICAL ANCHORS.

N:\0550\0868\01\Cadd\WATER-STD\W-50.DWG 06/29/2005 12:58

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		<h3>THRUST BLOCK SIZES</h3>	DWG. NO. W-50	
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	



City Of Camarillo

ALLOWABLE LEAKAGE FOR AWWA PVC PIPE					
NOMINAL PIPE SIZE IN.	AVERAGE TEST PRESSURE IN LINE- PSI				
	50	100	150	200	250
	ALLOWABLE LEAKAGE PER 1000 FT OR 50 JOINTS, GAL/HR (L/HR)				
4	.19 (0.72)	.27 (1.02)	.33 (1.25)	.38 (1.44)	.43 (1.63)
6	.29 (1.10)	.41 (1.55)	.50 (1.89)	.57 (2.16)	.64 (2.24)
8	.38 (1.44)	.54 (2.04)	.66 (2.50)	.76 (2.88)	.85 (3.22)
10	.48 (1.82)	.68 (2.57)	.83 (3.14)	.96 (3.63)	1.07 (4.05)
12	.57 (2.16)	.81 (3.07)	.99 (3.75)	1.15 (4.35)	1.28 (4.84)
14	.67 (2.54)	.95 (3.60)	1.15 (4.35)	1.33 (5.03)	1.49 (5.64)
16	.77 (2.91)	1.08 (4.09)	1.32 (4.99)	1.52 (5.75)	1.71 (6.47)
18	.86 (3.26)	1.22 (4.62)	1.48 (5.60)	1.71 (6.47)	1.92 (7.27)
20	.96 (3.63)	1.35 (5.11)	1.65 (6.25)	1.90 (7.19)	2.14 (8.10)

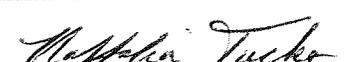
ALLOWABLE LEAKAGE FORMULA

$$L = \frac{ND\sqrt{P}}{7400}$$

WHERE

- L = ALLOWABLE LEAKAGE IN GALLONS PER HOUR
- N = NUMBER OF JOINTS IN PIPE LINE TO BE TESTED
- D = NOMINAL DIAMETER OF THE PIPE IN INCHES
- P = AVERAGE TEST PRESSURE DURING THE LEAKAGE TEST, IN POUNDS PER SQUARE INCH (GAUGE)

M:\3550\0868\01\Cadd\WATER-STD\W-51.DWG 06/29/2005 13:04

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		<h3>ALLOWABLE LEAKAGE CHART FOR PVC PIPE</h3>	DWG. NO. W-51	
REV.	DATE	BY	REVIEWED:  WATER SUPERINTENDENT			FILED	
			APPROVED:  CITY ENGINEER			SHT <u>1</u> OF <u>1</u>	
			R.C.E. 50878 EXPIRES 9/30/2005				



City Of Camarillo

ALLOWABLE LEAKAGE PER 1000 FT (305 M) OF PIPELINE*

NOMINAL PIPE DIAMETER IN.	AVERAGE TEST PRESSURE - PSI (BAR)											
	450 (31)	400 (28)	350 (24)	300 (21)	275 (19)	250 (17)	225 (16)	200 (14)	175 (12)	150 (10)	125 (9)	100 (7)
	LEAKAGE - GPH**											
3	0.48	0.45	0.42	0.39	0.37	0.36	0.34	0.32	0.30	0.28	0.25	0.23
4	0.64	0.60	0.56	0.52	0.50	0.47	0.45	0.43	0.40	0.37	0.34	0.30
6	0.95	0.90	0.84	0.78	0.75	0.71	0.68	0.64	0.59	0.55	0.50	0.45
8	1.27	1.20	1.12	1.04	1.00	0.95	0.90	0.85	0.80	0.74	0.67	0.60
10	1.59	1.50	1.40	1.30	1.24	1.19	1.13	1.06	0.99	0.92	0.94	0.75
12	1.91	1.80	1.69	1.56	1.49	1.42	1.35	1.28	1.19	1.10	1.01	0.90
14	2.23	2.10	1.97	1.82	1.74	1.66	1.58	1.48	1.39	1.29	1.18	1.05
16	2.55	2.40	2.25	2.08	1.99	1.90	1.80	1.70	1.59	1.47	1.34	1.20
18	2.87	2.70	2.53	2.34	2.24	2.14	2.03	1.91	1.79	1.66	1.51	1.35
20	3.18	3.00	2.81	2.60	2.49	2.37	2.25	2.12	1.98	1.84	1.68	1.50
24	3.82	3.60	3.37	3.12	2.99	2.85	2.70	2.55	2.38	2.21	2.01	1.80
30	4.78	4.50	4.21	3.90	3.73	3.56	3.38	3.19	2.98	2.76	2.52	2.25
36	5.73	5.41	5.06	4.68	4.48	4.27	4.05	3.82	3.58	3.31	3.02	2.70
42	6.69	6.31	5.90	5.46	5.23	4.99	4.73	4.46	4.17	3.86	3.53	3.15
48	7.64	7.21	6.74	6.24	5.98	5.70	5.41	5.09	4.77	4.41	4.03	3.60
54	8.50	8.11	7.58	7.02	6.72	6.41	6.03	5.73	5.36	4.97	4.53	4.05

* IF THE PIPELINE UNDER TEST CONTAINS SECTIONS OF VARIOUS DIAMETERS, THE ALLOWABLE LEAKAGE WILL BE THE SUM OF THE COMPUTED LEAKAGE FOR EACH SIZE.

** TO OBTAIN LEAKAGE IN LITRES/HOUR, MULTIPLY THE VALUES IN THE TABLE BY 3,785.

ALLOWABLE LEAKAGE FORMULA

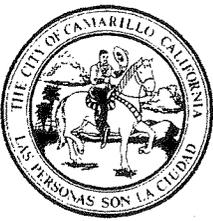
$$L = \frac{SD\sqrt{P}}{133.200}$$

WHERE

- L = ALLOWABLE LEAKAGE IN GALLONS PER HOUR
- S = LENGTH OF PIPE TESTED IN FEET
- D = NOMINAL DIAMETER OF THE PIPE IN INCHES
- P = AVERAGE TEST PRESSURE DURING THE LEAKAGE TEST, IN POUNDS PER SQUARE INCH (GAUGE)

N:\0550\0868\01\Cadd\WATER-STD\W-52.DWG 06/29/2005 13:04

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		<h2>ALLOWABLE LEAKAGE CHART FOR DUCTILE IRON PIPE</h2>	DWG. NO. W-52	
REV.	DATE	BY	REVIEWED: <i>Tom Smith</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>Melba Tucker</i> CITY ENGINEER			SHT <u>1</u> OF <u>1</u>	
			R.C.E. 50878 EXPIRES 9/30/2005				



City Of Camarillo

ALLOWABLE LEAKAGE PER 100 COUPLINGS

PIPE DIAMETER IN.	TEST PRESSURE AT LOWEST POINT IN LINE - PSI						
	50	75	100	125	150	200	225
	LEAKAGE - GPH						
4	0.71	0.87	1.00	1.02	1.23	1.42	1.51
6	1.06	1.29	1.51	1.68	1.84	2.12	2.25
8	1.42	1.72	2.00	2.24	2.45	2.84	3.00
10	1.77	2.15	2.50	2.79	3.07	3.54	3.75
12	2.12	2.58	3.00	3.35	3.68	4.24	4.52
14	2.48	3.01	3.50	3.91	4.28	4.96	5.26
16	2.83	3.44	4.01	4.47	4.89	5.68	6.00
18	3.18	3.87	4.52	5.02	5.52	6.37	6.75
20	3.54	4.30	5.00	5.58	6.12	7.08	7.51
24	4.24	5.16	6.00	6.69	7.34	8.50	9.01
30	5.30	6.45	7.51	8.37	9.18	10.62	11.26
36	6.37	7.75	9.01	10.07	11.02	12.74	13.50

THE ALLOWABLE LEAKAGE FOR A PIPELINE IS CALCULATED BY MULTIPLYING THE LEAKAGE PER HOUR PER 100 JOINTS AT THE AVERAGE TEST PRESSURE AND FOR THE DIAMETER OF PIPE TESTED AS OBTAINED FROM THE ABOVE TABLE, BY THE DURATION OF THE TEST IN HOURS AND THE TOTAL NUMBER OF JOINTS IN THE LINE DIVIDED BY 100.

N:\0550\0868\01\Cadd\WATER-STD\W-53.DWG 06/29/2005 13:03

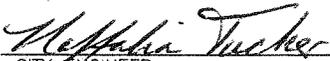
JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		ALLOWABLE LEAKAGE CHART FOR ACP	DWG. NO. W-53	
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	

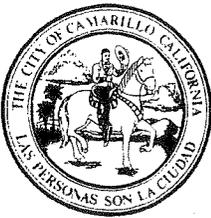


City Of Camarillo

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JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		NOT USED	DWG. NO. W-54
REV.	DATE	BY	REVIEWED:	 WATER SUPERINTENDENT		FILED
			APPROVED:	 CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005		SHT <u>1</u> OF <u>1</u>



City Of Camarillo

12.5% TO 15.0% SODIUM HYPOCHLORITE REQUIRED FOR 100 PPM OF CHLORINE IN PIPE

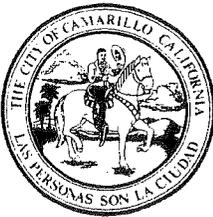
PIPE SIZE INSIDE DIAMETER IN.	CONTENTS IN A 100-FEET SECTION			AMOUNT OF 12.5% TO 15% SODIUM HYPOCHLORITE PER 100-FEET LENGTH TO GIVE 100 PPM AVAILABLE CHLORINE*		LENGTH OF PIPE IN WHICH 1 OZ. OF HYPOCHLORITE WILL PRODUCE 50 PPM AVAIL. CL ₂
	CU FT	LB	GAL	OZ. (APPROX)	LB	
4	8.75	545	65.5	5/8	0.039	168
6	19.65	1225	147	1 3/8	0.087	71.9
8	34.90	2180	261	2 1/2	0.159	39.4
10	54.55	3405	408	3 7/8	0.244	25.6
12	78.55	4905	587	5 5/8	0.350	17.9
14	106.90	6670	800	7 5/8	0.476	13.2
16	139.60	8725	1044	10	0.621	10.0
20	218.20	13,635	1632	15 1/2	0.972	6.45
24	314.20	19,635	2350	22 3/8	1.400	4.45
30	390.90	30,680	3672	35	2.185	2.95
36	706.90	44,180	5285	50 3/8	3.150	2.0
42	962.10	60,130	7197	69	4.300	1.45
48	1256.60	78,535	9400	89 3/4	5.610	1.06

*FOR 20FT LENGTHS OF PIPE, DIVIDE THESE VALUES BY FIVE.

$$\text{FORMULA } \frac{\text{MG} \times 8.34 \times \text{MG/L}}{0.70} = \text{LBS OF 70\% CHLORINE FED}$$

N:\0550\0868\01\Cadd\WATER-STD\W-55.DWG 06/29/2005 13:02

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		HYPOCHLORITE REQMNT. AND GUIDE FOR NEW WATER MAIN DISINFECTION	DWG. NO. W-55	
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT. <u>1</u> OF <u>1</u>	



City Of Camarillo

REQUIRED FLOW AND OPENINGS TO FLUSH PIPELINES (40-PSI RESIDUAL PRESSURE IN WATER MAIN)*

PIPE DIAMETER (IN.)	FLOW REQUIRED TO PRODUCE 2.5 FT/S (APPROX.) VELOCITY IN MAIN (GPM)	SIZE OF TAP (IN.)			NUMBER OF 2 1/2 IN. HYDRANT OUTLETS*
		1	1 1/2	2	
		NUMBER OF TAPS ON PIPE**			
4	100	1	-	-	1
6	200	-	1	-	1
8	400	-	2	1	1
10	600	-	3	4	1
12	900	-	-	4	2
16	1600	-	-	4	2

* WITH A 40-PSI PRESSURE IN THE MAIN WITH THE HYDRANT FLOWING TO ATMOSPHERE, A 2 1/2 IN. HYDRANT OUTLET WILL DISCHARGE APPROXIMATELY 1000 GPM AND A 4 1/2 IN. HYDRANT WILL DISCHARGE APPROXIMATELY 2500 GPM.

** NUMBER OF TAPS ON PIPE BASED ON DISCHARGE THROUGH 5 FT. OF GALVANIZED IRON (GI) PIPE WITH ONE 90° ELBOW.

NOTE: ACCELERATE FLOW TO ACHIEVE 5 FT/SEC VELOCITY.

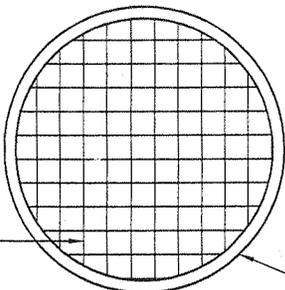
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JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		FLOW GUIDE FOR FLUSHING NEWLY INSTALLED WATER MAINS	DWG. NO. W-56	
REV.	DATE	BY	REVIEWED: <i>Tom P. Smith</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>Hoffman Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	



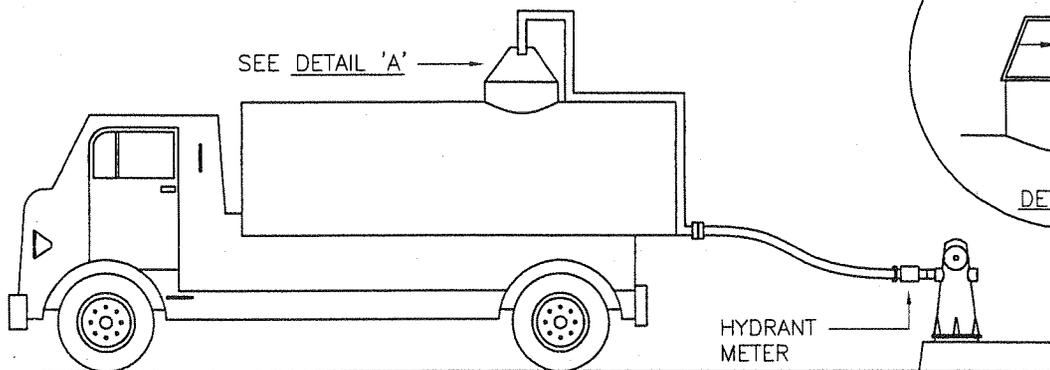
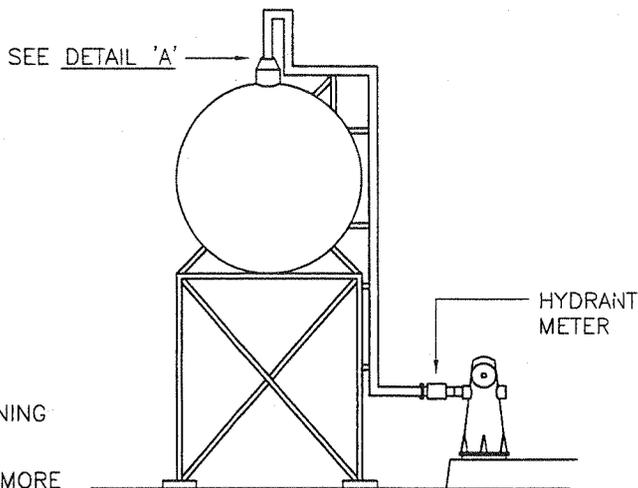
City Of Camarillo

2"x2"x1/4" WELDED WIRE MESH TO BE WELDED TO THE TANK OPENING TO PREVENT HOSE FROM DROPPING INTO TANK.

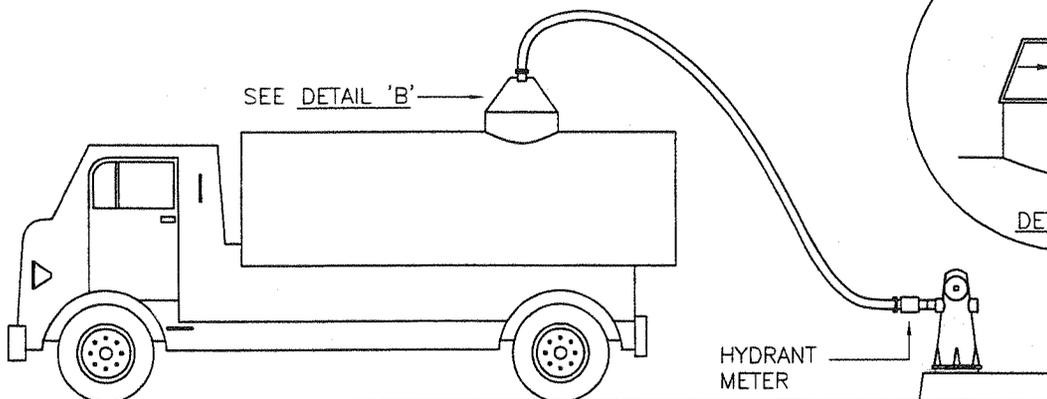


TANK OPENING

NOTE: ON-SITE STORAGE TANKS OR ANY WATER USAGE MORE THAN 50 FT. FROM A FIRE HYDRANT METER SHALL REQUIRE INSTALLATION OF A BACKFLOW PREVENTION ASSEMBLY. TYPE ASSEMBLY TO BE DETERMINED BY WATER DIVISION.



PROPER AIR GAP IS TWICE THE DIAMETER OF THE SUPPLY PIPING; I.E.: A 2" SUPPLY PIPE REQUIRES A 4" AIR GAP. SUPPLY PIPING CAN BE BRACED BUT NOT ENCLOSED.

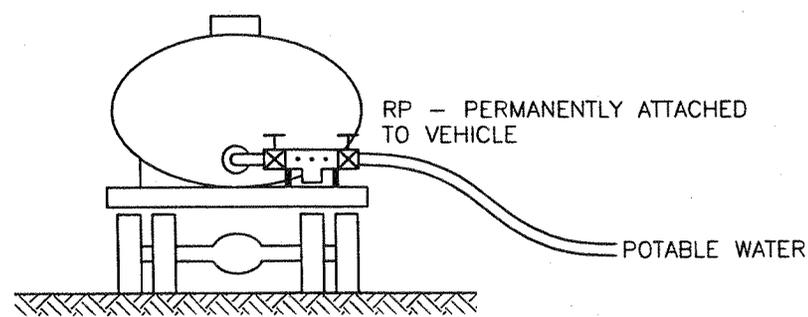
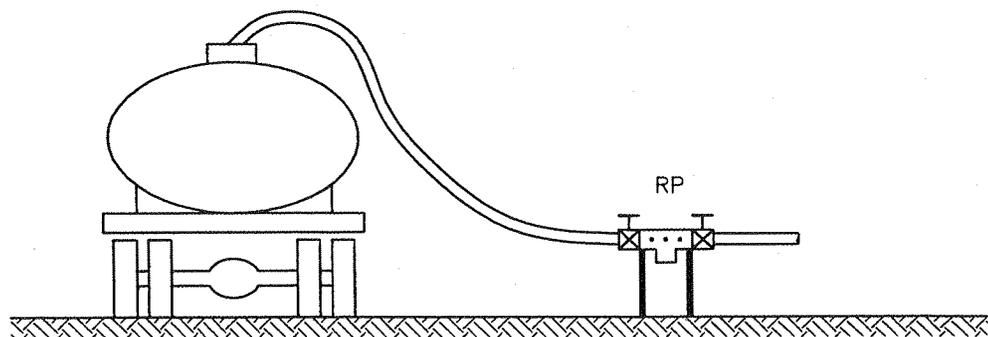
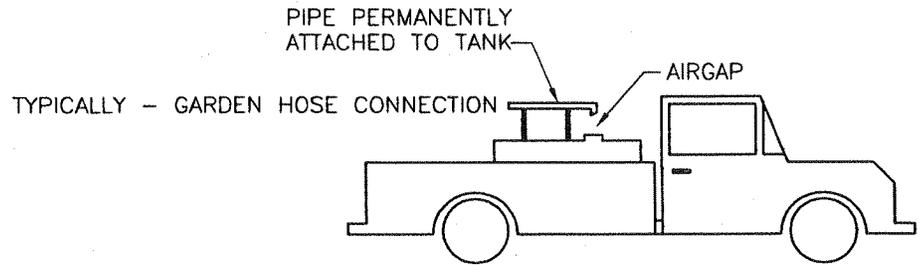
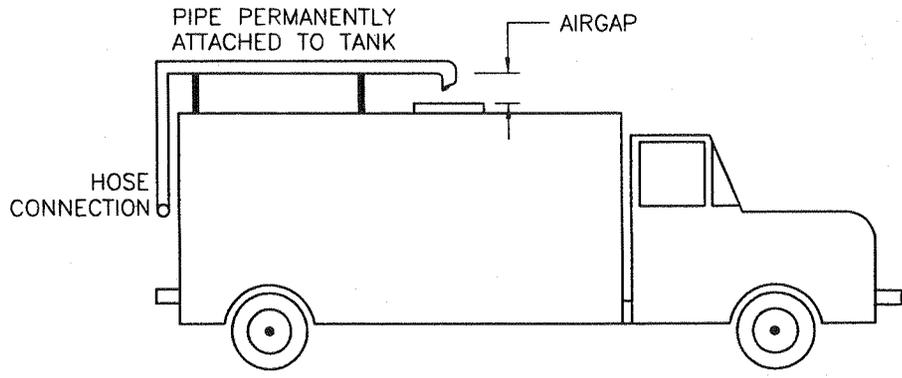


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JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		BACKFLOW PREVENTION REQUIREMENTS FOR WATER TANKER VEHICLES	DWG. NO. W-57		
REV.	DATE	BY	REVIEWED: <i>Lo P. Smith</i> WATER SUPERINTENDENT			FILED	SHT 1 OF 2	
			APPROVED: <i>Melanie Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005					



City Of Camarillo

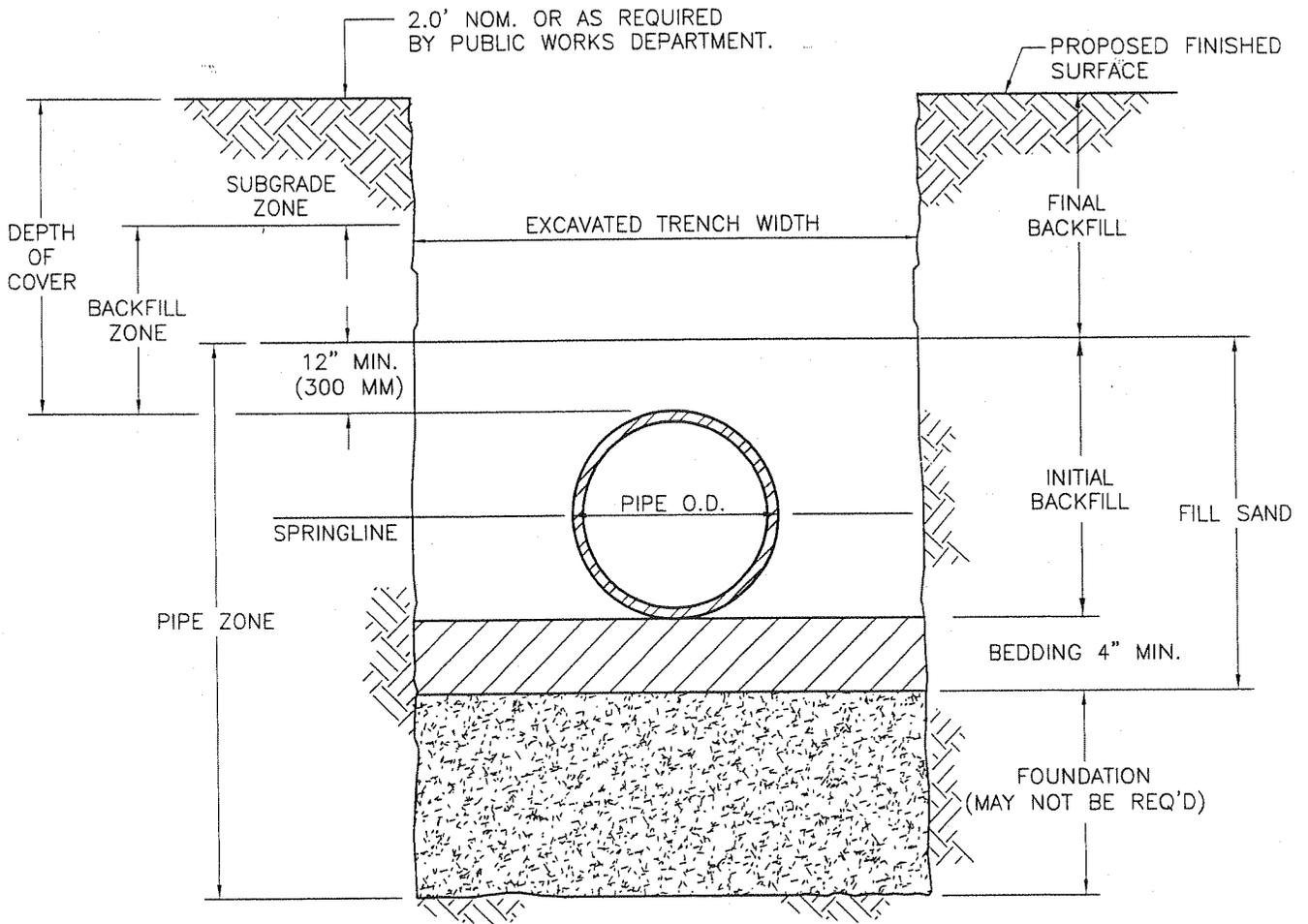


N:\0550\0868\01\Cadd\WATER-STD\W-57-2.DWG 08/30/2005 09:56

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		BACKFLOW PREVENTION REQUIREMENTS FOR WATER TANKERS	DWG. NO. W-57	
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED	SHT <u>2</u> OF <u>2</u>
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005				



City Of Camarillo



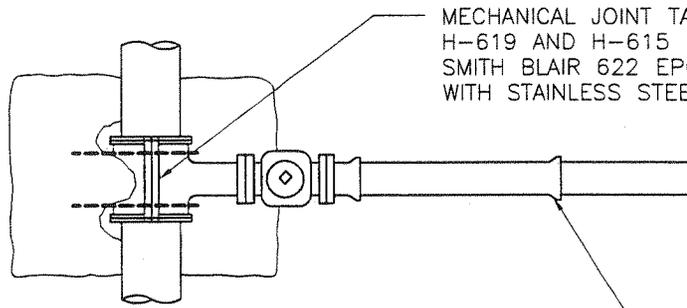
NOTE: THE STANDARD DEPTH OF COVER IS 42 INCHES TO TOP OF PIPE UNLESS OTHERWISE APPROVED BY DIRECTOR.

N:\0550\0868\01\Cadd\WATER-STD\W-58.DWG 06/29/2005 12:59

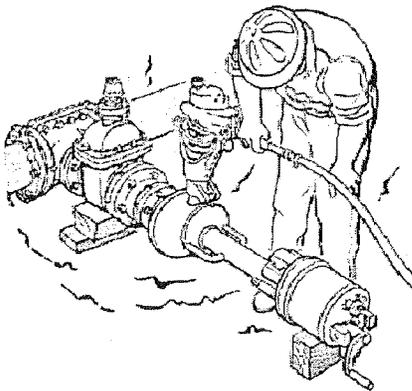
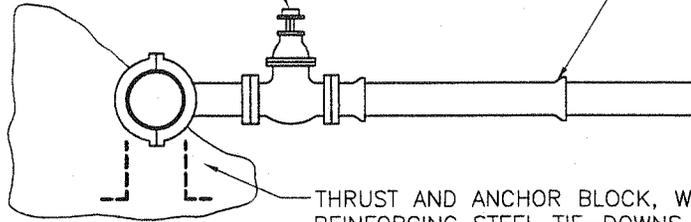
JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		TRENCH TERMINOLOGY AND STANDARD DIMENSION	DWG. NO. W-58	
REV.	DATE	BY	REVIEWED: <i>Tom D. Smith</i> WATER SUPERINTENDENT			FILED	
			APPROVED: <i>Maffalo Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>	



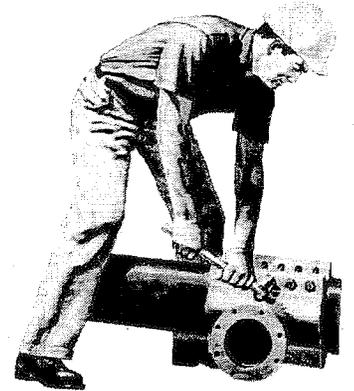
City Of Camarillo



TAPPING GATE VALVE
PER GENERAL WATER
PLAN NOTE NO. 29



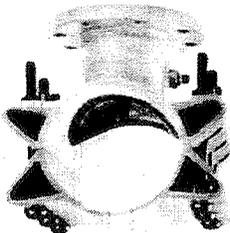
SETTING-UP DRILLING MACHINE



INSTALLING TAPPING SLEEVES

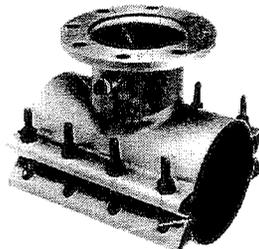
REQUIRED TAPPING SLEEVES OR AN APPROVED EQUAL

EPOXY WITH STAINLESS
STEEL BOLTS



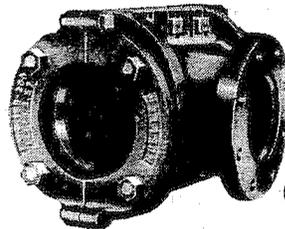
EPOXY COATED
SMITH BLAIR 622
TAPPING SLEEVE

FORD STAINLESS STEEL
NUTS & BOLTS

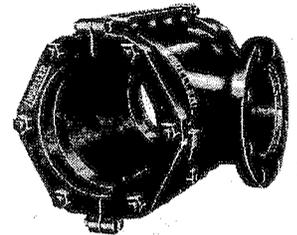


FORD Style FAST

MUELLER ® MECHANICAL JOINT TAPPING SLEEVE



H-619



H-615

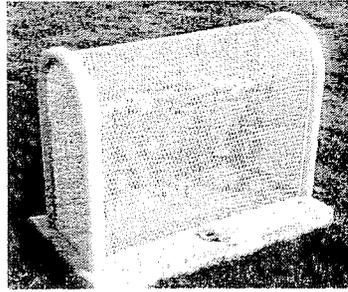
(PVC
&
DIP)

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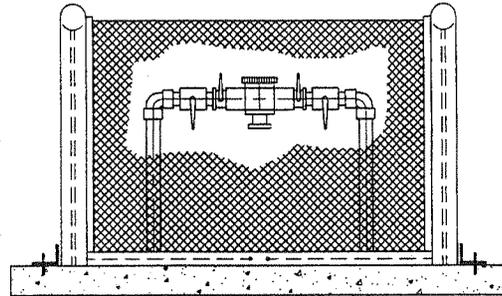
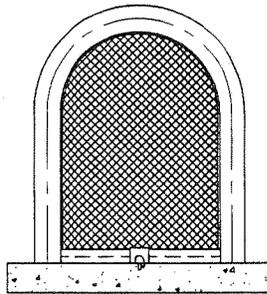
JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		DWG. NO. W-59	
REV.	DATE	BY	REVIEWED: <i>Tom P. Smith</i> WATER SUPERINTENDENT		TAPPING SLEEVES	
			APPROVED: <i>M. Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			
					FILED	
					SHT <u>1</u> OF <u>1</u>	



City Of Camarillo

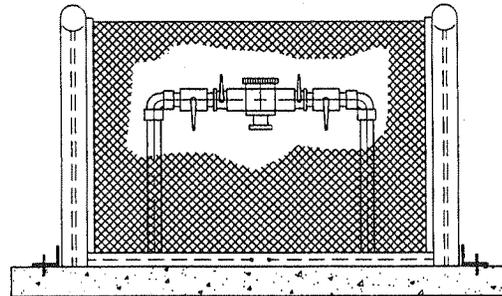
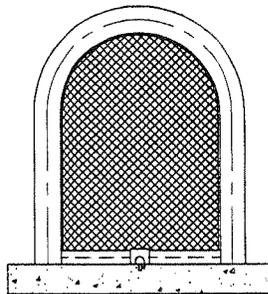


BACKFLOW PREVENTION DEVICE ENCLOSURES (BPDI)



GS-1 GUARDSHACK

1. SET EYEBLOT WITH BOTTOM OF CIRCLE FLUSH WITH CONCRETE BASE THEN EYEBOLT CANNOT BE TURNED WHEN BRACKET IS IN PLACE.
2. BOLT BRACKETS TO ENCLOSURE ON ENDS OR BOTH SIDES. USE 1/4" X 1 1/4" TAMPER-PROOF BOLTS WITH HEX NUTS AND WASHERS PROVIDED.
3. PAD DIMENSIONS - 32"L X 18"W X 3 3/4" THICK.

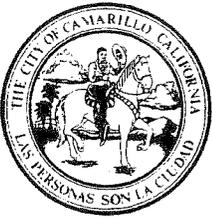


GS-2 GUARDSHACK

1. SET EYEBLOT WITH BOTTOM OF CIRCLE FLUSH WITH CONCRETE BASE THEN EYEBOLT CANNOT BE TURNED WHEN BRACKET IS IN PLACE.
2. BOLT BRACKETS TO ENCLOSURE ON ENDS OR BOTH SIDES. USE 1/4" X 1 1/4" TAMPER-PROOF BOLTS WITH HEX NUTS AND WASHERS PROVIDED.
3. PAD DIMENSIONS - 40"L X 18"W X 3 3/4" THICK.

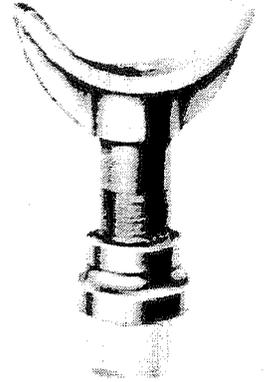
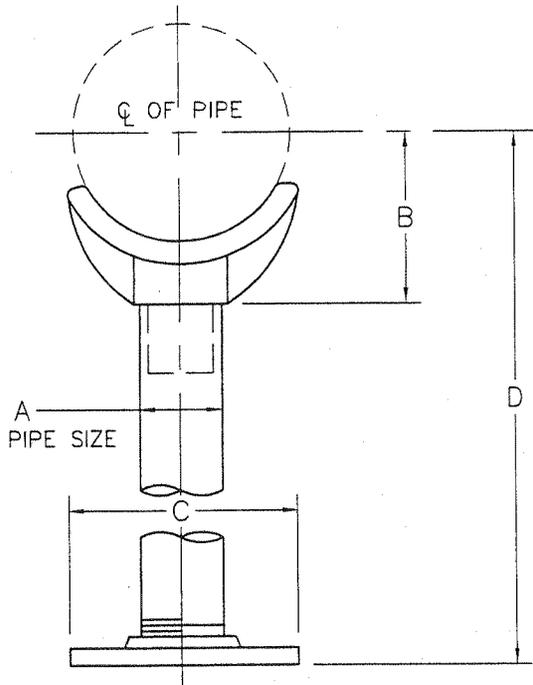
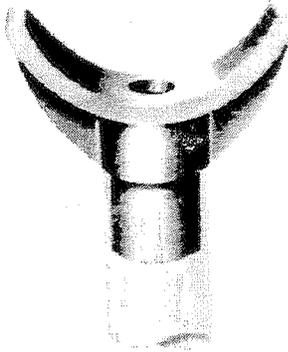
N:\0550\0868\01\Cadd\WATER-STD\W-60.DWG 06/29/2005 13:06

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		PROTECTIVE ENCLOSURE FOR BACKFLOW PREVENTION ASSEMBLIES 3/4" TO 2" IN SIZE	DWG. NO. W-60
REV.	DATE	BY	REVIEWED:	<i>Lois P. Smith</i> WATER SUPERINTENDENT		FILED
			APPROVED:	<i>M. Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005		SHT 1 OF 1



City Of Camarillo

ADJUSTABLE PIPE SADDLE SUPPORT GRINNEL (FIG. 264) OR EQUAL



DIMENSIONS			
PIPE SIZE IN.	A IN.	B IN.	C IN.
4	3	4 3/16	9
5	3	4 13/16	9
6	3	5 7/16	9
8	3	6 15/16	9
10	3	8 7/16	9
12	3	9 15/16	9
14 O.D.	4	10 15/16	11
16 O.D.	4	12 3/8	11
18 O.D.	4	13 7/8	11
20 O.D.	6	15 3/8	13 1/2
22 O.D.	6	16 5/8	13 1/2
24 O.D.	6	17 15/16	13 1/2
26 O.D.	6	19 1/8	13 1/2
30 O.D.	6	21 5/16	13 1/2
32 O.D.	6	22 1/2	13 1/2
36 O.D.	8	24 1/2	16

N:\0550\0868\01\Cadd\WATER-STD\W-61.DWG 06/29/2005 13:08

JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		<h3>ADJUSTABLE PIPE SUPPORT</h3>	DWG. NO. W-61
REV.	DATE	BY	REVIEWED: <i>Tom P. Smith</i> WATER SUPERINTENDENT			FILED
			APPROVED: <i>Muffalo Tucker</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>1</u>



City Of Camarillo

GENERAL WATER PLAN NOTES

CITY OF CAMARILLO WATER DIVISION
283 S. GLENN DR. - P.O. BOX 248
CAMARILLO, CA 93010 (805) 388-5373

1. ALL WATER FACILITY INSTALLATIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF CAMARILLO WATER DIVISION MANUAL OF DESIGN AND CONSTRUCTION STANDARDS.
2. ALL STANDARD PLATES REFER TO CITY OF CAMARILLO MANUAL OF DESIGN AND CONSTRUCTION STANDARDS FOR THE WATER DIVISION.
3. CONTRACTOR SHALL NOTIFY WATER DIVISION AND ARRANGE FOR PRE-CONSTRUCTION CONFERENCES 48 HOURS PRIOR TO BEGINNING CONSTRUCTION.
4. CONTRACTOR SHALL NOTIFY THE WATER DIVISION 24 HOURS PRIOR TO ANY REQUIRED CONSTRUCTION SPECIAL INSPECTIONS.
5. STATIONING AS SHOWN IS ON THE CENTERLINE OF THE WATER LINE UNLESS OTHERWISE NOTED.
6. ALL PAVEMENT REMOVALS SHALL BE SAW CUT TO A NEAT VERTICAL LINE AS DIRECTED BY THE ENGINEER.
7. SEPARATION OF WATER AND SEWER LINES SHALL BE IN ACCORDANCE WITH VENTURA COUNTY ORDINANCE AS ADOPTED BY THE CITY OF CAMARILLO COUNCIL AND DRAWING NOS. W-2.
8. FOR SEPARATION OF ALL CROSSING OF SEWER AND WATER MAINS, SEE SEWER AND WATER PLANS FOR LOCATION.
9. WATER LATERALS SHALL BE PLACED 5 FEET UPSTREAM OF THE CENTERLINE OF EACH LOT WITH A MINIMUM CLEARANCE OF 10 FEET FROM THE SEWER LATERALS IN EVERY CASE.
10. WATER MAIN CROSSING BELOW STORM DRAINS SHALL BE IN ACCORDANCE WITH CITY OF CAMARILLO WATER DIVISION DRAWING NO. W-45 OR DRAWING NO. W-46, OR AS APPROVED BY CITY ENGINEER.
11. MINIMUM COVER OF 42" SHALL BE MAINTAINED FOR ALL MAIN LINES UNLESS OTHERWISE SPECIFIED ON APPROVED PLANS.
12. ALL WATER METERS, APPURTENANCES, AND FIRE HYDRANTS SHALL BE CONSTRUCTED PER STANDARD DRAWING NO. W-3 THROUGH W-31. WATER METER AND FIRE HYDRANTS SHALL BE PLACED PER STANDARD DRAWING W-7, W-8, W-11, W-12 AND W-13.
13. THRUST BLOCKS SHALL BE INSTALLED FOR ALL WATER SERVICE FITTINGS IN ACCORDANCE WITH PLATES W-3, W-4, W-7, W-18, W-26, W-38, W-47 THROUGH W-50, AND SIZED AS SPECIFIED BY THE DESIGN ENGINEER.
14. SERVICE LATERALS SHALL BE A MINIMUM OF 1" PER DRAWING NO. W-11.
15. ALL COPPER PIPE SHALL BE COVERED WITH 6 MIL PLASTIC SLEEVING WITH ENDS SEALED WITH 10 MIL TAPE. PLASTIC SLEEVING SHALL BE SPECIALTY PRODUCT P-3015 FOR 3/4" AND 1" PIPE, AND P-3016 FOR 2" AND 2 1/2" PIPE OR APPROVED EQUAL.
16. CATHODIC PROTECTION SHALL BE INSTALLED ON ALL COPPER PIPE FOR METER SERVICES, AIR VACS AND BLOW OFFS. CATHODIC PROTECTION SHALL BE A 9 LB., 5"x 18" HIGH POTENTIAL MAGNESIUM ANODE ATTACHED WITH BRONZE CLAMP - MAXMAG 9D3GG OR APPROVED EQUAL.
17. MINIMUM COVER OF 30" SHALL BE MAINTAINED FOR ALL SERVICE CONNECTIONS.
18. ALL SADDLES WILL BE DOUBLE-STRAPPED (BRONZE) FORD MODEL 202BS OR EQUAL.
19. LOCATIONS OF ALL WATER SERVICES SHALL BE MARKED ON FACE OF CURB WITH THE LETTER "W" INSCRIBED 3" HIGH AND 3/16" DEEP IN A UNIFORM AND NEAT MANNER.
20. ALL WATER LINES SHALL BE STUBBED OUT TO PROPERTY LINES PRIOR TO THE INSTALLATION OF CURB, GUTTERS OR SIDEWALKS.

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JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		GENERAL WATER PLAN NOTES	DWG. NO. W-62
REV.	DATE	BY	REVIEWED: <i>[Signature]</i> WATER SUPERINTENDENT			FILED
			APPROVED: <i>[Signature]</i> CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			SHT <u>1</u> OF <u>3</u>



City Of Camarillo

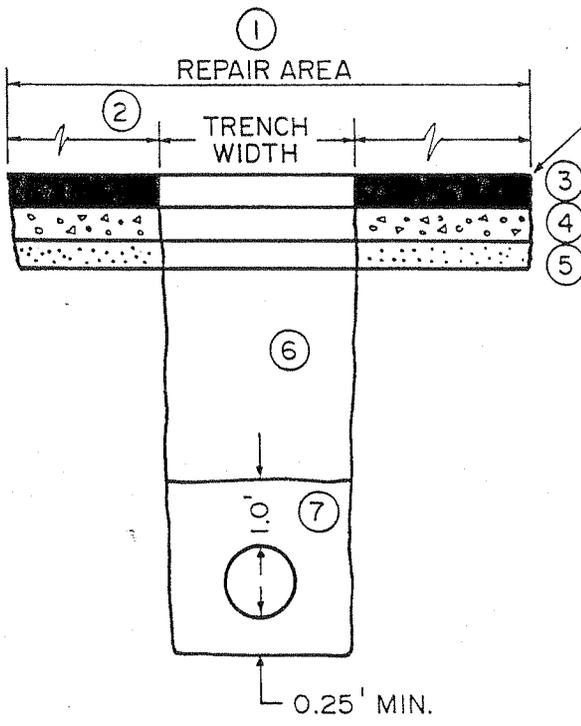
GENERAL WATER PLAN NOTES

CONTINUATION

21. BACKFILL SHALL BE GOVERNED BY SECTION 306.1.3.3 OF THE 1997 STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION. COMPACTION WORK SHALL NOT DISTURB ADJACENT STREET STRUCTURAL SECTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES.
22. ALL VALVES SHALL BE STACKED WITH 8 INCHES OF NON-CORROSIVE MATERIALS AND TOPPED WITH A CHRISTY PRODUCT MODEL G-3 VALVE BOX MARKED "WATER."
23. APPROVAL OF BACTERIOLOGICAL SAMPLES MUST BE OBTAINED PRIOR TO TYING INTO THE EXISTING WATER SYSTEM. THE CITY OF CAMARILLO WILL OBTAIN ALL SAMPLES AND SEND THEM TO A LAB FOR TESTING. THE CONTRACTOR / DEVELOPER WILL PAY FOR ALL BACTERIOLOGICAL TESTING. EACH BACTERIOLOGICAL TEST REQUIRES A MINIMUM OF 48 HOURS.
24. ALL WATER LINES SHALL BE CHLORINATED AND PRESSURE TESTED TO MEET WATER DIVISION REQUIREMENTS AS FAR AS LEAKAGE PRIOR TO TYING INTO EXISTING SYSTEM.
25. NEW WATER MAINS WILL BE CHLORINATED AFTER THE LINE HAS BEEN THOROUGHLY FLUSHED. NO CONNECTION SHALL BE MADE TO THE EXISTING WATER MAIN UNTIL THE NEW PIPE HAS BEEN SUCCESSFULLY PRESSURE TESTED, CHLORINATED, FLUSHED (TO REDUCE CHLORINE TO SYSTEM RESIDUAL), AND PASSED COLIFORM BACTERIA EXAMINATION.
26. WATER SYSTEM SHALL BE FLUSHED UNDER THE DIRECTION OF THE WATER INSPECTOR AND SHALL NOT BE LEFT UNATTENDED DURING FLUSHING OPERATIONS.
27. THE HYDROSTATIC PRESSURE TEST WILL BE 225 psi BETWEEN VALVES FOR ONE HOUR AND LEAKAGE TEST WILL BE 150 psi FOR FOUR HOURS.
28. CONTRACTOR SHALL KEEP A STRICT RECORD OF ALL VALVES, TEES AND LATERAL STUBS TO BE SUBMITTED TO THE ENGINEER TO PREPARE "AS BUILT" PLANS PRIOR TO FINAL ACCEPTANCE OF IMPROVEMENTS.
29. POT HOLE (EXPOSE) PIPING AT ALL JOINT POINTS WITH EXISTING, TO VERIFY LOCATION AND ALIGNMENT BOTH VERTICAL AND HORIZONTAL PRIOR TO JOINING WITH EXISTING WATER.
30. BEDDING SHALL BE GOVERNED BY STANDARD SECTION 306-1.2.1 OF THE 1997 STANDARD SPECIFICATION FOR PUBLIC WORKS CONSTRUCTION AND SHALL BE FREE-DRAINING GRANULAR MATERIAL HAVING A SAND EQUIVALENT OF OR NOT LESS THAN 30.
31. ALL GATE VALVES TO BE RESILIENT SEATED (RW) TYPE CONSTRUCTION AND SHALL MEET THE REQUIREMENTS OF THE CITY OF CAMARILLO; ACCEPTABLE VALVES ARE: AMERICAN FLOW CONTROL, CLOW, AVK AND THOSE WHICH ARE EQUAL, HAVE FULL SIZE UNOBSTRUCTED WATER WAY AND THE VALVE GATE IS FULLY ENCAPSULATED WITH RUBBER.
32. FITTING SHALL MEET THE REQUIREMENT OF AWWA C-110/A21.10; CEMENT MORTAR LINING SHALL BE IN ACCORDANCE WITH AWWA C-104/A21.4.
33. WATER MAIN LOCATION IN ROAD OR STREET. THE CENTERLINE OF THE WATER MAIN SHALL BE LOCATED IN PUBLIC STREETS PARALLEL TO AND FIVE FEET NORTH OR WEST OF THE STREET CENTERLINE.
34. LOCATION WIRE - INSTALL AN 8-GAUGE INSULATED LOCATION WIRE AFFIXED TO THE TOP OF THE NON-METALLIC WATER PIPE PER DRAWING NO. W-38.

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JULY 2005			CITY OF CAMARILLO PUBLIC WORKS DEPT.		GENERAL WATER PLAN NOTES (CONTINUATION)	DWG. NO. W-62
REV.	DATE	BY	REVIEWED:			FILED
			WATER SUPERINTENDENT			
			APPROVED:			SHT <u>2</u> OF <u>3</u>
			CITY ENGINEER R.C.E. 50878 EXPIRES 9/30/2005			



Existing Asphaltic Concrete (A.C.)

STRUCTURAL SECTION

- ① Repair area to be cold planed 1 1/2" deep and 18" wide beyond & including trench excavation; Alternate if approved by inspector - Saw cut and remove 18" each side of trench.
- ② Asphalt to be protected in place beyond repair area on both sides.
- ③ Replace Asphaltic Concrete (A.C.) 1" greater than existing; minimum 4" in two lifts. Tack coat and Petrotac or Petromat required.
- ④ Aggregate Base (A-B) match existing - min. 6" Class II A-B, 95% Compaction.
- ⑤ The top 6" of subgrade to be compacted to 95% relative compaction.
- ⑥ Trench backfill to be native material or import soil (if native is unsuitable) 90% relative compaction. A minimum of the top two feet to be filled with a two sack cement sand slurry.
- ⑦ Pipe bedding and pipe zone backfill per utility owner's and/or City specifications.
 - a. Remove soft, spongy, unsuitable material per Soils Engineer or Inspector.
 - b. Backfill with granular material (i.e. fill sand) > SE 75.
 - c. Method of compaction shall be reviewed by the Inspector.
 - d. Compaction tests required unless waived by Engineer. Test method, location and frequency shall be reviewed by Inspector and Soils Engineer.

MAXIMUM LIFTS

- a. Mechanical Compaction
 - Hydrohammer 3.00'
 - Vibratory Plate 0.50'
 - Rolling Stock 0.50'
 - Hand Tamper 0.33'
- b. Hydraulic Densification
(Only when approved by Inspector)
 - Jetting under pressure 5.00'

Note: Bedding must be free draining if fill is not.

REV.	DATE	BY	CITY OF CAMARILLO ENGINEERING DIVISION		UTILITY TRENCH WITHIN PAVEMENT	DRWG. NO.
B	10/97	SM	DRAWN BY RN	DATE 6/86		FILED
C	11/99	SM	CHECKED BY SM	SCALE N.T.S.		SHT 1 OF 1
			APPD. BY <i>Daniel W. Greeley</i>	10/23/97		
			DIRECTOR OF ENGINEERING SERVICES		DATE	