ANAHEIM
PUBLIC UTILITIES

WATER SERVICES
STANDARD SPECIFICATIONS

JULY 2021

CITY OF ANAHEIM
PUBLIC UTILITIES DEPARTMENT
Water Engineering Division

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CITY OF ANAHEIM

PUBLIC UTILITIES DEPARTMENT
WATER SERVICES

STANDARD SPECIFICATIONS FOR CONSTRUCTION OF WATER SYSTEMS

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INTRODUCTION

These Standard Specifications are to be used as a guide by Private Engineers and Contractors in the design and installation of additions or modifications to the City of Anaheim's Public Water System.

It is the intent that these Standard Specifications will provide uniformity in materials and installation of piping, valves, fire hydrants, service laterals and other appurtenant equipment. The Standard Specifications will also provide for construction methods and controls to be used by Contractors to construct, pressure test, chlorinate and place into service domestic and recycled water systems in the City of Anaheim.

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SECTION 1 GENERAL PROVISIONS

1-01 PLANS AND SPECIFICATIONS

Construction of all water system improvements intended to be dedicated to the City of Anaheim's Public Water System will be governed by plans and specifications approved by the Utility. All plans and specifications must be prepared by, or under the supervision of a current registered civil engineer licensed to practice in the State of California. All work shall be subject to fees as provided for in the City's Water Rates, Rules and Regulations and shall be inspected by the Utility to ensure conformity to these specifications.

In cases of conflict of information, the following documents will have precedence in the order listed:

1. Permits and licenses from affected agencies issued for the improvements.

2. Special provisions for the improvements.

3. Construction plans for the improvements.

4. City of Anaheim Public Utilities Department Water Services Standard Specifications (WSSS).

5. Latest edition of Standard Specifications for Public Works Construction (SSPWC), "Green Book" adopted by City of Anaheim.

6. Manufacturer's recommendations of product use and installation.

Conflicts and discrepancies noted by the Contractor shall be brought to the attention of the Utility. The Utility will review the conflicts or discrepancies and determine the appropriate course of action to follow, if any. Unless otherwise determined by the Engineer, the most stringent/restricted condition shall govern over all. Contractor/Developer shall check with zoning code and/or local ordinances for special requirements and color schemes on all above ground facilities.

Provisions of reference specifications noted in these specifications and plans shall have the same effect as if written herein, unless expressly modified by these specifications. Any reference specification in the absence of designation to the contrary, shall be understood to refer to the latest revision at the time of the beginning of work.

1-02 DEFINITIONS

Whenever the following terms or corresponding pronouns are used in these specifications or plans, the intent and meaning shall be interpreted as follows:

a. City:	The City of Anaheim, California.
b. Engineer:	The City Engineer or his authorized representative.
c. Utility:	The General Manager, Public Utilities Department, City of Anaheim or his authorized representative.
d. Developer:	The person or organization having legal responsibility for construction of water systems in conjunction with development of property.
e. Contractor:	The agent of the developer or independent contractor who furnishes labor, material, equipment, method, etc. to perform the requirements of these specifications in the construction of water systems.
f. Private Engineer:	The agent of the developer or independent engineer who has responsibility for the design and drawing of construction documents.
g. Or approved equal:	An equivalent product to that specified in these standard specifications, approved by the Utility before beginning of construction. No approved equal product is intended, unless so stated in these standard specifications.
h. Construction Plans:	The words “Construction Plans” or “Plans” or “Drawings” or “Contract Drawings” shall mean those drawings accompanying the specifications which show the location, nature, extent and form of the work, together with applicable details.

1-03 ABBREVIATIONS

Whenever the following abbreviations are used in these specifications, the meaning shall be interpreted as follows:

ANSI:	American National Standards Institute
ASTM:	American Society for Testing and Materials
AWWA:	American Water Works Association
CAL-OSHA:	California Occupational Safety and Health Administration
CBC:	California Building Code
CFC:	California Fire Code
CPC:	California Plumbing Code
DIPRA:	Ductile Iron Pipe Research Association
MS4:	Municipal Separate Storm Sewer System
NFPA:	National Fire Protection Association
NSF:	National Sanitation Foundation
RCP:	Right-of-Way Construction Permit (City of Anaheim Public Works Department)
SCAQMD:	South Coast Air Quality Management District
SSPC:	Steel Structures Painting Council
SSPWC:	Standard Specifications for Public Works Construction (Green Book) - Latest Edition
SSS:	Standard Specifications Supplement to the SSPWC (City of Anaheim Public Works Department)
UL:	Underwriters Laboratories
WSSS:	Water Services Standard Specifications (Anaheim Public Utilities Department)

SECTION 2 MATERIALS

2-00 GENERAL

All materials and equipment installed in City of Anaheim's water system shall meet all state and federal standards, as well as standards developed by nationally recognized organizations such as AWWA, ANSI and NSF. In order to protect human health, all materials, chemicals, lubricants, and products in contact with drinking water shall be tested and certified as meeting NSF/ANSI standard 60 (Drinking Water Treatment Chemicals-Health Effects) and ANSI/NSF Standard 61 (Drinking Water System Components- Health Effects).

In addition, all materials coming in contact with potable water shall be lead-free per California Health & Safety Code Section 116875. All materials are required to be certified as lead-free by NSF or other ANSI accredited certifier per SB 1334.

2-00.01 PROTECTION OF METAL SURFACES

All buried metal surfaces including bolts, nuts, flanges, restraining devices, couplings and other appurtenances in contact with the earth and backfill materials shall be coated with a minimum 30 mils of JS160H Mastic manufactured by Protecto Wrap Co., 30 mils of Bituminous Mastic 50-HT by Utility Coating Company, or approved equal.

Valves and fittings shall only require coating on bolts, nuts, and flanged or mechanical joint end connections.

In addition to the bituminous coating, all metal surfaces shall be encased in 8 mil polyethylene protective wrapping and tape wrapped to the pipe barrel in accordance with AWWA C105 and Sections 2-01.04 and 3-11.03.

2-00.01.1 CORROSIVE SOIL PROTECTION

For all construction east of the State Highway 55 and Tustin Avenue or other areas where corrosive soil is determined to be present by the Utility, in lieu of bitumastic coating, all buried metal surfaces including bolts, nuts, flanges, restraining devices, couplings and other appurtenances in contact with the earth and backfill materials shall be coated with a layer of Trenton Wax-Tape® Primer then wrapped with Trenton #1 Wax-Tape® and Trenton Poly-Ply™ outerwrap manufactured by The Trenton Corporation, Densyl Tape manufactured by Denso, Inc., or approved equal. Wax tape system shall be in accordance with AWWA C217.

Valves and fittings shall only require wax tape system on bolts, nuts, and flanged or mechanical joint end connections.

In addition to the wax tape system, all metal surfaces shall be encased in 8 mil polyethylene protective wrapping and tape wrapped to the

pipe barrel in accordance with AWWA C105 and Sections 2-01.04 and 3-11.03.

2-00.02 RECYCLED WATER FACILITIES

When recycled water facilities are permitted by the Utility, recycled water piping, valves, fittings, service laterals, meters, meter boxes, and other appurtenances shall be installed in accordance with the approved materials and construction methods outlined in these specifications and in accordance with industry standards, unless otherwise specified on the plans or elsewhere in these Specifications and Standard Drawings.

When available from manufacturer, materials for recycled water facilities shall be purple in color.

2-01 DUCTILE IRON PIPE

2-01.01 GENERAL

Ductile iron pipe shall conform to the requirements of AWWA Standard C151. Unless otherwise specified, size four-inch (4") through twelve-inch (12") shall be Thickness Class 52. Pipes larger than twelve-inch (12") shall be Thickness Class 51. Above ground pipe shall be Thickness Class 53.

Special order pipe sizes, such as ten-inch (10") and fourteen-inch (14"), are not allowed unless otherwise authorized by Utility.

2-01.02 PIPE JOINTS

Ductile iron pipe shall be furnished in eighteen-foot (18') or twenty-foot (20') nominal laying lengths and shall have a push-on joint employing a single rubber gasket in accordance with AWWA Standard C111, (TYTON JOINT® as manufactured by U.S. Pipe, Fastite Joint by AMERICAN Pipe, or approved equal). Push-on joints shall be restrained in accordance with the requirements of Section 2-12.02, unless otherwise indicated on the Drawings. Deflection at joints shall not exceed 4 degrees or 80% of the manufacturer’s recommendation, whichever is less.

Above ground or exposed pipe joints shall be flanged or as indicated on the construction plans.

2-01.03 COATING AND LINING

All ductile iron pipe shall have the interior cement-mortar lined (double thickness-sizes 4” to 24”) with a seal coat in accordance with AWWA Standard C104.

The exterior of ductile iron pipe and fittings shall be coated with a layer of arc-sprayed zinc per ISO 8179. The mass of the zinc applied shall be a minimum of 130 g/m^2 of pipe surface area. A finished layer of asphaltic topcoat per AWWA

Standard C151 shall be applied to the zinc. The coating system shall conform in every respect to ISO 8179-1 “Ductile iron pipes, fittings, accessories and their joints – External zinc-based coating – Part 1: Metallic zinc with finishing layer.”

2-01.04 POLYETHYLENE PROTECTIVE WRAPPING

All ductile iron pipe, pipe fittings, and valves shall be encased with Polyethylene Protective Wrapping that contains both an anti-microbial biocide and a corrosion inhibitor.

Polyethylene protective wrapping (“Polywrap”) shall conform to the requirements of ANSI/AWWA C105/A21.5 and be eight (8) mils thick tubing of virgin polyethylene or four (4) mil thick high-density, cross-laminated (HDCL) polyethylene. The color shall be (a) natural (where exposure to sunlight is limited) or (b) white or black in color. In addition, polyethylene wrap shall be in three layers of co-extruded polyethylene fused into a single layer. The inside surface to be in contact with the pipe exterior shall be infused with a blend of an anti-microbial biocide to mitigate microbiological influenced corrosion and a volatile corrosion inhibitor to control galvanic corrosion. The tubing shall be marked with legible print denoting the conformance to ANSI/AWWA C105 and presence of enhanced additives.

Tubing shall be installed in accordance with AWWA C600 and taped and secured with general purpose polyethylene tape, 2 inches wide and 10 mils thick (Scotchrap™ 50, Protecto Wrap 200, Polyken 900, or approved equal).

2-02 SPECIAL APPLICATIONS USING POLYVINYL CHLORIDE PIPE

2-02.01 GENERAL

Polyvinyl Chlorine pipe shall conform to the requirements of AWWA Standard C900 “Polyvinyl Chloride (PVC) Pressure Pipe”, Pressure Class 305 (DR 14), or AWWA Standard C909 “Molecularly Oriented Polyvinyl Chlorine (PVCO) Pressure Pipe”, Pressure Class 305. Unless otherwise specified, PVC or PVCO pipe shall only be used for pipe sizes four-inch (4") through twelve-inch (12"). PVC or PVCO pipe for pipes larger than twelve-inch (12") shall not be allowed. The use of PVC or PVCO pipe requires special approval by the Utility.

All PVC and PVCO pipe shall be furnished in twenty-foot (20') nominal laying lengths and shall be colored blue or white. Tracer wire and warning tape are required on all PVC and PVCO installations per Sections 2-02.05 and 3-06.

PVC and PVCO pipe shall be legible and permanently marked in ink with the following information:

- Manufacturer and Trade Name
- Nominal Size and DR Rating/Pressure Class
- Hydrostatic Proof Test Pressure
- [NSF-61]
- Manufacturing Date Code

2-02.02 PIPE JOINTS

PVC (C900) pipe joints shall be restrained using a restrained joint pipe system with bell-end push-on joints per Section 2-02.02.1 or installed with beveled plain ends and restrained couplings per Section 2-02.02.2.

PVCO (C909) pipe joints shall be installed with beveled plain ends and restrained couplings in accordance per Section 2-02.02.2.

2-02.02.1 RESTRAINED JOINT PIPE SYSTEMS FOR PVC (C900)

Approved restrained joint PVC (C900) pipe systems are Certa-Lok® C900/RJ or C900/RJIB system manufactured by NAPCO, Eagle Loc 900 manufactured by JM Eagle, Diamond Lok-21® by Diamond Plastics, or approved equal. Restrained joint PVC pipe systems shall conform to the requirements of Section 2-02.01.

2-02.02.2 RESTRAINED COUPLINGS FOR BEVELED PLAIN END PVC (C900) AND PVCO (C909) PIPE

PVC (C900) and PVCO (C909) pipe with beveled plain ends shall be restrained with ductile iron solid sleeves per Section 2-09.01 and mechanical joint restraints per Section 2-12.01, ALPHA™ restrained couplings manufactured by Romac Industries, Flex-Tite restrained couplings manufactured by RCT, or approved equal. A signed materials Certificate of Analysis shall be provided with the delivery of all RCT couplings.

2-02.03 FITTINGS

Main line PVC or PVCO pipe fittings shall be ductile iron fittings in accordance with Section 2-08 and the construction plans.

The cut off end of PVC or PVCO pipe shall be beveled prior to insertion into a mechanical joint fitting.

2-02.03.1 SELF-RESTRAINING FITTINGS

Self-restraining fittings shall be made of ductile iron pipe in accordance with ASTM A536 Grade 65-45-12. The fittings shall conform to ANSI/AWWA C153/A21.53 and shall have a minimum pressure rating of 350 PSI. The fittings shall be furnished with integral restraining gaskets. All gasket material shall meet ANSI/AWWA C111/A21.11. All gaskets material shall be SBR (Styrene Butadiene Rubber) and have NSF 61 approved compounds. The series of segments that are molded into the gasket shall be made of 316 or higher grade stainless steel. All self-restraining fittings shall be coated with protective fusion bonded epoxy coating for both exterior and interior surfaces in conformance with ANSI/AWWA C116/A21.16. The

fusion bonded epoxy coating material shall meet or exceed the requirements of NSF/ANSI 61.

Approved self-restraining fittings for PVC and PVCO pipes, 4-inch through 12-inch sizes, shall be Flex-Tite fittings as manufactured by RCT, or approved equal. A signed materials Certificate of Analysis shall be provided with the delivery of all RCT couplings.

2-02.04 INSTALLATION CURVATURE

Where the pipeline is to be installed in a curved alignment, the radius of curvature and specific alignment shall be as shown on the plans and shall be accomplished by means of deflecting the pipeline at the joints with couplings. Couplings used in a curved alignment shall be Flex-Tite restrained couplings manufactured by RCT, ALPHA™ restrained joint coupling manufactured by Romac Industries, Inc., or approved equal. A signed materials Certificate of Analysis shall be provided with the delivery of all RCT couplings.

Deflection at joints shall not exceed 4 degrees or 80% of the manufacturer's recommendation, whichever is less. Bending of PVC or PVCO pipe is not allowed.

2-02.05 TRACER WIRE AND WARNING TAPE

Tracer wire shall be #10 AWG copper-clad steel (CCS) rated at 30 volts with a minimum 600-pound break load, and shall be insulated with 30 mil HDPE. Color shall be blue. Approved tracer wire is Copperhead Industries High Strength 1030 CCS Tracer Wire. Connectors for tracer wire shall be Copperhead Industries Snakebite™ Locking Connector for #10 AWG or approved equal.

Tracer wire access boxes wire shall be installed within the concrete pad around nearby fire hydrants and may be required at additional locations if directed by the Utility. Access box shall have a magnetic base and cast iron collar suitable for incidental traffic loads. Lid color shall be blue. Approved access box is Copperhead Industries SnakePit® Concrete/Driveway Access Point or approved equal.

Warning/identification shall be installed 12 inches above PVC and PVCO pipe and tracer wire installations. Tape shall be 6 inches wide, blue in color and marked "Caution Water Line Below".

2-03 COPPER TUBING

2-03.01 GENERAL

This specification shall cover the requirements for 1-inch and 2-inch seamless, annealed, Type "K", copper water tube. Copper tubing shall meet the requirements of ASTM B-88, "Specifications for Seamless Copper Water Tube". The 2-inch copper water tube shall be of rigid or flexible type. Copper tubing shall comply with CA Health and Safety – Section 116875 (low lead).

2-03.02 DIMENSIONS

Copper tubing shall be furnished in coils or straight lengths, as follows:

SIZE	FORM	LENGTH
1" & 2"	Coils	60' to 100'
2"	Straight Lengths (rigid)	20'

Coils shall be wound in a single layer flat with a minimum 24-inch inside diameter.

2-03.03 TEMPER

Copper tubing shall be furnished in the annealed condition in accordance with the technical property requirements of ASTM B-88. Straight lengths shall be annealed after being drawn.

2-04 RED BRASS PIPE

Brass pipe shall conform to the requirements of the “Specifications for Seamless Red Brass Pipe, Standard Sizes” ASTM Specification B-43 and referenced in the appendix to AWWA Standard C800.

Fittings shall be of bronze conforming to the requirements of ASTM B-62, “Specifications for Composition Bronze or Ounce Metal Castings”.

2-05 MAIN LINE VALVES

2-05.01 GATE VALVES

Gate valves shall be ductile iron body, fusion bonded epoxy lined, non-rising stem fully encapsulated resilient wedge disc type and shall not have more than two internal moving parts. All gate valves shall open by turning the wrench nut counter-clockwise.

When required, above ground installations shall be resilient seat/wedge disc type valves with outside screw and yoke.

All bronze parts shall contain no more than 7% zinc, nor more than 2% aluminum.

Stems shall be low zinc bronze. Valves shall have 2-inch operating (wrench) nut conforming to AWWA C509 or C515. The valve manufacturer shall employ a positive physical means of indicating the specified stem material to ensure ready recognition during inspection.

The bolts and nuts on the bonnet shall be stainless steel type 304 or 316 with an anti-seize lubricant. All gate valves shall have a minimum of 6 bonnet bolts.

The ductile iron interior and exterior of all valves shall be protected with 6 to 7 mils (nominal) fusion bonded epoxy. Coating shall conform to AWWA Standard C213 and C550, and shall be certified to NSF 61.

For above ground or vault installation, exterior coating to valves shall be per Section 2-14 for coating on above ground or vault installation.

Resilient wedge type valves with a flanged end may be used as “tapping valves”.

All valves shall be provided with an epoxy coated stem extension if depth of valve nut exceeds 4 feet. All valve extensions shall be centered in the valve well by use of a guide and shall operate freely without binding after installation.

Gate valves 12” and below shall conform to the requirements of AWWA Standard C509 Resilient-Seated Gate Valves. Gate valves over 12” in size shall conform to the requirements of AWWA Standard C515 Reduced-Wall, Resilient Seated Gate Valves.

All gate valves shall be ductile-iron body equipped with double O-ring stem seals. All gate valves shall have EPDM O-rings, and stainless steel bolts.

2-05.01.1 APPROVED GATE VALVE MANUFACTURERS

SIZES 3" TO 12":	
Clow	Model 2639
M&H	Style 4067
Mueller	Model A-2362-E381
U.S. Pipe	Model A-USP2-E381

SIZES GREATER THAN 12":	
AMERICAN Flow Control	Series 2500
Clow	Model 2638
M&H	Style 7000
Mueller	A-2361-E381
U.S. Pipe	Model A-USP1-E381

2-05.02 BUTTERFLY VALVES

Butterfly valves shall conform to the requirements of AWWA Standard C504. Valves shall have a minimum working differential pressure across the valve disc of 150 psi for class 150B valves and 250 psi for class 250B valves. Valves shall be flanged short-body or restrained mechanical joint as indicated per the construction plans. Flanges for both Valve Class 150B and 250B shall be drilled per ANSI B16.1, 125-pound standard bolt pattern. Valves shall be designed for buried installation.

COMPONENT	MATERIAL	SPECIFICATIONS
Body	Ductile Iron	ASTM A-536, Grade 65-45-12
Valve Shaft	Stainless Steel	Type 316 or 17-4 (14" or larger)
Exposed body, cap screws, bolts and nuts including squeeze-pins	Stainless Steel	ASTM A-276, Type 316
Disc	Ductile Iron	ASTM A-536, Grade 65-45-12
Valve Seat	EPDM Rubber	ASTM D-412
O-Rings	EPDM Rubber	ASTM D-2000

Valve seat material shall be peroxide cured EPDM rubber seat and shall be fastened integrally with the valve body. The valve disc shall be furnished with a stainless steel seating edge to mate with the rubber seat in the valve body. Valves with the seat located on the disc shall not be accepted.

The ductile iron interior and exterior shall be factory coated with NSF 61 approved 16 mils DFT high solids 2 part epoxy of not less than 65% conforming to AWWA standard C550 (Amerlock® 400, Tnemec 141, or approved equal).

Valve operators shall be the manual type. Valve actuator shall be supplied and installed on the valve by the valve manufacturer. Gear actuators shall be for buried service applications and shall come furnished with a standard 2” AWWA operating nut. Operating nut for butterfly valves shall be placed at the north or east side of the water line. The operators shall be of travelling nut type with adjustable stops for valves smaller than 24” in size. The operator for valves 24” and larger shall be worm gear type. The actuator shall be capable of withstanding 300 ft-lb (for worm gear) and 450 ft-lb (for travel nut gear) at the stops. The actuator shall be sized for bi-directional maximum pressures and flow rate per AWWA valve classification 150B (250B when specified). All external bolts on the actuator shall be 316 stainless steel. The operator shall be of the size required for opening and closing the valve in accordance with AWWA C-504. All valve operators shall be factory packed with grease, fully gasketed and sealed for permanent installation and operation.

Factory signed and dated affidavit of compliance shall accompany all submittals. Affidavits shall include “holiday free” paint, actuator stops compliance of 450 foot pounds, proof of design per AWWA C504 latest version for valves and actuator, and bi-directional seat leak test. Signatures of agents or distributors of the factory will not be accepted.

All valves shall be seat leak tested at the rated pressure in both directions by the valve manufacturer and shall be witnessed by an authorized City agent. The valves shall be tested within 30 miles of City limits and shall be tested with the valve flanges in the vertical direction (the same orientation as the installation orientation). The seat leakage test shall be performed in compliance with AWWA C504 latest edition. Signed and dated records of compliance shall be provided to the City. Any valves which might fail to meet the seat leak test shall be expeditiously and professionally remedied at the valve manufacturer’s expense.

All subsequent re-testing for City witness leak testing approval shall be the responsibility of the manufacturer. Should the City deem that re-testing becomes excessive, the City shall reserve the right to require manufacturer reimbursement for its agents costs associated with the re-testing.

2-05.02.1 APPROVED BUTTERFLY VALVE MANUFACTURERS

DeZurik	BAW (AWWA Butterfly Valves)
Mueller	Lineseal XPII
Pratt	HP 250II

2-05.03 END CONNECTIONS AND GASKET MATERIAL

Valves shall have mechanical joints or flanged ends, or a combination of both. Gaskets shall conform to the requirements of Section 2-08.03 of these specifications. All gasket materials shall have NSF 61 approval.

Unless otherwise shown on plans, all valves installed at fittings shall be flanged by mechanical ends, with the flange abutting the fitting.

2-06 AIR AND VACUUM, AIR RELEASE AND COMBINATION AIR VALVES

Air and Vacuum, Air Release and Combination Air Valves shall conform to the performance criteria of AWWA C512 and be designed for a minimum working pressure of 150 psi, unless otherwise specified. Float, linkage and all internal parts shall be 316 stainless steel. All air valves shall be NSF 61 approved. Valves shall be APCO by DeZurik, Crispin by Multiplex Manufacturing Company, AirPro Max® by Pratt, Cla-Val, A.R.I., or approved equal.

	AIR/VACUUM	AIR RELEASE	COMBINATION AIR
APCO	Series 140	Model 50/200A	Series 140C
Cla-Val	Series 35	Series 34	Series 36
Crispin	AL Series	Series AR/PL	Series UL
Pratt	Series WAV	Series WAR	Series WCV
A.R.I.	D-040-C	S-050-C	D-040-C/D-060-C
A.R.I. (when not exposed to sunlight)	D-040	S-050	D-040/D-060

2-07 FIRE HYDRANTS

2-07.01 GENERAL

Fire hydrants shall be of the wet-barrel type, epoxy lined, ductile iron body, conforming to AWWA C503, and as supplemented herein. A break-off check valve shall be installed with all fire hydrants.

2-07.02 MATERIALS AND PARTS

Fire hydrants shall have two 2 1/2-inch hose outlets and one 4-inch pumper outlet. Outlet threads shall conform to ANSI-B26 “National Standard Fire-Hose Coupling Screw Threads”.

Fire hydrants shall be furnished with a pentagon shaped operating nut 1-1/8 inch per side, and opening shall be counterclockwise. Fire hydrants shall be furnished with flange bolts and break-off check valves.

Fire hydrants shall be equipped with plastic outlet nozzle caps attached to the body of the fire hydrant with non-kinking electro-galvanized steel chains and fitted with appropriate neoprene rubber gaskets.

All fire hydrant burys shall be ductile iron, asphalt coated and cement lined. Fire hydrant burys shall be provided with a Mechanical Joint-end at the shoe.

Wet barrel type fire hydrants shall have a nominal six-inch (6") base flange with a six-hole bolt pattern. All internal working parts, including stem, shall be bronze containing no more than seven percent (7%) zinc or two percent (2%) aluminum or 316 stainless steel. The inside of the Ductile Iron body shall be epoxy lined.

2-07.03 APPROVED FIRE HYDRANT MANUFACTURERS

Clow	Model F-860
Jones	Triton® J-4060 DR

2-08 MAIN LINE PIPE FITTINGS

2-08.01 GENERAL

Main line pipe fittings shall conform to the requirements of AWWA Standard C110, “Ductile-Iron and Gray-Iron Fittings”. Compact type fittings conforming to AWWA Standard C153, "Ductile Iron Compact Fittings" may be used for sizes 4-inch through 24-inch.

All fittings shall be made of ductile iron. Fittings up to 24-inch size shall be 350 psi pressure ratings and over 24-inch size shall be 250 psi pressure rating. Fittings shall be cement mortar lined in accordance with AWWA Standard C104, “Cement Mortar Lining for Ductile-Iron Pipe and Fittings for Water”.

The exterior of fittings shall be zinc-coated with a topcoat of bituminous material in accordance with Section 2-01.03.

For construction east of the State Highway 55 and Tustin Avenue, all ductile iron fittings and sleeves shall be lined and coated with 8 mils of fusion bonded epoxy conforming to AWWA Standards C116 and C550, as manufactured by 3M or approved equal and shall receive additional protective coating and wrapping system per Section 2-00.01.1.

All fittings shall be restrained in accordance with Section 2-12.01 unless otherwise indicated on plans.

2-08.02 END CONNECTIONS

2-08.02.1 MECHANICAL JOINTS

Mechanical Joints shall conform to the requirements of AWWA Standard C111 “Rubber-Gasket Joint for Ductile Iron Pressure Pipe and Fittings”. Glands shall be made of ductile iron.

2-08.02.2 FLANGED FITTINGS

Flanged fittings shall conform to the requirements of AWWA Standard C110 or C153. Flanges shall be drilled to ANSI B16.1, 125 lb. standard bolt pattern. The 250 lb., F-Style flanges, when required, shall be drilled to ANSI B16.1, 250 lb. standard bolt pattern.

2-08.03 GASKETS

Gaskets for flanged fittings shall be 1/8-inch thick ring type Non-Asbestos type compressed fiber gaskets and NSF 61 certified. The synthetic fiber content shall be aramid, bonded by nitrile butadiene rubber (NBR) and have a non-stick coating. Allowable gasket is NAM 37C manufactured by Ferolite or approved equal. Gaskets shall meet the pressure ratings, drillings, and dimensional requirements as per Section 2-08.02.2 and shall conform to the requirements of AWWA C111 and ANSI B16.21.

When project plans require 350 psi rating, gaskets for flanged fittings shall be 1/8-inch thick full faced with a thickened and rounded bulb (torus) located at the inside diameter of the gasket. These gaskets shall conform to the dimensions shown in AWWA C115/A21.15, Table A.1 and shall match standard flange fittings with Class 125 standard flange bolts. Gaskets shall be made of high quality black vulcanized styrene butadiene rubber (SBR) and shall be NSF 61 certified. All joints shall be assembled dry where all joint/gasket compounds are prohibited. Allowable gaskets meeting these criteria are AMERICAN Toruseal Flange Gasket or approved equal.

2-08.04 BOLTS AND NUTS FOR MECHANICAL JOINTS AND FLANGED FITTINGS

All below grade bolts and nuts with the exception of valves shall be stainless steel 316 with fluoropolymer coated (Tripac 2000 or equal) nuts. Valve nuts and bolts shall be stainless steel 304 or 316 (per manufactured assembly) and shall be coated with Loctite® N-5000™ anti-seize/rust preventer lubricant manufactured by the Henkel Corporation or approved equal.

Stainless Steel nuts and bolts are required for above ground installations and shall be type 316. For all stainless steel nuts and bolts, the Contractor shall strictly follow the torque limitations and shall use Loctite® N-5000™ anti-

seize/rust preventer lubricant manufactured by the Henkel Corporation or approved equal.

All buried nuts and bolts shall be coated after assembly as per Section 2-00.01.

2-08.05 TAPPING SLEEVES

All tapping sleeves for tapping a water main under pressure shall conform to the following requirements. Tapping sleeves are not allowed on pipe sizes greater than 24-inch.

2-08.05.1 TAPPING SLEEVES FOR DUCTILE IRON, CAST IRON, ASBESTOS-CEMENT AND POLYVINYL CHLORIDE PIPES

Tapping sleeves used for ductile iron pipe (DIP), cast iron pipe (CIP), asbestos-cement (AC) pipe, or polyvinyl chloride (PVC or PVCO) pipe shall be of the mechanical joint type or the full circle stainless steel type. All tapping sleeves specified in this Section must withstand a 250 psi minimum working pressure and shall provide a positive seal around the pipe at each end of the sleeve. Tapping sleeves that seal only around the opening in the pipe may not be used. For working pressures above 250 psi, special approval must be obtained from the Utility.

Mechanical joint type tapping sleeves shall be made of ductile iron and conform to the requirements of AWWA Standard C110 “Ductile-Iron and Gray-Iron Fittings, 3-inch through 48-inch, for Water and Other Liquids” and AWWA Standard C111 “Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings”. All interior surfaces of ductile iron tapping sleeves shall be lined with a fusion bonded epoxy coating. Approved mechanical joint type tapping sleeves are listed in Section 2-08.05.1.1.

Stainless steel type tapping sleeves shall be made of 18-8 stainless steel, with a stainless steel flange piece conforming to the requirements of AWWA Standard C207 “Steel Pipe Flanges for Waterworks Service, Sizes 4 in. through 144 in.” Approved stainless steel type tapping sleeves are listed in Section 2-08.05.1.2. Size on size stainless steel type tapping sleeves are not permitted.

2-08.05.1.1 APPROVED MECHANICAL JOINT DUCTILE IRON TAPPING SLEEVE MANUFACTURERS

Mueller	Model H-615 (Used on DIP or CIP)
Mueller	Model H-619 (Used on AC Pipe)
Tyler Union	Mechanical Joint Tapping Sleeve

AMERICAN Flow Control Series 2800
Or approved equal

2-08.05.1.2 APPROVED FULL CIRCLE STAINLESS STEEL TAPPING SLEEVE MANUFACTURERS

Mueller	Model H-304SS
PowerSeal	Model 3490AS
JCM	Model 432
Romac	Style SST (up to 8" pipe diameter)
Ford	Style FTSS

Or approved equal

2-08.05.2 SPECIAL APPLICATIONS

Tapping sleeves for special applications, such as Belgian cast iron pipe, shall be of the full circle split body, stainless steel type as noted above in Section 2-08.05.1. In special cases, fabricated steel tapping sleeves can be used with approval from the Utility.

2-08.05.3 CONCRETE CYLINDER PIPE

At the sole discretion of the Utility, tapping sleeves for concrete cylinder pipe (CCP) may be required to be of the weld-on type, provided that pipe wall thickness is greater than 13 gauge and that welding is performed by a State certified pipe welder. Approved material listing is in Section 2-08.05.3.1.

For concrete cylinder pipe with a steel cylinder wall thickness of 13 gauge or thinner, the Utility may require a full circle, split body, fabricated steel type tapping sleeve, conforming to the provisions of Section 2-08.05.2 of these specifications. Approved material listing for use on CCP is in Section 2-08.05.3.2.

2-08.05.3.1 APPROVED TAPPING SLEEVE MANUFACTURERS FOR CONCRETE CYLINDER PIPE (WALL THICKNESS GREATER THAN 13 GAUGE)

Weld-On (Three-Piece) Type:

Koppl	Model CN-120 (full wrapper plate)
JCM	416 Type 2 (full wrap)
Smith-Blair	627 Type 2

Or approved equal

2-08.05.3.2 APPROVED TAPPING SLEEVE MANUFACTURERS FOR CONCRETE CYLINDER PIPE (WALL THICKNESS LESS THAN 13 GAUGE)

Full Circle Type:

JCM	Model 415
Smith-Blair	Model 625

Or approved equal

2-09 MAIN LINE COUPLINGS

2-09.01 SLEEVE TYPE COUPLINGS

Sleeve type couplings shall provide a flexible water tight connection between two plain ends as described when shown on the construction plans. For ductile iron, gray iron, PVC and PVCO pipe, all couplings shall be ductile iron solid sleeve type couplings conforming to AWWA C110 and Section 2-08, with mechanical joint ends and body not less than 12 inches long, and shall be lined and coated as described per Section 2-08.01.

For steel or asbestos cement pipe, all couplings shall be standard steel couplings, with body not less than 7 inches long. Bolts for exposed steel couplings shall be hot-dip galvanized. Bolts for buried steel couplings shall be of type 316 stainless steel. The Contractor shall strictly follow the torque limitations and shall use Loctite® N-5000™ anti-seize/rust preventer lubricant manufactured by the Henkel Corporation, or approved equal. All sleeve type steel couplings shall be fusion bonded epoxy lined and coated with Scotchkote™ 6233, as manufactured by 3M™, or approved equal.

Allowable gap between two pipe ends shall be provided per manufacturer's recommendations.

Buried metal surfaces shall receive additional protective coating and wrapping after they are assembled as per Section 2-00.01.

2-09.01.1 APPROVED SLEEVE TYPE COUPLINGS MANUFACTURERS FOR DUCTILE IRON, GRAY IRON, PVC AND PVCO PIPE

Clow	Mechanical Joint Ductile Iron Long Solid Sleeves
Ford	Ultra-Flex Long Sleeve Wide Range Couplings
Romac	ALPHA™ Restrained Coupling
SIP Industries	Ductile Iron Long MJ Sleeves
RCT	Flex-Tite Couplings (for PVC or PVCO pipe only)

Or approved equal

2-09.01.2 APPROVED FLEXIBLE COUPLING MANUFACTURERS FOR STEEL PIPE

Ford	Ultra-Flex Wide Range Couplings
Smith-Blair	411 Steel Couplings
Smith-Blair	461 Quantum Wide Range Couplings
Romac	Style XR501

Or approved equal

2-09.01.3 APPROVED FLEXIBLE COUPLING MANUFACTURERS FOR TRANSITION TO ASBESTOS CEMENT PIPE AND BELGIAN CAST IRON PIPE

Ford	Ultra-Flex Wide Range Couplings
Smith-Blair	441 OMNI Ductile Iron Couplings
Smith-Blair	461 Quantum Wide Range Couplings
Romac	MACRO HP™

Or approved equal

2-09.02 MECHANICAL GROOVED-TYPE COUPLINGS

Mechanical grooved-type couplings shall provide a positive thrust restraint by locking two grooved or shouldered ends of pipe together. The couplings shall be Style 77 for steel pipe and Style 31 for ductile iron pipe as manufactured by Victaulic Company, or approved equal. These couplings shall have Grade H rubber gaskets and the interior shall be lined with fusion bonded epoxy. Mechanical grooved-type couplings shall be used in above ground or vault installation only. Ductile iron pipe for Style 31 shall be Thickness Class 53.

2-09.03 DISMANTLING JOINTS

Dismantling joints shall be a self-contained flanged restrained joint fitting, including both flanged components and sufficient harness bars to withstand the imposed thrust. The dismantling joint shall be designed to provide no less than 5 inches of longitudinal adjustment and shall be installed with 4 inches of inward adjustment and 1 inch of expansion. The pressure rating will be determined by the flange configuration, and all commonly used flanges shall be available. As standard, flanges conforming to AWWA C207 class D shall be used.

The dismantling joint shall be furnished as a complete assembly consisting of spigot piece, flange adapter, tie bars and gasket.

The spigot piece and the flange adapter shall be steel per AISI C1010-C1015. All exterior fasteners including tie bars shall be 304 or 316 stainless steel. Stainless steel fasteners and tie bars shall not be painted. Gasket material shall be EPDM or Buna-S. The dismantling joint shall be coated inside and out with a fusion bonded Epoxy coating applied to a thickness of 5 -10 mils. The epoxy shall comply with the requirements of NSF 61 and AWWA C550.

The dismantling joint shall comply with AWWA C219 where applicable, and the manufacturer shall operate an accredited Quality Management System to ISO 9001. The design pressure rating shall be equal to or greater than the mating flanges. The gasket seal and compression stud and nut arrangement shall be separate and independent of the tie bar restraint system. Seals between companion flanges and dismantling joint flanges shall made by full faced or drop in ring-style gaskets. Tie bar diameter shall be equal to the corresponding bolt diameter of the mating flange and shall not extend outside the diameter of the flange diameter.

The dismantling joint shall be Dresser Industries Style 131, Romac Industries, Inc. Style DJ400, Smith Blair 900 Series, or approved equal.

2-09.04 FLANGE ADAPTERS

Flange adapters shall be fully restrained wedge activated type with a minimum working pressure of 250 psi and a safety factor of two. Outside and inside surfaces of flange adapters shall be epoxy coated.

Flange adapters shall be manufactured from ductile iron per ASTM A536 and shall have bolt circles and bolt holes to meet ANSI B16.1 Class 125 or Class 250 if required and shown on the plans. Flange adapters are approved only for above ground ductile iron pipe installations. Approved flange adapters are listed in Section 2-09.04.1.

2-09.04.1 APPROVED FLANGE ADAPTOR MANUFACTURERS

EBAA Iron, Inc.	Series 2100 MEGAFLANGE®
Ford	RFAD Restrained Flange Adaptor
Romac	RFCA Restrained Flange Coupling Adapter
Smith-Blair	Model 911

Or approved equal

2-10 SERVICE LATERAL INSTALLATION

2-10.01 GENERAL

All valves and fittings for use in the buried service line from the main to the meter setting appurtenance shall conform to the requirements of AWWA standard C800 “Underground Service Line Valves and Fitting” and meet the California Health and Safety Code section 116875. The wetted surfaces of pipes, pipe fittings, and valves shall not contain more than 0.25% lead by average weight. All corporation stops and angle meter valves used for copper installations shall have compression connection of copper tubing. Approved manufacturers, with the exception of corporation stops are Jones, Ford, Mueller, and A.Y. McDonald. Approved manufacturers of corporation stops are Mueller and Jones.

2-10.02 FITTINGS

2-10.02.1 CORPORATION STOPS

1-inch and 2-inch corporation stops shall be insulated ball corporation valves. Insulation (dielectric) material shall either be enclosed or fused together as a composite part that has metal threads on one end. Plastic insert threads are not allowed to be screwed to metal threads. Connection at main shall be AWWA tapered CC threads. Outlet shall be a compression connection for copper tube O.D. Approved corporation stops (both 1-inch and 2-inch) are Mueller N-35008N or Jones E-1999SG.

2-10.02.2 ANGLE METER VALVES

All angle meter valves shall be full port "ball" type, have a locking wing on the key operator, and with full 360-degree rotation of tee head. All valves for 5/8 x 3/4 inch and 1-inch meters shall have a compression connection inlet and a meter swivel nut outlet. All 2-inch valves shall have a compression connection inlet for 2-inch copper tubing and a meter flange outlet slotted to accommodate 1½-inch and 2-inch meters. Slot should not extend to the outside edge - open slot will not be accepted.

2-10.02.3 COUPLINGS AND SOLDER

Couplings required for 2-inch service laterals shall be made with copper tube fittings in accordance with ANSI B16.22. The annular clearance between the tube and fitting shall be .004 to .010 inches. Solder shall be 95/5 (tin-antimony) or an approved equal. Solder with a lead content of 0.2% or greater will not be accepted.

2-10.02.4 BOLTS AND NUTS FOR METER FLANGE CONNECTIONS

All bolts, nuts and washers for flanged fittings shall be Teflon coated, silicon-bronze per ASTM B98, or of an approved similar metal as the flanges, to resist corrosion and for easy removal after lengthy service.

2-10.03 SERVICE SADDLES

All service saddles shall be bronze conforming to ASTM B-62, double strap and tapped. 1-inch and 2-inch diameter service saddles and tap shall have AWWA tapered CC threads, as specified by AWWA Standard C800 "underground Service Line Valves and Fittings."

2-10.03.1 SERVICE TAPPING TO CONCRETE CYLINDER PIPES

Service tapping to concrete cylinder pipes shall only be made under special approval by the Utility. Unless specified otherwise, tapping shall be a minimum of 2-inch NPT with bushing, as needed. Service saddles shall be Smith-Blair 362, or approved equal.

2-10.03.2 SERVICE TAPPING TO PVC PIPE OR PVCO PIPE

For dry tapping 1" and 2" services on PVC or PVCO pipe, the hole shall be bored into the pipe with a hole saw that retains the coupon and allows the shavings to fall clear of the hole. When multiple taps are required, the taps shall be kept a minimum of 24" apart lengthwise and shall be staggered so that the minimum spacing along the same line is 48". The service saddle shall be centered over the hole, seated, and tightened, and then the corporation stop installed using pipe thread sealant.

2-10.04 METER BOXES

Meter boxes shall be straight wall polymer concrete having a compressive strength of 4000 psi. Meter boxes shall have a polymer concrete cover with a drop-in reading lid. The body of the meter box shall be constructed with a “ring” at the top to prevent settlement.

Where required, meter boxes shall have a traffic load rating. Meter boxes shall be manufactured by Armorcast Products Company or approved equal. Approved equal must have the same dimensions of meter box, cover, and drop-in lids to be interchangeable with Armorcast products and have equal or better polymer concrete compressive strength.

2-10.04.1 APPROVED METER BOXES

METER SIZE	BOX SIZE (W×L×D)	BOX / COVER / DROP-IN LID
5/8" × 3/4" and 1"	13" × 24" × 12"	Pedestrian Load: Armorcast A6001946PCX12 / A6001866DQ / A6000487 Traffic Load: Armorcast A6001946PCX12 / A6001866TDQ / A6000487T
1 ½" and 2"	17" × 30" × 12"	Pedestrian Load: Armorcast A6001640PCX12 / A6001643DZ / A6000482 Traffic Load: Armorcast A6001640PCX12 / A6001643TDZ / A6000482T

2-11 SMALL METERS

2-11.01 POSITIVE DISPLACEMENT TYPE

2-11.01.1 GENERAL

Meters 2-inch or less in size are classified as small meters and shall conform to AWWA C700, Standard Specifications for “Cold Water Meters – Displacement Type, Bronze Main Case”. All meters shall consist of a bronze main case with serial numbers stamped on the main case. All meters shall be read in cubic feet.

2-11.01.2 APPROVED POSITIVE DISPLACEMENT TYPE METER MANUFACTURERS

Neptune Technology Group:

5/8" × 3/4"	T-10®
1"	T-10®
1 ½"	T-10®
2"	T-10®

Badger Meter, Inc.:

5/8" × 3/4"	Recordall® Disc Series
1"	Recordall® Disc Series
1 ½"	Recordall® Disc Series
2"	Recordall® Disc Series

2-11.02 RESIDENTIAL FIRE SERVICE TYPE

2-11.02.1 GENERAL

Meters serving residential buildings designed to meet NFPA 13D, "Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes," shall be in compliance with applicable sections of AWWA Standard C701, and shall hold a current UL Fire Service Approval. Meters shall have a minimum strainer open area of four times the inlet pipe diameter and shall be capable of providing full meter flows under a “locked” measuring element condition. All meters shall be lead-free compliant and stamped with serial numbers on the main case. All meters shall be read in cubic feet.

2-11.02.2 APPROVED RESIDENTIAL FIRE SERVICE TYPE METER MANUFACTURERS

Mueller Systems (Hersey):

1”	Model RFM50*
1½”	Model RFM100**
2”	Model RFM160**

Or approved equal

*1" Compact meter shall be provided with 1" Adaptor 95063 and Adapter Washer 95064.

** 1 ½” and 2” Compact RFM meter shall be provided with threaded nipples and standard 2-bolt flange kits to obtain a flange-face to flange-face lay length of 13” and 17”, respectively.

2-11.03 TURBINE TYPE

The use of turbine meters requires prior approval by the Utility and will be authorized only on a case-by-case basis.

When authorized, all turbine meter installations shall include a strainer and shall conform to AWWA C701. Approved manufacturers are Neptune Technology Group and Badger Meter.

2-12 THRUST RESTRAINING MATERIALS

All mechanical thrust restraining devices shall be made of ductile iron. All devices shall withstand a working pressure of at least 250 psi with minimum safety factor of two. Deflection of joints with thrust restraining devices shall not exceed 80% of the manufacturer's allowable deflection.

2-12.01 MECHANICAL JOINT RESTRAINT

2-12.01.1 FOLLOWER GLAND TYPE

Restraining devices for mechanical joint fittings shall be incorporated with design of the follower gland and shall include a restraining mechanism which when activated, imparts multiple wedging action against the pipe, increasing its resistance as the pressure increases. The joint shall maintain flexibility after burial. Glands shall be manufactured of ductile iron conforming to ASTM A536. A coating system shall be applied to the body and wedge assembly and related parts to provide corrosion, impact and UV resistance. The coating for restraint body shall be electrostatically applied to ensure complete coverage. The coating system shall be MEGA-BOND by EBAA Iron, Inc., E-Coat by Ford Meter Box, Inc., Flexi-Coat by Smith-Blair, or approved equal. Requests for approved equal must submit coating material and process details for review.

Approved mechanical joint restraints shall be Megalug® Series 1100 as manufactured by EBAA Iron, Inc., Uni-Flange Series 1400 as manufactured by Ford Meter Box, Inc., RomaGrip as manufactured by Romac Industries Inc., Stargrip as manufactured by Star Pipe Products, Inc., Cam-Lock™ 111 as manufactured by Smith-Blair, or approved equal.

For PVC (C900) pipe, approved mechanical joint restraints for 4 inch through 12 inch sizes shall be Megalug® Series 2000PV as manufactured by EBAA Iron, Inc., Cam-Lock™ 120 as manufactured by Smith-Blair, or approved equal.

For PVCO (C909) pipe, approved mechanical joint restraints for 4 inch through 12 inch sizes shall be Megalug® Series 19MJ00 as manufactured by EBAA Iron, Inc. or approved equal.

2-12.01.2 GASKET TYPE

Where gasket type restraints are indicated on the plans, mechanical joint pipe and fittings shall be restrained with the MJ FIELD LOK® Gasket as manufactured by US PIPE, or approved equal. The

restraint system shall be completely integral to the gasket, requiring only standard mechanical joint assembly techniques. The gasket type restraint shall fit mechanical joints conforming to ANSI/AWWA C111/A21.11 “Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings”.

2-12.02 PUSH-ON PIPE BELL RESTRAINTS

For buried installations, push-on joints for ductile iron pipe shall be restrained with FIELD LOK® 350 or TR FLEX restraint as manufactured by U.S. Pipe, Flex-Ring as manufactured by AMERICAN Pipe, Sure Stop 350 Gasket as manufactured by McWane Pipe, or approved equal. When above-ground applications are approved by the Utility, push-on joints shall be restrained with TR FLEX® restrained joint pipe as manufactured by U.S. Pipe, Flex-Ring as manufactured by AMERICAN Pipe or approved equal. Restrained push-on joint pipe shall be capable of being deflected after assembly.

PVC and PVCO pipe shall be restrained in accordance with Section 2-02.02.

2-12.03 CONCRETE

Concrete for thrust blocks shall conform to Concrete Class 420-C-2000. If thrust block is to be disturbed or backfill is to be placed prior to developing its required strength, additional mechanical thrust restraining devices approved by the Utility shall be installed. Concrete for anchor and Gravity Anchor Blocks shall conform to Class 560-C-3250.

2-13 SHOP DRAWING AND MATERIAL SUBMITTALS

The Contractor shall furnish to the Utility such working drawings, data on materials, certifications of materials, and equipment and samples as are required for the proper control of the work, including, but not limited to, those working drawings, data and samples specifically required in Subsection 2-5.3 of the SSPWC and on the construction plans. All working drawings, data and samples shall be subject to review by the Utility for conformity with the plans and specifications. The shop drawings shall be submitted at least ten (10) working days before such drawings will be required for commencing the work.

2-14 PAINTING - ABOVE GROUND INSTALLATIONS

After all testing and disinfection has passed, but prior to final acceptance by the Utility, all above ground installations shall be painted in accordance with the following:

Remove all dirt, oil, grease, rust, bituminous coating, and other contaminants from surfaces to be painted by sand-blasting, pickling, or wire brushing as required. Sand blasting can damage ductile iron pipe and therefore only qualified personnel familiar with sand blasting may perform this work. Clean all surfaces with a SCAQMD-compliant, biodegradable surface cleaner as may be necessary. Allow surfaces to dry completely then apply primer to all surfaces to be painted. Allow primer to dry, then apply intermediate coat to all surfaces; allow intermediate coat to dry, then apply finish coat.

The underlined generic terms in the above paragraph shall be considered together as a painting system and shall be supplied by a single manufacturer selected from the list of approved paint manufacturers at the end of this section.

The above specified work shall be accomplished per the appropriate sections of Steel Structures Painting Manual, Volumes 1 and 2, published by the SSPC of Pittsburgh, Pennsylvania and strict adherence to the manufacturer's recommendations.

Approved paint manufacturers shall be per the table below.

<table>
<tr><th rowspan="2">CITY DEVICE</th><th rowspan="2">COLOR</th><th colspan="3">MANUFACTURER</th></tr>
<tr><th>CARBOLINE</th><th>SHERWIN WILLIAMS</th><th>PPG</th></tr>
<tr><td>Fire Hydrants</td><td>Carboline Safety Yellow or equivalent</td><td rowspan="3"><u>Primer Coat:</u>
Carbocrylic 3358 MC
(2.0 to 3.0 mils DFT)

<u>Finish Coat (Gloss):</u>
Carbocrylic 3359 DTMC
(2.0 To 5.0 mils DFT)</td><td rowspan="3"><u>Primer Coat:</u>
Pro-Cryl B66-310 Series
(2.0 To 4.0 mils DFT)

<u>Finish Coat (Gloss):</u>
Acrylic B66-600 Series
(2.5 To 4.0 mils DFT)</td><td rowspan="3"><u>Primer Coat:</u>
Pitt-Tech Plus 90-912 DTM Primer
(2.0-4.0 mils DFT)

<u>Finish Coat (Gloss):</u>
Pitt-Tech Plus 90-1310 Gloss Finish
(2.0-4.0 mils DFT)</td></tr>
<tr><td>Above Ground Assemblies:
▪ Backflow Devices
▪ Fire Lines
▪ Large Meters</td><td>Carboline Hunter Green or equivalent</td></tr>
<tr><td>Guard Posts</td><td>Carboline Safety Yellow, Hunter Green, or Light Grey; or equivalent</td></tr>
</table>

2-15 ACCESS TO MANUFACTURING AND TEST FACILITIES

The Utility shall at all times have access to the manufacturing and test facilities, and the right to inspect the work, and materials. The manufacturer shall furnish the Utility with reasonable facility access for obtaining such information as necessary to assess the progress of the work, and the character and quality of materials used. When requested by the Utility, the manufacturer shall submit a certificate of compliance that the product meets the requirements of these specifications.

SECTION 3 CONSTRUCTION METHODS AND CONTROL

3-01 INSPECTION

The construction of any water system improvement intended for dedication to the City and used by the Utility for public water service shall be subject to inspection by the Utility. Such inspection will assure the Utility that all phases of the work are in compliance with these specifications. The Utility water inspector will be the representative of the General Manager, Public Utilities Department and shall coordinate the various tasks and responses of the Utility to the Contractor throughout the work.

The Utility shall have access to the work and shall be furnished with every reasonable facility for ascertaining full knowledge of the progress, material, and workmanship used to complete the work. A minimum of 48-hour notice is required when requesting Utility inspection. All material shall be inspected by the Utility water inspector prior to placement and all workmanship shall be visually inspected prior to backfilling. The Contractor is required to verify elevation and alignment by means of a flow line or laser level as required by the Utility water inspector. The Contractor shall provide reasonable aid to ascertain the exact location of all work.

Inspection of the work, by the Utility water inspector, shall not relieve the Contractor of any obligation to complete the work as prescribed by these specifications. Defective work shall be made good by the Contractor, and unsuitable materials may be rejected by the Utility water inspector, notwithstanding the fact that such defective work and unsuitable materials may have been previously accepted by the Utility.

The Utility shall have the authority to suspend the work wholly, or in part, for such time as it may deem necessary due to the failure of the Contractor to perform any provisions of the plans or specifications. The work can only continue when the defective material or method is recognized as corrected by the Contractor and accepted by the Utility.

It is the sole responsibility of the Contractor to prevent the consumption of water for any and all uses from water mains and appurtenances whether by their workmen, subcontractors, or any other person prior to the acceptance of the project by the Utility.

The Contractor shall agree to indemnify, defend and hold harmless the City, its officials, officers, employees, agents, and representatives from and against any and all claims, losses, damages, defense costs, or liability of any kind or nature, arising out of or in connection with the consumption of water from the new main or appurtenances prior to acceptance by the City.

The Contractor (or Developer) is prohibited from operating any existing water valves in the Utility water system. The Contractor shall schedule operation of existing water valves through the Utility water inspector. Should an emergency arise, the Contractor shall contact the Utility water inspector and the Utility’s Water Services Emergency 24-Hour Dispatch at (714) 765-4560.

3-02 PRE-CONSTRUCTION DETAILS

3-02.01 LICENSES AND PERMITS

The Contractor shall have a Class "C-34" or Engineering "A" Contractor's License valid in the State of California and shall meet all the applicable requirements of the Anaheim Municipal Code. The Contractor shall have a current, valid City of Anaheim business license. The Contractor shall obtain all necessary permits, licenses, or agreements required by any legally constituted agency. The Contractor shall observe all safety procedures as required by Cal/OSHA.

A Right-of-Way Construction Permit (RCP) from the City of Anaheim Department of Public Works (Public Works) shall be obtained for all work in the public right-of-way within the City of Anaheim.

When a Developer or Contractor is responsible for water system construction in conjunction with development of property, the Developer or Contractor shall obtain a separate Utilities Water Management (UWM) permit from the Utility. Developers shall refer to the City of Anaheim *Water Services Administrative Procedures and Design Guidelines (APDG) for Development Projects* for UWM permit application procedures and requirements.

A copy of all licenses and permits required for the project shall be provided to the Utility prior to starting work.

All provisions of the permits, licenses, or agreements shall be binding upon the Contractor as though stated herein. The Utility will not be responsible for actions involving the agencies controlling such permits, licenses, or agreements.

3-02.02 TRAFFIC CONTROL

The Contractor shall furnish all materials, labor and traffic controls necessary to safeguard the work and the public safety. Traffic and pedestrian control shall comply with the requirements contained in the RCP. All traffic control plans, if required by the RCP, shall be reviewed and approved by Public Works. At Public Works' discretion, engineered traffic control plans prepared by a California registered professional traffic engineer may be required as part of the RCP.

Public Works requires that "Temporary No Parking" signs shall be posted at the work zone 72 hours in advance and reference C.V.C. 22651L. Dates and times of parking restrictions shall be identified on the front of signs and date of original posting shall be marked on the back of signs.

3-02.03 SURVEYING

The Contractor shall provide equipment, method, and labor to locate accurately all proposed water facilities. The Contractor shall further guarantee the accurate location of all water facilities by constructing curb and gutter prior to the beginning of any water improvements. If, in the opinion of the Utility, this sequence of

construction cannot be followed, the Contractor will sign a "Waiver of Curb and Gutter Requirements" and assume all responsibility and costs for correcting any resulting errors or omissions.

3-02.04 POLLUTION PREVENTION & BEST MANAGEMENT PRACTICES

Stormwater and non-stormwater discharges resulting from municipal construction activities, as well as some private construction activities, including those to which these Standard Specifications apply, are subject to the requirements of the City's MS4 NPDES Permit. Among these requirements is conformance with applicable OC Watersheds Stormwater Best Management Practices (BMPs) for Municipal Activities (found at: https://ocerws.ocpublicworks.com/service-areas/oc-environmental-resources/oc-watersheds/documents/best-management-practices-bmp-4) as well as all BMPs for Construction Activities (found at: https://ocerws.ocpublicworks.com/service-areas/oc-environmental-resources/oc-watersheds/documents/best-management-practices-bmp-3).

3-03 REMOVALS AND TRENCH EXCAVATION

3-03.01 REMOVAL OF PAVEMENT

Asphalt concrete paving and concrete paving shall be saw cut prior to removal. All edges shall be as straight as possible. Contractor shall dispose the pavement off the work site to a permitted facility.

3-03.02 REMOVAL OF UTILITIES

Utilities shall be protected in place unless otherwise stated on the construction plans. Structures or piping not shown on the construction plan shall be brought to the attention of the Utility. Disposition of these structures shall be determined by the Utility prior to proceeding with the work.

The Contractor shall notify and coordinate with representatives of any utility which must be removed or relocated.

All abandoned piping, appurtenances, and/or facilities shall be removed and permanently disconnected from the system except where authorized by the Utility.

3-03.03 TRENCH EXCAVATION

Trench excavation shall include any excavation in which the depth is greater than the width at the bottom of the excavation. Such excavations as required for vaults, thrust blocks, boring pits and service laterals shall be considered as trench excavations. All earthen material and water that will interfere with the placement of the pipe shall be removed. Contractor shall use sufficient means to protect any existing utilities from damage during trench excavation. Contractor shall also use Best Management Practices (BMP) to prevent silt, mud, or other pollutants from entering storm drains or catch basins as a result of trenching or excavating activities.

The maximum length of open trench shall be 500 feet or the length of pipe installed in one day, whichever is less. An open trench of up to 1,000 feet is permissible only in areas not subject to public traffic. The width of the trench at the bottom of the excavation shall not exceed 9 inches on either side of the pipe. Bell and coupling holes shall be used as required to complete a satisfactory pipe joint.

Water main installation will not be permitted until subgrade is established and the storm drain and sewer installation have been completed. Pipe shall be placed to the grade and depth specified on the construction plans. When not specified, pipe shall be placed as follows:

a. 42-inch standard cover to finish surface of primary and secondary streets (typically 64 feet right-of-way width and greater).

b. 36-inch standard cover to finished surface of collector and interior streets (typically less than 64 feet right-of-way width).

c. 12-inch standard vertical clearance from any crossing utility or structure.

d. 5-foot standard horizontal clearance from any utility, including recycled water mains, or structure, except sanitary sewers, which require a minimum horizontal separation of 10 feet (outside wall-to-outside wall).

In all cases pipe shall be installed so that there is a minimum of 24" cover between top of pipe and bottom of pavement structural section. The minimum cover and clearance herein stated applies to construction where there are existing underground facilities. These minimums are not intended as "design minimums" where all new underground facilities or two or more conflicting facilities are installed at the same relative time. The design shall attempt to maximize clearance between conflicting facilities and provide standard cover as the minimum.

The trench bottom shall be graded to provide a smooth, firm, and stable foundation which is free of rocks and other obstructions. All soft, spongy, and unstable material shall be over-excavated and replaced with backfill material per Section 3-08 of these specifications, and compacted to provide a firm and stable foundation. All rocks or cobbles two inches or greater in any dimension shall be removed and replaced with compacted backfill material per Section 3-08 of these specifications.

Pavement repair for trench excavations shall be per City of Anaheim Public Works Department Trench Replacement Standard Detail No. 132 and Section 3-09 of these specifications.

3-04 CONNECTION TO EXISTING FACILITIES

3-04.01 GENERAL

The Contractor shall make connection to the existing public facilities as shown on the construction plans. All connections must be made under inspection of the Utility. The Utility water inspector will consider the means of chlorinating those sections of main, fittings, or valves in contact with the public system. When such connection provides a direct closure of valves between the existing public system and that under construction, such valves shall become the property of the Utility and shall be operated only by the Utility.

The connecting joints between existing pipe and existing valves are typically unknown. The Contractor shall expose all joints to confirm the existing piping is restrained prior to tying into existing piping with new piping or abandonment of existing pipe and valves from existing piping. The Contractor shall exercise due caution during tie-ins and abandonment work, including any temporary bracing until the Contractor has installed permanent restraints to all joint(s).

Permanent restraints shall follow the standard details W-140 and W-142 or as called for by the Utility after a field determination can be made. No work shall proceed until the Utility approves the thrust restraint device(s) proposed by the Contractor.

3-04.02 PRESSURE TAPPING

Cast iron, ductile iron, PVC, PVCO, or asbestos cement pipe can be tapped under pressure by the Contractor. The exterior surface of the pipe shall be cleaned to provide a smooth surface for the tapping sleeve. The tapping sleeve shall be secured to the pipe to prevent movement during the tapping process. Prior to tapping operation, the tapping sleeve shall be hydrostatically tested for any leaks. It shall be tested to withstand 1.5 times the local static pressure, or 150 psi, whichever is greater. Concrete cylinder pipes shall be tapped under pressure by the Koppl Company (Montebello, California), International Flow Technologies, Inc. (Anaheim, California), or approved Contractor. Tapping nozzles shall be bolted or welded on as determined by the Utility based on steel cylinder thickness.

3-04.03 SHUTDOWN OF MAIN

All work necessary to shut down an existing public water main for the benefit of a Contractor shall be by Utility personnel and shall require prior approval by the Utility. Unless at the direct supervision of the Utility water inspector, under no circumstances shall the Contractor operate valves, hydrants, and other appurtenant equipment on the existing public system. It shall be the Contractor's responsibility to coordinate the necessary shutdown schedules through the Utility water inspector assigned to the project. Scheduled shutdowns shall require sufficient time to allow operations personnel to review, approve, and develop an appropriate Valve Operation Program.

All requests for shutdowns shall be in writing; verbal requests are not acceptable. Written requests shall be submitted a minimum of (10) ten city business days in advance of the desired date of shutdown. The Contractor shall be responsible for ensuring that all schedules are kept current and shall coordinate all deviations which may occur from time to time with the Utility water inspector.

The Utility will make a concerted effort to isolate the system as planned with the Contractor. However, the Contractor shall be prepared to employ pumping equipment to drain the water main trench if valves cannot completely shut down flow. The Utility will not be responsible for any delays due to system shutdown and isolation.

All emergency situations shall be reported immediately to the Utility's Water Services 24-hour emergency number (714) 765-4560. When extensive main shutdown is required, the Utility will determine what temporary service connections may be required. The Contractor shall furnish all necessary hose, piping, valves, pumps, water trucks and associated labor required to provide such temporary service. All piping, hoses and associated equipment used in temporary service connections shall be flushed and disinfected in accordance with Section 3-10.

3-05 LAYING OF DUCTILE IRON PIPE WATER MAIN

3-05.01 GENERAL

Installations of pipes and fittings shall be in accordance with AWWA Standard C600, "Installation of Ductile-Iron Water Mains and Their Appurtenances" and the pipe manufacturer's installation manual. The DIPRA Publication "Guide for the Installation of Ductile Iron Water Mains" shall be used for details of pipe installation practice except as follows and where noted otherwise on plans. Maximum deflection of joints and/or minimum laying curvature shall not exceed 80% of manufacturer's recommendations.

All joints shall be restrained, unless otherwise indicated on the plans.

Line and grade of all water facility flow lines or center lines shall be installed within 0.1 foot tolerance of approved design and shall have a continuous positive or negative slope corresponding to the approved design slopes on the plans.

Water mains shall be installed to provide a 10-foot minimum horizontal separation between the outside wall of the water main and the outside wall of any sanitary sewer. In addition, installation shall comply with Standard Drawing W-130.

Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the trench. If the pipe-laying crew cannot put the pipe into the trench and in place without getting soil into it, the Utility may require that before lowering the pipe into the trench, a temporary plug be placed over each end and left there until the connection is to be made to the adjacent pipe. During laying operations, no debris, tools, clothing or other materials shall be left in the pipe.

At times when pipe laying is not in progress, the open ends of pipe shall be closed by watertight plug or other means approved by the Utility. This provision shall apply during the lunch-hour breaks as well as overnight. If water is in the trench, the plug shall remain in place until the trench is pumped completely dry.

The cutting of pipe for inserting tees, fittings or closure pieces shall be done in a neat workmanlike manner without damage to the pipe or cement lining and so as to leave a smooth end at right angles to the axis of the pipe. No pipe shall be laid in water or when, in the opinion of the Utility water inspector, trench conditions are unsuitable. Field welding of Ductile Iron Pipe for repair or for joining is prohibited.

3-05.02 THRUST RESTRAINT

The Contractor shall be responsible for anchoring the pipe and fittings against movement due to water pressure. The materials specified in Section 2-12 will be used for restraining any movement of underground piping systems. Concrete thrust blocks shall be poured in place against an undisturbed earth bearing surface. Concrete shall be placed so as not to interfere with the fitting joint. Concrete shall be per Section 2-12.03. Thrust block locations and dimensions shall be per Standard Drawings W-140 through W-144, Section 6 of these specifications.

3-05.03 STANDARD ASSEMBLIES

Fire hydrants shall be constructed per Standard Drawing W-110, Section 6 of these specifications.

Fire hydrants shall be placed at a location shown on the construction drawing or as directed by the Utility water inspector. The determination will be based on specific locations which, in the opinion of the Utility, could result in potential hazard from the fire hydrant being hit and broken, such as closeness to overhead power lines or water damage to property. Where required by the construction drawing, guard posts shall be installed per Standard Drawing W-115, Section 6 of these specifications.

Water valves shall be installed at locations shown on the construction drawing, or as directed by the Utility water inspector. Valves shall be set plumb, and shall be stabilized and supported separately from the pipeline. Information regarding size, type, make, and number of turns to close shall be supplied to the Utility by the Contractor in accordance with Section 2-13. All valves shall be covered with a valve box assembly. Valve boxes shall be plumb, centered over the valve nut, and supported separately from the valve body per Standard Drawings W-150 and W-151. Valve boxes shall be lowered to below paving grade level prior to street paving, and after final grade has been established, the valve boxes will then be raised to match final grade. In any event, Contractor shall ensure that all valve boxes will provide access to the operation of the valve by the Utility. Valve boxes shall be flagged or barricaded during construction to divert traffic around their location.

3-05.04 PROTECTION AND CLEANING OF PIPE AND FITTINGS

The Contractor shall take extreme care to ensure cleanliness and protection of the inside coatings of all piping and fittings. The interior surfaces of pipes, fittings and other appurtenances shall be kept free of dirt or foreign matter at all times. All lumps, blisters, excess lining and coating materials shall be removed from the flanged end or bell and spigot end of each pipe or fittings. The outside of the spigot and the inside of the bell shall be wire brushed and wiped clean, and free from oil and grease before the pipe is laid.

3-05.05 HANDLING PIPE AND OTHER MATERIALS

Proper implements, tools and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient prosecution of the work. All pipes, fittings and valves shall be carefully lowered into the trench in such a manner as to prevent damage to water main materials and protective coatings and linings. Under no circumstances shall water main materials be dropped or dumped into the trench.

3-05.06 PROTECTION OF METAL SURFACES

All buried metal surfaces shall be protected and coated as specified throughout Section 2. Should the protective coating system to the buried or above ground metal surfaces be damaged or compromised in any way, the Contractor shall repair the damaged coating/ wrapping system to the satisfaction of the Utility.

3-06 LAYING OF PVC AND PVCO PIPE WATER MAIN

Installations of pipe, bends, and fittings shall be in accordance with Section 2-08 for ductile iron bends and fittings, and the latest edition of AWWA C605 “Underground Installation of Polyvinyl Chloride (PVC) and Molecular Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings” and the pipe manufacturer's installation manual. PVC or PVCO bends and fittings are not allowed. The Uni-Bell Handbook of PVC Pipe-Design and Construction shall be used for details of pipe installation practice, except as follows and where noted otherwise on plans. Longitudinal bending of pipe sections is prohibited and deflection of PVC or PVCO pipe shall occur only at couplings per Section 2-02.03.

All joints shall be restrained, unless otherwise indicated on the construction plans.

The tracer wire and warning identification tape shall be installed per Standard Drawing W-609. Tracer wire shall be secured to the pipe at 10-foot intervals with 10-mil plastic adhesive tape or plastic tie straps. The wire shall run continuously along the top of pipe for the entire length of pipe. Tracer wire and warning tape materials shall be per Section 2-02.05.

Service saddles are required for all corporation stops 2-inch diameter and less.

Point load set screws in retainer glands and flanges are prohibited, whereas those devices with pads or full circle are acceptable.

Water mains shall be installed to provide a 10-foot minimum separation between the outside wall of the water main and the outside wall of any sanitary sewer. In addition, installation shall comply with Standard Drawing W-130.

Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the trench. If the pipe-laying crew cannot put the pipe into the trench and in place without getting soil into it, the Utility may require that before lowering the pipe into the trench, a temporary plug be placed over each end and left there until the connection is to be made to the adjacent pipe. During laying operations, no debris, tools, clothing or other materials shall be left in the pipe.

At times when pipe laying is not in progress, the open ends of pipe shall be closed by watertight plug or other means approved by the Utility. This provision shall apply during the lunch-hour breaks as well as overnight. If water is in the trench, the plug shall remain in place until the trench is pumped completely dry.

The cutting of pipe for inserting tees, fittings or closure pieces shall be done in a neat workmanlike manner without damage to the pipe and so as to leave a smooth end at right angles to the axis of the pipe. The beveled end of any PVC or PVCO pipe shall be cut off before the pipe is inserted into a mechanical joint bend or fitting. No pipe shall be laid in water or when, in the opinion of the Utility, trench conditions are unsuitable.

3-07 SERVICE LATERALS

3-07.01 GENERAL

One-inch and two-inch diameter service laterals shall be installed per Standard Drawing W-101 and W-102, respectively. The service lateral shall consist of the double strap service saddle with polywrap per Section 3-11.03, insulated corporation stop, angle meter valve, meter, meter box and lid, and copper tubing. Service laterals shall be installed perpendicular to the centerline of the street and a three inch "plus" symbol will be chiseled into the curb face opposite the location of the corporation stop.

Meters and meter boxes shall be supplied and installed by the Contractor at such time and place as directed by the Utility. Meter boxes located in areas subject to traffic loading, or located behind a rolled curb (Type F, Standard Detail No. 120, City of Anaheim Department of Public Works), shall be installed with an approved traffic bearing lid.

Special consideration shall be given to backfill and compaction in the area adjacent to the copper tubing that is "snaked" in the trench. The area adjacent to the tubing shall be considered to extend not less than 4-inches below and 4-inches above the copper tubing and shall include the entire width of the trench. Bedding and backfill shall conform to Section 3-08 of these specifications. Backfill material shall be compacted under the service lateral so as to create a firm laying bed prior to placing and compacting any material over the top of the lateral. Compaction of backfill material by mechanical means directly over the exposed service tubing shall not be allowed.

Prior to any modification of service laterals 4-inches or larger and within 20-feet from the existing valve, the Contractor shall expose the valve on the service lateral to ensure the lateral including the valve is adequately restrained to the main pipeline. The exposed valve is to be witnessed by the Utility for verification of restraint. Inadequately restrained valve shall be properly restrained by the

The Utility may require the Contractor to install an approved backflow protection device on all service connections in accordance with Section 5 of these specifications.

3-07.02 ABANDONMENT OF SERVICES

All existing active and inactive services not intended for reuse shall be abandoned or removed at the main as directed by Utility water inspector. Services 2-inches and smaller shall be cut and plugged at the main and abandoned. For services 3-inch and larger, the existing tee or tapping sleeve shall be removed and replaced with a pipe spool connected to the existing water main with an approved coupling per Section 2-09.01. Capping of tees is not allowed.

3-07.03 IRRIGATION SERVICES

Services installed for the primary purpose of providing irrigation of landscapes or commercial crops, and which may have booster pumps downstream of the meter, shall conform to the following requirements:

1. A hydraulically actuated, slow open/close valve shall be provided immediately downstream of the pump or a surge tank, properly sized and approved by the Utility.

2. A Reduced Pressure Principle (RPP) type backflow preventer will be required immediately downstream of the flow meter. The irrigation service shall not be used until the RPP has been tested and a passing test report has been received by the Utility water inspector (See Section 5-03).

3-08 INSTALLATION OF PIPE BEDDING, PIPE ZONE AND TRENCH BACKFILL

The following shall apply to 3-05 and 3-06 above.

Bedding Zone

1. The Contractor shall import sand bedding material for placement in the bedding zone as defined in W-180 and as approved by the Utility water inspector. All bedding material shall be compacted by hand or approved mechanical methods and as defined in W-180.

2. Unstable soil consisting of loose, soft, spongy, or organic earth encountered, shall be removed from the trench bottom to a depth determined in the field by the Utility water inspector. The trench shall be refilled to proper grade with imported sand bedding

material and tamped in place as defined in W-180. The trench bottom shall be graded flat and prepared to provide a firm and uniform bearing surface for the pipe.

3. Unyielding soil consisting of rock, rocky earth, or cemented earth encountered, shall be removed from the trench bottom to a minimum of 9-inches below grade. The trench shall be refilled to proper grade with imported sand bedding material and tamped in place as defined in W-180. The trench bottom shall be graded flat and prepared to provide a firm and uniform bearing surface for the pipe.

4. Bell holes shall be dug from the bedding such that the pipe barrel, first laid, shall uniformly bear on the bedding material.

Pipe Zone

1. The Contractor shall import sand bedding material for placement in the pipe zone as defined in W-180 and as approved by the Utility water inspector. All pipe zone material shall be compacted by hand or approved mechanical methods.

2. Initial placement of pipe zone material shall be performed immediately after the pipe has been laid. Loose/moist pipe zone material shall be placed in the trench simultaneously on each side of the pipe to a depth not greater than the pipe centerline or 12-inches (loose measurement), whichever is less, and shall then be tamped beneath the pipe so that all voids are eliminated and the pipe zone material gets compacted as defined in W-180.

3. Subsequent placement of pipe zone material shall be performed immediately following initial pipe zone placement. Loose/moist backfill material shall continue to be placed in the trench simultaneously on each side of the pipe, not exceeding 12-inch thickness (loose measurement), with each placement tamped until the pipe has been covered by a minimum of 12-inches of well compacted material. Alternatively, the pipe zone material may be densified by jetting until the pipe has been covered by at least 12-inches of pipe zone material with compaction results as defined in W-180.

Backfill Zone

1. Backfill material shall be a free draining granular material, as defined in W-180 and be free of debris, organics, and cobbles greater than 2 inches. Native material approved by the Utility water inspector to be suitable as backfill will be allowed in sections of Anaheim west of State Highway 55 and Tustin Avenue. Native material shall not be allowed in trenches east of those travel ways.

2. All fittings, valves, utility crossings, and assemblies shall be visually inspected by the Utility water inspector prior to backfilling.

3. The Contractor shall backfill the pipe trench as soon after placement of pipe as practical with due regard of the requirements in this Section.

4. All backfill for pipe or conduit shall be densified to a relative compaction as defined in W-180 by water densification, mechanical tampers or rollers or other mechanical means, as approved by the Utility water inspector.

5. All buried valves and fittings shall be backfilled with clean sand. The sand shall be installed in such a manner that after compaction no earth or other backfill will be less than 6-inches from any part of the valve, fitting, flanges, bolts, or nuts. The sand shall be compacted as specified for other backfill.

6. Regardless of compaction/densification technique, care in backfilling shall be exercised to avoid any damage to pipe, fittings, appurtenances, persons, or property, and to achieve the minimum relative density compaction of the backfill material as defined in W-180.

7. At the close of the construction day, the pipe end(s) shall be sealed with a water tight, rodent-proof plug. The trench shall be backfilled.

8. Bedding zone, pipe zone, and backfill shall be placed in accordance with the Sections 306-1.2.1 and 306-1.3 of the "Standard Specifications for Public Works Construction" and as supplemented herein

3-09 REPAVING AND FINISHING

The Contractor shall replace all removed or damaged pavement in accordance with the City of Anaheim Public Works Department Trench Replacement Standard Detail No. 132. All pavement replacement, temporary or final, shall be hot-mix A.C. and as specified in the Plans or Specifications. The Contractor shall place pavement following final compaction of the backfill in accordance with Section 3-08 of these specifications. The Contractor shall not wait for completion of the full length of pipeline installation to begin resurfacing; the pavement shall be repaired and/or replaced, flush with existing road surface, within five working days of damage or removal of the pavement.

Valve boxes shall be located after final paving and brought to finished grade. The Contractor shall remove the paving section down to the valve box, raise the valve box top section to finished surface, install the concrete collar per Standard Drawing W-150, and patch the paving section.

3-10 TESTING, DISINFECTION AND FLUSHING

3-10.01 GENERAL

All required testing shall be performed and certified by a third party agency hired by the Contractor and approved by the Utility. All tests shall be made in the presence of the Utility water inspector, except that bacteriological tests shall be performed at laboratories certified by the State. All constructed facilities shall be isolated from the existing public system while being tested by means of a test plate or physical separation, as determined by the Utility water inspector.

Hydrostatic pressure testing, disinfection, and bacteriological sampling is not permitted until the following conditions have been met:

For all development construction:

1) All curb and gutter on both sides of street must be poured and cured.

2) Rough grade of street must be established to within 12” of finished surface.

3) All sewer and storm drain improvements must be installed and completed.

For all water construction:

1) All services, fire hydrants, blow offs, and other appurtenances must be installed and adjusted to final grade.

2) All water valve boxes must be installed per W-150 and permanently accessible.

3) As-Built plans must be submitted by the contractor and approved by the Utility water inspector. All field changes must be marked “As-Built” and documented in red ink on a clean set of plans.

At the discretion of the Utility water inspector, the Contractor may be required to provide a Mandatory Flushing Sign per W-060 during flushing and/or disposal of test water; and Contractor may be required to provide Test Set Up for Newly Installed Improvements per W-126 during testing.

All water used for flushing and testing purposes shall be measured through a Utility temporary meter connected to a Utility fire hydrant and paid for by the Contractor. Cross connection protection shall be accomplished by the Contractor by providing a reduced pressure principle backflow prevention device with a passing test report approved by a Utility cross connection specialist. At the discretion of the Utility water inspector, the Contractor may be required to dispose of flushing and/or test water in the sewer system.

It is the sole responsibility of the Contractor to install water mains and appurtenances that pass the testing phase. Utility assistance through inspection, testing, and receipt of laboratory test results does not relieve the Contractor of this responsibility.

3-10.02 HYDROSTATIC PRESSURE TESTING

After all thrust blocks have been placed for at least two days in the particular portion to be tested, a pressure test shall be conducted by a hydrostatic testing agency hired by the Contractor and approved by the Utility. Each section of main, up to but not exceeding 1,200 feet in length, and all fire hydrants and fittings connected thereto, shall be subjected to a hydrostatic pressure in accordance with AWWA Standard C600 (ductile iron) or C605 (PVC and PVCO) and as modified herein, while all pipe, fittings and joints are inspected for leakage. Test pressure shall not exceed rated working pressure of the gate or butterfly valves. The section of pipe under test shall be allowed to stand at 40 psi minimum pressure for one (1) hour prior to the beginning of the test. The pressure shall then be increased to 1.5 times the local static pressure, or 150 psi, whichever is greater, to a maximum of 300 psi. Pressure shall be measured at, or corrected to, the lowest point in the portion of the line being tested. After the entire section under test has been inspected and if leaks have been found to be within tolerance of allowable leakage per thousand feet of pipe shown in the chart below, the pressure test will be approved by the Utility water inspector. If leakage exceeds

allowable tolerances, the source(s) of leakage shall be identified and repaired and re-subjected to the test pressure. The pressure shall be maintained for four (4) hours, during which time the amount of leakage shall be determined by measuring the quantity of water which must be added to maintain the test pressure.

No leakage will be allowed for steel pipe.

The following table lists the maximum allowable leakage per 1,000 feet of pipe, in gallons per hour, in conformance with AWWA Standard C600 and C605:

Maximum Allowable Leakage per 1,000 feet of Pipe, Gallons per Hour								
Static Pressure, psi	Test Pressure, psi	Nominal Pipe Diameter, in.						
		4	6	8	10	12	16	18
100 or less	150	0.33	0.50	0.66	0.83	0.99	1.32	1.49
110	165	0.35	0.52	0.69	0.87	1.04	1.39	1.56
120	180	0.36	0.54	0.73	0.91	1.09	1.45	1.63
130	195	0.38	0.57	0.75	0.94	1.13	1.51	1.70
140	210	0.39	0.59	0.78	0.98	1.17	1.57	1.76
150	225	0.41	0.61	0.81	1.01	1.22	1.62	1.82
160	240	0.42	0.63	0.84	1.05	1.26	1.67	1.88
170	255	0.43	0.65	0.86	1.08	1.29	1.73	1.94
180	270	0.44	0.67	0.89	1.11	1.33	1.78	2.00
190	285	0.46	0.68	0.91	1.14	1.37	1.83	2.05
200	300	0.47	0.70	0.94	1.17	1.40	1.87	2.11

If the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

The following formula shall be used to determine allowable leakage for other test pressures:

$$L = \frac{SD\sqrt{P}}{148{,}000}$$

Where:

L = testing allowance (makeup water), 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 hydrostatic test, in pounds per square inch

3-10.03 DISINFECTION

3-10.03.1 GENERAL

All water mains, water services, attached appurtenances and connections shall be disinfected in accordance with AWWA Standard C651 "Disinfecting Water Mains", and as modified herein.

Contractor shall furnish all equipment, labor, materials, safety requirements, and water necessary for chlorinating and flushing the pipeline. Disinfection of new mains, including all chlorination, chlorine residual measurements, collection of samples, and certification shall be conducted by a third party testing agency approved by the City. Gauges and apparatus used for chlorine injection shall bear the current State certification. An independent State Certified laboratory or authorized agent shall collect the samples and a State Certified laboratory shall perform the bacteriological tests. All costs for disinfection, including laboratory fees, shall be paid by the Contractor.

At no time shall personnel other than the authorized third party testing agency be in charge of injecting chlorine into the water pipeline, the residual testing of the chlorine, or obtaining bacteriological samples.

Contractor shall ensure that all pipes, fittings, and appurtenances are kept free from dirt and foreign matter at all times. During construction all open pipe ends and fittings shall be fitted with a water tight plug. At the end of the work day the open pipe in the trench shall be plugged in an equally suitable manner.

The Contractor shall swab the interior surfaces of the new valves, pipes and appurtenances as well as interior surfaces of existing main, both upstream and downstream of the new pipe section, with a minimum five percent concentration of hypochlorite disinfection solution before installation. During the chlorination or chlorinating process, all valves shall be operated, and the chlorine solution shall be drawn through all laterals and appurtenances. Disinfection of mains and appurtenances, hydrostatic testing, and chlorine retention may run concurrently for the required minimum 24-hour period only if prior approval is obtained from the Utility.

In the event of leakage or where repairs are necessary, added disinfection shall be made only by injecting chlorine into the line whereby adequate mixing is assured. If the test results are not satisfactory, the Contractor shall provide additional disinfection, as required. Such additional disinfection shall be at the Contractor's expense.

Disinfection of pipelines 4-inch or larger and in excess of 18-feet in length shall be accomplished by direct liquid chlorine or chlorine gas as specified herein, unless otherwise approved by the Engineer.

3-10.03.2 CHLORINATION

The new system which is being disinfected shall be thoroughly pre-flushed, utilizing a minimum velocity of 2.5 feet per second throughout the entire system. The chlorinating agent shall be applied at a point not more than ten feet from the beginning of the section to be chlorinated and shall be injected through a corporation stop, a hydrant, or other approved connection to ensure treatment of the entire system being disinfected. All required corporation stops and other plumbing materials necessary for chlorination or flushing of all parts of the main being disinfected shall be installed by and at the expense of the Contractor.

3-10.03.2.1 CHLORINE GAS FEED

Chlorine gas shall be fed directly from the chlorine cylinder equipped with a suitable device capable of regulating the rate of flow and diffusion of gas within the pipe. Water shall be concurrently fed into the pipe at a rate which produces a residual of not less than 50 (parts per million) PPM and not to exceed 100 PPM of chlorine in all sections of the pipeline and appurtenances being disinfected. Chlorinated water shall be retained in the system for a minimum duration of 24 hours, and shall produce at the end of the retention period not less than 25 PPM of chlorine in all sections of the pipeline being disinfected.

3-10.03.2.2 SODIUM HYPOCHLORITE FEED

Sodium hypochlorite shall conform to the requirements of AWWA B300 and shall be delivered by chemical feed pump at a constant concentration of a minimum of 50 PPM of free chlorine until the new pipe system is completely filled. The chlorinated water shall remain in the new pipe section, full, for a period of 24-hours during which time new valves and fire hydrants shall be exercised to ensure complete coverage of internal parts. At the conclusion of the 24-hour period, the chlorinated water concentration shall have a minimum concentration of 25 PPM of free chlorine. Source water shall be protected by an approved backflow device approved by the Utility water inspector.

3-10.03.3 FINAL FLUSHING

Following the chlorination period of 24 hours, the newly laid line shall be thoroughly flushed to remove any foreign material. A suitable connection shall be provided by the Contractor at the end of each new

line at the invert large enough to achieve a flushing velocity in the line of at least 5 feet per second.

Water shall be flushed from the line at its extremities and at all outlets until the chlorine residual of the water system being flushed is equal to or less than the distribution system level. Flush water shall be dechlorinated per 3-10.6.

3-10.03.4 BACTERIOLOGICAL TESTS

After the system has been flushed, the Contractor shall have tests conducted for chlorine residual by a State certified laboratory approved by the Utility. Should the chlorine residual in any part of the disinfected system be higher than the distribution system level, the Contractor shall repeat the flushing procedure. If the chlorine residual after flushing is equivalent to or less than the distribution system level, the Contractor may proceed with the bacteriological sampling. Samples shall be taken at the direction of the Utility with at least two sets of samples collected at: (1) 1,200-foot intervals along the new water main, (2) each dead-end main section(s), and (3) all branches 4-inch diameter and larger. Two consecutive bacteriological samples are required for water quality evaluation. The first bacteriological sample shall be taken immediately after final flushing and the second sample shall be taken at least 24 hours later. If bacteriological test results fail to pass the requirements, the Contractor shall take corrective actions and daily bacteriological sampling shall be continued until two (2) consecutive negative samples are demonstrated. All samples shall be collected by certified laboratory personnel and tested for bacteriological quality in accordance with Standard Methods for the Examination of Water and Wastewater, and shall show the absence of coliform organisms.

The following tests are required to provide information for water quality evaluation:

1) Presence/Absence of Total Coliform by any of the three methods:
   a. Multiple Tube Fermentation
   b. Membrane Filtration
   c. Colilter/Colisure

2) Heterotrophic Plate Count.
   Report shall include:
   a. Presence/Absence of Coliform Bacteria Count per 100 ml.
   b. Heterotrophic Plate Count per ml.
   c. Total and Free Chlorine Residual, taken at time of sample collection by certified laboratory personnel.

All coliform test results must be negative. The heterotrophic plate count shall be 500 or less per ml.

The results of these tests must be approved in writing by the Utility's water inspection supervisor prior to activating any new water facilities. Should the test results from the State certified laboratory disclose that the water from the new line does not meet the above standards, the disinfection process shall be repeated until it meets the required standards.

3-10.03.5 MISCELLANEOUS DISINFECTION AND TESTING PROTOCOL

New installations of large services (fire lines or domestic), fire hydrants, and water mains greater than 18-feet in length shall have a physical separation by means of a test plate or end cap with a temporary blow off from the existing city water main. The newly installed portion shall be third party tested, thoroughly flushed, and chlorinated per Section 3-10.

Large services and fire hydrants require one sample per day on two consecutive days, which shall be taken by a State certified laboratory approved by the Utility.

Water mains that are greater than 18-feet in length require sampling in accordance with Section 3-10.03.4. A minimum of two samples per day on two consecutive days will be required for: (1) every 1,200 feet of main, (2) each dead end main section(s), and (3) all branches 4 inch diameter and larger.

The physical separation (test plates or end cap with temporary blow off) will not be allowed to be removed and connection to existing City water line shall not occur until the Utility water inspection supervisor has approved the certified passing bacteriological sample results that the Contractor has forwarded. The certified results must be received by the Utility water inspection supervisor within five calendar days of taking of the sample(s). Draft copies are not acceptable.

Relocation and/or extension of large water services, fire hydrants, or backflow devices, all less than 18-feet in length, shall be accomplished as follows: (1) the work shall be performed under full-time inspection, (2) all parts shall be swabbed and sprayed with an approved disinfectant, (3) the relocation or extension shall be bolted up and completed to grade and (4) the fittings/pipe will be inspected for leaks and where questionable, shall be thoroughly flushed and adjusted to a water tight condition. The Contractor shall immediately schedule one single bacteriological sample to be taken by a State certified laboratory. The certified bacteriological sample report shall be sent to Utility's water quality supervisor and water inspection supervisor for approval. The certified results must be sent to the Utility's water quality supervisor and water inspection supervisor within five calendar days from when the sample has been taken.

Sampling of small water services (1 inch and 2 inch) is not required, provided that new materials are used, installation is under full-time inspection, and the service is thoroughly flushed.

3-10.04 DISPOSAL OF TEST WATER

All water used for testing and/or disinfecting portions of pipeline or water system components, including that used for retesting, shall be disposed of following such testing, retesting, and disinfecting by the Contractor at his sole expense. The disposal of water shall, in all cases, be carried out in compliance with the water quality objectives and discharge permit restrictions established by State requirements. In no event may the water discharged transport trash, dirt or other debris into the Right of Way, adjacent property, or into the private or public storm drain system.

The contractor shall not discharge any wastewater from the site to the right of way, adjacent property or any storm drain system (private or public) unless it conforms to all applicable requirements, permits and restrictions. This will include complying with at least one or more of the following:

- The discharge is described in an Erosion & Sediment Control Plan approved by the Anaheim Public Works Department as part of a Right of Way Construction Permit and/or a Grading Permit); and
- The discharge is allowed by a valid National Pollutant Discharge Elimination System (NPDES) permit.

If the project is over one acre, the discharge must be described in a Stormwater Pollution Prevention Plan (SWPPP) approved by the State Water Resources Control Board.

Any discharge (whether or not a SWPPP is required) must conform to applicable Best Management Practices (BMPs) relative to the type of work and phase of construction. Construction BMPs can be found at the OC Watersheds website at: https://ocerws.ocpublicworks.com/service-areas/oc-environmental-resources/oc-watersheds/documents/best-management-practices-bmp-3. Water system discharges shall also comply with the latest edition of the American Water Works Association California-Nevada Section *Best Management Practices (BMP) for Drinking Water System Releases*, available at: https://www.ca-nv-awwa.org/canv/CNS/Communications/Publications.aspx.

Contractors conducting municipal water system work for the Utility shall comply with the *Statewide General NPDES Permit for Drinking Water System Discharges to Waters of the United States*, Order WQ 2014-0194-DWQ, available at https://www.waterboards.ca.gov/water_issues/programs/npdes/drinkingwatersystems.html). The Contractor is responsible for all activities required by the permit, including recordkeeping, sampling, and implementing appropriate BMPs. The Contactor shall notify the Utility Water Inspector at least 7 days prior to commencing a discharge in excess of 1 acre-foot, and immediately upon being aware of any non-compliance of any portion of the permit.

For projects not administered by the City (such as developer projects), the Contractor shall obtain coverage under another NPDES permit, such as the General Waste Discharge Requirements for Discharges to Surface Waters that Pose an Insignificant (De Minimis) Threat to Water Quality, Order No. R8-2015-0004, available at: https://www.waterboards.ca.gov/santaana/board_decisions/adopted_orders/orders/2015/R8-2015-0004_Updated_General_WDR_for_Discharges_to_Surface_Waters_that_Pose_an_Insignificant_Deminimis_Threat_to_WQ2.pdf. Other NPDES permits may be applicable.

Disposal of test water or chlorinated water used for disinfection will require the Contractor to apply a reducing agent (i.e. sodium thiosulfate) in order to neutralize residual chlorine or chloramine to meet the discharge limitation. The discharge shall be tested by use of an electronic colorimeter to verify it has been adequately dechlorinated and the results provided to the Utility water inspector. Additionally, the flow of water from the portions of pipeline shall be controlled to prevent erosion of surrounding soil, damage to vegetation, and altering of ecological conditions in the area and shall not contribute to silt, mud, debris, or other contaminants entering storm drains or surface waters.

The Contractor's attention is directed to that portion of the pipe with a low elevation. All water used in testing and disinfecting in that portion of the pipe shall be pumped out by the Contractor, at his expense, as specified in the paragraph hereinbefore. The Contractor shall furnish and operate all necessary pumps, pipelines, valves, hoses and all other appurtenances needed for pumping out water from the said low portion.

At the discretion of the Utility water inspector, the Contractor may be required to dispose of test water in the sewer system.

3-11 SPECIAL CONDITIONS

3-11.01 SHEETING AND SHORING

All trench excavation shall be adequately protected to provide a safe working condition, and protection to adjacent facilities and structures. The Contractor shall work in such a manner and install such protective devices, shoring, and bracing to comply with all rules, regulations, and orders of CAL-OSHA, Division of Industrial Safety.

Prior to any trench excavation where the depth is more than five feet, the Contractor shall submit a detailed plan to the Utility showing the design of shoring, bracing, sloping, or other provisions to protect the workers from the hazard of caving ground during the excavation of such trench. If the plan varies from the shoring system standards, the plan shall be prepared by a Civil or Structural Engineer registered in the State of California. No excavation shall start until the Utility has accepted the plan and the Contractor has obtained a permit from CAL-OSHA, Division of Industrial Safety. A copy of the permit shall be submitted to the Utility and available at the job site at all times.

Sheeting and shoring shall not place any undue strain on existing utilities or structures, nor on completed sections of construction. Sheeting and shoring may be removed during backfilling, provided adequate protection is provided at all times. The Contractor shall be responsible for any damage to existing utilities or structures due to placement, removal, or failure of any sheeting and/or shoring system. The Contractor shall repair or have repaired any damage as soon as practical.

3-11.02 JACKING OF STEEL CASING

Steel casing shall be placed at the location, elevations, and limits shown on the construction plans. Known existing utilities shall be shown on the construction plans. Any utilities or structures encountered which will interfere with construction shall be brought to the attention of the Utility. Only new steel casing shall be used for jacking. Jacking shall be at a rate that will not over stress the casing, causing failure. Any damage to the casing during placement of the pipe shall be brought to the attention of the Utility. The jacking and receiving pit shall be sheeted and shored as required by CAL-OSHA and as provided in Section 3-11.01 of these specifications. The excavated area ahead of the casing shall not be larger than 0.1 foot greater than the outside diameter of the casing. Over excavation beyond the above described limits shall be sanded or pressure grouted as directed by the Utility. Sluicing or jetting ahead of the jacking casing shall not be permitted.

3-11.03 POLYETHYLENE PROTECTIVE WRAPPING

Unless otherwise noted on the plans, polyethylene protective wrapping (Polywrap) for ductile iron pipe shall be furnished and installed on all buried water lines in accordance with the requirements of AWWA C105, Section 2-01.04 of these specifications, and as specified herein, except where water lines are within a steel casing pipe. Polywrap shall be installed so as to prevent any section of the pipe, fittings, valves, services, or appurtenances from contacting the soil.

The Polywrap shall be taped to provide a snug fit along the pipe. Minimum tubing size shall allow for an overlap of 12 inches; i.e., flat tube width in inches = (3.14 × outside diameter) + 12 inches. An additional 3 layer wrap of polyethylene shall be made at all tapping locations a minimum of 12 inches in width. Openings for service taps, blow offs, or similar appurtenances shall be cut in the Polywrap during backfilling of the trench. Corporation stops and copper service lines shall be wrapped with polyethylene protective wrapping for a minimum clear distance of 3 feet from the water main.

Any punctures, tears or other damage shall be patched with polyethylene wrap and tape in accordance with the requirements of AWWA C105 and manufacturer’s instructions. Rocks or other material that could damage the wrapping shall not be included in the backfill.

3-12 DEDICATION OF IMPROVEMENTS TO THE CITY

The Utility may serve temporary construction water through facilities installed by the Contractor. This use shall be permitted following written confirmations from the State

certified laboratory conducting bacteriological tests that all samples meet the requirements of the Utility and from the Utility. This use does not constitute acceptance of these facilities by the Utility.

Only after the following items are received will the Utility accept facilities installed by the Contractor.

1. Written confirmation from the State certified laboratory conducting bacteriological tests that all samples meet the requirements of the Utility.

2. Confirmation by the Utility that all water improvements have been constructed per applicable specifications and plans. Contractor shall be responsible to maintain accurate records of any changes made during the course of construction and shall submit such information to the Utility per section 3-13 below.

3. Public Utility Easements dedicated to the Utility, as required to gain access to public water facilities located on private property.

4. Such agreements, fees, or other items as required by the Utility.

5. All backflow prevention devices have been tested, found to be acceptable through the testing, and passing test reports have been received by the Utility's cross connection control program.

Prior to serving domestic water through the installed facilities, the Developer shall present all deeds or instruments of conveyance to the Utility and shall dedicate all water system improvements intended for public use to the City.

The Contractor shall warrant the quality of all material and workmanship for a period of one year from the date of acceptance of these facilities by the City. The Contractor shall make all repairs to facilities due to defect in material or construction method. Such repair shall not be the responsibility of the Utility. If the Utility should deem the repair of such defective work an emergency situation, the Contractor shall be held liable for all costs required to correct such defective work.

3-13 AS-BUILT DRAWINGS

The Contractor shall provide and maintain a complete, legible, and accurate As-Built record set of prints. Such prints shall be kept up to date as work progresses and shall be maintained at the job site during construction. Progress payments for City of Anaheim projects will not be processed until the As-Built drawings are reviewed and approved by the Utility.

As-Built drawings shall be prepared and shall show all changes in the work constituting deviations from the original contract drawings. All conceptual or major design changes shall be approved by the Utility before implementing the change in the construction contract.

Upon completion of the work, all required information, dimensions and adjustments to the original contract drawings shall be submitted to the Utility to be transferred to the record

drawings. Facilities and items to be located and verified on the record drawings shall include the following:

a. Point of connections.

b. Actual location of existing utility mains (water, sewer, gas, storm drain) and encased electrical conduit banks crossing the water main.

c. Actual location of existing water, sewer and gas service laterals and communications conduit only when there is a conflict which requires a vertical and/or horizontal alignment change of the water main to be installed.

d. Water mains: where deviations along installed water mains are more than ½ foot vertically and more than 1 foot horizontally, actual location (line and grade) shall be noted on the plans at intervals of 100 feet.

e. Services: where service tie-in differs from the plan station by more than 2 feet or when meter box is not perpendicular from the main, corporation stops shall be stationed. For all service lines that have directional changes, such as in the case of cul-de-sacs, the actual installation shall be noted regardless of field changes, and shall be adequately referenced to the satisfaction of the Utility Inspector.

f. Any material changes, including additions, deletions and substitutions.

g. Other related facilities, as required by the Utility Inspector

h. Contractor shall write on all sheets where the water improvements were built per plan that the construction was made “Per Plan”.

The Utility’s receipt and acceptance of As-Built drawings shall be a condition precedent to the release of the Contractor’s retention/final payment. For projects constructed by Developers, the Utility will not give final acceptance until approved “as-built” plans have been received.

SECTION 4 LARGE SERVICES AND FIRE LINES

4-01 GENERAL

All services larger than 2 inches in diameter installed for the purpose of obtaining water from the public system for domestic, irrigation, commercial or industrial consumption, or for fire protection shall be defined as Large Services. Large services installed for the purpose of providing fire protection only shall be further defined as Fire Lines.

Unless otherwise specified on the plans approved by the Utility, all materials, construction methods and controls shall conform to the applicable sections of the Water Services Standard Specifications (WSSS), which this section is a part thereof, including, but not limited to, testing, disinfection and flushing.

Developers and Private Engineers responsible for design and construction of Large Services in conjunction with development of property shall refer to the City of Anaheim *Water Services Administrative Procedures and Design Guidelines (APDG) for Development Projects* for Utilities Water Management (UWM) permit application procedures, plan submittal requirements, and design criteria.

4-02 METERS

Separate water services for domestic water and fire protection shall be installed. No dual systems (combined fire and domestic service) or Fire Service Meters (FM) are allowed. In addition, if a non-residential project's landscaping area is 1,000 square feet or larger, a separate irrigation meter shall be required. If a residential project's landscaping area is 2,500 square feet or larger, a separate irrigation meter shall be required. All Large Service installations shall include a meter assembly which shall be located outside of the public right of way on private property. Meters shall conform to size, type and manufacturer as shown on the Standard Drawings. Meters shall be compound type unless otherwise approved by the Utility. The Utility reserves the right to specify the type of meter if, in its sole opinion, a specific type of meter is best suited for the proposed application. Meters shall be provided with direct reading or electronic registers to provide visual reading capability, a leak indication dial, and shall read in cubic feet. Meters shall be provided with a lid on the registers for protection against sunlight for above ground installations

Minimum registration shall be as follows for the meter sizes stated:

2 to 3 inch meters	CF X 10
4 to 8 inch meters	CF X 100
10 inch and greater	CF X 1,000

All Large Service installations, except Fire Lines, shall include provisions for a temporary bypass line per Standard Drawing W-230 or W-231. All valves and fittings on the bypass line shall be flanged and shall conform to Sections 2-05 and 2-08 of these specifications, respectively.

The Utility at its sole discretion, may require the bypass line to have outside stem and yoke (OS&Y) valves with handwheel operators and a permanent bypass spool. When

OS&Y gate valves and spools are required by the Utility on the bypass line, the hand wheel operators shall be secured in the closed position by a lock and chain.

Theft protection shall be provided for bypass meters on double check detector assemblies (DCDA). Approved anti-theft devices are Sentry Fire Detector Check Bypass Backflow Guard SDC75 or equal. All anti-theft devices shall be submitted to the Utility for review and approval prior to installation.

4-03 VAULT INSTALLATIONS

Vaults shall only be allowed in the Platinum Triangle or the Anaheim Resort areas and where directed by the Utility. Contact the City's Planning Department for specific boundaries of these areas.

All Large Services installed underground shall be installed in a precast concrete vault with an aluminum cover or as otherwise specified on the construction plans. The dimensions of the vault, location of knock-out sections and the cover details shall be in strict conformance with this section and the application Detail Drawings contained in Section 6 of these specifications or as otherwise specified on the construction plans.

The vault cover shall consist of one or two doors in one channel frame and shall open over the entire length and width of the vault. Door leaf shall be 1/4-inch aluminum diamond pattern plate to withstand a live load of 300 pounds per square foot. Channel frame shall be 1/4-inch aluminum. Door shall be equipped with heavy forged brass hinges, stainless steel pins, spring operators for easy operation, and an automatic hold open arm with release handle. A snap lock with removable handle shall be provided. Unless noted otherwise on the plans, hardware shall be mill finish with bituminous coating applied to the exterior of the frame. Stainless steel hardware may be required for installations in a highly corrosive environment. Manufacturer shall guarantee against defects in material and workmanship for a period of at least five years.

All vaults installed in areas subject to incidental vehicular traffic shall be steel reinforced concrete with an aluminum cover designed to meet a minimum traffic bridge loading of H-20, as defined by the American Association of State Highway Officials. As to type, materials, and hardware, traffic covers shall conform to the requirements specified in the preceding paragraph. In certain situations, guard posts may be required to prevent vehicular traffic from passing over the vault.

When vaults are installed in areas subject to pedestrian traffic, the cover shall consist of non-skid materials as approved by the Engineer.

4-04 THRUST RESTRAINT - VAULT INSTALLATION

A positive means of thrust restraint shall be provided on the inlet line to a vault installation so that the pipe at the last joint, prior to entering the vault, is physically restrained from movement in the direction of the vault. See Standard Plan W-143.

4-05 PAINTING - ABOVE GROUND INSTALLATIONS

After all testing and disinfection has passed, but prior to final acceptance by the Utility, all above ground Large Service installations shall be painted in accordance with Section 2-14.

4-06 AESTHETICS - ABOVE GROUND INSTALLATIONS

Above ground Large Services shall be screened from public view by landscape plants and/ or walls as or other appropriate means as directed by Utility. Landscape plants shall incorporate perennial thornless varieties, chosen from the accepted list shown below, which blend with the local environment. Size of the landscape plants shall be approved by the Utility; at a minimum, mature plants will be required in all installations. If a screen wall is proposed, landscaping including clinging vines shall be planted to soften the wall and discourage graffiti. If such wall is adjacent to a structure, the wall may also be required to be painted to match the exterior of the structure, if determined necessary by the Utility. The above ground service will be shielded from view on at least three sides, including the street side and the two adjacent sides. Whichever method of concealment is used, it shall neither obscure nor hinder access to the Fire Department's pumper connection.

Within the confines established by the Utility, the owner/developer shall locate all above ground large services in a manner which is aesthetically pleasing. Additional conditions may be required for specific projects in order to comply with local ordinances and zoning codes.

It shall be the owner’s responsibility to irrigate and maintain planted landscape screening in a healthy state and to trim and prune them such that access to the device is not impaired. If owner fails to maintain landscape plants and paint in the desired state, City will cause such work to be performed and owner will be billed for the actual cost of performing the work plus ten percent for overhead and administration. Failure to pay for said work, when due, shall be cause for termination of service.

Acceptable landscape plants:
Abelia grandiflora
Eugenia myrtifolia ‘Compacta’
Escallonia rubra
Eunymous japonica
Hibiscus ‘Brilliant’ (San Diego Red)
Ligustrum japonicum ‘Texanum’ (Wax leaf Privet)
Ligustrum ovalifolium (California Privet)
Pittosporum Tobira
Photinia fraseri ‘Indian Princess’ (Fraser’s photinia)
Or approved equal

Acceptable clinging vines:
Ficus Pumila (Creeping fig)
Parthenocissus tricuspida (Boston ivy)
Cissus rhombifolia (Grape ivy)
Or approved equal

SECTION 5 BACKFLOW PREVENTION

5-01 BACKFLOW PROTECTION

All water services connected to the public water system may be required to include an approved backflow prevention device of the type designated by the Utility. The type of device approved shall be based on the existing or potential degree or hazard which exists, in the opinion of the Utility. All devices shall be approved by the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California, Los Angeles, CA 90089-2531. All domestic backflow prevention devices shall be lead-free per California Health and Safety Code.

The Developer or his Contractor shall be responsible for the installation, initial test and certification of all new or relocated backflow prevention devices. Thereafter, backflow prevention devices will be maintained and tested annually by the owner or water user.

When an existing backflow prevention device that is located in a vault or in public right-of-way needs to be replaced, the property owner shall be required to install the new device above ground on private property. Unless otherwise approved by the Utility, the entire section of piping between the water main and the new device shall be replaced with new pipe. In addition, design plans for the new device, and accompanying plan check and inspection fees shall be submitted to the Utility for review and approval in accordance with Section 4 of these specifications.

Backflow prevention devices shall be located above ground, outside of the ultimate right-of-way and as close as practical to the meter. The ultimate right-of-way shall be determined by Public Works Development Services which is in accordance with the Circulation Element of the General Plan, applicable Specific Plan or Precise Alignments approved by the City Engineer. Location shall be subject to approval by the Utility and the City of Anaheim’s Planning Department.

The backflow prevention device shall be painted and screened from view in accordance with Sections 2-14, 4-05, and 4-06, and shall be installed in conformance with the applicable Standard Drawings of these Specifications.

5-01.01 APPROVED MANUFACTURERS

Any backflow prevention devices approved by the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California, Los Angeles, CA 90089-2531, as shown on the latest edition of "List of Approved Backflow Prevention Assemblies". The current list is available at the Foundation's website at https://fccchr.usc.edu/list.html.

5-02 FIRE LINE ASSEMBLY

All fire line assemblies shall require a detector meter and backflow protection as may be determined by the Utility. All fire lines shall be installed in conformance with Section 6 of these Specifications. Vault installation of fire line assemblies is prohibited.

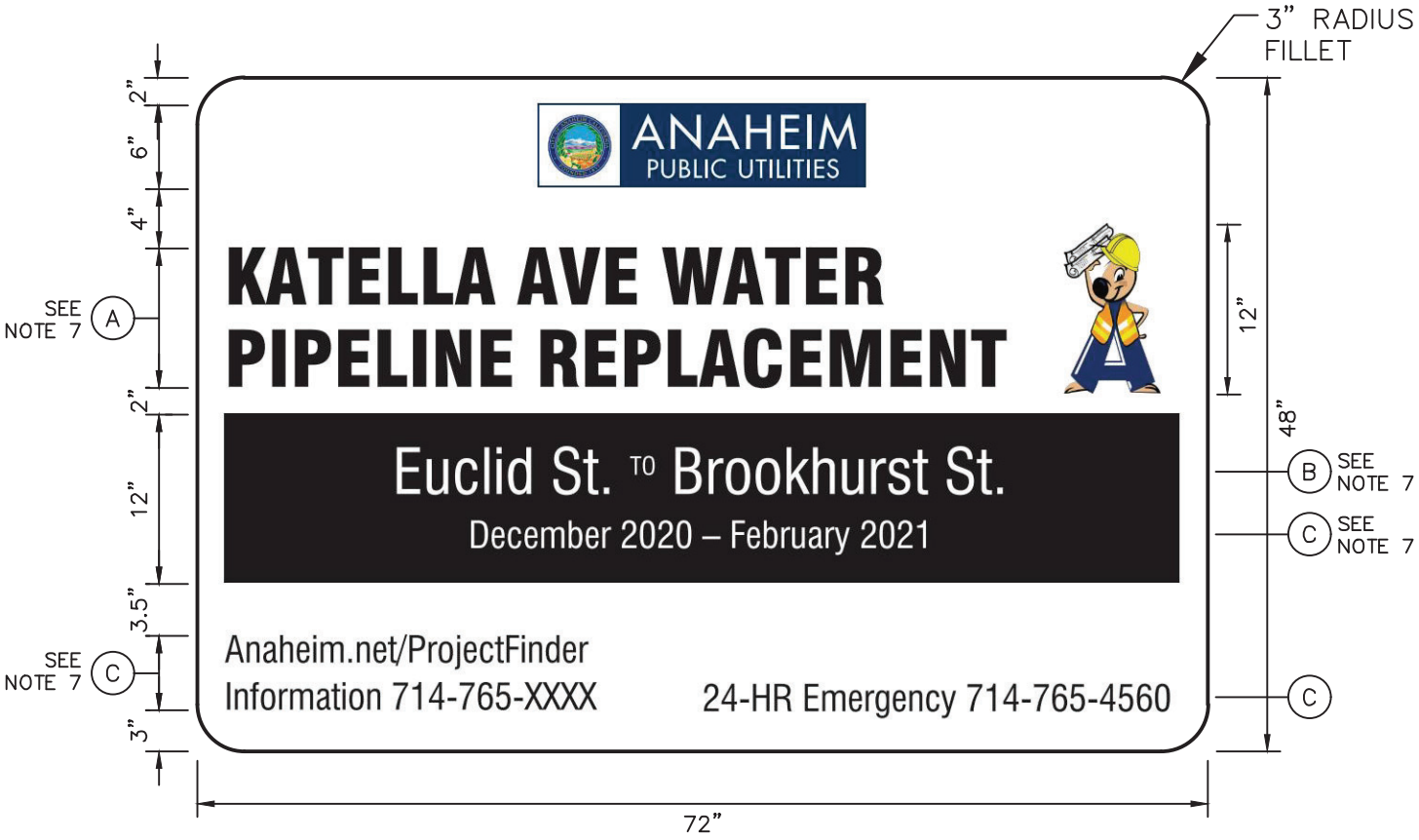
For assemblies that require a detector meter, the meter shall be 5/8 or 3/4 inch nominal size with bronze case and shall have a straight read magnetic drive register capable of detecting increments of consumptive use in one cubic foot increments.

5-03 BACKFLOW PREVENTION DEVICES – TESTING AND MAINTENANCE

Backflow preventers shall be tested immediately after they are installed, relocated or repaired and not placed in service until they are functioning as required. Backflow preventers shall be tested by persons who have demonstrated their competency, are approved by the Utility's cross connection control program, and hold a current City of Anaheim business license.

Backflow preventers shall be tested at least annually or more frequently, if determined to be necessary by the Orange County Health Agency or the Utility's cross connection control program. When devices are found to be defective, they shall be repaired or replaced by the owner. Reports of testing and maintenance shall be kept by the owner for a minimum of three years.

SECTION 6 STANDARD DRAWINGS

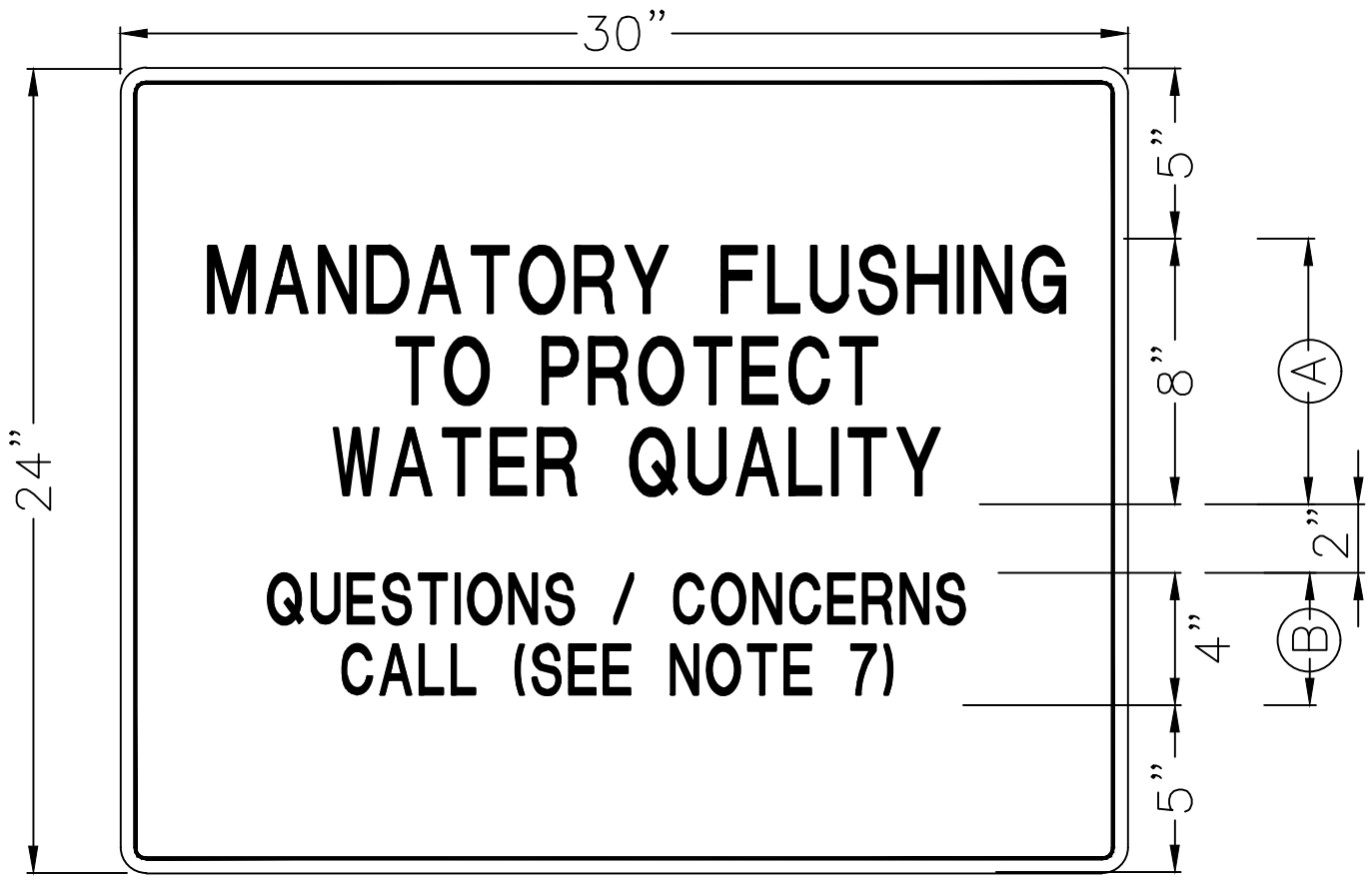


NOTES:

1. THIS PROJECT SIGN SHALL INSTALLED FOR ALL WATER PROJECTS AWARDED UNDER THE WATER SERVICES MASTER CONSTRUCTION AGREEMENT.
2. BASE MATERIAL OF SIGN SHALL BE PLYWOOD (1/2" THICK) OR METAL.
3. OVERALL SIGN DIMENSIONS SHALL BE 4 FEET BY 6 FEET UNLESS OTHERWISE APPROVED BY THE UTILITY.
6. BACKGROUND COLOR SHALL BE NON REFLECTIVE WHITE.
7. THE CITY WILL PROVIDE THE CONTRACTOR WITH PROJECT SPECIFIC NAME, LIMITS, START AND AND FINISH DATES, AND INFORMATION PHONE NUMBER.
8. SIGN FONT SHALL BE "Swis721 Cn BT" OR "Helvetica Neue LT Pro" WITH LETTER SIZE AND SPACING AS FOLLOWS:
   - (A) BOLD LETTERS 4" HIGH, 2" SPACING BETWEEN LINES
   - (B) LETTERS 3.5" HIGH, 1.5" SPACING BETWEEN LINES
   - (C) LETTERS 2" HIGH, 1.5" SPACING BETWEEN LINES
9. PRIOR TO FABRICATION, THE CONTRACTOR SHALL SUBMIT A PROOF BY THE SIGN FABRICATOR WITH PROJECT SPECIFIC INFORMATION FOR REVIEW AND APPROVAL.
4. SIGN SHALL BE SECURELY ANCHORED DOWN. CONTRACTOR SHALL SUBMIT FOR REVIEW AND APPROVAL BY THE ENGINEER.
5. BOTTOM OF SIGN SHALL BE RAISED 7 FEET ABOVE THE ADJACENT GRADE AND SHALL ALLOW 4' WIDE ADA ACCESS IF NECESSARY.

STANDARD PROJECT SIGN

WATER SERVICES	BY	DATE	PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
DRAWN	CE	5-10-21	APPROVED WATER ENGINEERING MANAGER	DATE 5/10/2021	W-050
CHECKED	CE	5-10-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 5/10/2021	
RECOMMENDED	CE	5-10-21	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 1 OF 1



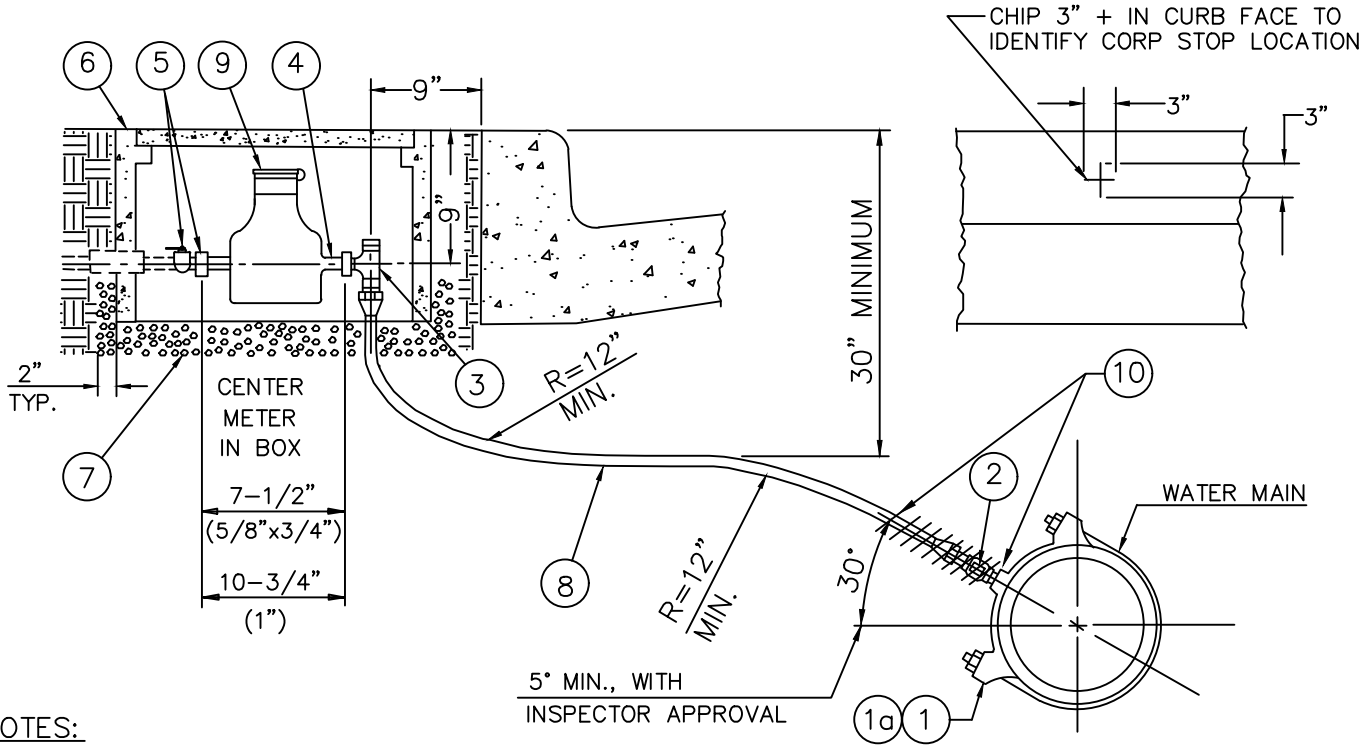
NOTES:

1. A MANDATORY FLUSHING SIGN SHALL BE POSTED WHERE DIRECTED BY THE WATER UTILITY INSPECTOR DURING REQUIRED FLUSHING OF NEW WATER IMPROVEMENTS BY THE CONTRACTOR. THE SIGN IS TO REMAIN IN PLACE UNTIL ITS REMOVAL IS DIRECTED BY THE WATER UTILITY INSPECTOR.
2. BASE MATERIAL OF SIGN SHALL BE PLYWOOD (1/2" THICK) OR SHEET METAL
3. THE SIGN SHALL BE MOUNTED ON A TYPE 1 BARRICADE OR AS DEEMED ACCEPTABLE TO THE WATER UTILITY INSPECTOR.
4. LETTERING SHALL BE CALTRANS HIGHWAY C, LETTER SIZE, FONT, & SPACING AS FOLLOWS
   - (A) LETTER 2" HIGH, 1" BETWEEN LINES (HELVETICA BOLD)
   - (B) LETTER 1-1/2" HIGH, 1" BETWEEN LINES (HELVETICA MEDIUM)
5. BACKGROUND COLOR SHALL BE NON REFLECTIVE WHITE
6. SIGN MESSAGE SHALL BE CENTERED
7. (INSERT : CONTRACTOR'S 24 HRS DISPATCH PHONE NUMBER)

MANDATORY FLUSHING SIGN

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
	BY	DATE			
DRAWN	TL	12-8-14	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021	W-060
CHECKED	DRS	12-15-14	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021	
RECOMMENDED	DEE	12-15-14	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 1 OF 1

LIST OF MATERIAL					
ITEM	DESCRIPTION	FORD	JONES	MUELLER	A.Y. McDONALD
1	DOUBLE STRAP SERVICE SADDLE	202B	J-979	BR2B SERIES	3825
1a	DOUBLE STRAP SERVICE SADDLE (SEE NOTE 8)	202BS	J-969	BR2S SERIES	3855
2	CORPORATION STOP, 1"	—	E-1999SG	N-35008N	—
3	ANGLE METER STOP, 1"	BA43-444WRQ-NL	E-1963WLS	B-24258-3-N	74602B-22
4	BUSHING, 1-1/4"x1" (FOR 5/8"x3/4" ONLY)	—	E-128H	—	—
5	METER COUPLING W/BALL VALVE W/HANDLE	B13444W-NL	E-1908	B24351-411-N	76101MW
6	POLYMER CONCRETE METER BOX & LID (SEE SECTION 2-10.04)				
7	1/2" CRUSHED ROCK, 4" BASE				
8	1" COPPER TUBE, TYPE K (NO SPLICES ALLOWED), SOFT				
9	WATER METER(SEE SECTION 2-11)				
10	TAPE WRAP A DISTANCE OF 3 FEET FROM & INCLUDING CORPORATION STOP W/ POLKEN #900 OR APPROVED EQUAL				



NOTES:

1. COPPER TUBE TO BE ONE CONTINUOUS PIECE. NO SPLICES PERMITTED.
2. INSTALL CORPORATION STOP WITH KEY ON THE SIDE.
3. TAPS SHALL BE MADE AT LEAST 24" FROM ANY OTHER TAP OR COUPLING.
4. STANDARD 1" WATER SERVICE IS USED FOR 5/8" x 3/4" AND 1" METERS.
5. SERVICE SADDLE AND CORPORATION STOP SHALL BE CC (AWWA) THREAD.
6. A TRAFFIC LOAD RATED COVER SHALL BE USED IN AREAS WITHOUT CURB, IN AREAS WITH ROLLED OR TYPE "F" CURB, OR WHERE THE METER IS LOCATED WITHIN 5-FEET OF THE BCR, ECR OR A DRIVEWAY APPROACH.
7. ANGLE METER STOPS SHALL BE PROVIDED WITH 360° TEE HEAD ROTATION.
8. FOR USE ON PVC OR PVCO WATER MAIN CONSTRUCTION ONLY. PVC OR PVCO WATER MAIN CONSTRUCTION SHALL BE PRE-APPROVED BY THE UTILITY PER SECTION 2-02.

1 INCH WATER SERVICE INSTALLATION

PUBLIC UTILITIES DEPARTMENT

WATER SERVICES — CITY OF ANAHEIM

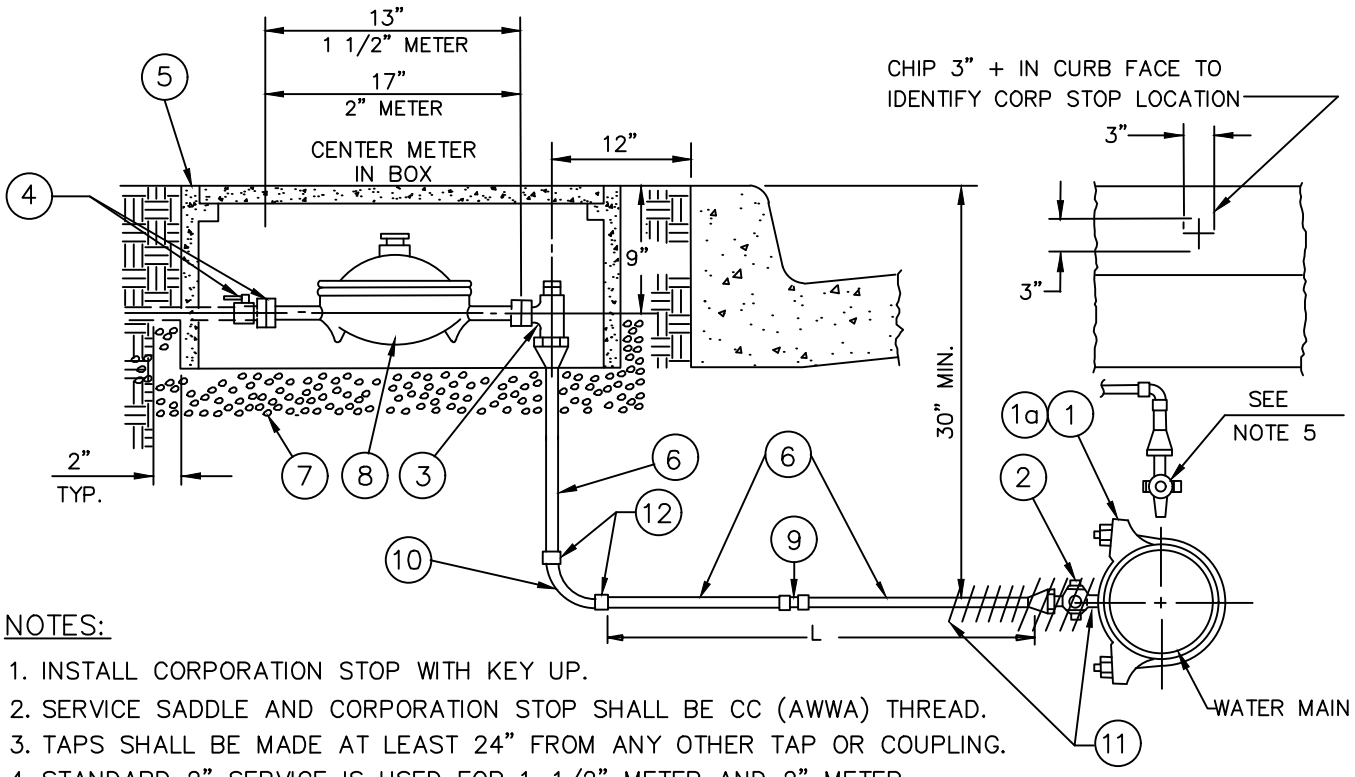
	BY	DATE		
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO. **W-101**

SHEET 1 OF 1

LIST OF MATERIAL

ITEM	DESCRIPTION	FORD	JONES	MUELLER	A.Y. McDONALD
1	DOUBLE STRAP SERVICE SADDLE	202B	J-979	BR2B SERIES	3825
1a	DOUBLE STRAP SERVICE SADDLE (SEE NOTE 9)	202BS	J-969	BR2S SERIES	3855
2	CORPORATION STOP, 2"	———	E-1999SG	N-35008N	———
3	ANGLE METER STOP, 2"	BFA43-777WRQ-NL	E-1975W	B-24276-1-3-N	74612B-22
4	METER COUPLING W/BALL VALVE W/HANDLE	BF13-777W-NL	E-1913WJ	B-24337-41-N	76101MW2
5	POLYMER CONCRETE METER BOX & LID (SEE SECTION 2-10.04)				
6	2" COPPER TUBE, TYPE K, SOFT OR RIGID				
7	1/2" CRUSHED ROCK, 4" BASE				
8	WATER METER (SEE SECTION 2-11)				
9	2" COMPRESSION COUPLING (USE WHEN L > 20')				
10	2" BRASS ELL (LEAD FREE FOR DOMESTIC SERVICE), COMPRESSION TYPE OR F.I.P				
11	TAPE WRAP A DISTANCE OF 3 FEET FROM & INCLUDING CORPORATION STOP W/ POLKEN #900 OR APPROVED EQUAL				
12	COMPRESSION X MALE I.P. (WHEN USING I.P. BRASS ELL)				



NOTES:

1. INSTALL CORPORATION STOP WITH KEY UP.
2. SERVICE SADDLE AND CORPORATION STOP SHALL BE CC (AWWA) THREAD.
3. TAPS SHALL BE MADE AT LEAST 24" FROM ANY OTHER TAP OR COUPLING.
4. STANDARD 2" SERVICE IS USED FOR 1-1/2" METER AND 2" METER.
5. IF APPROVED BY THE WATER UTILITY INSPECTOR, WATER MAIN MAY BE TAPPED W/SERVICE SADDLE AND CORPORATION STOP FROM TOP WHEN FINISHED SURFACE IS GREATER THAN 5-FEET OVER TOP OF PIPE.
6. A TRAFFIC LOAD RATING COVER SHALL BE USED IN AREAS WITHOUT CURB, IN AREAS WITH ROLLED OR TYPE "F" CURB, OR WHERE THE METER IS LOCATED WITHIN 5-FEET OF THE BCR, ECR OR A DRIVEWAY APPROACH.
7. ANGLE METER STOPS SHALL BE PROVIDED WITH 360° TEE HEAD ROTATION.
8. TURBINE METER REQUIRES WATER ENGINEERING APPROVAL.
9. FOR USE ON PVC OR PVCO WATER MAIN CONSTRUCTION ONLY. PVC OR PVCO WATER MAIN CONSTRUCTION SHALL BE PRE-APPROVED BY THE UTILITY PER SECTION 2-02.

2 INCH WATER SERVICE INSTALLATION

PUBLIC UTILITIES DEPARTMENT

WATER SERVICES — CITY OF ANAHEIM

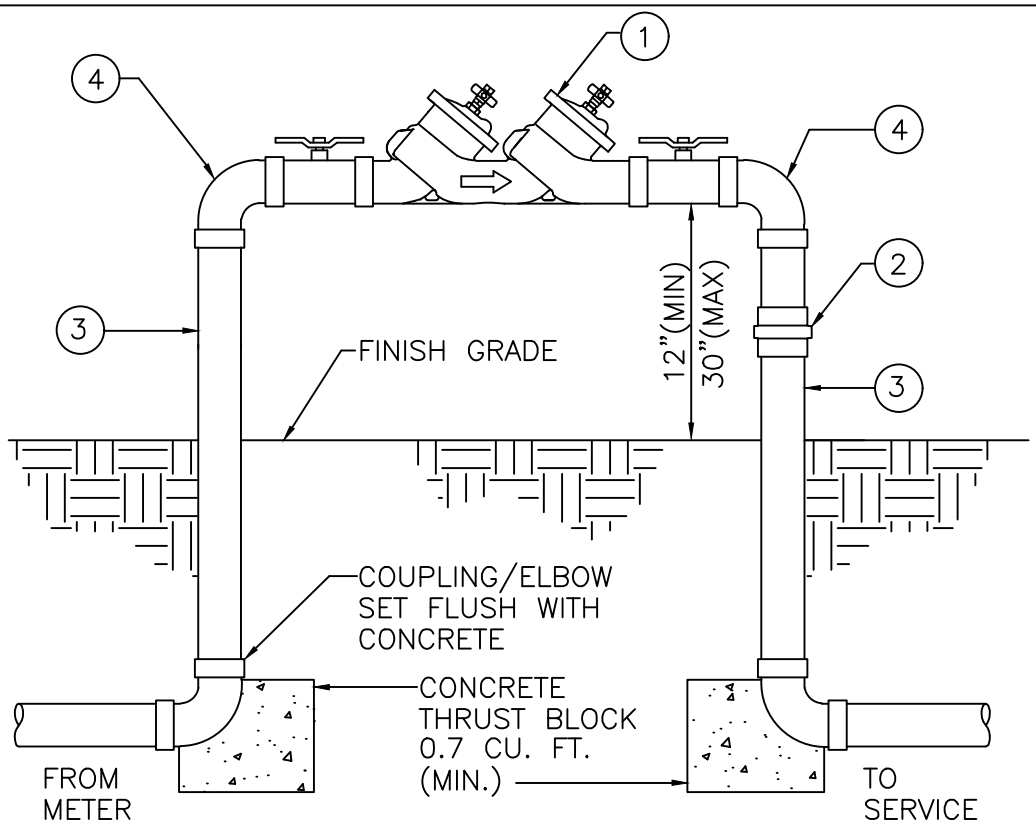
	BY	DATE		
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO.

W-102

SHEET 1 OF 1

LIST OF MATERIAL	
ITEM	DESCRIPTION
1	DOUBLE CHECK BACKFLOW PREVENTION DEVICE, USC APPROVED TYPE (SEE SECTION 5-01)
2	BRASS UNION
3	RISER AND NIPPLES – BRASS OR COPPER
4	90° ELBOW – BRASS OR COPPER



NOTES:

1. THE BACKFLOW PREVENTION ASSEMBLY SHALL CONSIST OF AN APPROVED DOUBLE CHECK ASSEMBLY. THE DEVICE SHALL BE LEAD FREE FOR DOMESTIC SERVICE.
2. LOCATION AND INSTALLATION SHALL BE PER PLAN AS SUBMITTED TO AND APPROVED BY THE UTILITY.
3. NO CONNECTIONS TO BE MADE BETWEEN METER AND BACKFLOW PREVENTER.
4. INSTALL BRASS PLUGS IN ALL TEST COCKS AFTER DEVICE HAS PASSED TESTING
5. BACKFLOW DEVICE SHALL NOT BE LOCATED WITHIN THE PUBLIC RIGHT OF WAY (ROW) AND SHALL BE OUTSIDE OF THE SETBACK AREA (TYPICALLY 5-FT MIN. FROM ROW). UNLESS OTHERWISE APPROVED BY PLANNING DEPT.
6. SECURITY ENCLOSURE (OPTIONAL) SHALL BE PER PUBLIC WORKS STD 512 OR AS SPECIFIED PER PROJECT PLAN OR AS DIRECTED BY THE UTILITY. ENCLOSURES WITH HEIGHT GREATER THAN 36" SHALL BE SUBMITTED FOR APPROVAL BY THE PLANNING DEPARTMENT.

3/4 INCH THROUGH 2 INCH DOUBLE CHECK BACKFLOW PREVENTION ASSEMBLY

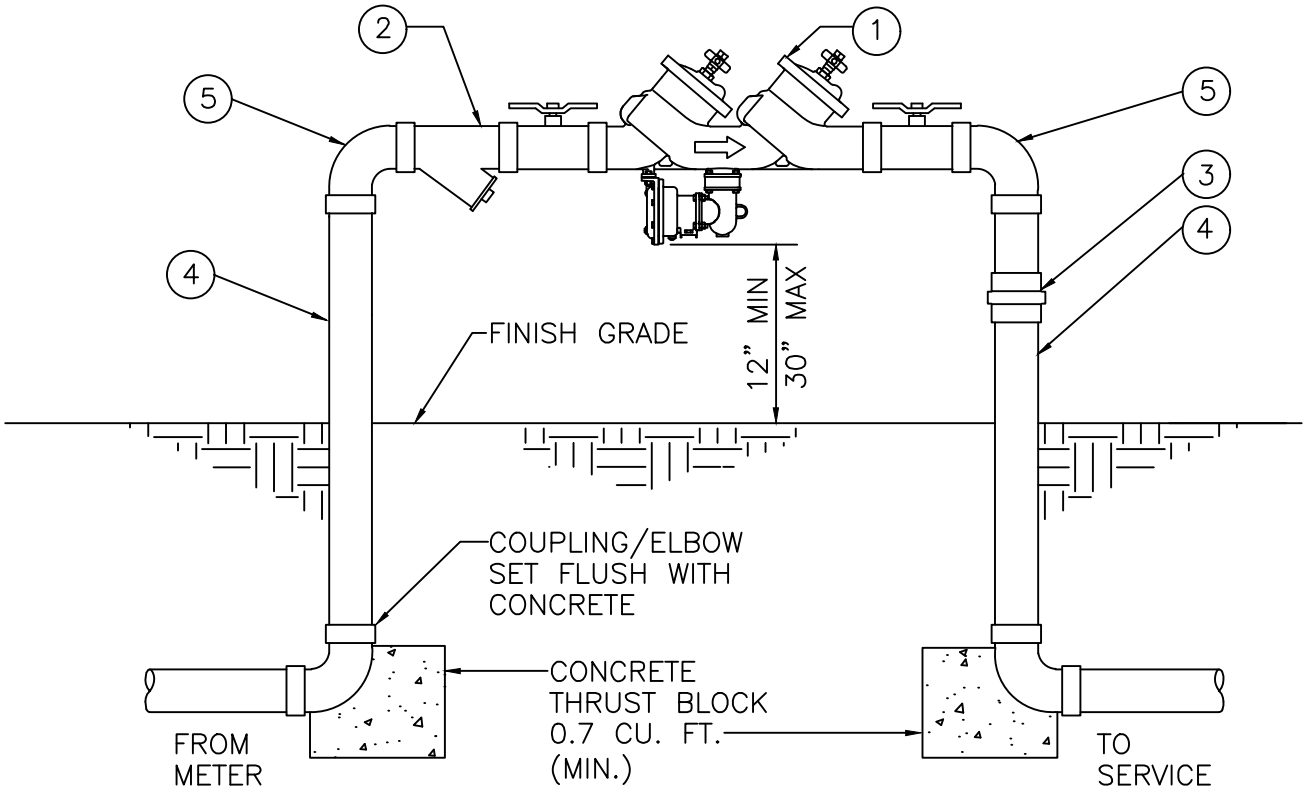
WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

	BY	DATE		
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO. **W-103**

SHEET 1 OF 1

LIST OF MATERIAL	
ITEM	DESCRIPTION
1	REDUCE PRESSURE PRINICIPLE BACKFLOW PREVENTION DEVICE, USC APPROVED TYPE (SEE SECTION 5-01)
2	WYE STRAINER, BRONZE
3	BRASS UNION
4	RISER AND NIPPLES – BRASS OR COPPER
5	90° ELBOW – BRASS OR COPPER



NOTES:

1. THE BACKFLOW PREVENTION ASSEMBLY SHALL CONSIST OF AN APPROVED REDUCED PRESSURE ASSEMBLY. THE DEVICE SHALL BE LEAD FREE FOR DOMESTIC SERVICE.
2. LOCATION AND INSTALLATION SHALL BE PER PLAN AS SUBMITTED TO AND APPROVED BY THE UTILITY.
3. NO CONNECTIONS TO BE MADE BETWEEN METER AND BACKFLOW PREVENTER.
4. INSTALL BRASS PLUGS IN ALL TEST COCKS AFTER DEVICE HAS PASSED TESTING
5. BACKFLOW DEVICE SHALL NOT BE LOCATED WITHIN THE PUBLIC RIGHT OF WAY (ROW) AND SHALL BE OUTSIDE OF THE SETBACK AREA (TYPICALLY 5-FT MIN. FROM ROW). UNLESS OTHERWISE APPROVED BY PLANNING DEPT.
6. SECURITY ENCLOSURE (OPTIONAL) SHALL BE PER PUBLIC WORKS STD 512 OR AS SPECIFIED PER PROJECT PLAN OR AS DIRECTED BY THE UTILITY. ENCLOSURES WITH HEIGHT GREATER THAN 36" SHALL BE SUBMITTED FOR APPROVAL BY THE PLANNING DEPARTMENT.

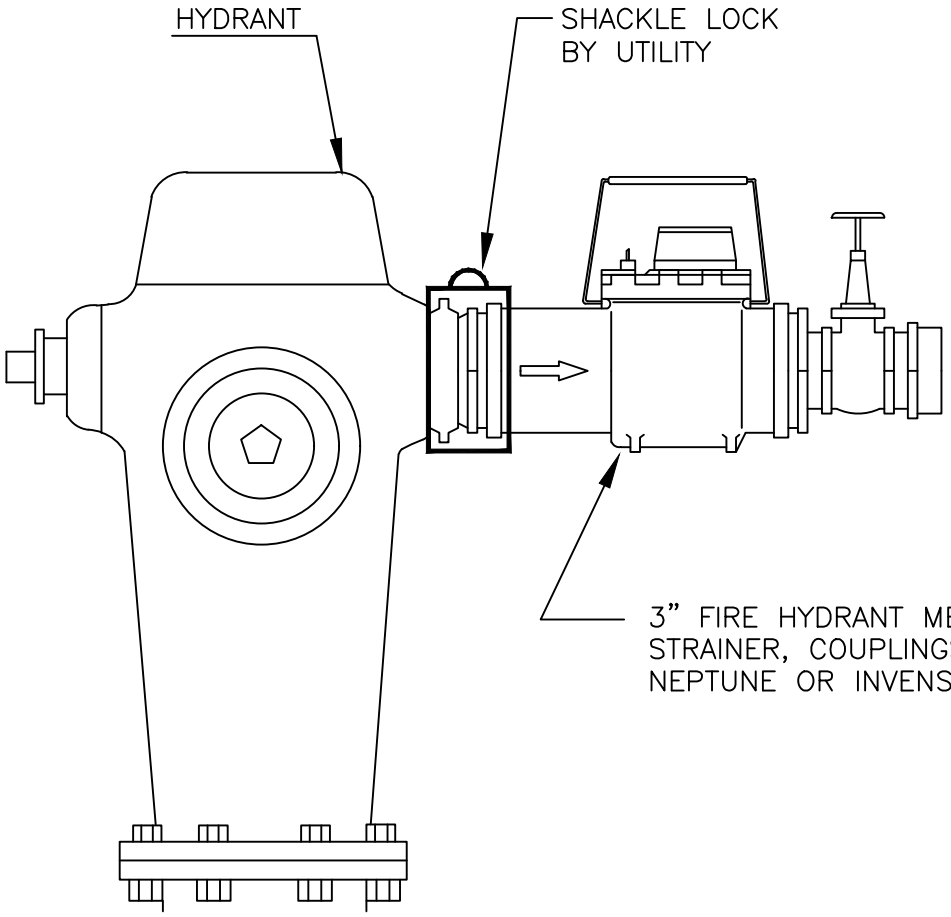
3/4 INCH THROUGH 2 INCH REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY

WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

STD. NO. **W-104**

SHEET 1 OF 1

	BY	DATE		
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021



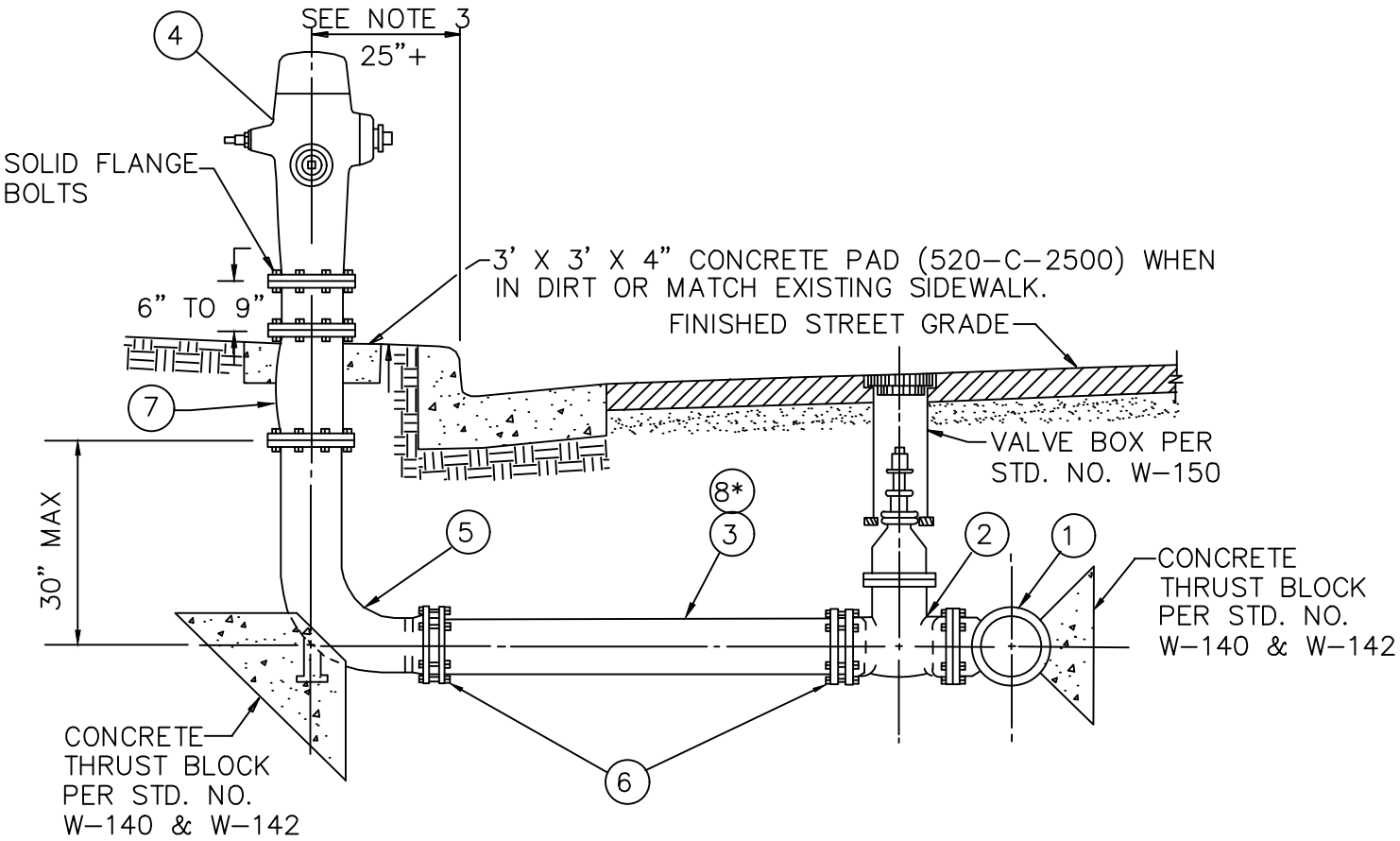
NOTES:

1. OPENING AND CLOSING OF HYDRANT IS PERMITTED ONLY WITH A HYDRANT WRENCH. GATE VALVE WILL BE USED TO CONTROL WATER FLOW.
2. SERVICE MAY BE MOVED FROM ONE LOCATION TO ANOTHER ONLY BY THE WATER DIVISION.
3. BACKFLOW DEVICES MAY BE REQUIRED FOR CERTAIN USES.
4. SERVICE CONNECTION MAY BE TERMINATED AT ANY TIME AT THE DISCRETION OF THE WATER DIVISION.
5. CHARGES FOR LOSS OR DAMAGE TO ANY SERVICE MATERIAL WILL BE BASED UPON CURRENT PRICES.

2-1/2" TEMPORARY WATER SERVICE

WATER SERVICES	BY	DATE	PUBLIC UTILITIES DEPARTMENT — CITY OF ANAHEIM		STD. NO.
DRAWN	HQ	4-10-02	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021	W-106
CHECKED	DE	4-10-02	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021	
RECOMMENDED	DS	4-10-02	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 1 OF 1

LIST OF MATERIAL	
ITEM	DESCRIPTION
1	TEE (MAIN SIZE X 6" FLG OUTLET)
2	GATE VALVE (6" FLG X MJ)
3	DUCTILE IRON PIPE (6")
4	FIRE HYDRANT (WET BARREL), 2–2 1/2" & 1–4"
5	6" X REQ. LENGTH FIRE HYDRANT BURY
6	MECHANICAL JOINT RESTRAINT PER SECTION 2–12.01.1
7	BREAK AWAY CHECK VALVE CLOW 400A OR EQUAL W/ 1/16" WITNESS HOLE IN FLAPPER
8*	IN LIEU OF ITEM 3, PIPE SHALL BE AWWA C900 PVC OR AWWA C909 PVCO PIPE (6"), PRESSURE CLASS 305, PE X PE (SEE NOTES 9 AND 10 ON SHEET 2)



* FOR PVC OR PVCO WATER MAIN CONSTRUCTION ONLY – SEE NOTES 9 AND 10 ON SHEET 2

STANDARD FIRE HYDRANT INSTALLATION

PUBLIC UTILITIES DEPARTMENT

WATER SERVICES — CITY OF ANAHEIM

	BY	DATE		
DRAWN	TL	1–27–20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2–05–21	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2–05–21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO.

W-110

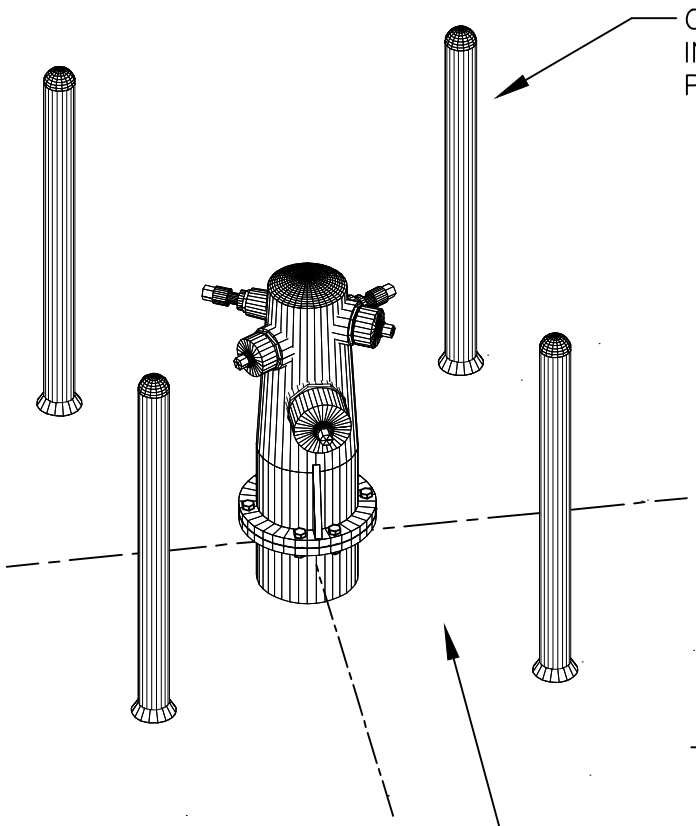
SHEET 1 OF 2

NOTES:

1. FIRE HYDRANTS SHALL BE PAINTED IN ACCORDANCE WITH SECTION 2–14.
2. BREAK–OFF CHECK VALVES SHALL BE CLOW, LB400 OR APPROVED EQUAL. BREAK–OFF CHECK VALVES SHALL HAVE A MAXIMUM LAYING LENGTH OF 21 INCHES AND A MAXIMUM WEIGHT OF 120 POUNDS UNLESS OTHERWISE APPROVED BY UTILITY.
3. DISTANCE FROM CURB FACE TO BE 5'–3" WHEN 4' WIDE SIDEWALK IS ADJACENT TO CURB. A MINIMUM 4' SIDEWALK CLEARANCE SHALL BE MAINTAINED.
4. APPROVED FIRE HYDRANTS: CLOW F–860, JONES J–4060–DR.
5. CONTRACTOR SHALL USE ADDITIONAL RESTRAINED BENDS NECESSARY TO AVOID OTHER EXISTING OR PROPOSED UTILITIES WHEN REQUIRED.
6. FOR ALL CASES, THE LOCATION OF FIRE HYDRANT SHALL MEET ADA REQUIREMENT THAT A MINIMUM 48–INCH CLEARANCE BE MAINTAINED FROM ANY OBSTRUCTION IN THE WALK.
7. FIRE HYDRANT SHALL BE LOCATED A MINIMUM OF 5 FEET FROM BCR, ECR OR DRIVEWAY APPROACH.
8. FOR ROLLED CURBS THE DISTANCE FROM THE EDGE OF THE PAVEMENT TO THE FIRE HYDRANT SHALL BE AS DIRECTED BY THE ENGINEER.
9. PVC OR PVCO WATER MAIN CONSTRUCTION SHALL BE PRE–APPROVED BY THE UTILITY PER SECTION 2–02.
10. MECHANICAL JOINT RESTRAINT FOR PVC OR PVCO PIPE SHALL BE PROVIDED PER SECTION 2–12.01
11. TAPPING SLEEVES, WHEN INDICATED PER PLAN OR AS DIRECTED BY UTILITY, SHALL BE PER SECTION 2–8.05. TAPPING VALVES 12" AND SMALLER SHALL BE RESILIENT WEDGE GATE VALVES.

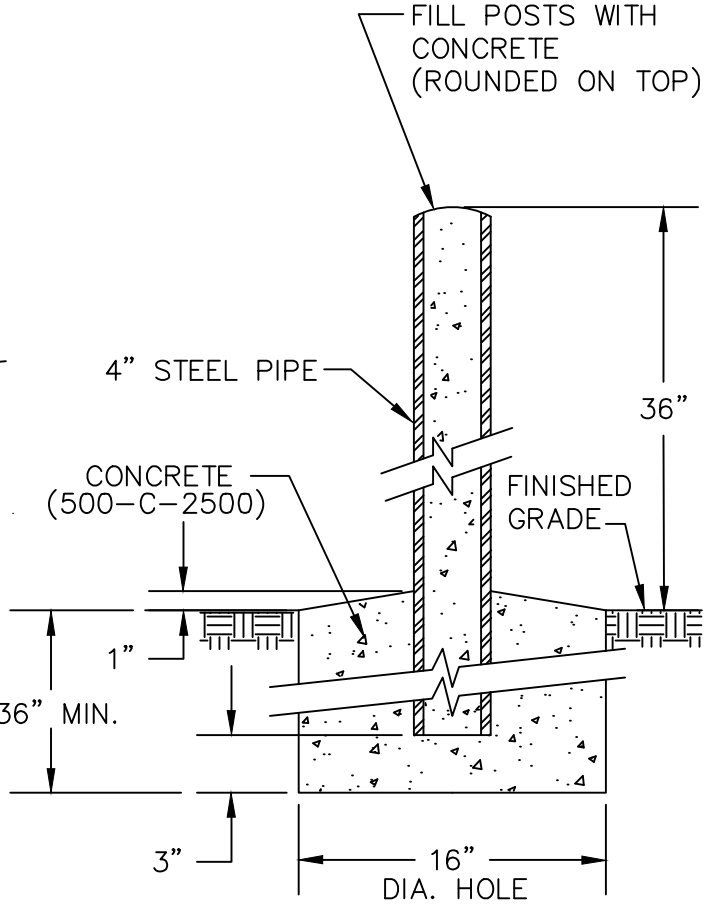
STANDARD FIRE HYDRANT INSTALLATION

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
	BY	DATE			
DRAWN	TL	1–27–20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021	W-110
CHECKED	CE	2–05–21	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021	
RECOMMENDED	CE	2–05–21	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 2 OF 2



OMIT REAR GUARD POSTS ON INSTALLATIONS NOT REQUIRING PROTECTION FROM REAR.

PROVIDE 36" CLEARANCE ALL AROUND FROM OUTSIDE EDGE OF HYDRANT OR FACILITY TO OUTSIDE EDGE OF GUARD POST



POST DETAIL

NOTES:

1. WHEN REQUIRED BY THE UTILITY, GUARD POSTS SHALL BE INSTALLED FOR HYDRANTS OR OTHER CITY WATER FACILITIES ADJACENT TO STREETS WITHOUT CURBS, WITH ROLLED OR TYPE 'F' CURB, OR WITHIN 4 FEET OF PARKING LOT CURB OR CURB STOPS.
2. GUARD POSTS SHALL BE PAINTED IN ACCORDANCE WITH SECTION 2-14.
3. REFLECTIVE TAPE REQUIRED FOR COLORS OTHER THAN SAFETY YELLOW.
4. FOR ALL CASES, THE LOCATION OF GUARD POSTS SHALL MEET ADA REQUIRMENT THAT A MINIMUM 48-INCH CLEARANCE BE MAINTAINED FROM ANY OBSTRUCTION IN THE WALK.
5. GUARD POSTS SHALL BE LOCATED A MINIMUM OF 5 FEET FROM BCR, ECR OR DRIVEWAY APPROACH.
6. IN AREAS WITH ROLLED CURBS OR NO CURBS, THE DISTANCE FROM THE EDGE OF PAVEMENT TO THE GUARD POSTS SHALL BE AS DIRECTED BY THE UTILITY.

WATER FACILITY GUARD POSTS

PUBLIC UTILITIES DEPARTMENT

WATER SERVICES — CITY OF ANAHEIM

	BY	DATE		
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021

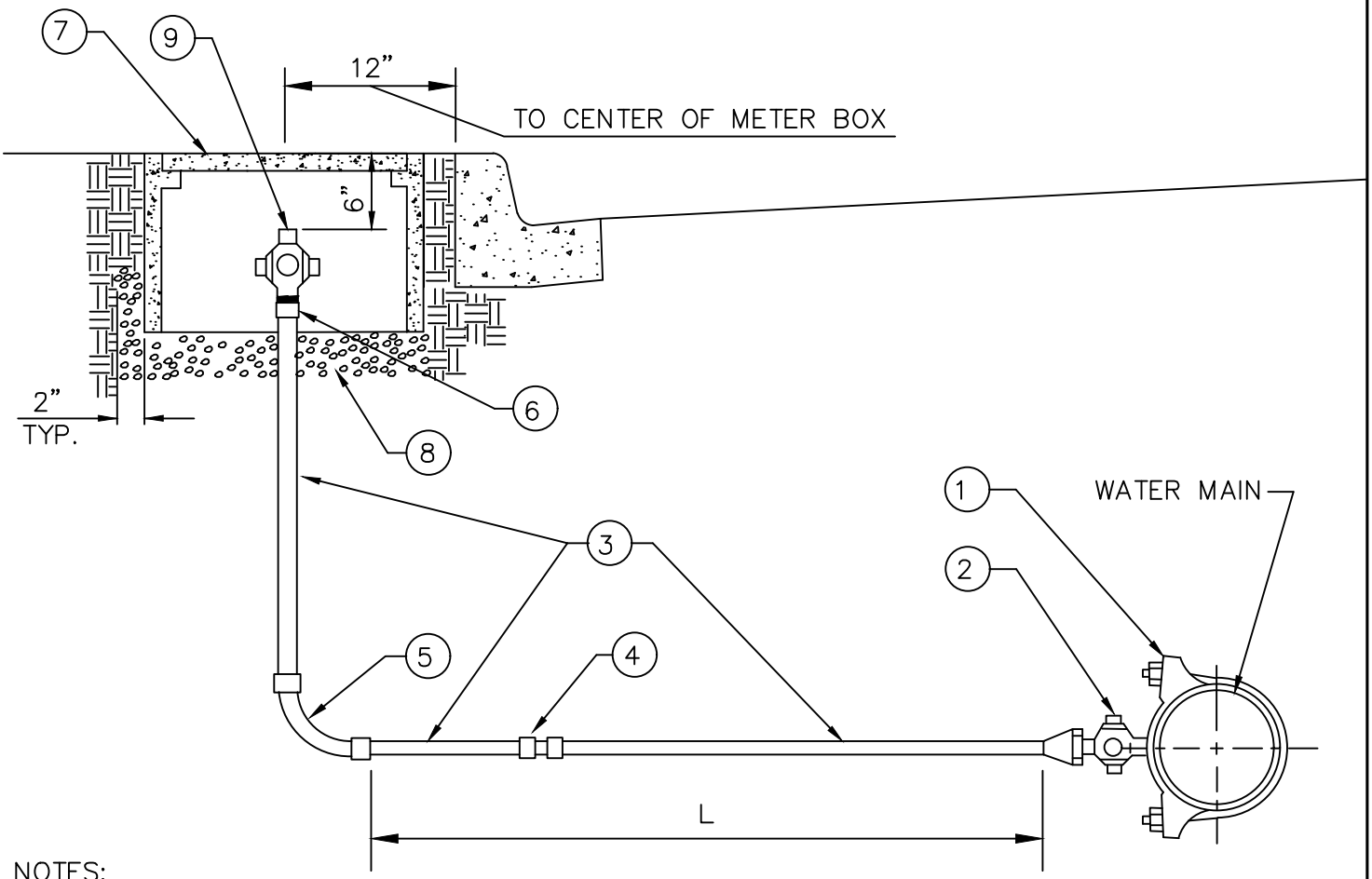
STD. NO.

W-115

SHEET 1 OF 1

LIST OF MATERIAL

ITEM	DESCRIPTION	FORD	JONES	MUELLER	A.Y. McDONALD
1	DOUBLE STRAP SERVICE SADDLE W/CC (AWWA) THREAD	202B	J-979	BR2B SERIES	3825
2	CORPORATION STOP, 2", KEY UP W/CC (AWWA) THREAD	FB1000-Q-NL	E-1937	B-25008N	74701BL
3	2" COPPER TUBE, TYPE K, 20' LENGTHS				
4	COUPLING, W/STOP, CxC; USE WHEN L > 20', NIBCO				
5	SHORT RADIUS ELL, CxC, NIBCO				
6	COUPLING, C X FIP				
7	METER BOX FOR 2" SERVICE PER SECTION 2-10.04 WITH ARMORCAST, A6001643 COVER FOR PEDESTRIAN LOAD AND A6001947T FOR TRAFFIC LOAD, PLUS "BLOW-OFF" MARKING				
8	1/2" CRUSHED ROCK, 4" BASE				
9	CORPORATION STOP, 2", MIP X FIP	FB1700-7-NL	E-1931	B-20046N	73149B



NOTES:

1. TAPS SHALL BE MADE AT LEAST 24" FROM ANY OTHER TAP, COUPLING, OR END OF MAIN.
2. USE 95/5 (TIN-ANTIMONY) OR SILVER SOLDER
3. IN AREAS WITHOUT CURB OR WITH ROLLED OR TYPE "F" CURB, USE TRAFFIC LOAD RATED COVER.

2" BLOWOFF ASSEMBLY - NON TRAFFIC BEARING

PUBLIC UTILITIES DEPARTMENT

WATER SERVICES — CITY OF ANAHEIM

	BY	DATE		
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021

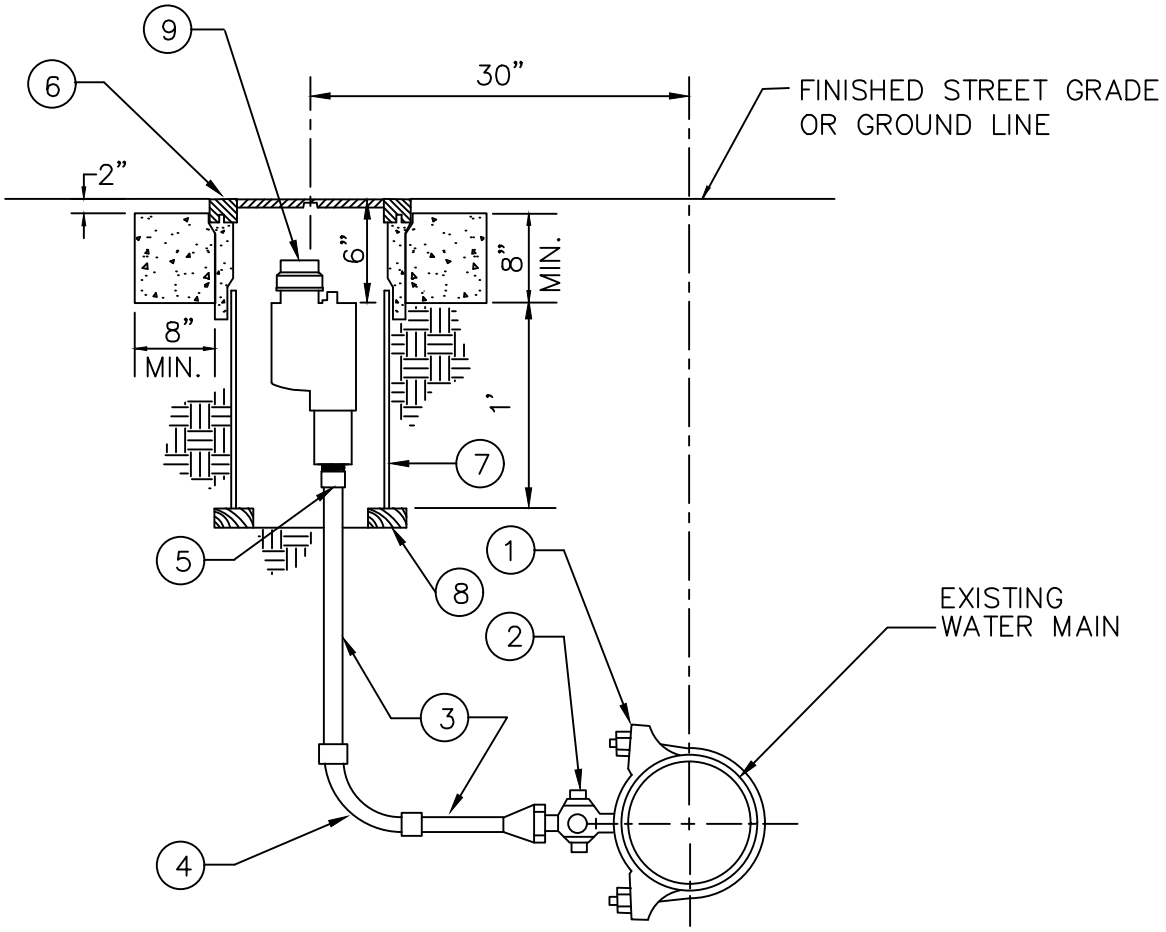
STD. NO.

W-121

SHEET 1 OF 1

LIST OF MATERIAL

ITEM	DESCRIPTION	FORD	JONES	MUELLER	A.Y. McDONALD
1	DOUBLE STRAP SERVICE SADDLE W/CC (AWWA) THREAD	202B	J-979	BR2B SERIES	3825
2	CORPORATION STOP, 2", KEY UP W/CC (AWWA) THREAD	FB-1000-Q	J-1937	B-25008	4701BL
3	2" COPPER TUBE, TYPE K				
4	SHORT RADIUS ELL, CxC, NIBCO				
5	COUPLING, C X THREAD				
6	BROOKS 4TT BOX.				
7	8" DIA PVC PIPE, C900 LENGTH AS REQUIRED				
8	2" X 4" X 8" REDWOOD, 2 PLACES				
9	BLOW-OFF VALVE, BRASS, 2", TRUFLO MODEL TF550 BY THE KUPFERLE FOUNDARY CO.				



NOTES:

1. TAPS SHALL BE MADE AT LEAST 24" FROM ANY OTHER TAP, COUPLING, OR END OF MAIN.
2. USE 95/5 (TIN-ANTIMONY) OR SILVER SOLDER.

2" BLOWOFF ASSEMBLY - TRAFFIC BEARING

PUBLIC UTILITIES DEPARTMENT

WATER SERVICES — CITY OF ANAHEIM

	BY	DATE		
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021

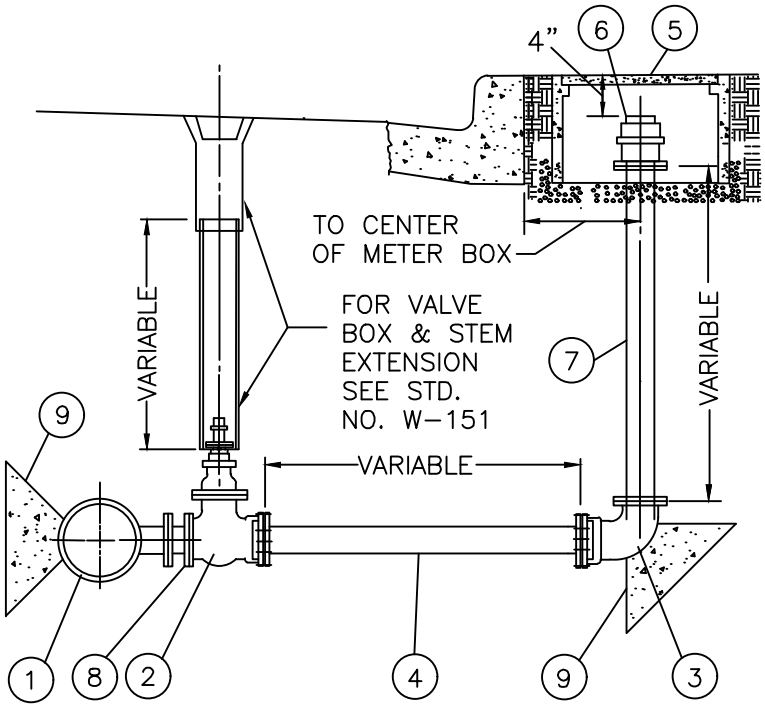
STD. NO.

W-122

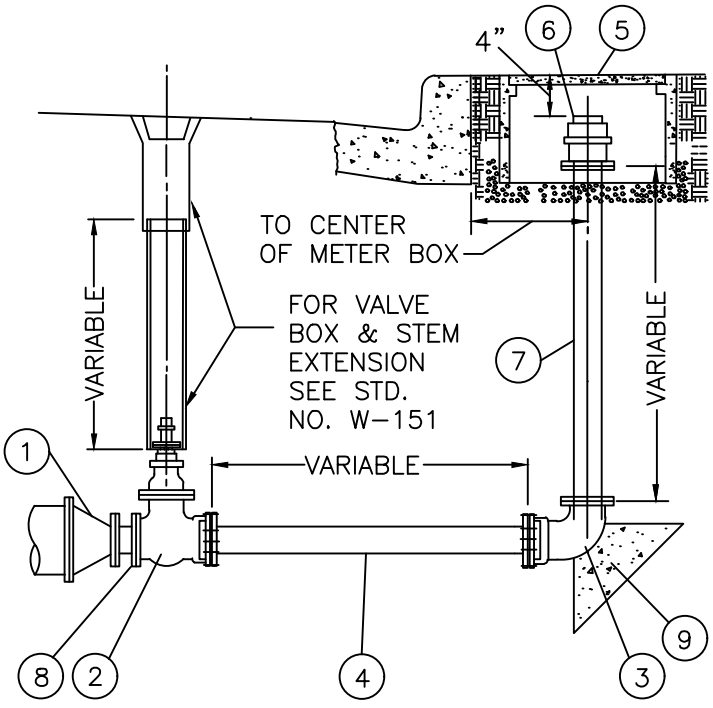
SHEET 1 OF 1

LIST OF MATERIAL	
ITEM	DESCRIPTION
1	MAIN SIZE X 4" TEE, FLG X MJ, RESTRAINED, D.I. OR MAIN SIZE X 4" REDUCER, FLG X FLG
2	4" GATE VALVE, RESILIENT WEDGE, AWWA C509, FLG X MJ, RESTRAINED
3	4" D.I. 90° BEND, MJ, RESTRAINED X FLG
4	VARIABLE LENGTH 4" C900 PVC OR C909 PVCO, CLASS 305
5	METER BOX FOR 2" SERVICE PER SEC. 2-10.04 WITH ARMORCOAST, A6001643 COVER FOR PEDESTRIAN LOAD AND A6001947T FOR TRAFFIC LOAD, PLUS "BLOW-OFF" MARKING
6	4" FLG X 4" NST FIRE HOSE CONNECTION ADAPTER WITH 4" THREADED CAP
7	VARIABLE LENGTH 4" D.I. FLANGED SPOOL
*8	4" D.I. FLANGED SPOOL X LENGTH DESIGNATED ON PLAN. 8-5/8"ø X 2 3/4" LONG HEX. HEAD BOLTS W/NUTS. 1-4" GASKET RUBBER RING.
9	CONCRETE THRUST BLOCK PER STD. NO. W-140 & W-142.

*IF DESIGNATED ON PLAN



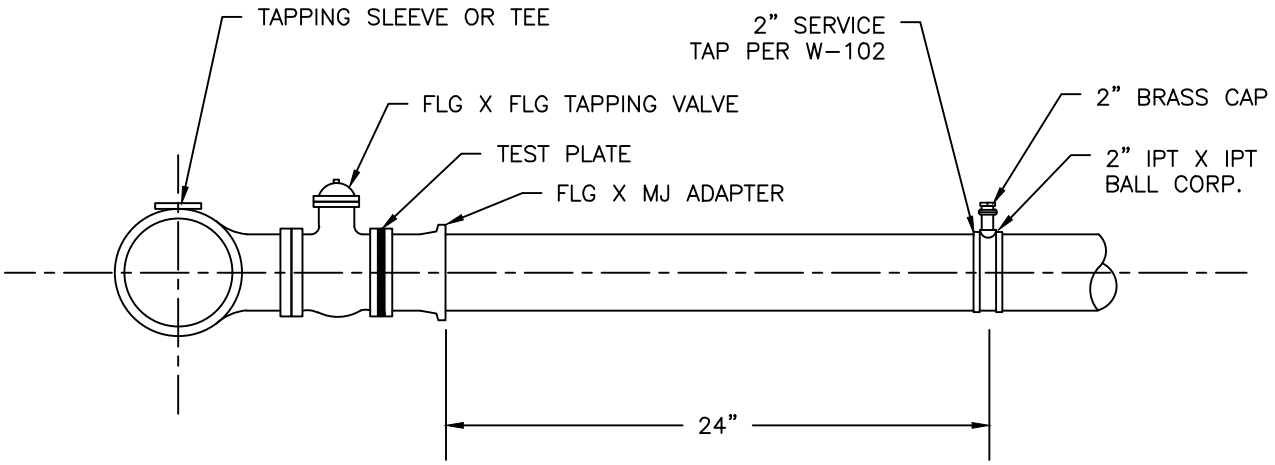
IN-LINE BLOWOFF



END-OF-LINE BLOWOFF

4" BLOWOFF

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
	BY	DATE			
DRAWN	DK	11-1-16	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021	W-124
CHECKED	DK	11-1-16	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021	
RECOMMENDED	MF	11-2-16	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 1 OF 1

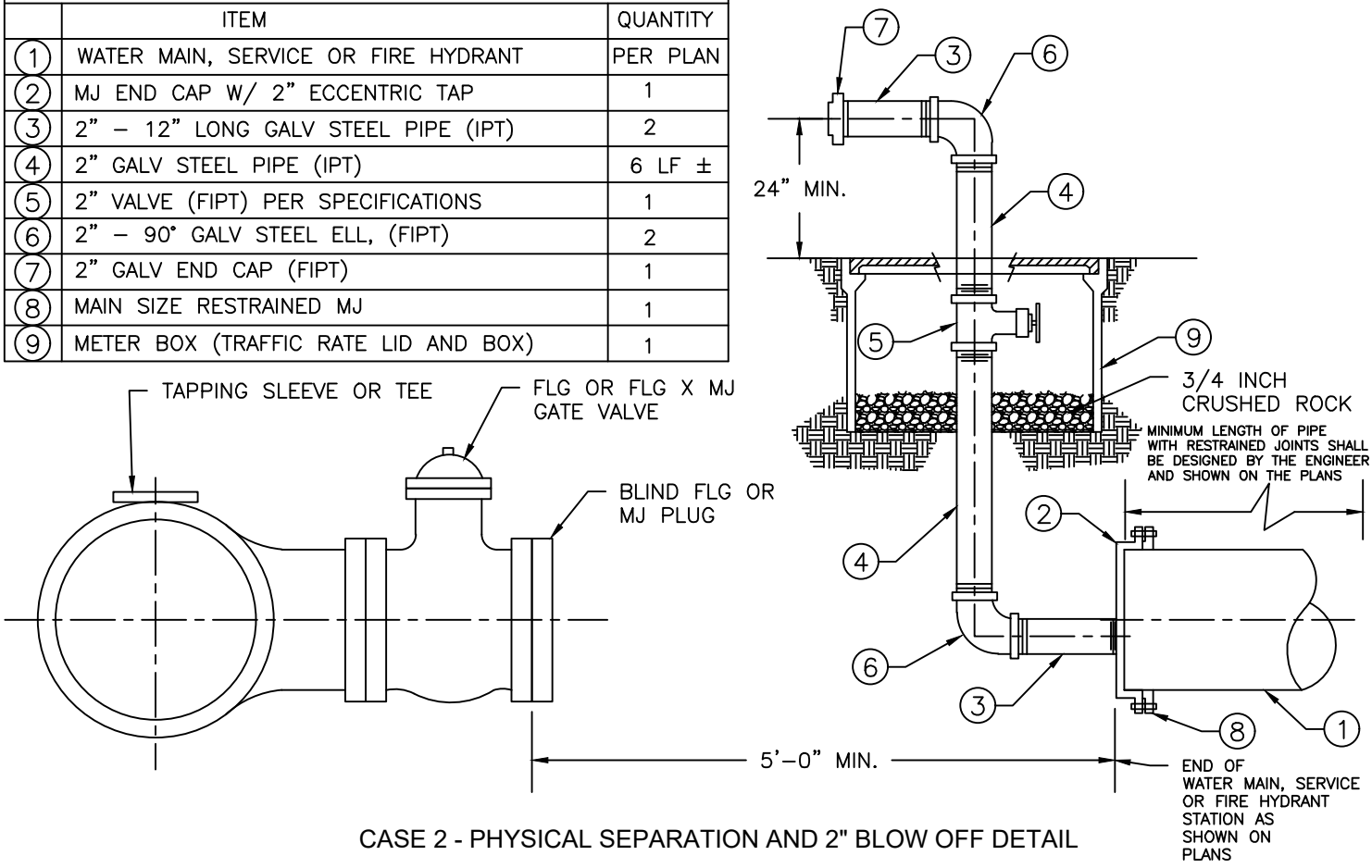


CASE 1 - TEST PLATE DETAIL

BILL OF MATERIALS

	ITEM	QUANTITY
1	WATER MAIN, SERVICE OR FIRE HYDRANT	PER PLAN
2	MJ END CAP W/ 2" ECCENTRIC TAP	1
3	2" – 12" LONG GALV STEEL PIPE (IPT)	2
4	2" GALV STEEL PIPE (IPT)	6 LF ±
5	2" VALVE (FIPT) PER SPECIFICATIONS	1
6	2" – 90° GALV STEEL ELL, (FIPT)	2
7	2" GALV END CAP (FIPT)	1
8	MAIN SIZE RESTRAINED MJ	1
9	METER BOX (TRAFFIC RATE LID AND BOX)	1

NOTE:
1– CONTRACTOR SHALL LEAVE END CAP IN PLACE UNTIL FINAL CONNECTION IS APPROVED



CASE 2 - PHYSICAL SEPARATION AND 2" BLOW OFF DETAIL

TEST SET UP REQUIREMENTS FOR NEWLY INSTALLED WATER MAINS, LARGE METER SERVICES › 2 INCH , AND FIRE HYDRANTS-ALL EXCEEDING 18 FT IN LENGTH

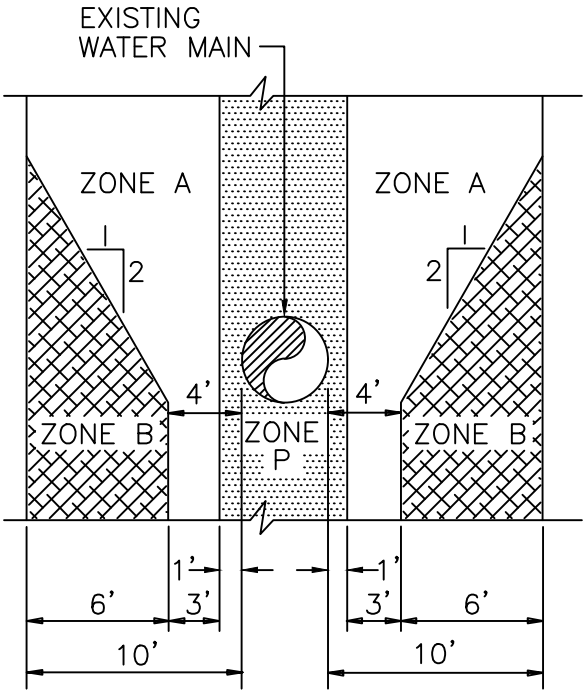
WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

STD. NO. **W-126**

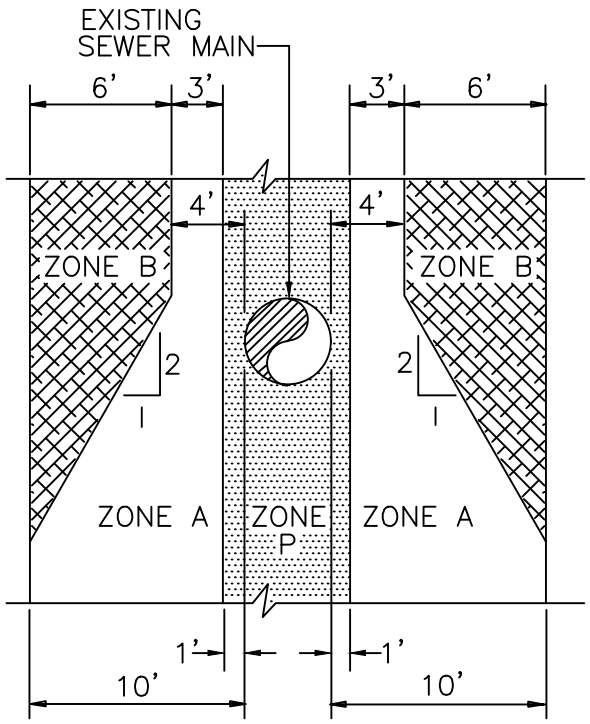
SHEET 1 OF 1

	BY	DATE		
DRAWN	TL	8–21–14	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	DRS	8–28–14	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021
RECOMMENDED	DEE	8–28–14	APPROVED CITY ENGINEER	DATE 7/7/2021

ZONE	NEW SEWER CONSTRUCTION	NEW WATER MAIN CONSTRUCTION
B	SEWER PIPE SHALL BE EXTRA STRENGTH V.C.P. WITH COMPRESSION JOINTS OR ALTERNATE MATERIAL AS APPROVED BY PUBLIC WORKS AND PUBLIC UTILITIES DEPARTMENT	WATER PIPE SHALL BE DIP, CLASS 52, WITH HOT DIP BITUMINOUS COATING PER SECT. 2–01 OR, UPON APPROVAL, PVC PIPE, CLASS 305 (DR 14 AWWA C900), SEE NOTE 4 ON W–130 SHEET 2 OF 4
A	NO CONSTRUCTION WITHOUT APPROVAL OF WATER UTILITY AND STATE WATER RESOURCES CONTROL BOARD, DIVISION OF DRINKING WATER (SWRCB–DDW)	
P	PROHIBITED ZONE PER SECTION 64572 CALIFORNIA CODE OF REGULATION, TITLE 22	



ZONES INDICATING LOCATIONS OF NEW SEWER



ZONES INDICATING LOCATIONS OF NEW WATER MAIN

PARALLEL CONSTRUCTION

NOTE: SPECIAL CONSTRUCTION SHOWN ABOVE ARE FOR GUIDELINES ONLY
SEE NOTES ON FOLLOWING SHEETS FOR ADDITIONAL REQUIREMENTS

WATER AND SEWER SEPARATION REQUIREMENTS

WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

	BY	DATE			
DRAWN	TL	10–21–14	APPROVED WATER ENGINEERING MANAGER	DATE	3/11/2021
CHECKED	DRS	10–28–14	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE	3/11/2021
RECOMMENDED	DE	10–28–14	APPROVED CITY ENGINEER	DATE	7/7/2021

STD. NO. **W-130**

SHEET 1 OF 4

NOTES:

1. SWRCB–DDW REGULATIONS REQUIRE THAT THE HORIZONTAL DISTANCE BETWEEN THE WATER MAIN AND THE SANITARY SEWER MAIN SHALL BE A MINIMUM OF 10–FT FROM OUTSIDE WALL–TO–OUTSIDE WALL.

2. FOR SITUATIONS IN WHICH THERE IS NO ALTERNATIVE BUT TO INSTALL WATER MAINS, SANITARY SEWER MAINS OR OTHER NON–POTABLE PIPELINES AT A DISTANCE LESS THAN THAT REQUIRED BY SWRCB–DDW REGULATIONS, THEN SPECIAL CONSTRUCTION AS SHOWN ON SHEET 1 OF 4 OF W–130, CAN BE USED AFTER REVIEW AND APPROVAL IN WRITING BY SWRCB–DDW

3. FORCE SEWER MAINS ARE NOT PERMITTED IN ZONES A OR B.

4. PVC WATER MAIN CONSTRUCTION SHALL BE PRE–APPROVED BY THE UTILITY PER SECTION 2–02. PVC PIPE LARGER THAN 12–INCH IN DIAMETER IS NOT ALLOWED.

5. INSTALLATION OF WATER MAINS, SANITARY SEWER MAINS, OR OTHER NON–POTABLE PIPELINES THAT DO NOT MEET THE MINIMUM SWRCB–DDW SEPARATION CRITERIA SHALL BE REVIEWED AND APPROVED IN WRITING BY SWRCB–DDW ON A CASE–BY–CASE BASIS PRIOR TO CONSTRUCTION.

WATER AND SEWER SEPARATION REQUIREMENTS

WATER SERVICES

PUBLIC UTILITIES DEPARTMENT

CITY OF ANAHEIM

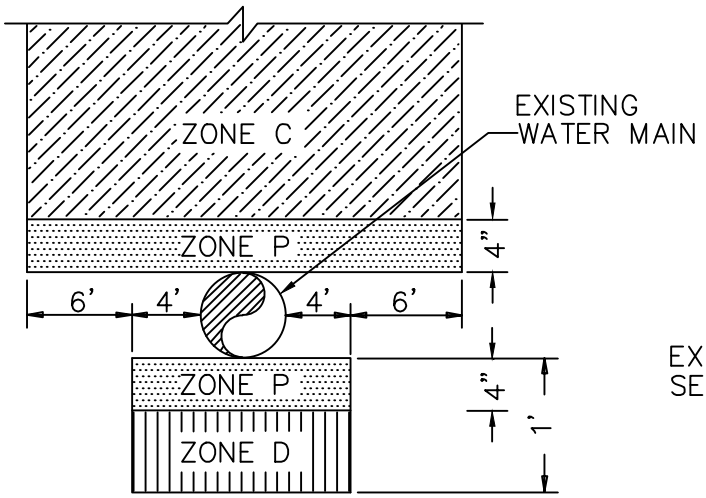
	BY	DATE			
DRAWN	TL	10–21–14	APPROVED WATER ENGINEERING MANAGER	DATE	3/11/2021
CHECKED	DRS	10–28–14	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE	3/11/2021
RECOMMENDED	DE	10–28–14	APPROVED CITY ENGINEER	DATE	7/7/2021

STD. NO.

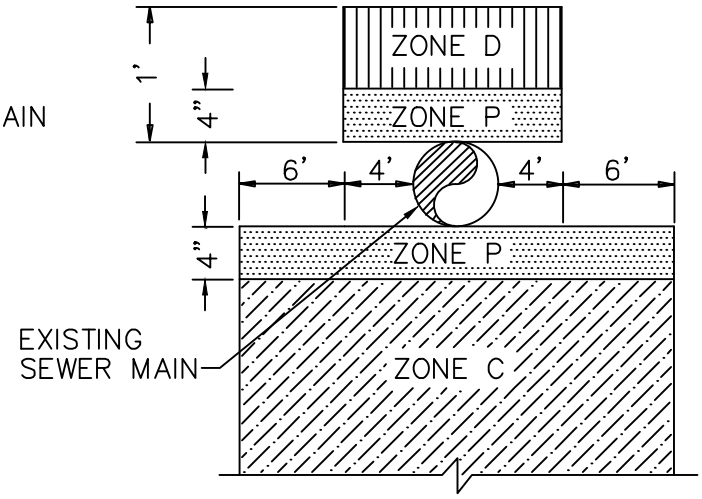
W-130

SHEET 2 OF 4

ZONE	NEW SEWER CONSTRUCTION	NEW WATER MAIN CONSTRUCTION
C	NEW SEWER PIPE SHALL BE CENTERED OVER THE EXISTING WATER PIPE BEING CROSSED; SEWER PIPE SHALL BE A CONTINUOUS FULL LENGTH OF DIP WITH CERAMIC EPOXY LINING (PROTECTO 401 OR APPROVED EQUAL), OR, ALTERNATIVELY, ANY APPROVED SEWER PIPE MATERIAL WITHIN A CONTINUOUS CASING AS APPROVED BY PUBLIC WORKS	NEW WATER PIPE SHALL BE CENTERED UNDER THE EXISTING SEWER PIPE BEING CROSSED; WATER PIPE SHALL BE A CONTINUOUS FULL LENGTH OF DIP, CLASS 52, OR, UPON APPROVAL, A CONTINUOUS FULL LENGTH OF PVC PIPE, CLASS 305 (DR 14 AWWA C900), SEE NOTE 5 ON W-130, SHEET 4 OF 4
D	SEWER PIPE SHALL NOT HAVE JOINTS WITHIN 4-FT FROM EITHER SIDE OF WATER PIPE BEING CROSSED; SEWER PIPE SHALL BE A CONTINUOUS SECTION OF DIP WITH CERAMIC EPOXY LINING (PROTECTO 401 OR APPROVED EQUAL), OR, ALTERNATIVELY, ANY APPROVED SEWER PIPE MATERIAL WITHIN A CONTINUOUS CASING AS APPROVED BY PUBLIC WORKS	WATER PIPE SHALL HAVE NO JOINTS WITHIN 4-FT FROM EITHER SIDE OF SEWER PIPE BEING CROSSED; WATER PIPE SHALL BE A CONTINUOUS FULL LENGTH OF DIP, CLASS 52, OR UPON APPROVAL, A CONTINUOUS FULL LENGTH OF PVC PIPE, CLASS 305 (DR 14 AWWA C900), SEE NOTE 5 ON W-130, SHEET 4 OF 4
P	PROHIBITED ZONE PER SECTION 64572, CALIFORNIA CODE OF REGULATION, TITLE 22.	



ZONES INDICATING LOCATIONS OF NEW SEWER



ZONES INDICATING LOCATIONS OF NEW WATER MAIN

PERPENDICULAR CONSTRUCTION (CROSSING)

NOTE: SPECIAL CONSTRUCTION SHOWN ARE FOR GUIDELINES ONLY.
SEE NOTES ON FOLLOWING SHEET FOR ADDITIONAL REQUIREMENTS

WATER AND SEWER SEPARATION REQUIREMENTS

PUBLIC UTILITIES DEPARTMENT

WATER SERVICES — CITY OF ANAHEIM

	BY	DATE		
DRAWN	CE	5-10-21	APPROVED WATER ENGINEERING MANAGER	DATE 5/10/2021
CHECKED	CE	5-10-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 5/10/2021
RECOMMENDED	CE	5-10-21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO. **W-130**

SHEET 3 OF 4

NOTES:

1. SWRCB–DDW REGULATIONS REQUIRE THAT WATER MAINS BE INSTALLED A MINIMUM OF ONE (1) FOOT VERTICALLY ABOVE THE SANITARY SEWER MAINS.

2. FOR SITUATIONS IN WHICH THERE IS NO ALTERNATIVE BUT TO INSTALL WATER MAINS, SANITARY SEWER MAINS OR OTHER NON–POTABLE PIPELINES AT A DISTANCE LESS THAN THAT REQUIRED BY SWRCB–DDW REGULATIONS, THEN SPECIAL CONSTRUCTION SHOWN ON SHEET 3 OF 4 W–130, CAN BE USED AFTER REVIEW AND APPROVAL IN WRITING BY SWRCB–DDW.

3. FORCE SEWER MAINS ARE NOT PERMITTED IN ZONE C, AND IN ZONE D ONLY WITH SPECIAL CONSTRUCTION AS DETERMINED BY SWRCB–DDW

4. ALL WATER MAIN PIPE SHALL BE D.I.P. PER SECTION 2–01 AND SHALL RECEIVE A HOT DIP BITUMINOUS COATING.

5. PVC WATER MAIN CONSTRUCTION SHALL BE PRE–APPROVED BY THE UTILITY PER SECTION 2–02. PVC PIPE LARGER THAN 12–INCH DIAMETER IS NOT ALLOWED.

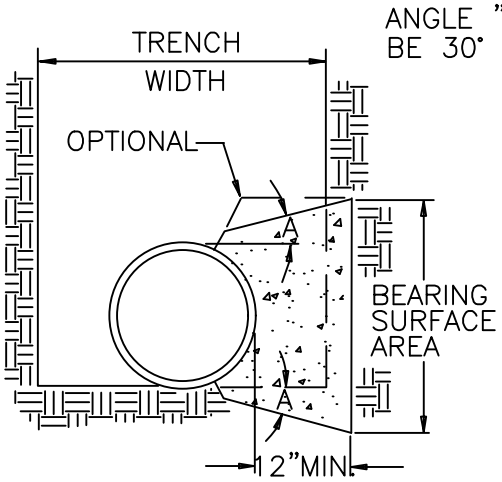
6. SEWER HOUSE LATERAL REPAIR CROSSING ABOVE A WATER MAIN SHALL BE CONTINUOUS 5–FT LENGTH VCP PIPE WITH FERNCO COUPLING OR APPROVED EQUAL.

7. WATER MAIN CROSSING BELOW AN EXISTING SEWER HOUSE LATERAL SHALL BE A CONTINUOUS FULL LENGTH PIPE CENTERED BELOW THE LATERAL.

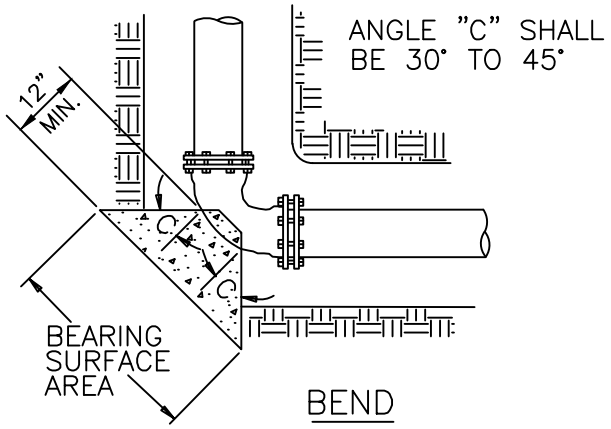
8. INSTALLATION OF WATER MAINS, SANITARY SEWER MAINS, OR OTHER NON–POTABLE PIPELINES THAT DO NOT MEET THE MINIMUM SWRCB–DDW SEPARATION CRITERIA SHALL BE REVIEWED AND APPROVED IN WRITING BY SWRCB–DDW ON A CASE–BY–CASE BASIS PRIOR TO CONSTRUCTION.

WATER AND SEWER SEPARATION REQUIREMENTS

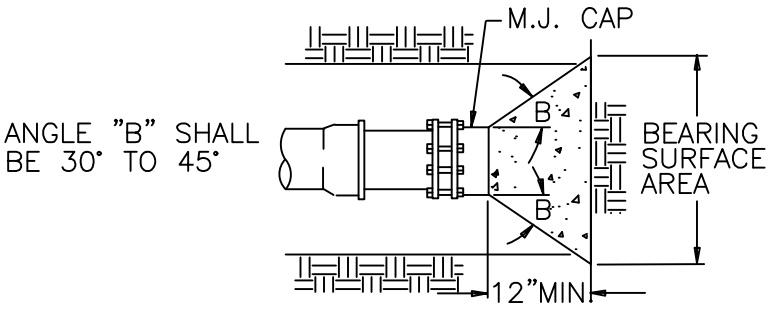
WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
	BY	DATE			
DRAWN	TL	10–21–14	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021	W-130
CHECKED	DRS	10–28–14	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021	
RECOMMENDED	DE	10–28–14	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 4 OF 4



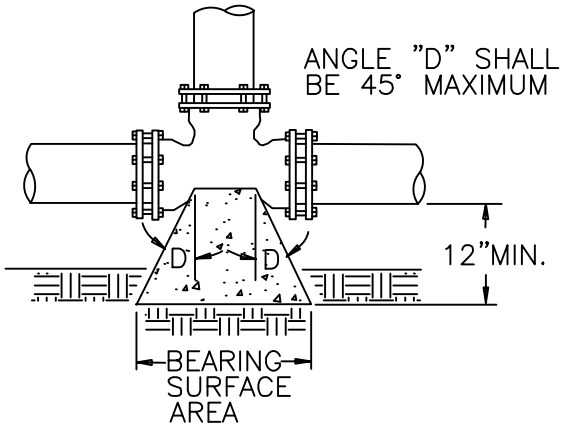
TYPICAL SECTION



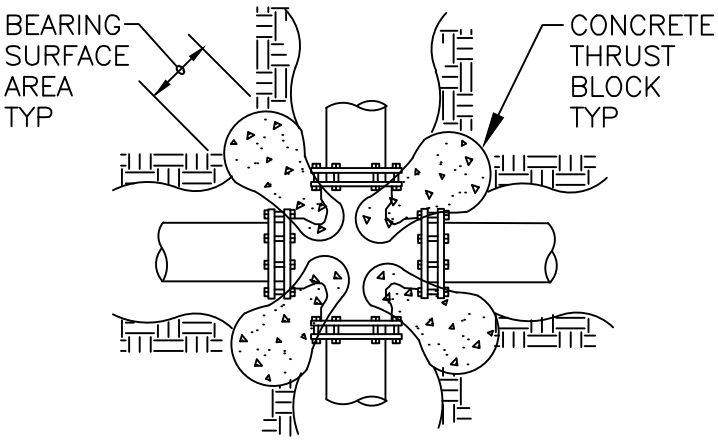
BEND



DEAD END



TEE AND TAPPING SLEEVES



CROSS

NOTES:

1. CONCRETE FOR THRUST BLOCK SHALL CONFORM TO SECTION 2.12.04.
2. CONCRETE SHALL BE POURED AGAINST UNDISTURBED SOIL.
3. CONCRETE SHALL HAVE 3" MINIMUM CLEARANCE AROUND ALL JOINTS.
4. BEARING SURFACE AREA REQUIREMENTS SHALL BE PER STD. NO. W-142 OR AS INDICATED ON CONSTRUCTION DRAWINGS.
5. THRUST BLOCKS FOR CROSS SHALL BE USED WHEREVER PIPE SIZES DIFFER OR WHEN ONE OR MORE OPENINGS ARE PLUGGED. SIZE WILL BE BASED ON THE LARGER MAIN.

TYPICAL THRUST BLOCK DETAILS (4" TO 16" DIA. FITTING)

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
	BY	DATE			
DRAWN	HQ	4-10-02	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021	W-140
CHECKED	DE	4-10-02	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021	
RECOMMENDED	DS	4-10-02	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 1 OF 1

DEAD END, TEE OUTLET, CROSS, & TAPPING SLEEVE

PIPE DIA.	STATIC WATER PRESSURE–P.S.I.										
	100	110	120	130	140	150	160	170	180	190	200
4"&6"	2.5	2.5	3.0	3.0	3.0	3.5	3.5	4.0	4.0	4.0	4.5
8"	4.0	4.5	4.5	5.0	5.5	6.0	6.0	6.5	7.0	7.5	7.5
10"	6.0	6.5	7.5	8.0	8.5	9.0	9.5	10.0	11.0	11.5	12.0
12"	8.5	9.5	10.5	11.0	12.0	13.0	14.0	14.5	15.5	16.5	17.0
16"	15.5	17.0	18.5	20.0	21.5	23.0	24.5	26.0	27.5	29.0	30.5

BENDS

PIPE DIA.	BEND	STATIC WATER PRESSURE–P.S.I.										
		100	110	120	130	140	150	160	170	180	190	200
4" & 6"	90°	3.0	3.5	4.0	4.0	4.5	4.5	5.0	5.5	5.5	6.0	6.0
	45°	2.0	2.0	2.0	2.5	2.5	2.5	3.0	3.0	3.0	3.5	3.5
	22½°	1.0	1.0	1.0	1.5	1.5	1.5	1.5	1.5	1.5	2.0	2.0
	11¼°	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
8"	90°	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.5	10.0	10.5	11.0
	45°	3.0	3.5	3.5	4.0	4.0	4.5	5.0	5.0	5.5	5.5	6.0
	22½°	1.5	2.0	2.0	2.0	2.5	2.5	2.5	2.5	3.0	3.0	3.0
	11¼°	1.0	1.0	1.0	1.0	1.0	1.5	1.5	1.5	1.5	1.5	1.5
10"	90°	8.5	9.5	10.0	11.0	12.0	12.5	13.5	14.5	15.0	16.0	17.0
	45°	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.0
	22½°	2.5	2.5	3.0	3.0	3.5	3.5	4.0	4.0	4.5	4.5	5.0
	11¼°	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.5	2.5	2.5
12"	90°	12.0	13.5	14.5	16.0	17.0	18.0	19.5	20.5	22.0	23.0	24.0
	45°	6.5	7.5	8.0	8.5	9.5	10.0	10.5	11.0	12.0	12.5	13.0
	22½°	3.5	4.0	4.0	4.5	5.0	5.0	5.5	6.0	6.0	6.5	7.0
	11¼°	2.0	2.0	2.0	2.5	2.5	2.5	3.0	3.0	3.0	3.5	3.5
16"	90°	21.5	23.5	26.0	28.0	30.0	32.0	34.5	36.5	38.5	40.5	43.0
	45°	11.5	13.0	14.0	15.0	16.5	17.5	18.5	20.0	21.0	22.0	23.5
	22½°	6.0	6.5	7.5	8.0	8.5	9.0	9.5	10.0	11.0	11.5	12.0
	11¼°	3.0	3.5	3.5	4.0	4.5	4.5	5.0	5.0	5.5	6.0	6.0

NOTES:

1. AREA REQUIREMENTS ARE BASED UPON 1½ TIMES STATIC WATER PRESSURE, AND SOIL BEARING PRESSURE OF 2000 LBS/SQ FT. DESIGN ENGINEER SHALL DETERMINE SIZES FOR OTHER SOIL BEARING VALUES.
2. UNITS OF AREA REQUIREMENTS ARE "SQUARE FEET."
3. SEE STD. NO. W–140 FOR TYPICAL THRUST BLOCK DETAILS.
4. THRUST BLOCK WIDTH SHALL BE BETWEEN ONE AND TWO TIMES ITS HEIGHT.
5. DESIGN ENGINEER SHALL DETERMINE SIZES FOR PIPE LARGER THAN 16" AND SUBMIT TO UTILITIES FOR APPROVAL.

THRUST BLOCK AREA REQUIREMENTS

WATER SERVICES

PUBLIC UTILITIES DEPARTMENT

CITY OF ANAHEIM

	BY	DATE		
DRAWN	TL	6–25–91	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	KT	9–13–91	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021
RECOMMENDED	BDB	9–20–91	APPROVED CITY ENGINEER	DATE 7/7/2021

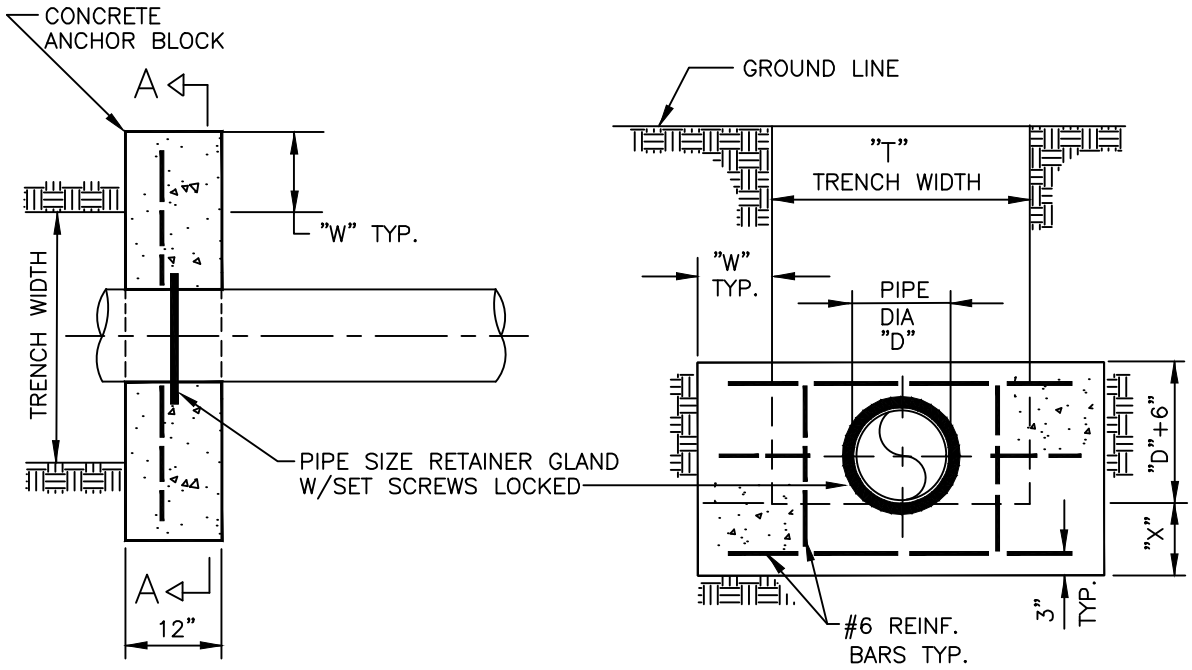
STD. NO.

W-142

SHEET 1 OF 1

ANCHOR BLOCK DIMENSIONS

T	D	VARIABLE	STATIC WATER PRESSURE – PSI										
			100	110	120	130	140	150	160	170	180	190	200
30"	6"	AREA SF	2.1	2.3	2.5	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.2
		W (INCHES)	14	14	16	18	18	13	14	15	15	16	17
		X (INCHES)	0	0	0	0	0	6	6	6	6	6	6
30"	8"	AREA SF	3.8	4.1	4.5	4.9	5.3	5.7	6.0	6.4	6.8	7.2	7.5
		W (INCHES)	10	12	12	14	16	16	14	16	16	18	18
		X (INCHES)	6	6	6	6	6	6	9	9	9	9	9
30"	10"	AREA SF	5.9	6.5	7.1	7.7	8.2	8.8	9.4	10.0	10.6	11.2	11.8
		W (INCHES)	16	18	16	18	16	18	18	20	22	24	24
		X (INCHES)	6	6	9	9	12	12	12	12	12	12	12
36"	12"	AREA SF	8.5	9.3	10.2	11.0	11.9	12.7	13.6	14.4	15.3	16.1	17.0
		W (INCHES)	18	16	18	20	22	24	20	20	22	24	26
		X (INCHES)	9	12	12	12	12	12	18	18	18	18	18
36"	16"	AREA SF	15.1	16.6	18.1	19.6	21.1	22.6	24.1	25.6	27.1	28.7	30.2
		W (INCHES)	18	18	18	18	18	18	20	20	22	22	24
		X (INCHES)	15	15	18	21	25	30	30	30	30	30	30



PLAN

SECTION A–A

NOTES:

1. ANCHOR BLOCK SHALL BE 560–C–3250 (3250 P.S.I. AT 28 DAYS).
2. CONCRETE SHALL BE POURED AGAINST UNDISTURBED EARTH.
3. DIMENSIONS ARE BASED ON 1.5 TIMES STATIC WATER PRESSURE, 2000 P.S.F. SOIL BEARING CAPACITY PRESSURE & 60,000 LB. REINF. BAR TENSILE STRENGTH.

ANCHOR BLOCK ASSEMBLY FOR 6" THRU 16" PIPE

PUBLIC UTILITIES DEPARTMENT

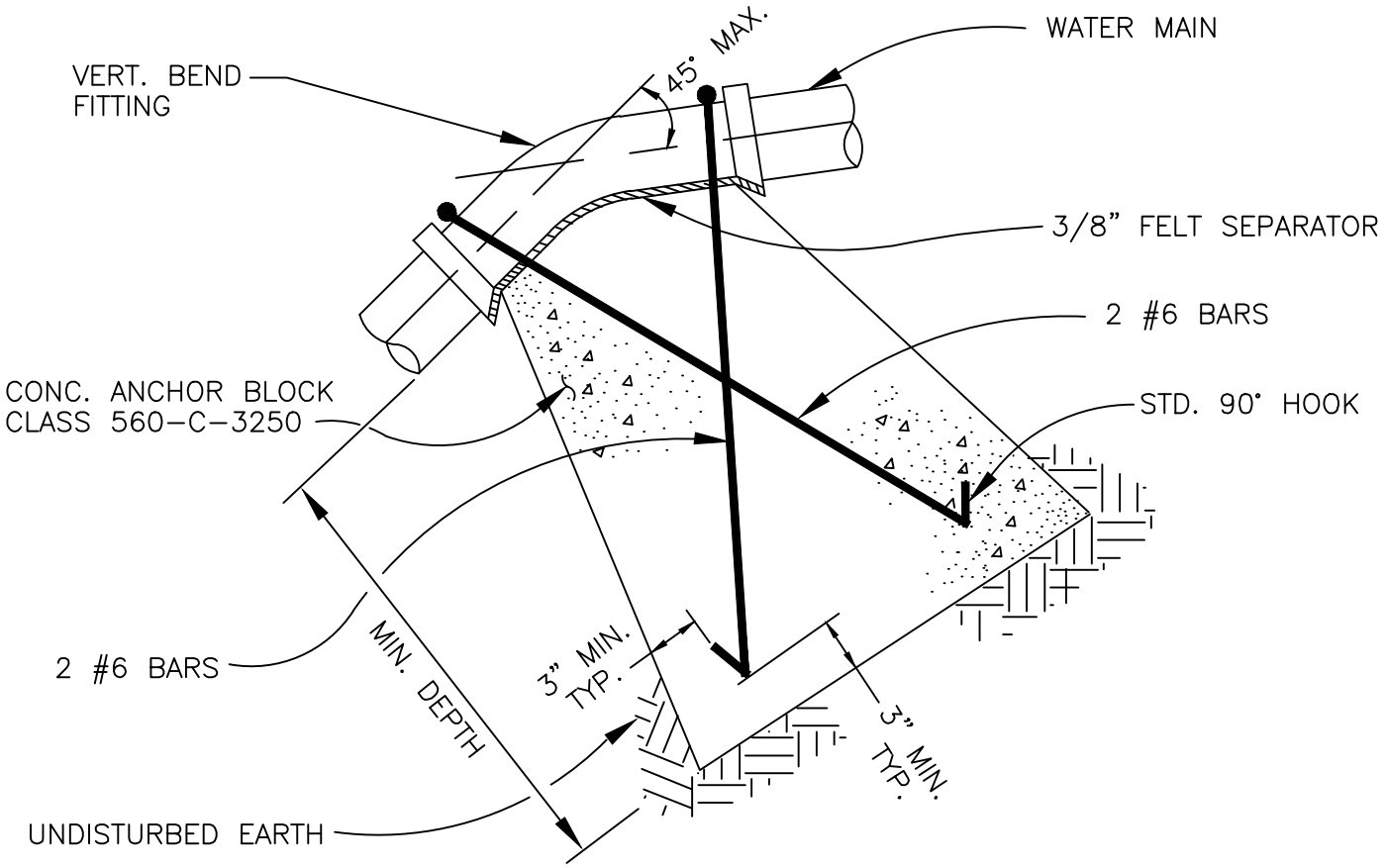
WATER SERVICES — CITY OF ANAHEIM

	BY	DATE		
DRAWN	TL	3–17–09	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	LOC	3–24–09	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021
RECOMMENDED	MF	3–24–09	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO.

W-143

SHEET 1 OF 1



VERTICAL DOWN BEND

NOTES:

1. CONCRETE FOR GRAVITY ANCHOR BLOCK SHALL CONFORM TO SECTION 2.12.04.
2. CONCRETE SHALL BE POURED AGAINST UNDISTURBED SOIL. IF THERE IS A POSSIBILITY OF THE ANCHOR BLOCK BEING DISTURBED AFTER CONSTRUCTION, ADDITIONAL MECHANICAL THRUST RESTRAINING DEVICES APPROVED BY UTILITY SHALL BE INSTALLED.
3. CONCRETE SHALL HAVE 3" MINIMUM CLEARANCE AROUND ALL JOINTS.
4. ALL REINFORCED STEEL SHALL BE #6 BARS.
5. FOR VERTICAL UP BEND, SEE THRUST BLOCK REQUIREMENTS PER STD. NO. W-140 & W-142.
6. FOR PIPES LARGER THAN 12 INCH DIAMETER, RESTRAINED JOINTS APPROVED BY UTILITY SHALL BE INSTALLED IN LIEU OF ANCHOR BLOCKS.
7. SIZING REQUIREMENTS ARE BASED UPON 1 1/2 TIMES STATIC WATER PRESSURE, AND SOIL BEARING PRESSURE OF 2000 PSI. DESIGN ENGINEER SHALL DETERMINE SIZES FOR OTHER SOIL BEARING VALUES.

GRAVITY ANCHOR BLOCK DETAIL

PUBLIC UTILITIES DEPARTMENT

WATER SERVICES — CITY OF ANAHEIM

	BY	DATE			
DRAWN	HQ	4-10-02	APPROVED WATER ENGINEERING MANAGER	DATE	3/11/2021
CHECKED	DE	4-10-02	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE	3/11/2021
RECOMMENDED	DS	4-10-02	APPROVED CITY ENGINEER	DATE	7/7/2021

STD. NO. **W-144**

SHEET 1 OF 2

Static Pressure – P.S.I.			60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
VERTICAL DOWN BENDS – Minimum Dimensions in feet																	
Pipe Dia.	Change in Slope																
6	1.5:1	Volume (C.F.)	16.8	17.6	20.2	22.7	25.2	27.7	30.2	32.8	35.3	37.8	40.3	42.9	45.4	47.9	50.4
	1.5:1	Depth (Ft.)	2.7	2.8	3.2	3.6	4.0	3.1	3.4	3.6	3.9	4.2	4.5	3.5	3.7	3.9	4.1
	2:1	Volume (C.F.)	13.5	14.2	16.3	18.3	20.3	22.4	24.4	26.4	28.5	30.5	32.5	34.5	36.6	38.6	40.6
	2:1	Depth (Ft.)	3.4	3.6	2.6	2.9	3.3	3.6	3.9	4.2	3.2	3.4	3.6	3.8	4.1	4.3	4.5
8	1.5:1	Volume (C.F.)	29.9	31.4	35.8	40.3	44.8	49.3	53.8	58.3	62.7	67.2	71.7	76.2	80.7	85.1	89.6
	1.5:1	Depth (Ft.)	3.3	3.5	4.0	4.5	3.7	4.0	4.4	4.8	5.1	4.2	4.5	4.8	5.0	5.3	5.6
	2:1	Volume (C.F.)	24.1	25.3	28.9	32.5	36.1	39.7	43.4	47.0	50.6	54.2	57.8	61.4	65.0	68.6	72.3
	2:1	Depth (Ft.)	3.9	4.0	3.2	3.6	4.0	4.4	4.8	3.8	4.1	4.4	4.7	5.0	4.1	4.3	4.5
10	1.5:1	Volume (C.F.)	46.7	49.0	56.0	63.0	70.0	77.0	84.0	91.0	98.0	105.0	112.0	119.0	126.0	133.0	140.0
	1.5:1	Depth (Ft.)	3.8	4.0	4.6	5.1	4.4	4.8	5.3	5.7	4.8	5.2	5.5	5.9	5.0	5.3	5.6
	2:1	Volume (C.F.)	37.6	39.5	45.2	50.8	56.4	62.1	67.7	73.4	79.0	84.7	90.3	96.0	101.6	107.3	112.9
	2:1	Depth (Ft.)	4.2	4.4	3.7	4.1	4.6	5.1	4.2	4.6	4.9	5.3	5.6	4.7	5.0	5.3	5.6
12	1.5:1	Volume (C.F.)	67.2	70.6	80.7	90.7	100.8	110.9	121.0	131.1	141.2	151.2	161.3	171.4	181.5	191.6	201.6
	1.5:1	Depth (Ft.)	4.2	4.4	5.0	4.5	5.0	5.5	6.0	5.2	5.6	6.0	6.5	5.7	6.0	6.3	6.7
	2:1	Volume (C.F.)	54.2	56.9	65.0	73.2	81.3	89.4	97.5	105.7	113.8	121.9	130.1	138.2	146.3	154.4	162.6
	2:1	Depth (Ft.)	4.4	4.6	4.1	4.6	5.1	5.6	4.8	5.2	5.6	6.0	5.2	5.5	5.9	6.2	6.5

GRAVITY ANCHOR BLOCK DETAIL

WATER SERVICES

PUBLIC UTILITIES DEPARTMENT

CITY OF ANAHEIM

STD. NO. **W-144**

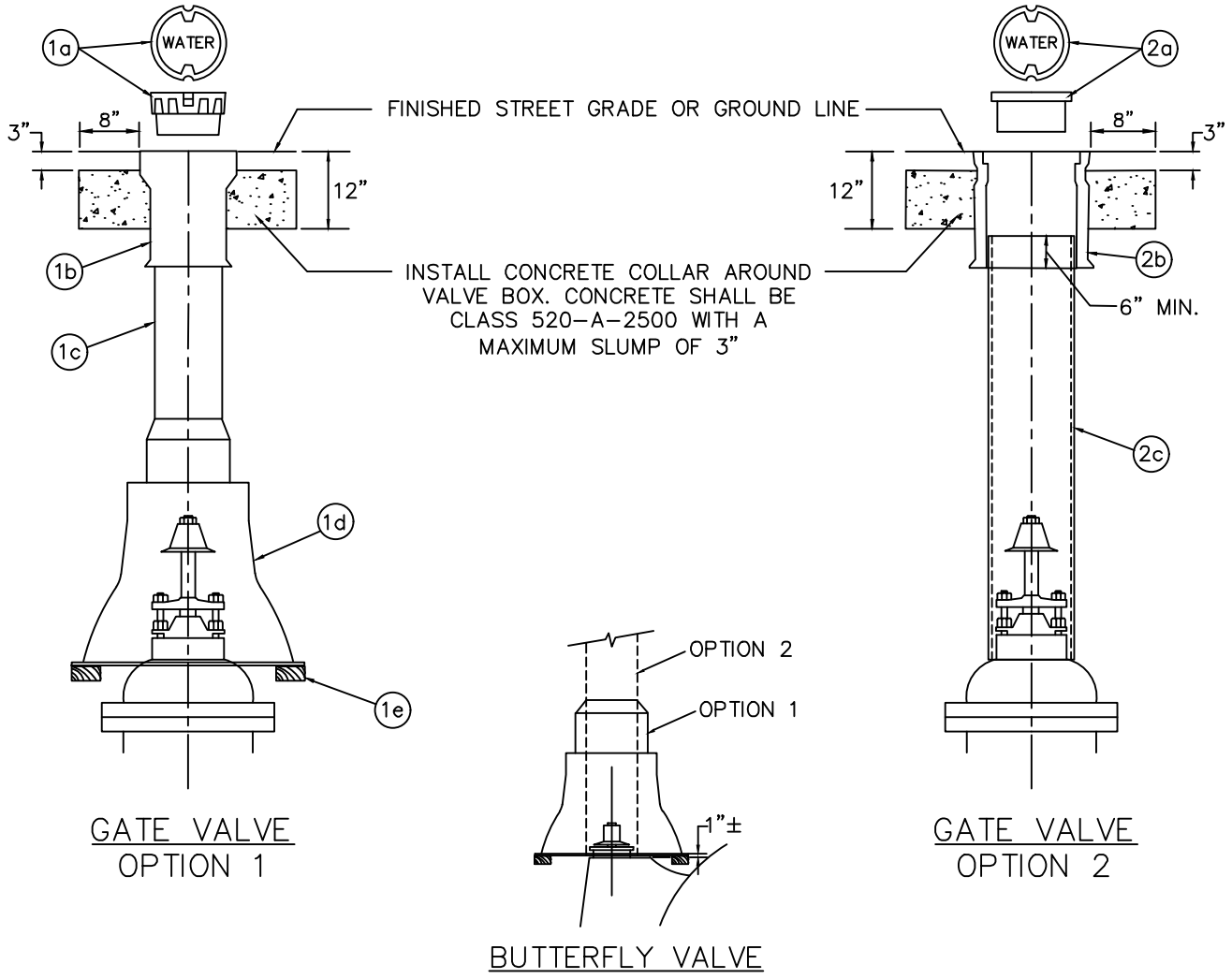
	BY	DATE		
DRAWN	HQ	4-10-02	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	DE	4-10-02	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021
RECOMMENDED	DS	4-10-02	APPROVED CITY ENGINEER	DATE 7/7/2021

SHEET 2 OF 2

LIST OF APPROVED MATERIAL

OPTION 1
SCREW TYPE CAST IRON VALVE BOX ASSEMBLY, TYLER UNION 6860 OR BINGHAM & TAYLOR 4906
a. 5 ¼" DROP LID
b. HEAVY DUTY TOP SECTION–VARIABLE LENGTH
c. BOTTOM SECTION–VARIABLE LENGTH
d. #6 BASE
e. 2"X4"X8" MIN. LENGTH REDWOOD, 2 PLACES

OPTION 2
BINGHAM & TAYLOR MARK V ROUND HEAVY DUTY VALVE BOX ASSEMBLY
a. MARK V ROUND 10" LID WITH 4" SKIRT
b. MARK V ROUND 10" RIM WITH FLANGE
c. 8" PVC, SDR 35–VARIABLE LENGTH



NOTES

1. 3" ASPHALT CAP SHALL BE HOT MIX TYPE PER PUBLIC WORKS STANDARD DETAIL 132.
2. OPERATING NUT FOR BUTTERFLY VALVE SHALL BE PLACED NORTH OR EAST OF THE WATER MAIN.
3. FOR RECYCLED WATER VALVES, APPROVED VALVE BOX ASSEMBLY IS BINGHAM & TAYLOR MARK V TRIANGLE 10" RIM WITH FLANGE AND MARK V TRIANGLE STANDARD LID MARKED WITH "RW". LID AND RIM SHALL BE POWDER COATED PURPLE BY MANUFACTURER. BOTTOM SECTION SHALL BE 8" PVC PER ITEM 2c ABOVE.

STANDARD VALVE BOX ASSEMBLY

PUBLIC UTILITIES DEPARTMENT

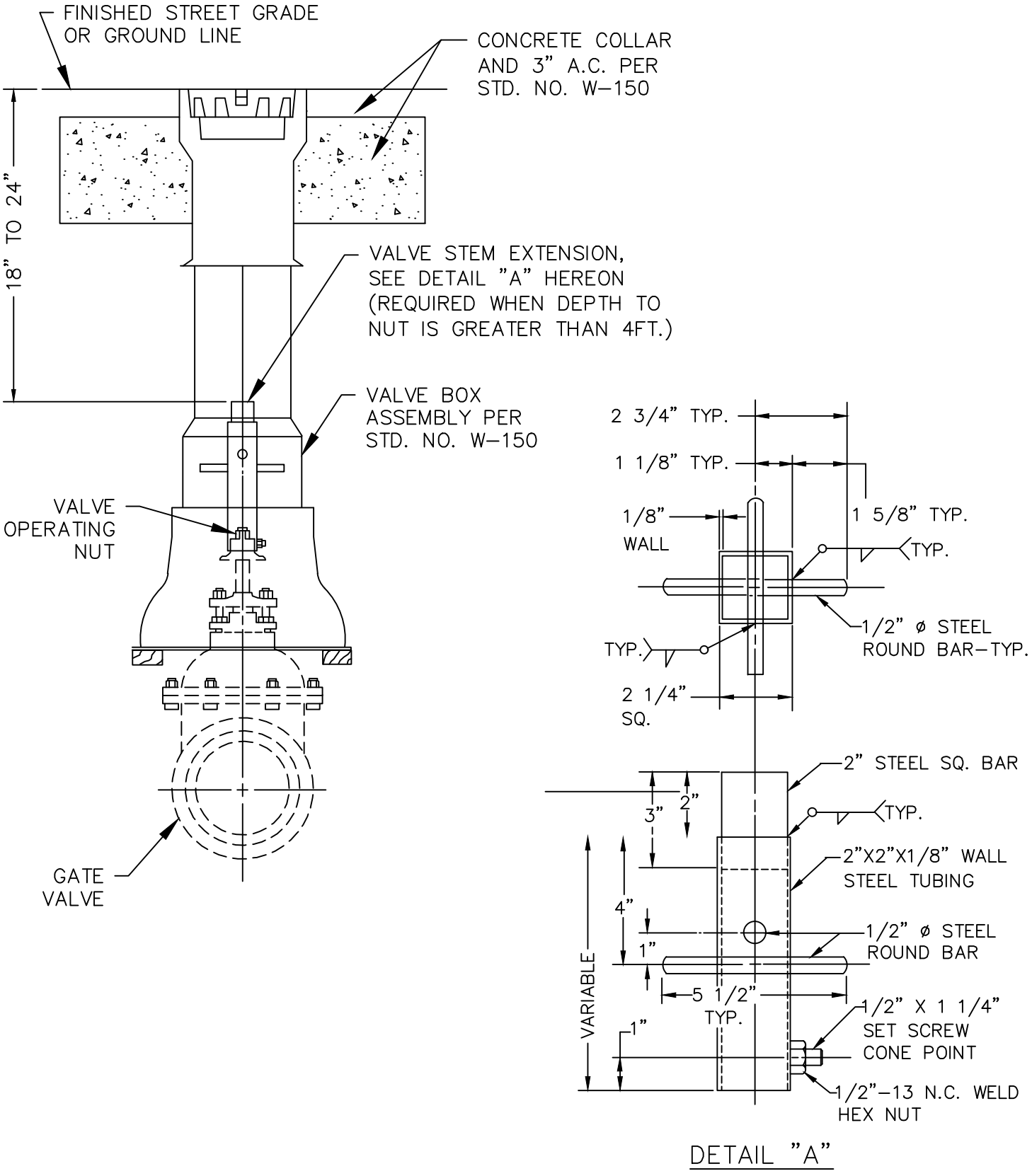
WATER SERVICES — CITY OF ANAHEIM

	BY	DATE			
DRAWN	CE	5–10–21	APPROVED WATER ENGINEERING MANAGER	DATE	5/10/2021
CHECKED	CE	5–10–21	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE	5/10/2021
RECOMMENDED	CE	5–10–21	APPROVED CITY ENGINEER	DATE	7/7/2021

STD. NO.

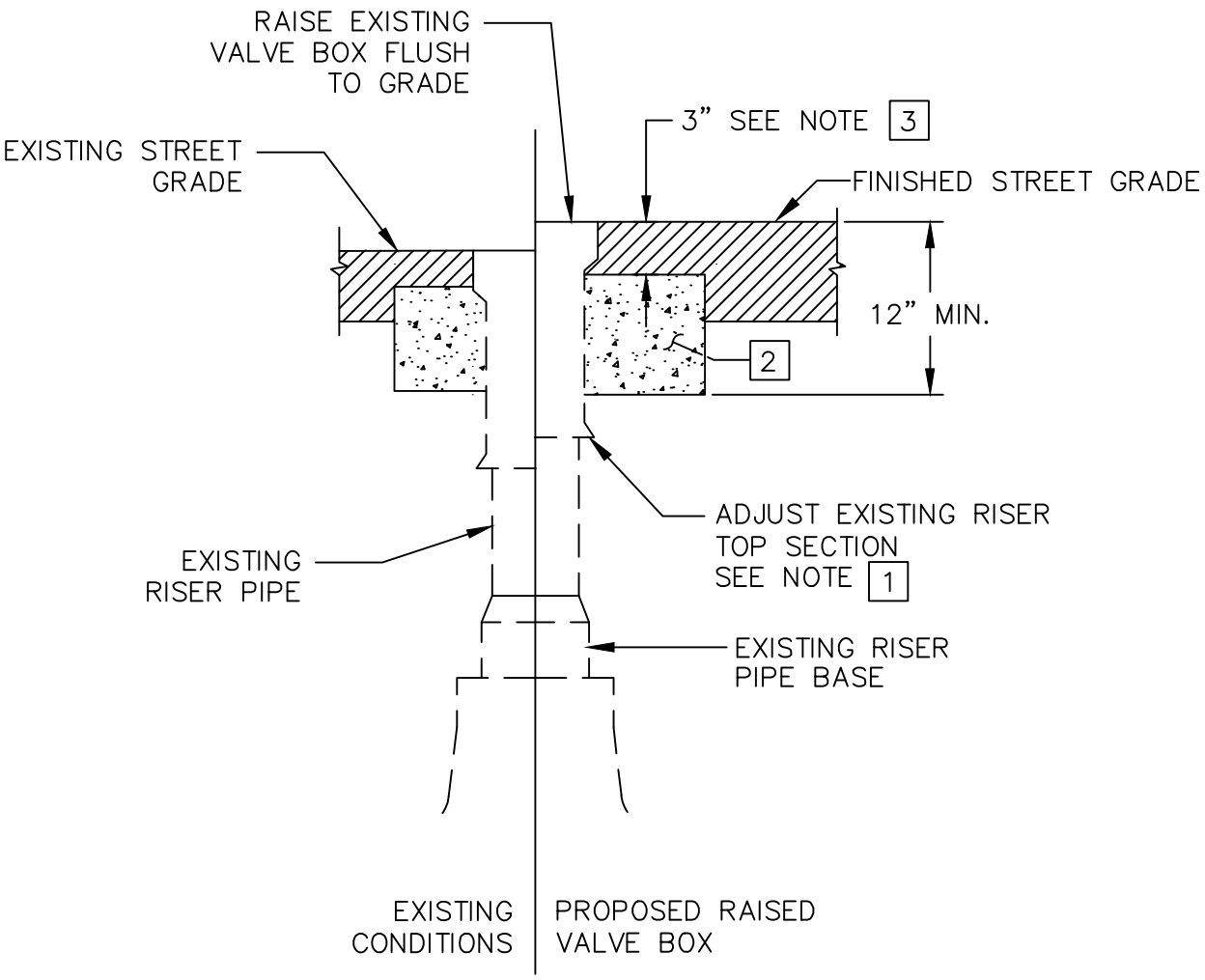
W-150

SHEET 1 OF 1



VALVE BOX AND STEM EXTENSION

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
	BY	DATE			
DRAWN	CE	5-10-21	APPROVED WATER ENGINEERING MANAGER	DATE 5/10/2021	**W-151**
CHECKED	CE	5-10-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 5/10/2021	
RECOMMENDED	CE	5-10-21	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 1 OF 1



CASE 1

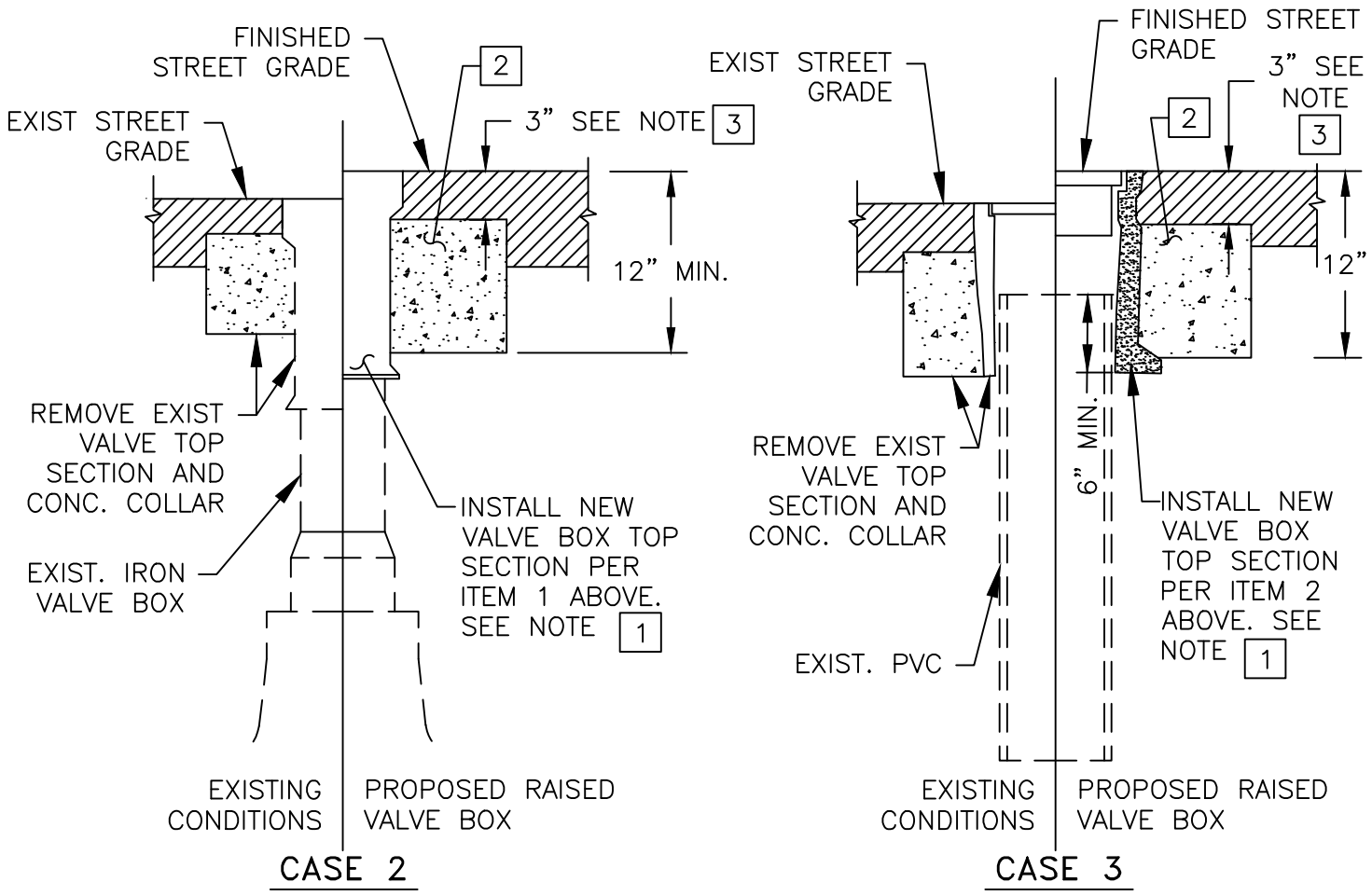
NOTES:

1. CONTRACTOR TO EXPOSE THE EXISTING VALVE BOX FOR THE WATER UTILITY INSPECTOR TO DETERMINE CONDITION OF EXISTING BOX. INSPECTOR SHALL DIRECT CONTRACTOR TO ADJUST EXISTING VALVE BOX FLUSH TO GRADE AS SHOWN ABOVE, OR REPLACE THE TOP SECTION OF VALVE BOX AS SHOWN IN DETAIL W-152 SHEET 2 OR DIRECT CONTRACTOR TO REMOVE AND REPLACE ENTIRE EXISTING VALVE BOX WITH NEW AS PER W-150 AND W-151.
2. INSTALL CONCRETE COLLAR AROUND VALVE BOX, 8" WIDTH PER STD. NO. W-150. CONCRETE SHALL BE CLASS 520-A-2500 WITH A MAXIMUM 3" SLUMP.
3. 3" ASPHALT CAP SHALL BE HOT MIX TYPE PER PUBLIC WORKS STANDARD DETAIL 132.

VALVE BOX RAISING

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
	BY	DATE			
DRAWN	CE	5-10-21	APPROVED WATER ENGINEERING MANAGER	DATE 5/10/2021	W-152
CHECKED	CE	5-10-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 5/10/2021	
RECOMMENDED	CE	5-10-21	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 1 OF 2

LIST OF MATERIAL	
ITEM	DESCRIPTION
1	SCREW TYPE CAST IRON VALVE BOX, TYLER UNION 6860 OR BINGHAM & TAYLOR NO. 4906 (OR APPROVED EQUAL) WITH HEAVY DUTY TOP SECTION
2	BINGHAM & TAYLOR, MARK V ROUND 10" RIM WITH FLANGE AND ROUND 10" LID WITH 4" SKIRT



NOTES:

1. CONTRACTOR TO EXPOSE THE EXISTING VALVE BOX FOR THE WATER UTILITY INSPECTOR TO DETERMINE CONDITION OF EXISTING BOX. INSPECTOR SHALL DIRECT CONTRACTOR TO REPLACE THE TOP SECTION OF VALVE BOX AS SHOWN OR DIRECT CONTRACTOR TO REMOVE AND REPLACE ENTIRE EXISTING VALVE BOX WITH NEW PER STD. NO. W-150 AND STD. NO. W-151.
2. INSTALL CONCRETE COLLAR AROUND VALVE BOX, 8" WIDTH PER STD. NO. W-150. CONCRETE SHALL BE CLASS 520-A-2500 WITHIN MAXIMUM 3" SLUMP.
3. 3" ASPHALT CAP SHALL HOT MIX TYPE BE PER PUBLIC WORKS STANDARD DETAIL 132.

VALVE BOX RAISING

PUBLIC UTILITIES DEPARTMENT

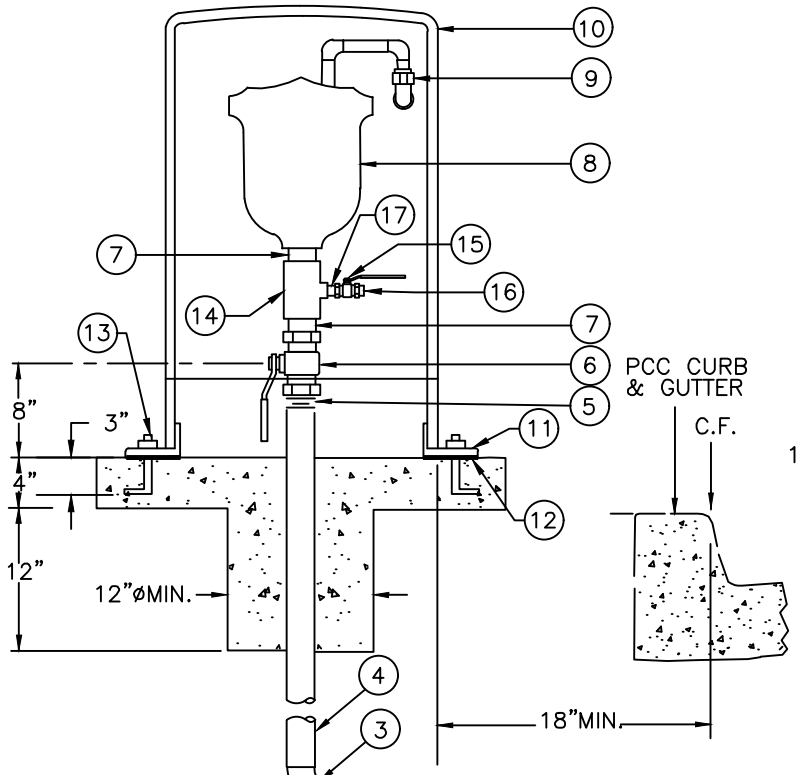
WATER SERVICES — CITY OF ANAHEIM

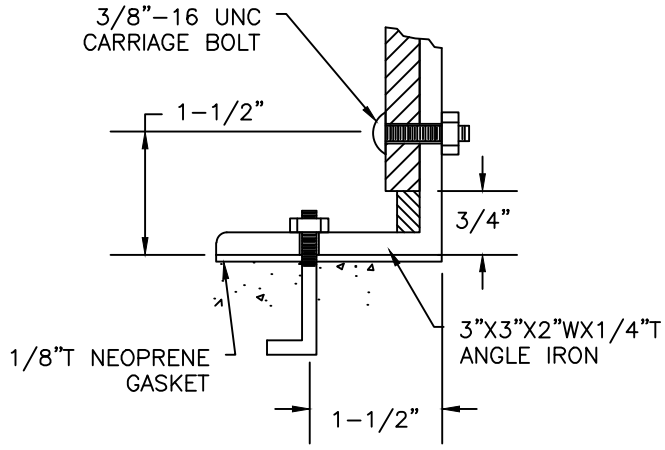
	BY	DATE		
DRAWN	CE	5-10-21	APPROVED WATER ENGINEERING MANAGER	DATE 5/10/2021
CHECKED	CE	5-10-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 5/10/2021
RECOMMENDED	CE	5-10-21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO.

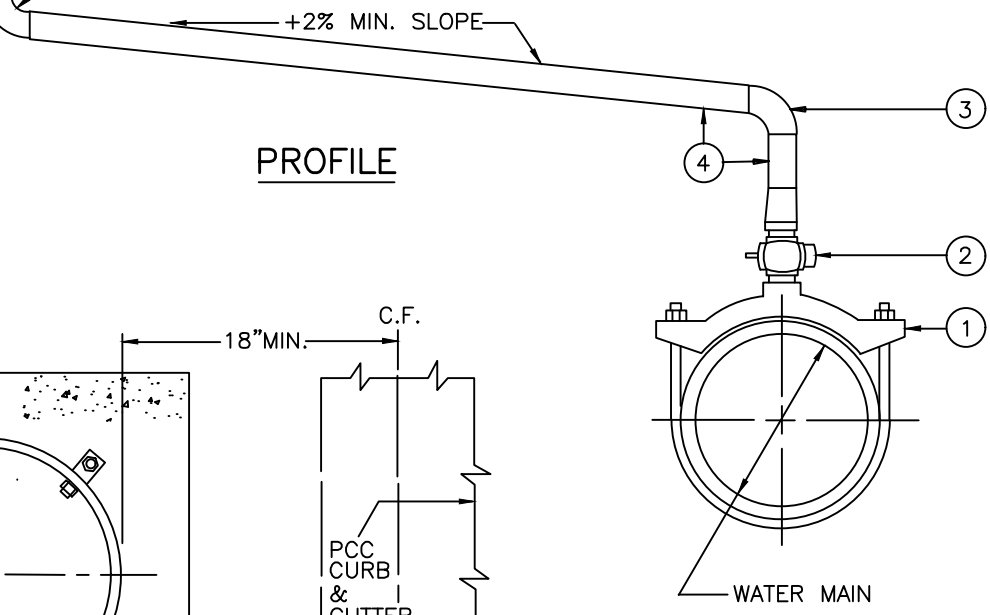
W-152

SHEET 2 OF 2

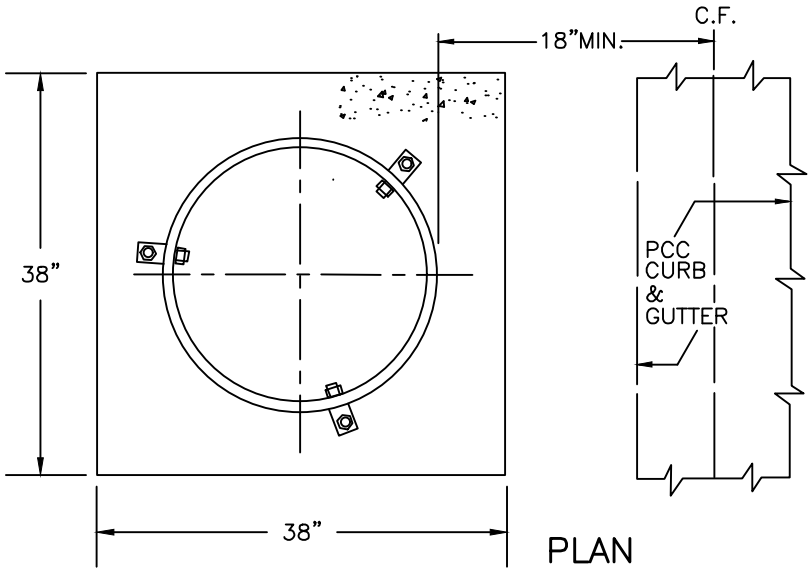




BOLT DOWN DETAIL



PROFILE



PLAN

1" AIR-RELEASE/ AIR-VACUUM/ COMBINATION-AIR VALVE ASSEMBLY

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT		CITY OF ANAHEIM
	BY	DATE			
DRAWN	TL	12–19–14	APPROVED WATER ENGINEERING MANAGER	DATE	3/11/2021
CHECKED	DRS	12–26–14	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE	3/11/2021
RECOMMENDED	DE	12–26–14	APPROVED CITY ENGINEER	DATE	7/7/2021

STD. NO.

W-160

SHEET 1 OF 2

LIST OF MATERIALS

ITEM	DESCRIPTION
1	MAIN SIZE X 1" BRONZE DOUBLE STRAP SADDLE (SEE ITEM 1a OF W-101)
2	1" CORPORATION STOP (SEE ITEM 2 OF W-101)
3	1" COPPER ELBOW, COMPRESSION JOINTS
4	1" COPPER TUBING, TYPE K, RIGID
5	1" MALE I.P. THREAD X COMPRESSION
6	1" BRONZE BALL VALVE
7	1" BRASS CLOSE NIPPLE
8	1" AIR-RELEASE/AIR-VACUUM/COMBINATION-AIR VALVE (SEE SECTION 2-06)
9	1/2" COPPER VENT WITH STAINLESS STEEL SCREEN
10	20" DIA. X 36"H, W/14 EA. 1/2" VENT HOLES AIR VACUUM VALVE HOUSING ARMORCAST -P6002002SND
11	3"X3"L X 2"W X 1/4"T STEEL ANGLE IRON
12	3" X 2" X 1/8" THICK NEOPRENE GASKET
13	3/8" DIA. X 6" LONG STEEL ANCHOR BOLT W/NUT & LOCK WASHER
14	1" X 3/8" BRASS TEE (SEE NOTE 4 BELOW)
15	3/8" BRONZE BALL VALVE (SEE NOTE 4 BELOW)
16	3/8" BRASS PLUG (SEE NOTE 4 BELOW)
17	3/8" BRASS CLOSE NIPPLE (SEE NOTE 4 BELOW)

NOTES:

1. FOR ALL CASES, THE LOCATION OF ASSEMBLY SHALL MEET ADA REQUIREMENT THAT A MINIMUM 48" CLEARANCE BE MAINTAINED FROM ANY OBSTRUCTION IN THE WALK.
2. ASSEMBLY SHALL BE LOCATED A MINIMUM 5-FEET FROM BCR, ECR OR DRIVEWAY APPROACH.
3. FOR ROLLED CURBS OR NO CURBS, THE DISTANCE FROM THE EDGE OF PAVEMENT TO THE ASSEMBLY SHALL BE AS DIRECTED BY THE WATER UTILITY INSPECTOR.
4. ITEMS 14 THROUGH 17 REQUIRED FOR VALVES WITHOUT DRAIN PLUGS LOCATED AT BOTTOM OF VALVE.
5. VALVES WITH DRAIN PLUG AT THE BOTTOM OF THE VALVE REQUIRE A 3/8" BRONZE BALL VALVE, 3/8" BRASS PLUG, AND ADDITIONAL BRASS FITTINGS AS REQUIRED FOR PROPER INSTALLATION. PROVIDE SUBMITTAL TO UTILITY FOR REVIEW AND APPROVAL.

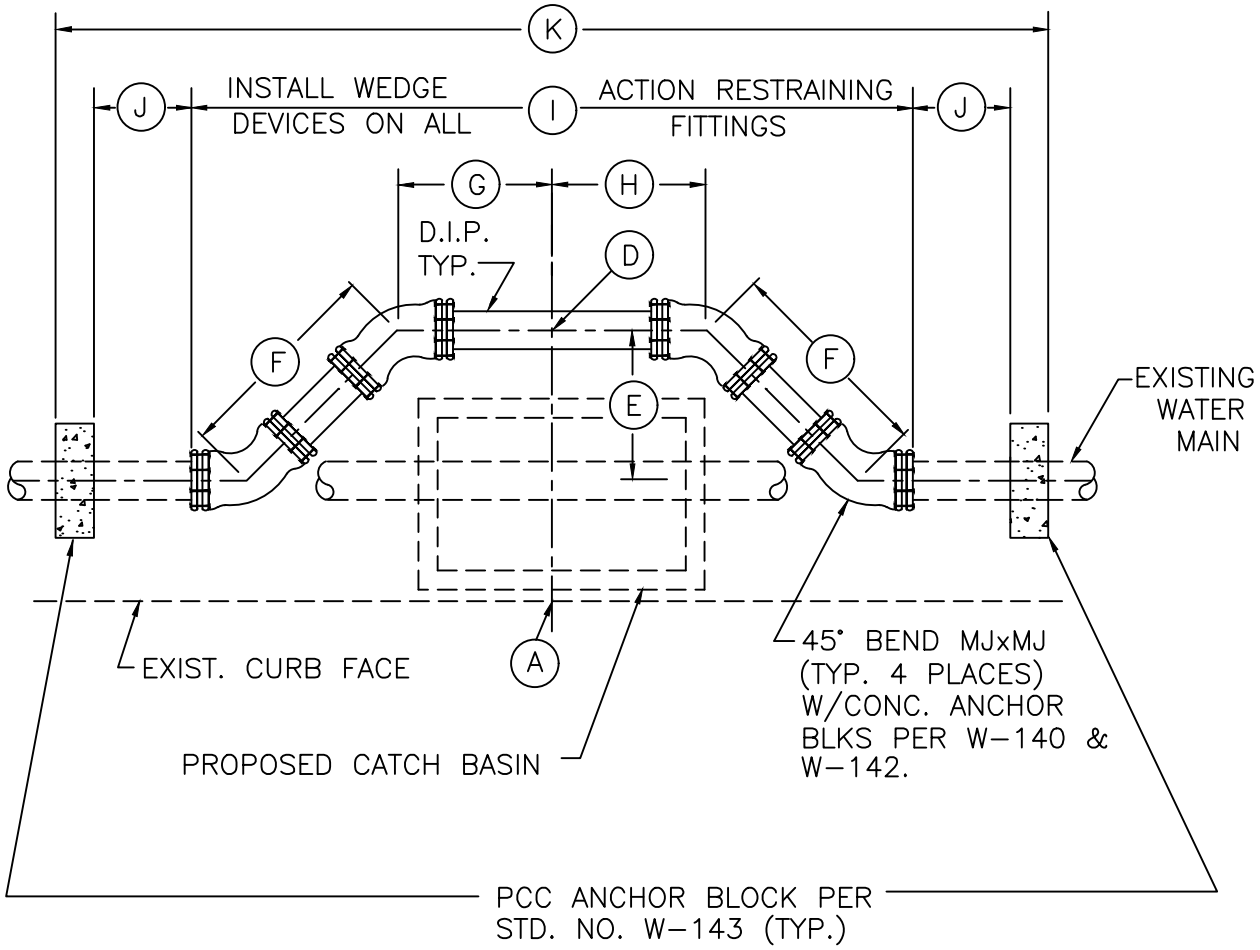
1" AIR-RELEASE/ AIR-VACUUM/ COMBINATION-AIR VALVE ASSEMBLY

WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

	BY	DATE			
DRAWN	TL	12-19-14	APPROVED WATER ENGINEERING MANAGER	DATE	3/11/2021
CHECKED	DRS	12-26-14	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE	3/11/2021
RECOMMENDED	DE	12-26-14	APPROVED CITY ENGINEER	DATE	7/7/2021

STD. NO. **W-160**

SHEET 2 OF 2



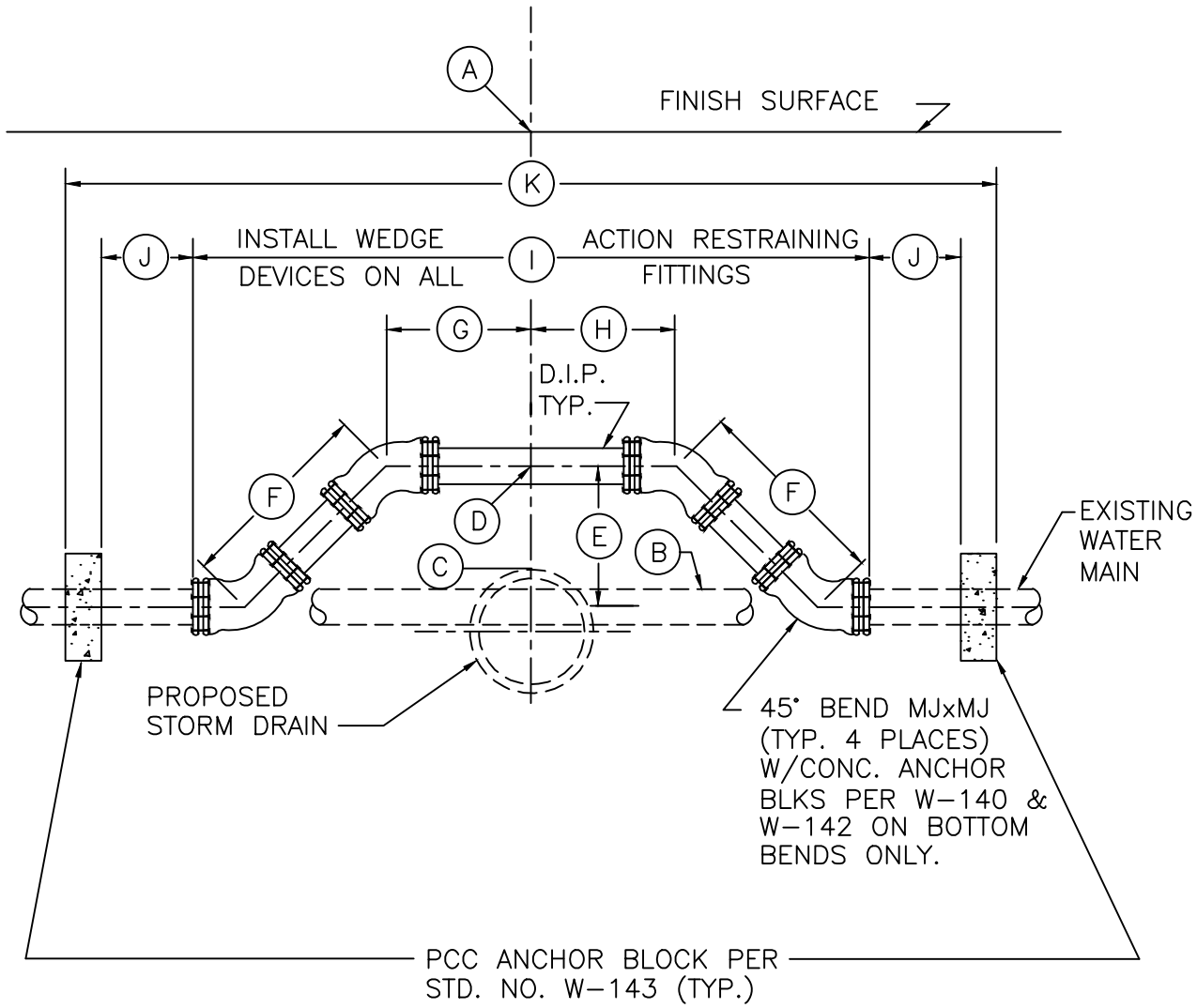
TYPE 1 OFFSET – PLAN

NOTE:

FOR PVC WATER MAIN CONSTRUCTION ONLY– SEE NOTES 9, 10 AND 11 ON SHEET 4.

WATER MAIN OFFSET / SIPHON

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
	BY	DATE			
DRAWN	AA	3-08-06	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021	W-170
CHECKED	LOC	3-10-06	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021	
RECOMMENDED	DEE	4-17-06	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 1 OF 4



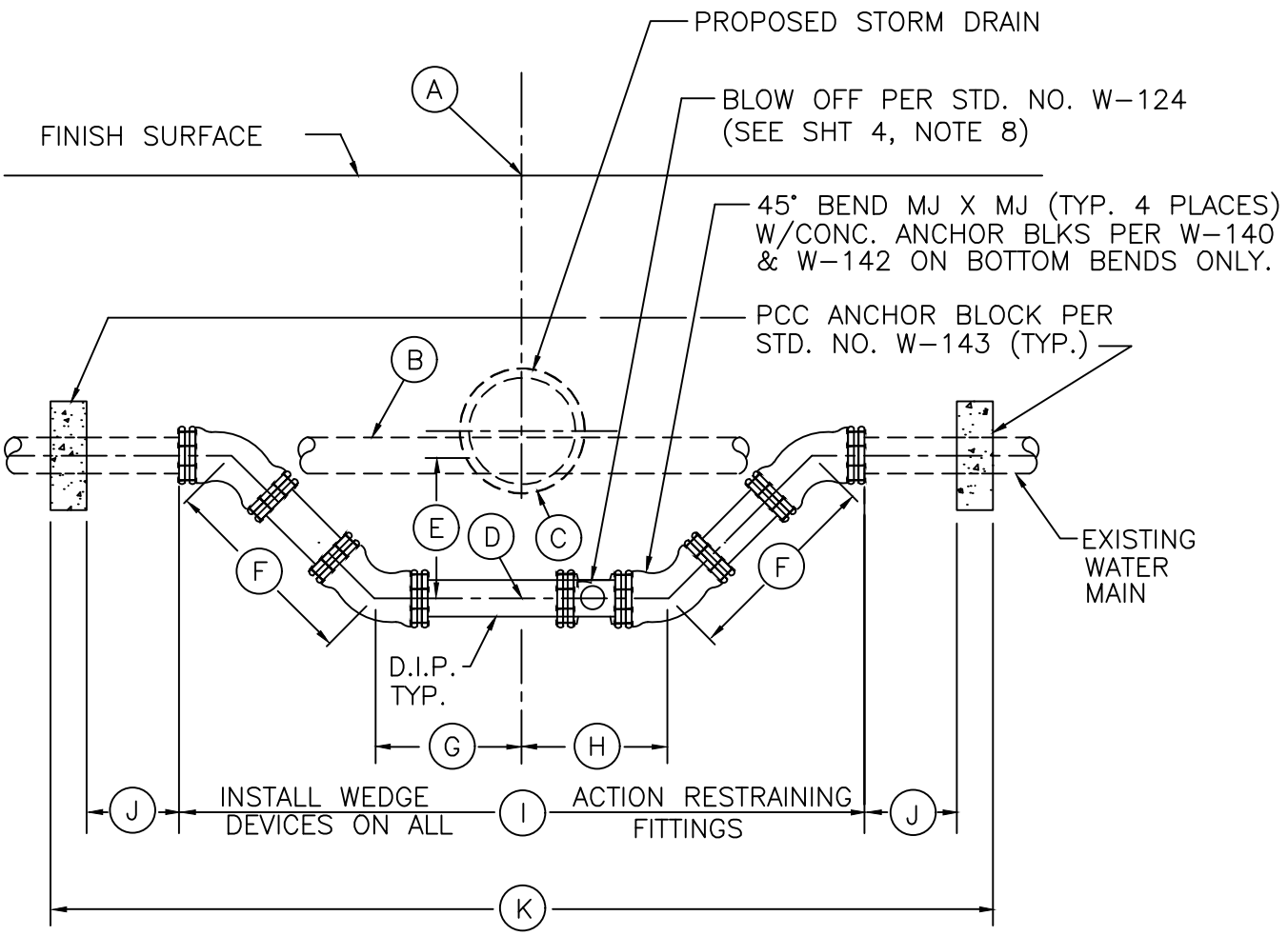
TYPE 2 SIPHON – ELEV.

NOTE:

FOR PVC WATER MAIN CONSTRUCTION ONLY– SEE NOTES 9, 10 AND 11 ON SHEET 4.

WATER MAIN OFFSET / SIPHON

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
	BY	DATE			
DRAWN	AA	3-14-06	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021	W-170
CHECKED	LOC	3-14-06	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021	
RECOMMENDED	DEE	3-21-06	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 2 OF 4



TYPE 3 SIPHON – ELEV.

NOTE:

FOR PVC WATER MAIN CONSTRUCTION ONLY– SEE NOTES 9, 10 AND 11 ON SHEET 4.

WATER MAIN OFFSET / SIPHON

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
	BY	DATE			
DRAWN	AA	3-18-06	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021	W-170
CHECKED	LOC	3-24-06	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021	
RECOMMENDED	DEE	4-12-06	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 3 OF 4

DIMENSIONS

Siphon No.	LOCATION/REMARKS	S.D. Station	Prop. S.D. size	Water Main Size& Type (EX.)	Siphon Type	Exist. Fin.Sur. Elev. (A)	Exist. Top of Wtr.Pipe (B)	Top/BTM Elev. S.D. (C)	Water Siphon Sta. (D)	Water Main Offset (E)	℄Length Pipe& Fit'g (F)	Length Pipe& Fit'g (G)	Length Pipe& Fit'g (H)	Length Pipe& Fit'g Offset (I)	Length TieRod to Anc. Blk. (J)	Total length Offset (K)

NOTES:

1. THIS STANDARD TO BE USED ONLY WHERE APPROVED BY UTILITY. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE ANAHEIM WATER UTILITY STANDARD PLANS AND SPECIFICATIONS.
2. THE CONTRACTOR SHALL NOTIFY THE CITY OF ANAHEIM WATER UTILITY INSPECTOR TWO (2) WEEKS PRIOR TO BEGINING OF CONSTRUCTION TO ARRANGE FOR INSPECTION. PHONE (714) 765–4591.
3. THE CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION OF THE EXISTING CAST IRON PIPE (C.I.P.), ASBESTOS–CEMENT PIPE (A.C.P.) OR DUCTILE IRON PIPE(D.I.P) WATER MAIN PRIOR TO CONSTRUCTION OF THE OFFSET / SIPHON.
4. THE CONTRACTOR SHALL COORDINATE W/THE WATER INSPECTOR FOR NOTIFICATION OF ALL WATER CUSTOMERS A MINIMUM OF FOUR (4) WORKING DAYS PRIOR TO SERVICE INTERRUPTION.
5. CONTRACTOR IS NOT PERMITTED TO TURN (OR EXERCISE) WATER VALVES. THE CONTRACTOR SHALL CONTACT THE CITY OF ANAHEIM WATER UTILITY INSPECTOR AT (714) 765–4591 A MINIMUM OF FOUR (4) WORKING DAYS PRIOR TO REQUIRING VALVE SHUT DOWN AT EACH LOCATION.
6. THE CITY OF ANAHEIM WATER SERVICES CANNOT GUARANTEE A COMPLETE SHUT DOWN OF EXISTING MAIN. THE UTILITY WILL ATTEMPT TO SHUT DOWN MAINS AS COMPLETELY AS POSSIBLE; HOWEVER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING AND ISOLATION OF CONSTRUCTION FOR TESTING PURPOSES.
7. IF EXISTING MAIN IS A.C.P., CONNECT D.I.P. TO THE EXSTING A.C.P. USING AN APPROVED SLEEVE TYPE COUPLING IN ACCORDANCE WITH THE SPECIFICATION. DO NOT TIE TO A.C.P. WITH RESTRAINING GLANDS.
8. BLOW–OFF ASSEMBLY SHALL BE INSTALLED ONLY IF APPROVED BY WATER ENGINEERING AND SPECIFICALLY CALLED FOR ON THE PROJECT PLANS.
9. PVC WATER MAIN CONSTRUCTION SHALL BE PRE–APPROVED BY UTILITY PER SEE SECT. 2–02. PVC LARGER THAN 12" DIA. IS NOT ALLOWED.
10. PVC PIPE SHALL BE AWWA C900, CLASS 305 (DR14), P.E.XP.E. (SEE NOTE 9)
11. MECHANICAL JOINT RESTRAINT FOR PVC PIPE SHALL BE 2000PV RESTRAINT BY EBBA IRON OR EQUAL AS PER SPECIFICATION SECTION 2–12.01 FOR PVC.

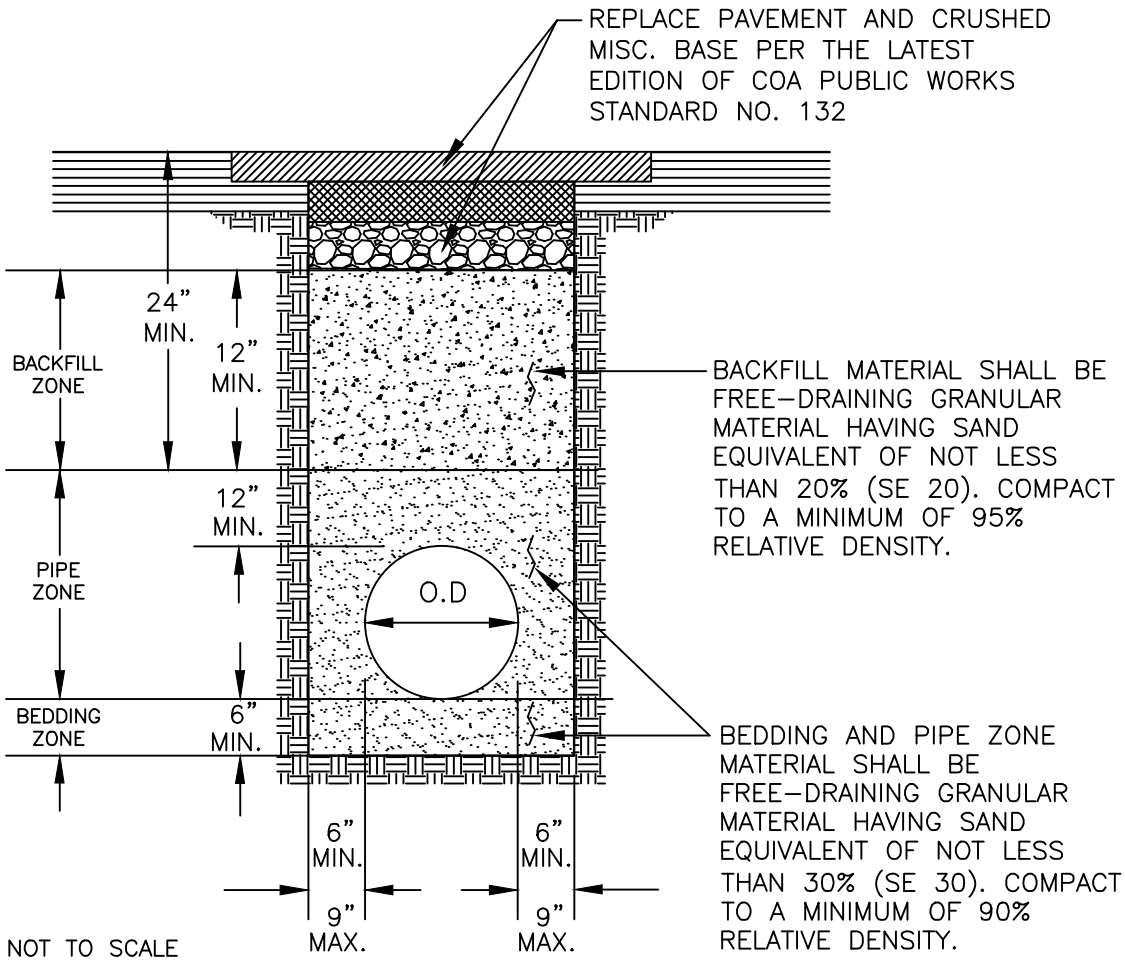
WATER MAIN OFFSET / SIPHON

WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

	BY	DATE		
DRAWN	TL	4–2–09	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	LOC	4–9–09	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021
RECOMMENDED	MF	4–9–09	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO. **W-170**

SHEET 4 OF 4



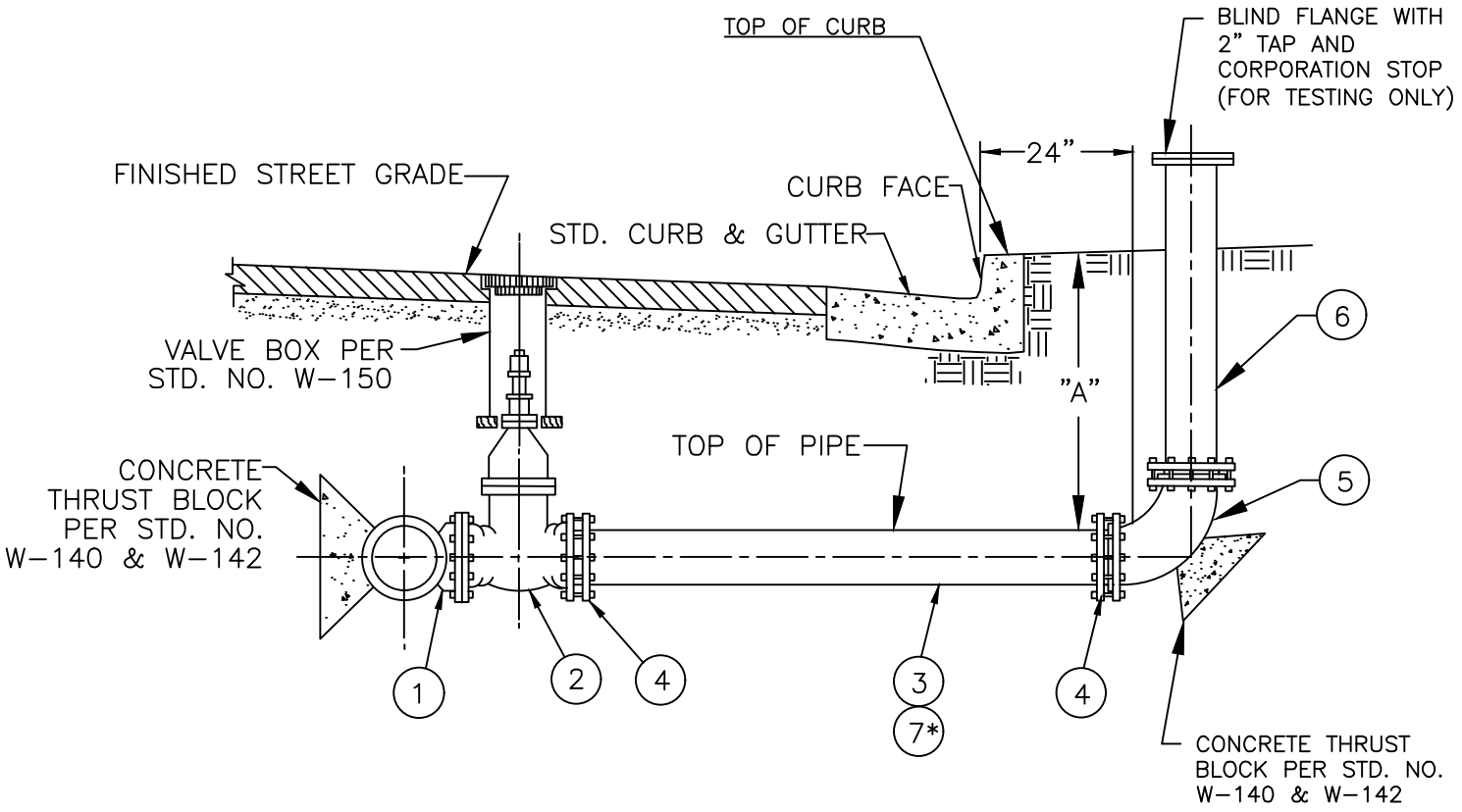
NOTES:

1. DIMENSIONS SHOWN HERE ARE MINIMUM. MORE STRINGENT REQUIREMENTS SHALL BE FOLLOWED PER PROJECT PLANS AND SPECIFICATIONS.
2. SHORING OR SOLID SHEATHING IS REQUIRED FOR DEPTHS OVER 5 FEET. DESIGN CALCULATIONS BY A REGISTERED ENGINEER SHALL BE REQUIRED.

WATER PIPE BEDDING DETAIL

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
	BY	DATE			
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021	W-180
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021	
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 1 OF 1

LIST OF MATERIAL	
ITEM	DESCRIPTION
1	TEE–FLANGED OUTLET
2	VALVE–FLG X MJ
3	LATERAL–DUCTILE IRON PIPE PER SECTION 2–01
4	MECHANICAL JOINT RESTRAINT PER SECTION 2–12.01 (TYP.).
5	D.I. SOLID SLEEVE COUPLING–MJ X MJ
6	DUCTILE IRON PIPE, CLASS 53, PER SECTION 2–01–PE X FLG
7*	IN LIEU OF ITEM 3, LATERAL PIPE SHALL BE AWWA C900 PVC OR AWWA C909 PVCO PIPE, CLASS 305, P.E. X P.E. (SEE NOTES 7, 8 AND 9 ON SHEET 2)



* FOR PVC AND PCVO WATER MAIN CONSTRUCTION ONLY– SEE ITEM 7* ABOVE AND NOTES 7, 8, AND 9 ON SHEET 2

LARGE METER AND FIRELINE LATERAL INSTALLATION

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
	BY	DATE			
DRAWN	TL	1–27–20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021	W-201
CHECKED	CE	2–05–21	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021	
RECOMMENDED	CE	2–05–21	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 1 OF 2

NOTES:

1. FOR DEVELOPMENT PROJECTS, METER SIZE AND LATERAL SIZE ARE TO BE DETERMINED BY DEVELOPER'S ENGINEER AND SHALL BE SUBJECT TO REVIEW AND APPROVAL BY THE UTILITY.
2. TAPPING SLEEVES, WHEN INDICATED PER PLAN OR AS DIRECTED BY UTILITY SHALL BE PER SECTION 2–8.05.7. TAPPING VALVES 12" AND SMALLER SHALL BE RESILIENT WEDGE GATE VALVES.
3. PIPE, VALVE, TEE OUTLET AND CAP SHALL BE OF SAME NOMINAL DIAMETER, EXCEPT FOR 3" METER.
4. ALL FIRELINE ASSEMBLIES SHALL BE INSTALLED ABOVE GROUND WITH DIMENSION "A" EQUAL TO 34" OR AS OTHERWISE APPROVED BY THE UTILITY.
5. PLUG 2" OUTLET AFTER DISINFECTION AND FLUSHING OF LATERAL.
6. ALL PUSH ON JOINTS SHALL BE RESTRAINED PER SECTION 2–12.02.
7. PVC OR PVCO WATER MAIN CONSTRUCTION SHALL BE PRE–APPROVED BY THE UTILITY PER SECTION 2–02.
8. MECHANICAL JOINT RESTRAINTS FOR PVC OR PVCO PIPE SHALL BE PER SECTION 2–12.01.
9. FOR PVC OR PVCO LATERAL PIPE, CONNECT AND RESTRAIN PLAIN END PIPE USING DUCTILE IRON MECHANICAL JOINT SOLID SLEEVES WITH RESTRAINTS PER NOTE 8 ABOVE.

LARGE METER AND FIRELINE LATERAL INSTALLATION

WATER SERVICES

PUBLIC UTILITIES DEPARTMENT

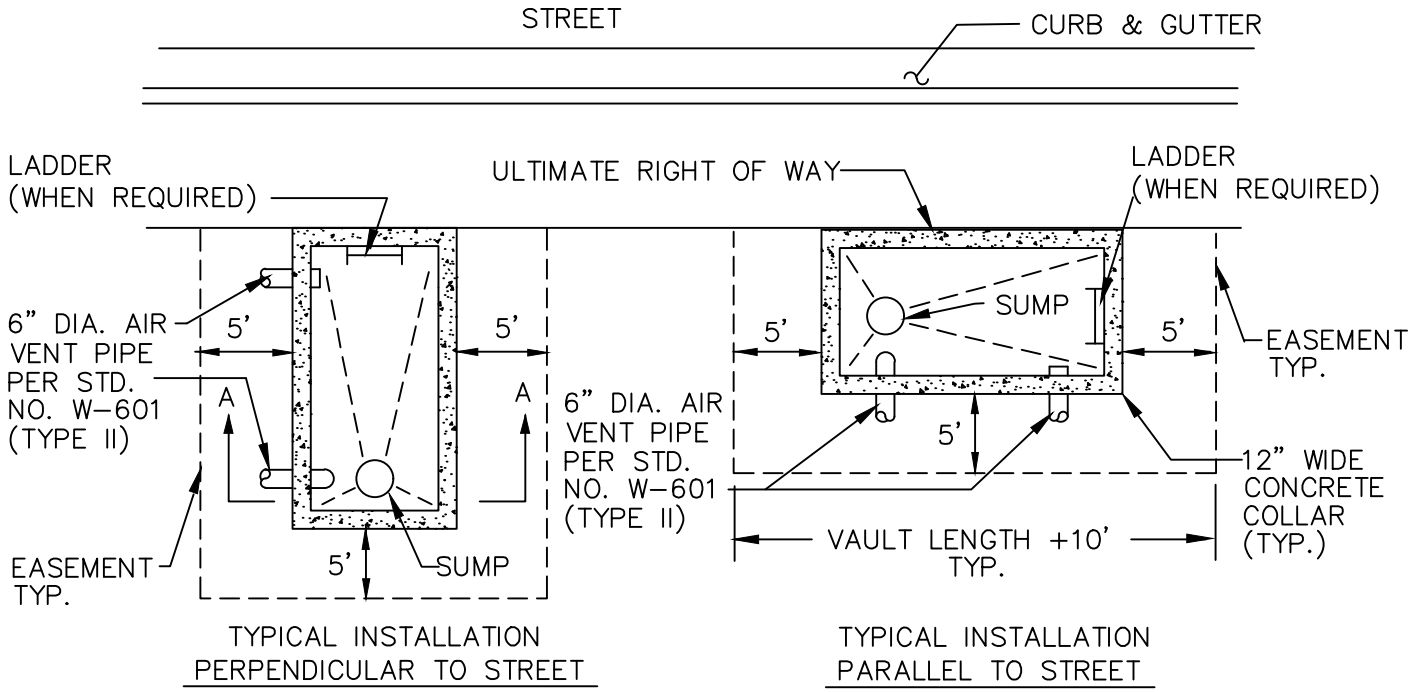
CITY OF ANAHEIM

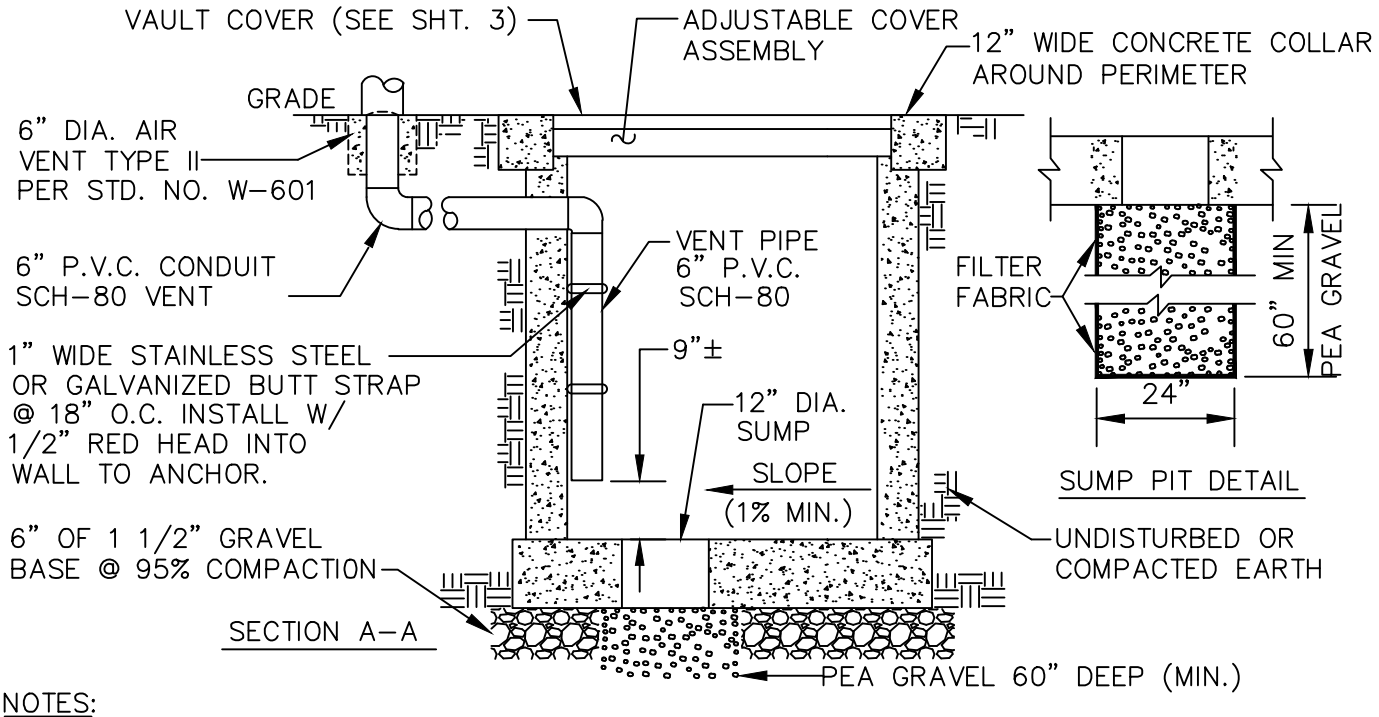
	BY	DATE		
DRAWN	TL	1–27–20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2–05–21	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2–05–21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO.

W-201

SHEET 2 OF 2





NOTES:

1. POURED IN PLACE FLOORS SHALL BE FORMED. 6" MIN. THICKNESS WITH #3 WIRE TIED 12" O.C. BOTH WAYS. CONCRETE SHALL BE CLASS 560-C-3250 (3250 P.S.I. AT 28 DAYS) FLOOR SHALL BE TROWEL FINISHED WITH PROPER FISHBONE SLOPE TO SUMP HOLE DRAIN.
2. VAULTS GREATER THAN 4' IN DEPTH REQUIRE A FIBER REINFORCED PLASTIC (FRP) LADDER SET PERPENDICULAR TO HINGE.
3. ULTIMATE RIGHT OF WAY SHALL BE DETERMINED BY PUBLIC WORKS – DEVELOPMENT SERVICES.

STANDARD METER VAULT INSTALLATION

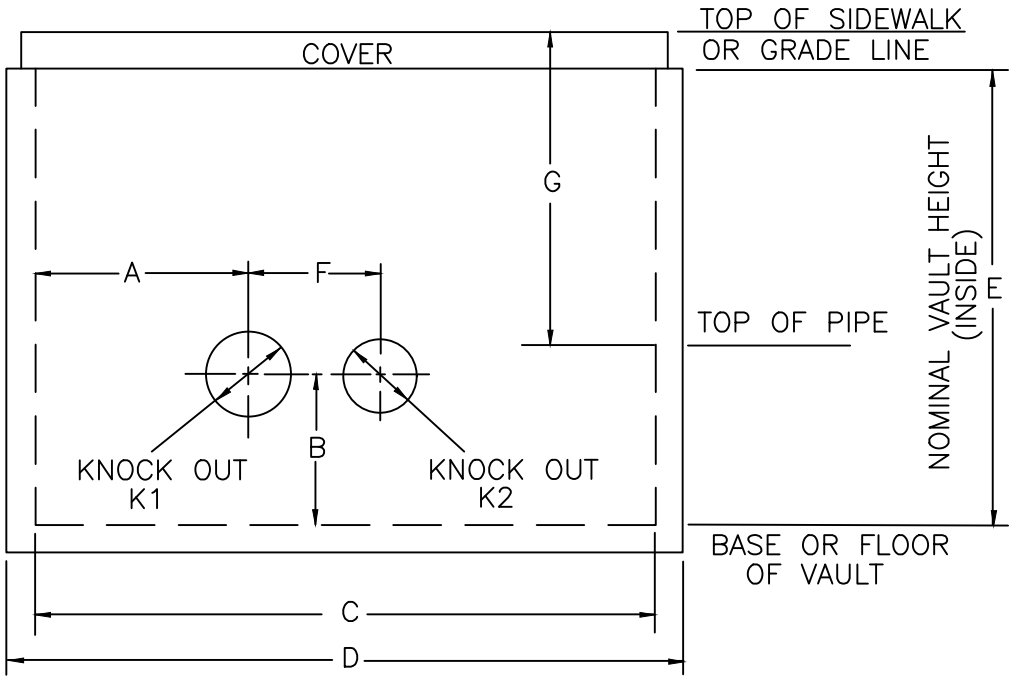
PUBLIC UTILITIES DEPARTMENT

WATER SERVICES — CITY OF ANAHEIM

	BY	DATE		
DRAWN	CE	5-10-21	APPROVED WATER ENGINEERING MANAGER	DATE 5/10/2021
CHECKED	CE	5-10-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 5/10/2021
RECOMMENDED	CE	5-10-21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO. **W-203**

SHEET 1 OF 3



INLET END – STANDARD DIMENSIONS

TURBINE/COMPOUND METERS

METER SIZE	K1	K2	A	B	C	D	E	F	G
3"	10"	N/A	19"	16"	57.5"	63.75"	48"	N/A	34"
4"	10"	N/A	19"	16"	57.5"	63.75"	48"	N/A	34"
6"	12"	N/A	19"	16"	57.5"	63.75"	48"	N/A	34"
DUAL 6"	12"	12"	14.5"	14"	57.5"	63.75"	48"	26.5"	38"
8"/10"	SPECIAL DESIGN								

APPROVED VAULT SUPPLIERS:

1. EISEL ENTERPRISES, INC.
2. JENSEN PRECAST
3. J&R CONCRETE PRODUCTS, INC.
4. OLSON PRECAST COMPANY
5. OLDCASTLE PRECAST, INC.

NOTE:

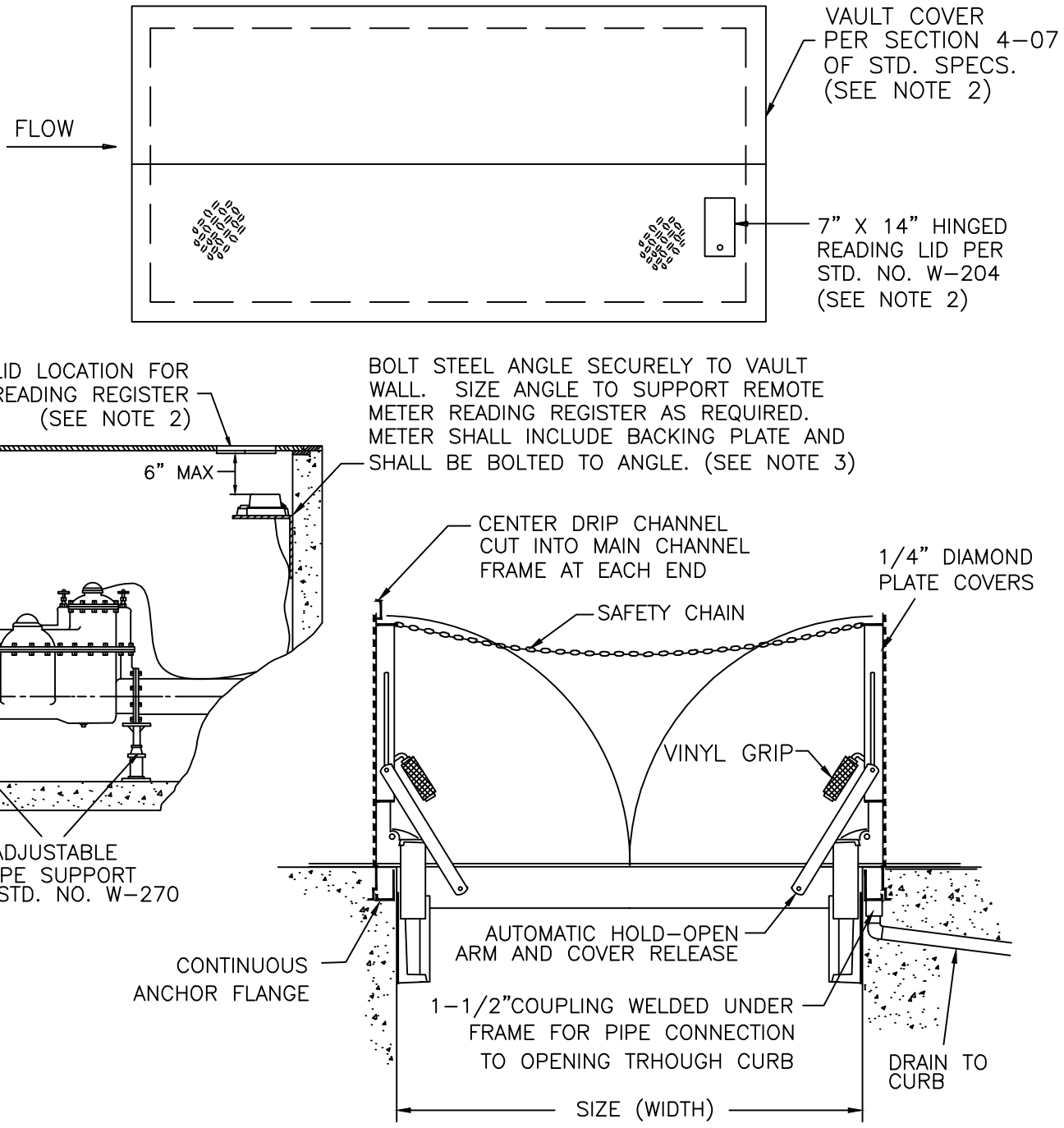
1. WHEN ORDERING VAULTS, INFORM SUPPLIER THAT VAULT WILL BE INSTALLED IN THE CITY OF ANAHEIM.
2. HOLES TO BE SEALED W/NON SHRINK GROUT, LINK SEALS, OR APPROVED EQUAL.

STANDARD METER VAULT INSTALLATION

WATER SERVICES	PUBLIC UTILITIES DEPARTMENT			CITY OF ANAHEIM
	BY	DATE		
DRAWN	TL	12-22-14	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	DRS	12-29-14	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021
RECOMMENDED	DE	12-29-14	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO. **W-203**

SHEET 2 OF 3



NOTES:

1. APPROVED VAULT COVER SUPPLIERS: BILCO, ACCESS MANUFACTURING, AND USF FABRICATION.
2. THE CONTRACTOR SHALL SUBMIT TO THE UTILITY FOR REVIEW AND APPROVAL THE VAULT COVER DETAIL INDICATING THE LOCATION OF THE HINGED LID OPENING PRIOR TO FABRICATION. THE LOCATION OF THE HINGED LID SHALL ALLOW FOR CLEAR ACCESS TO THE METER READING REGISTER.
3. STEEL ANGLE SUPPORT FOR REMOTE METER READING REGISTER SHALL BE LOCATED BELOW THE HINGED COVER FOR CLEAR ACCESS TO THE METER. EXACT LOCATION TO BE DETERMINED BY CONTRACTOR IN THE FIELD.

STANDARD METER VAULT INSTALLATION

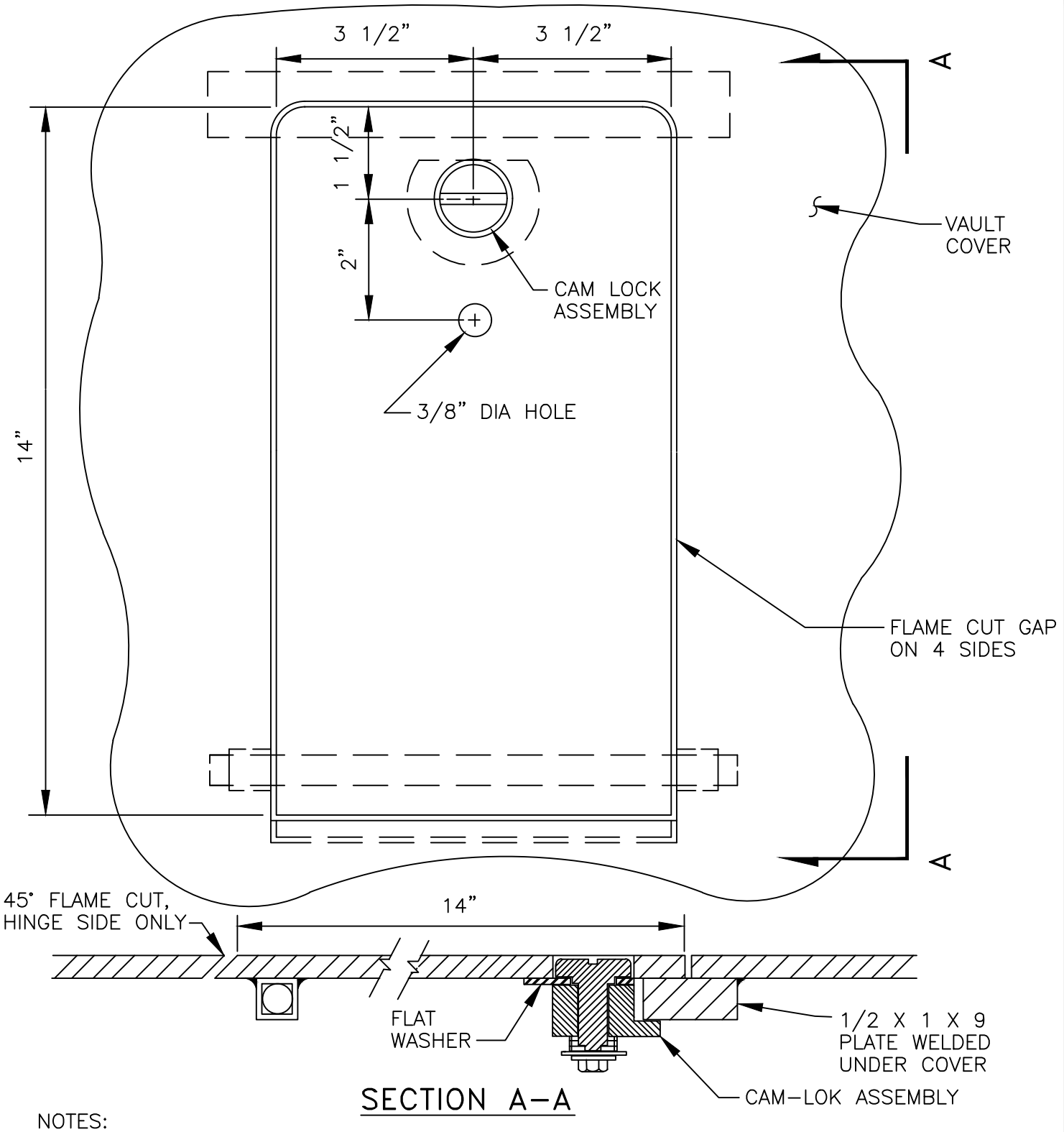
PUBLIC UTILITIES DEPARTMENT

WATER SERVICES — CITY OF ANAHEIM

STD. NO. **W-203**

SHEET 3 OF 3

	BY	DATE		
DRAWN	TL	12-22-14	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	DRS	12-29-14	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	DE	12-29-14	APPROVED CITY ENGINEER	DATE 7/7/2021



SECTION A–A

NOTES:

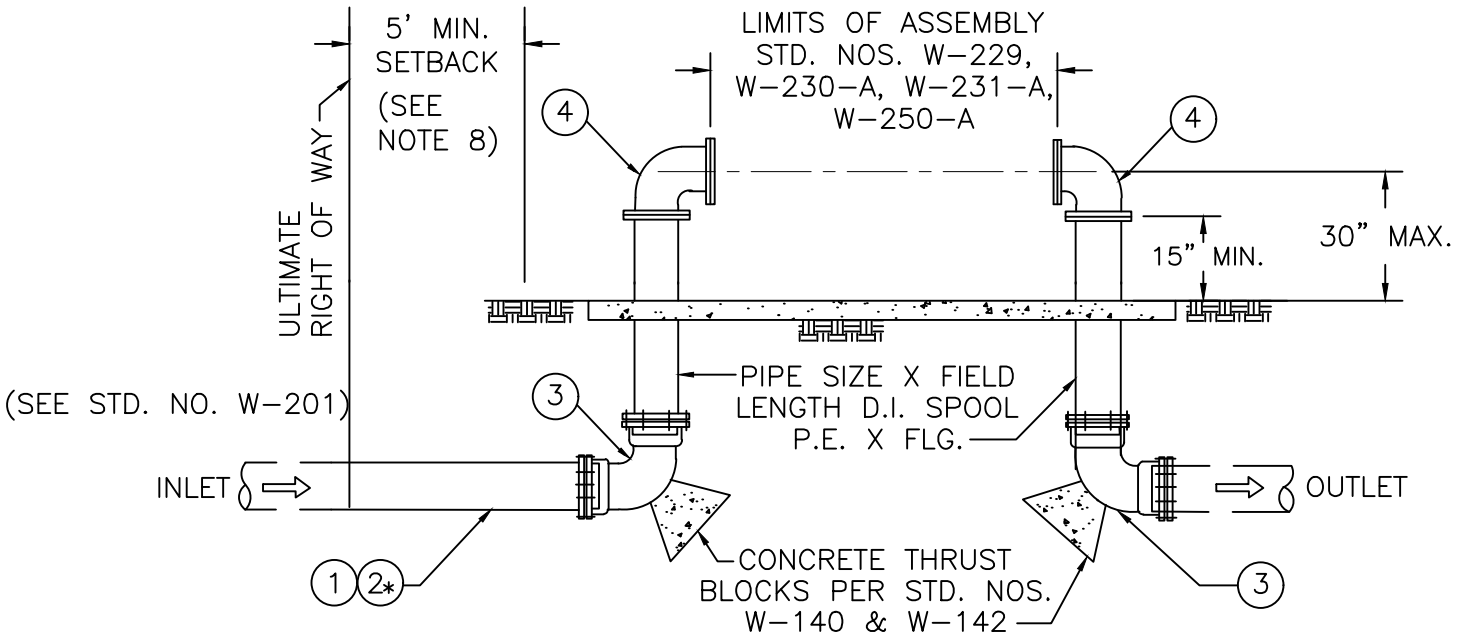
1. THIS READING LID IS TO BE USED IN NON–TRAFFIC AREAS ONLY.

7 INCH X 14 INCH HINGED READING LID

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
DRAWN	BY: HQ	DATE: 4–10–02	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021	W-204
CHECKED	DE	4–10–02	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021	
RECOMMENDED	DS	4–10–02	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 1 OF 1

LIST OF MATERIAL

ITEM	DESCRIPTION
1	PIPE SIZE X FIELD LENGTH D.I. SPOOL, P.E. X P.E.
2*	IN LIEU OF ITEM 1, PIPE SHALL BE AWWA C900 PVC OR AWWA C909 PVCO PIPE, CLASS 305 P.E.XP.E. (SEE NOTES 5 AND 6)
3	D.I. 90° BEND, M.J.XM.J. (2 TYP.), RESTRAINED PER SECTION 2–12.01
4	D.I. 90° BEND, FLG.X FLG. (SEE NOTE 7 IF METER AND LATERAL SIZES ARE DIFFERENT.)



* FOR PVC/PVCO WATER MAIN LINE CONSTRUCTION ONLY – SEE ITEM 2* ABOVE AND NOTES 5 AND 6 BELOW

NOTES:

1. ALL PIPE SHALL BE DUCTILE IRON PIPE PER SECTION 2–01.
2. ALL FITTINGS AND APPURTENANCES (GASKETS, BOLTS, NUTS, RESTRAINTS) SHALL COMPLY WITH SECTION 2–08 & 2–12 OF THESE SPECIFICATIONS.
3. THE COMPLETED ASSEMBLY SHALL BE PAINTED PER SECTION 2–14.
4. ITEM 3 IS REQUIRED IF THE FIRE LINE ASSEMBLY IS NOT INSTALLED AT THE SAME TIME OF THE LATERAL INSTALLATION.
5. PVC OR PVCO WATER MAIN CONSTRUCTION SHALL BE PRE–APPROVED BY THE UTILITY PER SECTION 2–02.
6. MECHANICAL JOINT RESTRAINTS FOR PVC AND PVCO PIPE SHALL BE PER SECTION 2–12.01.
7. D.I. REDUCING 90° BEND OR REDUCER ON RISER PIPE (LATERAL SIZE BY METER SIZE) TO BE INSTALLED AS REQUIRED.
8. THE ULTIMATE RIGHT OF WAY SHALL BE DETERMINED BY PUBLIC WORKS – DEVELOPMENT SERVICES.
9. THE DISTANCE FROM SETBACK LINE TO THE ULTIMATE RIGHT OF WAY LINE VARIES BY ZONING WITH A MINIMUM OF 5 FEET, OR AS APPROVED BY PLANNING DEPARTMENT.
10. SEE SHEETS 2 AND 3 FOR ADDITIONAL REQUIREMENTS.

ABOVE GROUND ASSEMBLIES INSTALLATION

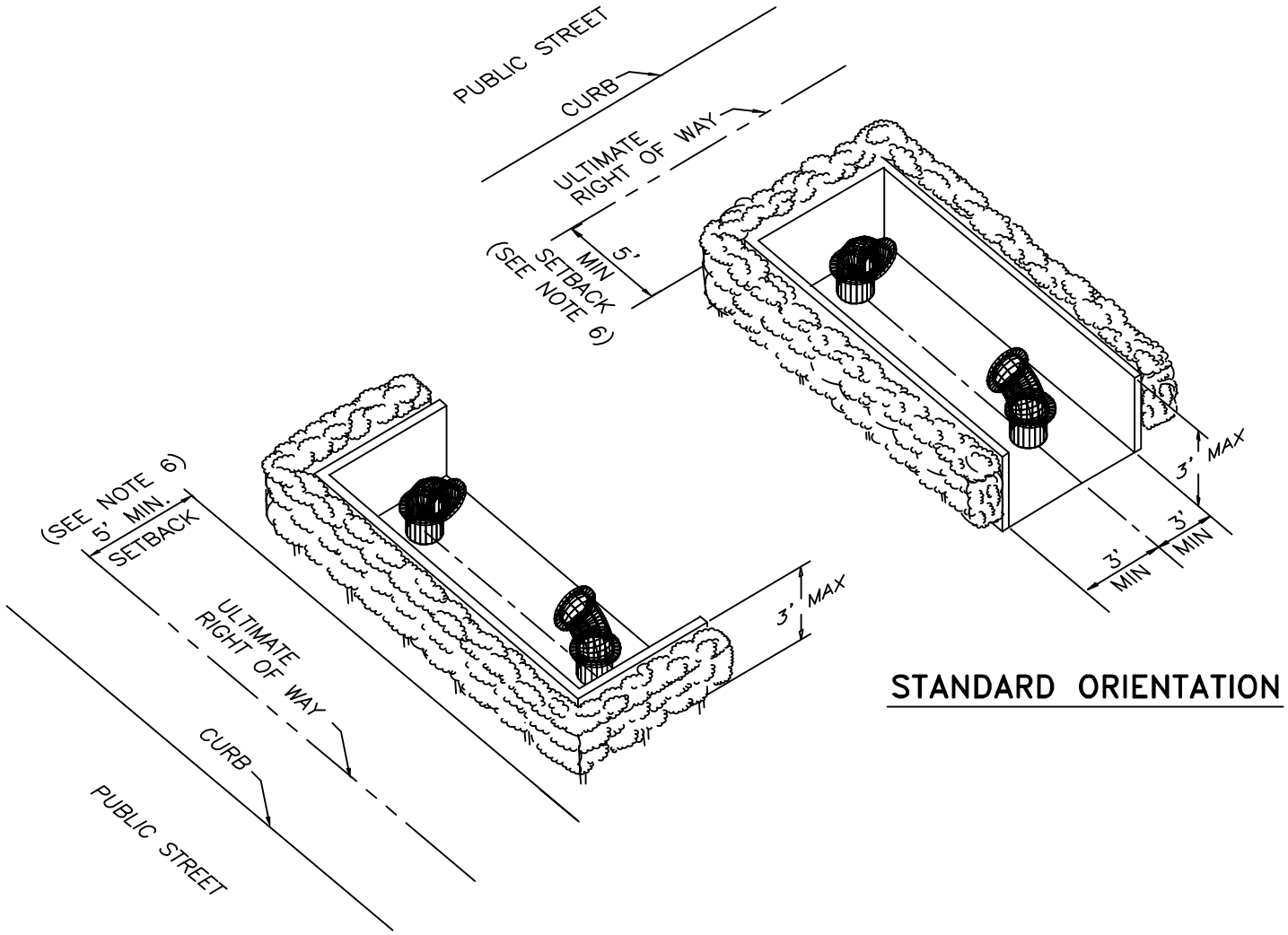
PUBLIC UTILITIES DEPARTMENT

WATER SERVICES — CITY OF ANAHEIM

	BY	DATE		
DRAWN	CE	5–10–21	APPROVED WATER ENGINEERING MANAGER	DATE 5/10/2021
CHECKED	CE	5–10–21	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 5/10/2021
RECOMMENDED	CE	5–10–21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO. **W-207**

SHEET 1 OF 3



STANDARD ORIENTATION

PARALLEL ORIENTATION

NOTES:

1. ABOVE GROUND FIRE LINE AND BACKFLOW ASSEMBLIES MUST BE SHIELDED FROM PUBLIC VIEW FROM STREET WITH LANDSCAPING AND/OR WALLS OR OTHER MEANS IN ACCORDANCE WITH SECTION 4–10 OF THE SPECIFICATIONS OR AS DIRECTED BY THE UTILITY.
2. WALL HEIGHT SHALL BE RESTRICTED TO A MAX. OF 3' IN STREET SETBACK AREA.
3. CLINGING VINES TO BE PLANTED ADJACENT TO WALL PER PLANNING DEPT. REQUIREMENTS.
4. ALL LANDSCAPING WITH IRRIGATION TO BE INSTALLED AND MAINTAINED BY PROPERTY OWNER.
5. FIRE DEPARTMENT CONNECTIONS CANNOT BE PLACED ON THE ASSEMBLY WITHOUT PRIOR APPROVAL. CONTACT FIRE DEPARTMENT AT 714–765–4040 FOR ACCEPTABLE LOCATION.
6. THE ULTIMATE RIGHT–OF–WAY SHALL BE DETERMINED BY PUBLIC WORKS – DEVELOPMENT SERVICES.
7. THE DISTANCE FROM THE SETBACK LINE TO THE RIGHT OF WAY LINE VARIES BY ZONING WITH A MINIMUM OF 5 FEET, OR AS APPROVED BY PLANNING DEPARTMENT.
8. FOR METER INSTALLATION, AN EASEMENT DEDICATED TO THE CITY IS REQUIRED. SEE SHEET 3 FOR REQUIRED LIMITS OF EASEMENT.

ABOVE GROUND ASSEMBLIES INSTALLATION

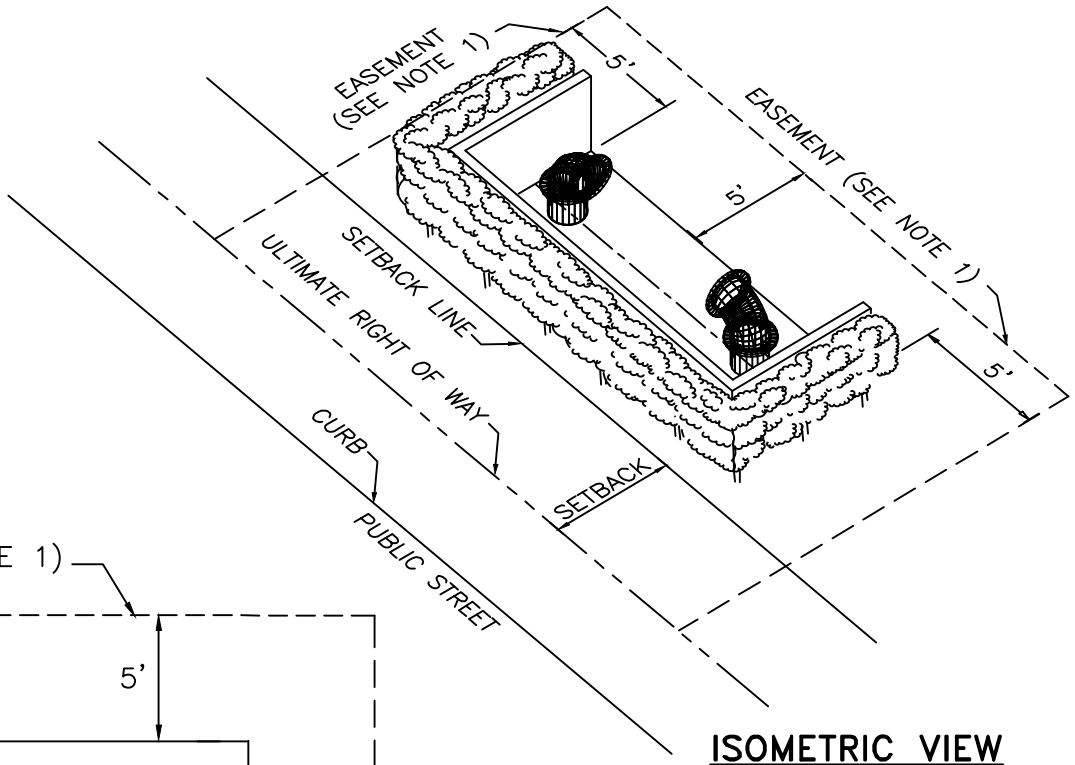
PUBLIC UTILITIES DEPARTMENT

WATER SERVICES — CITY OF ANAHEIM

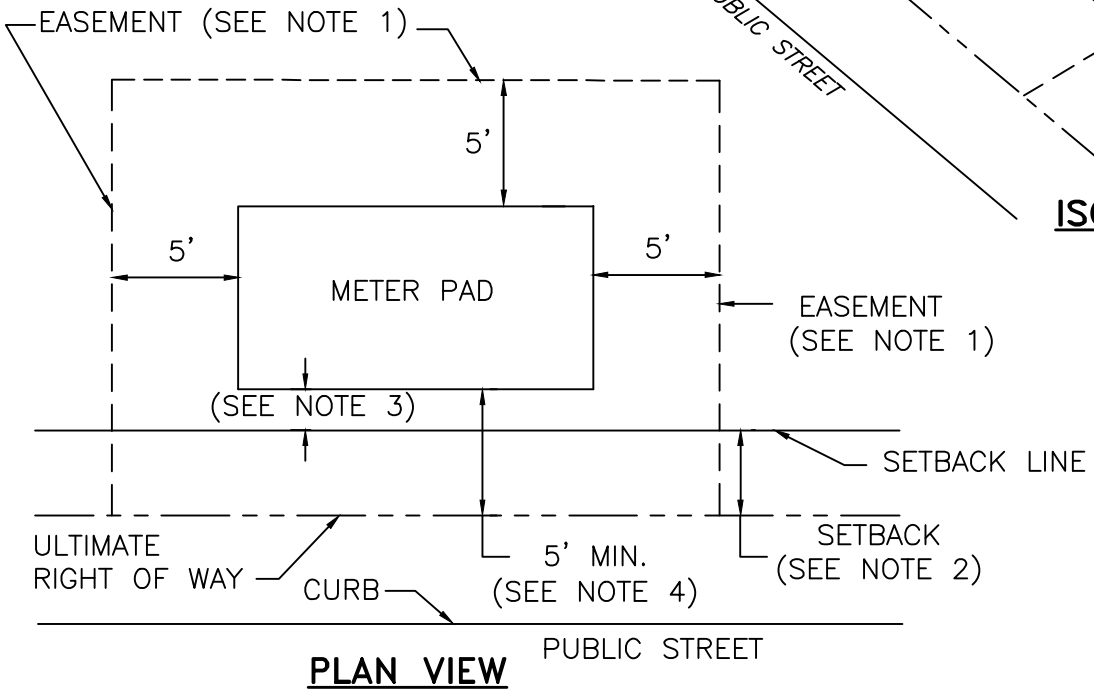
	BY	DATE		
DRAWN	CE	5–10–21	APPROVED WATER ENGINEERING MANAGER	DATE 5/10/2021
CHECKED	CE	5–10–21	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 5/10/2021
RECOMMENDED	CE	5–10–21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO. **W-207**

METER INSTALLATION EASEMENT



ISOMETRIC VIEW



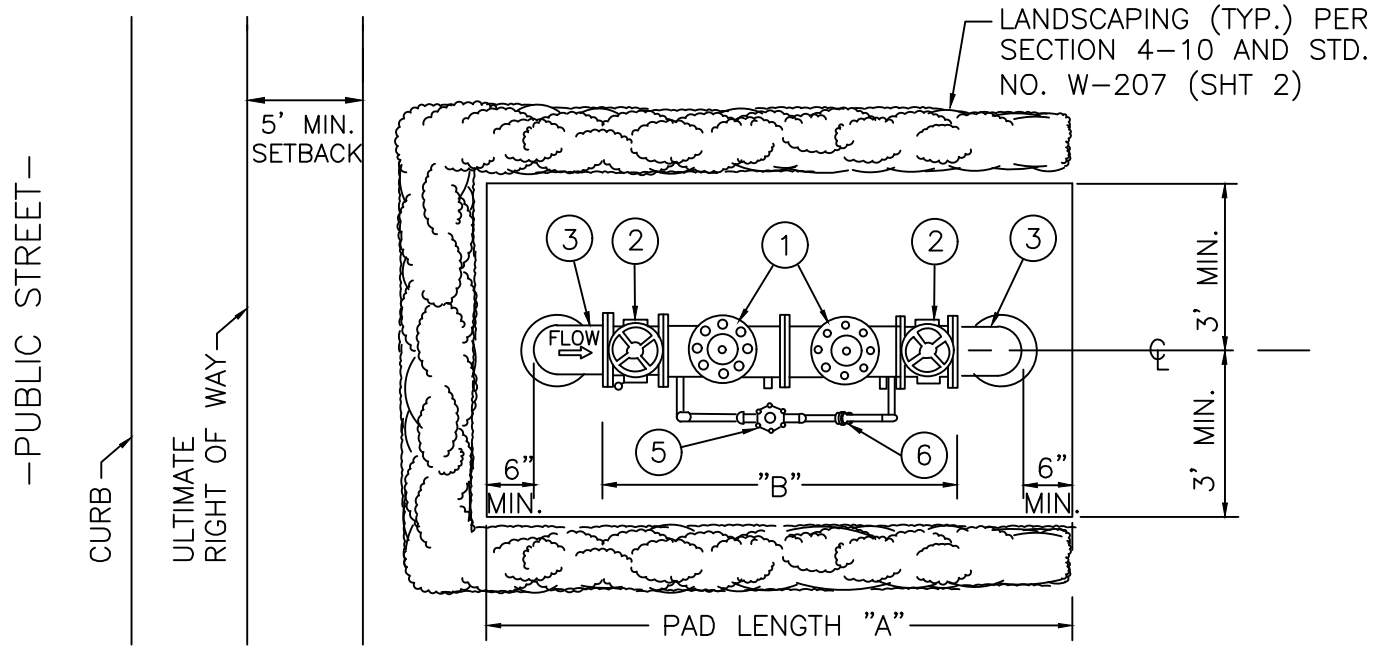
PLAN VIEW

NOTES:

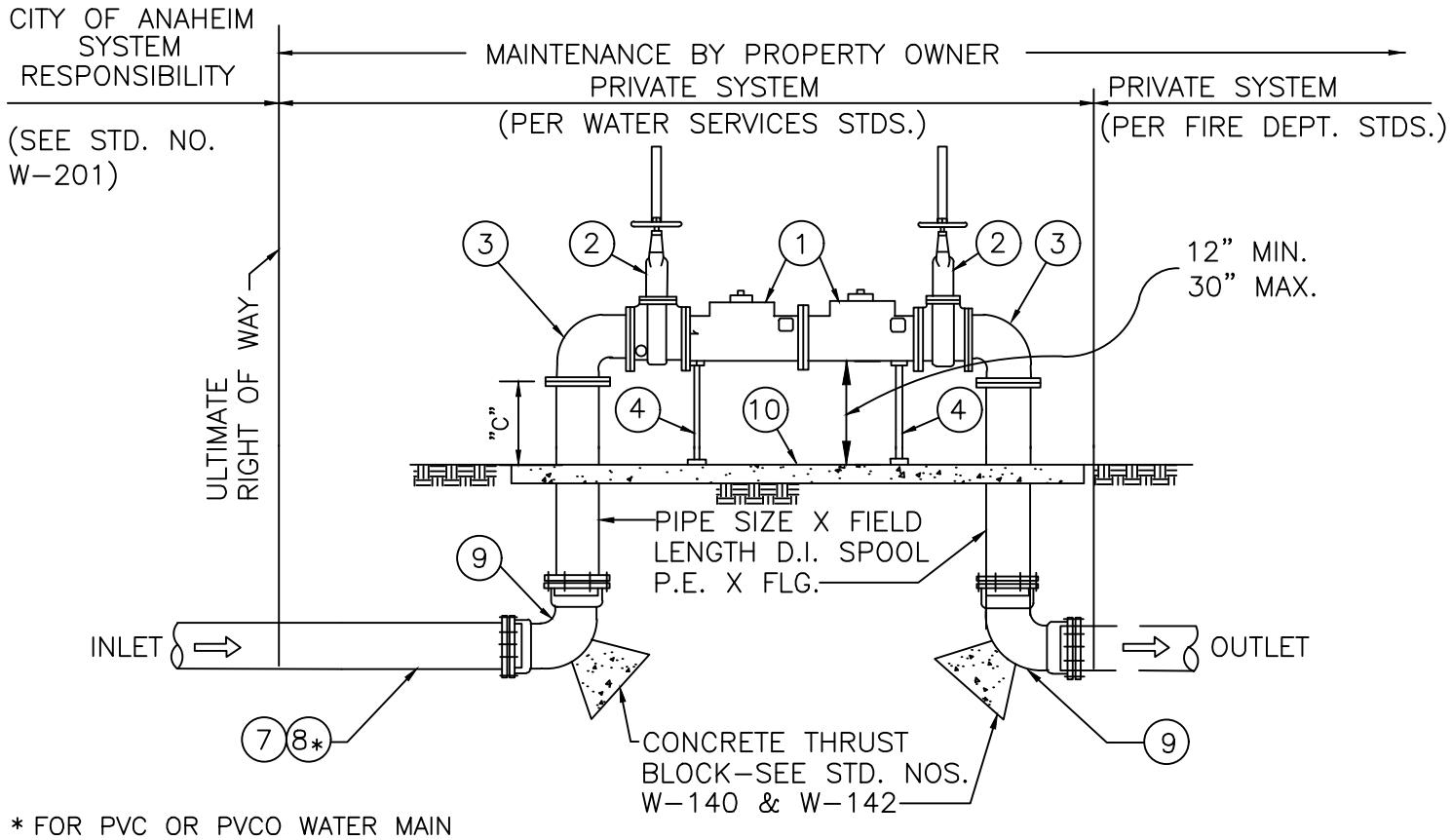
1. FOR METERS ONLY – AN EASEMENT IS REQUIRED TO BE DEDICATED TO THE CITY. THE EASEMENT SHALL EXTEND 5 FEET MINIMUM OUTSIDE OF THE CONCRETE PAD AND SHALL CONTINUE TO EXTEND TO THE ULTIMATE RIGHT OF WAY. THIS DISTANCE VARIES – SEE NOTES 3 AND 4.
2. THE ULTIMATE RIGHT OF WAY SHALL BE DETERMINED BY PUBLIC WORKS – DEVELOPMENT SERVICES.
3. THE DISTANCE FROM THE SETBACK LINE TO THE ULTIMATE RIGHT OF WAY LINE VARIES BY ZONING WITH A MINIMUM OF 5 FEET, OR AS APPROVED BY PLANNING DEPARTMENT.
4. THE DISTANCE FROM THE SETBACK LINE TO THE METER PAD SHALL BE AS REQUIRED TO MEET SCREENING REQUIREMENTS PER SECTION 4–10.

ABOVE GROUND ASSEMBLIES INSTALLATION

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
	BY	DATE			
DRAWN	CE	5–10–21	APPROVED WATER ENGINEERING MANAGER	DATE 5/10/2021	W-207
CHECKED	CE	5–10–21	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 5/10/2021	
RECOMMENDED	CE	5–10–21	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 3 OF 3



PLAN VIEW



* FOR PVC OR PVCO WATER MAIN CONSTRUCTION ONLY – SEE ITEM 8* AND NOTES 9 AND 10 ON SHEET 2

ELEVATION VIEW

DOUBLE CHECK DETECTOR ASSEMBLY FIRELINE ONLY

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM
	BY	DATE		
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO.

W-220

SHEET 1 OF 2

LIST OF MATERIAL	
ITEM	DESCRIPTION
1	DOUBLE CHECK DETECTOR ASSEMBLY (SEE SECTION 5–01.)
2	RESILIENT WEDGE VALVE, O.S.&Y, (SEE SECTION 2–05.)
3	SR 90° BEND, FLG X FLG, D.I., CEMENT MORTAR LINED.
4	FLAT PIPE SUPPORT (SEE STD. NO. W–270).
5	BYPASS METER (SEE SECTION 4–06.)
6	BYPASS METER DOUBLE CHECK VALVE.
7	PIPE SIZE X FIELD LENGTH D.I. SPOOL, P.E. X P.E.
8*	IN LIEU OF ITEM 7, PIPE SHALL BE AWWA C900 PVC OR AWWA C909 PVCO PIPE, CLASS 305, P.E.XP.E. (SEE NOTES 9 AND 10)
9	D.I. 90° BEND, M.J. X M.J. (2 TYP.), RESTRAINED PER SECTION 2–12.01.
10	CONCRETE PAD 4" THICK, SIZE AS INDICATED HEREIN; CLASS 520–C–2500 CONCRETE.

FIRELINE SIZE	A	B(MAX.)	C
4"	7.0'	4'–3"	14"
6"	8.5'	5'–3"	14"
8"	9.5'	6'–4"	13.5"
10"	11.5'	7'–5"	12"

NOTES:

1. FIRE DEPT. CONNECTIONS CANNOT BE PLACED ON THE ASSEMBLY WITHOUT PRIOR APPROVAL, CONTACT FIRE DEPT. AT (714)765–4040. WHERE APPROVED BY FIRE DEPT., A FLG X FLG X FLG, D.I., CEMENT MORTAR LINED TEE MAY BE SUBSTITUTED FOR THE TOP 90° BEND ON FIRELINES.
2. O.S.&Y. VALVES SHALL BE LOCKED IN OPEN POSITION WITH CHAIN AND OWNER'S PADLOCK(S). PADLOCK(S) SHALL BE BREAKAWAY TYPE.
3. ALL PIPE SHALL BE DUCTILE IRON PER SECTION 2–01.
4. ALL FITTINGS AND APPURTENANCES (GASKETS, NUTS, BOLTS, RESTRAINT) SHALL COMPLY WITH SECTIONS 2–08 & 2–12 OF THESE SPECIFICATIONS.
5. SEE STD. NO. W–207, SHEET 2, FOR ABOVE GROUND ASSEMBLY INSTALLATION REQUIREMENTS.
6. THE COMPLETED ASSEMBLY SHALL BE PAINTED PER SECTION 2–14.
7. PROVIDE A MINIMUM OF 18 INCHES OF CLEAR SPACE FROM THE BYPASS METER TO THE EDGE OF CONCRETE PAD.
8. BACKFLOW DEVICE SIZE SHALL BE EQUAL TO OR GREATER THAN PIPE SIZE.
9. PVC OR PVCO WATER MAIN CONSTRUCTION SHALL BE PRE–APPROVED BY THE UTILITY PER SECTION 2–02.
10. MECHANICAL JOINT RESTRAINT FOR PVC OR PVCO PIPE SHALL BE PER SECTION 2–12.01.
11. THE ULTIMATE RIGHT OF WAY SHALL BE DETERMINED BY PUBLIC WORKS – DEVELOPMENT SERVICES.

DOUBLE CHECK DETECTOR ASSEMBLY
FIRELINE ONLY

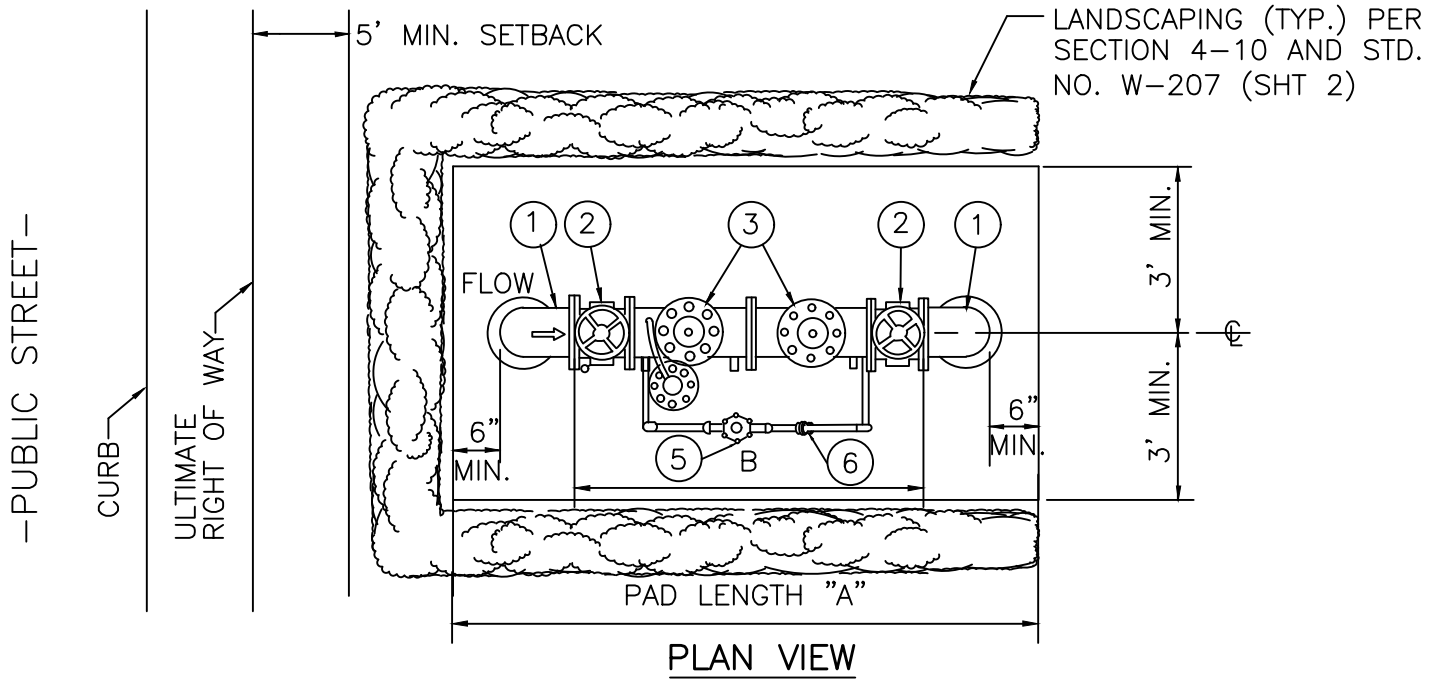
WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

	BY	DATE		
DRAWN	CE	5–10–21	APPROVED WATER ENGINEERING MANAGER	DATE 5/10/2021
CHECKED	CE	5–10–21	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 5/10/2021
RECOMMENDED	CE	5–10–21	APPROVED CITY ENGINEER	DATE 7/7/2021

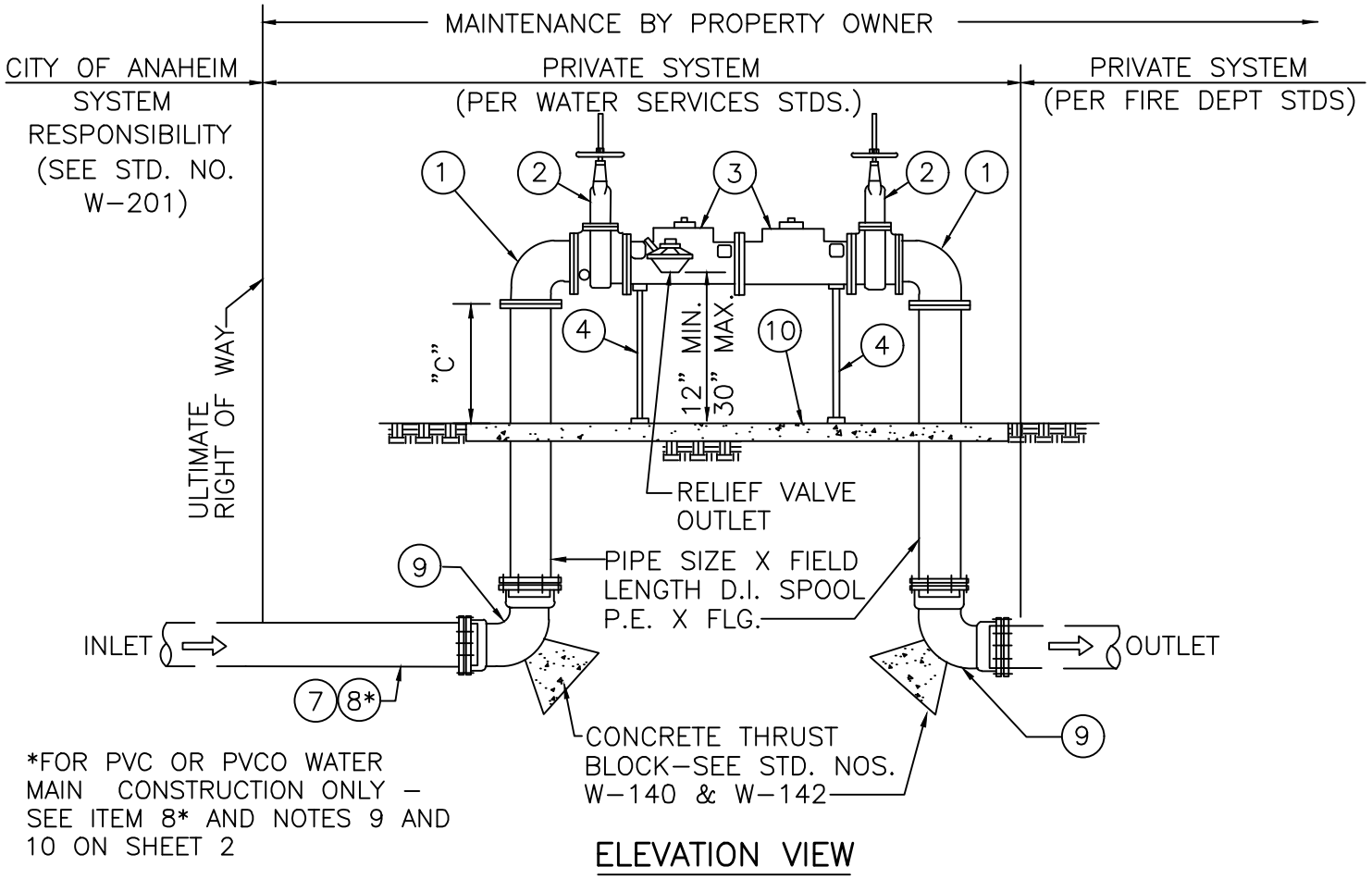
STD. NO.

W-220

SHEET 2 OF 2



PLAN VIEW



FOR PVC OR PVCO WATER MAIN CONSTRUCTION ONLY - SEE ITEM 8 AND NOTES 9 AND 10 ON SHEET 2

ELEVATION VIEW

REDUCED PRESSURE PRINCIPLE DETECTOR ASSEMBLY FIRELINE ONLY

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
	BY	DATE			
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021	W-221
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021	
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 1 OF 2

LIST OF MATERIAL

ITEM	DESCRIPTION
1	SR 90° BEND, D.I., FLG X FLG.
2	RESILIENT WEDGE VALVE, O.S.&Y., FLG X FLG, HAND WHEEL (SEE SECTION 2-06).
3	REDUCED PRESSURE PRINCIPLE DETECTOR ASSEMBLY TYPE BACKFLOW PREVENTER W/BYPASS METER (SEE SECTION 5-01).
4	FLAT PIPE SUPPORT (SEE STD. NO. W-270).
5	BYPASS METER (SEE SECTION 4-06).
6	BYPASS METER REDUCED PRESSURE PRINCIPLE CHECK VALVE.
7	PIPE SIZE X FIELD LENGTH D.I. SPOOL, P.E. X P.E.
8*	IN LIEU OF ITEM 7, PIPE SHALL BE AWWA C900 PVC OR AWWA C909 PVCO PIPE, CLASS 305, P.E.XP.E. (SEE NOTES 9 AND 10).
9	D.I. 90° BEND, M.J.X M.J. (2 TYP.), RESTRAINED PER SECTION 2-12.01.
10	CONCRETE PAD 4" THICK, SIZE AS INDICATED HEREIN; CLASS 520-C-2500 CONCRETE.

LATERAL SIZE	A	B (MAX)	C
4"	7.0'	4'-3"	14"
6"	8.5'	5'-3"	14"
8"	9.5'	6'-4"	13.5"
10"	11.5'	7'-5"	12"

NOTES:

1. FIRE DEPT. CONNECTIONS CANNOT BE PLACED ON THE ASSEMBLY WITHOUT PRIOR APPROVAL, CONTACT FIRE DEPT. AT (714) 765-4040. WHERE APPROVED BY FIRE DEPT., A FLG X FLG X FLG, D.I., CEMENT MORTAR LINED TEE MAY BE SUBSTITUTED FOR THE TOP 90° BEND ON FIRELINES.
2. O.S.&Y. VALVES SHALL BE LOCKED IN OPEN POSITION WITH CHAIN AND OWNER'S PADLOCK(S) IN SERIES WITH WATER UTILITY'S PADLOCK(S).
3. ALL PIPE SHALL BE DUCTILE IRON PIPE PER SECTION 2-01.
4. ALL FITTINGS AND APPURTENANCES (GASKETS, BOLTS, NUTS, RESTRAINTS) SHALL COMPLY WITH SECTIONS 2-08 & 2-12 OF THESE SPECIFICATIONS.
5. SEE STD. NO. W-207, SHEET 2, FOR ABOVE GROUND ASSEMBLY INSTALLATION REQUIREMENTS.
6. THE COMPLETED ASSEMBLY SHALL BE PAINTED PER SECTION 2-14.
7. PROVIDE A MINIMUM OF 18 INCHES OF CLEAR SPACE FROM THE BYPASS METER TO THE EDGE OF CONCRETE PAD.
8. BACKFLOW DEVICE SIZE SHALL BE EQUAL TO OR GREATER THAN PIPE SIZE.
9. PVC OR PVCO WATER MAIN CONSTRUCTION SHALL BE PRE-APPROVED BY THE UTILITY PER SECTION 2-02.
10. MECHANICAL JOINT RESTRAINTS FOR PVC OR PVCO PIPE SHALL BE PER SECTION 2-12.01.
11. THE ULTIMATE RIGHT OF WAY SHALL BE DETERMINED BY PUBLIC WORKS - DEVELOPMENT SERVICES.

REDUCED PRESSURE PRINCIPLE DETECTOR ASSEMBLY FIRELINE ONLY

PUBLIC UTILITIES DEPARTMENT

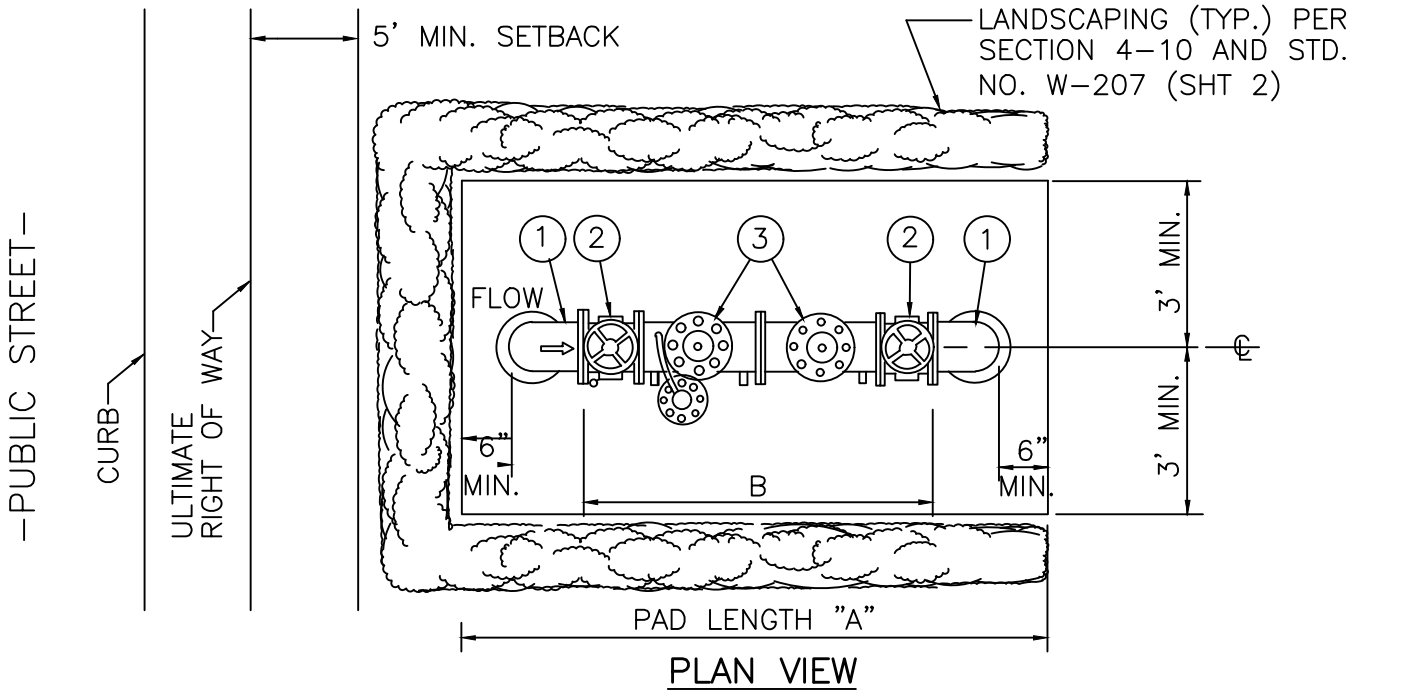
WATER SERVICES — CITY OF ANAHEIM

	BY	DATE		
DRAWN	CE	5-10-21	APPROVED WATER ENGINEERING MANAGER	DATE 5/10/2021
CHECKED	CE	5-10-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 5/10/2021
RECOMMENDED	CE	5-10-21	APPROVED CITY ENGINEER	DATE 7/7/2021

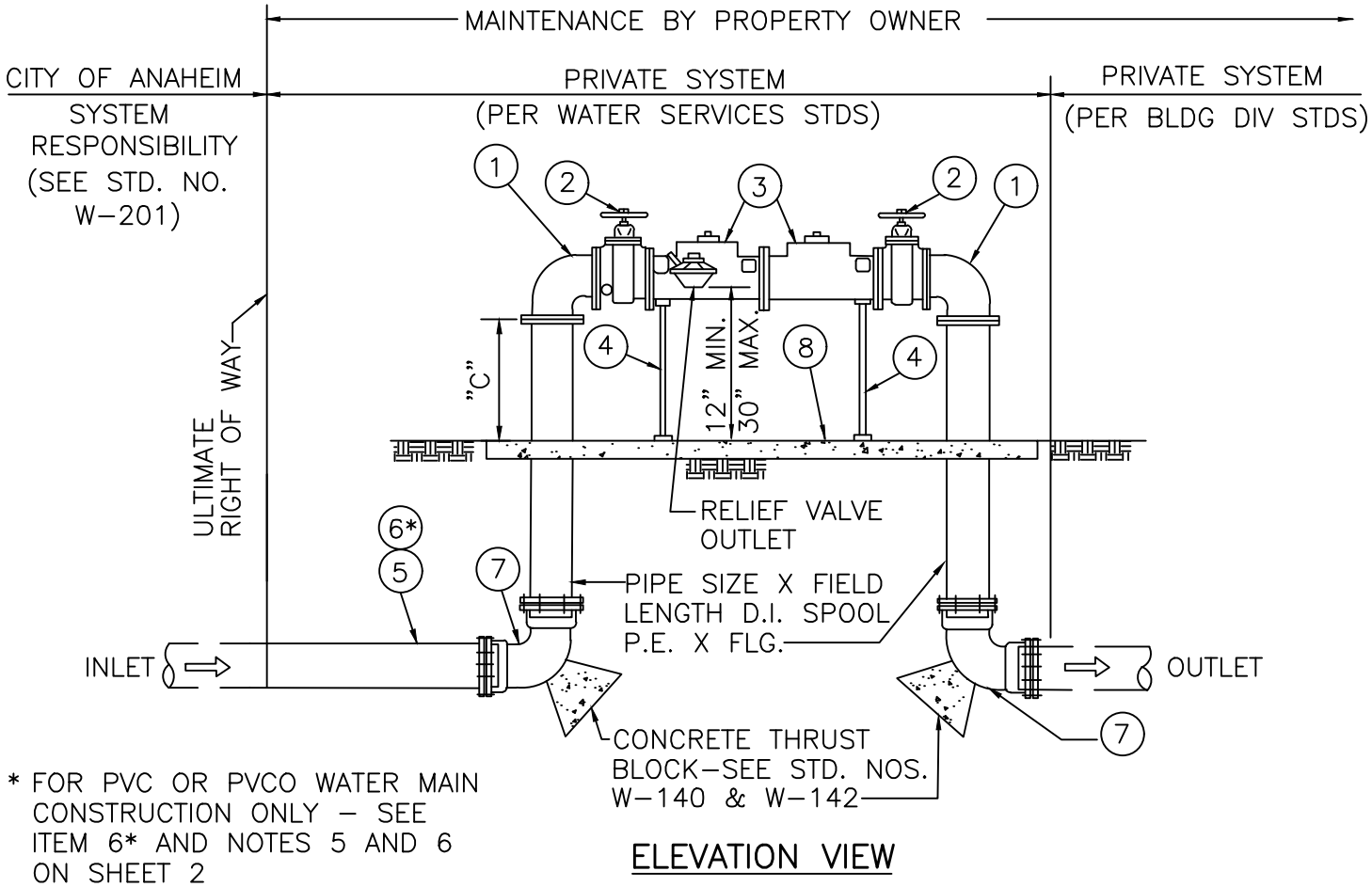
STD. NO.

W-221

SHEET 2 OF 2



PLAN VIEW



* FOR PVC OR PVCO WATER MAIN CONSTRUCTION ONLY – SEE ITEM 6* AND NOTES 5 AND 6 ON SHEET 2

ELEVATION VIEW

REDUCED PRESSURE PRINCIPLE TYPE ASSEMBLY FOR LARGE SERVICES - EXCLUDING FIRELINES

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
	BY	DATE			
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021	W-221A
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021	
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 1 OF 2

LIST OF MATERIAL	
ITEM	DESCRIPTION
1	SR 90° BEND, D.I., FLG X FLG.
2	RESILIENT WEDGE VALVE, FLG X FLG, HAND WHEEL (SEE SECTION 2–06).
3	REDUCED PRESSURE PRINCIPLE TYPE BACKFLOW PREVENTER. THE BACKFLOW DEVICE SHALL BE LEAD FREE FOR DOMESTIC SERVICE.(SEE SECTION 5–01)
4	FLAT PIPE SUPPORT (SEE STD. NO. W–270).
5	PIPE SIZE X FIELD LENGTH D.I. SPOOL, P.E. X P.E.
6*	IN LIEU OF ITEM 5, PIPE SHALL BE AWWA C900 PVC OR AWWA C909 PVCO PIPE, CLASS 305, P.E.XP.E. (SEE NOTES 5 AND 6)
7	D.I. 90° BEND, M.J. X M.J. (2 TYP.), RESTRAINED PER SECTION 2–12.01
8	CONCRETE PAD 4" THICK, SIZE AS INDICATED HEREIN; CLASS 520–C–2500 CONCRETE

LATERAL SIZE	A	B (MAX)	C
2–1/2"	6'–6"	4'–0"	14"
3"	6'–6"	4'–0"	14"
4"	7'–0"	4'–3"	14"
6"	8'–6"	5'–3"	14"
8"	9'–6"	6'–4"	13.5"
10"	11'–6"	7'–5"	12"

NOTES:

1. ALL PIPE SHALL BE DUCTILE IRON PER SECTION 2–01.
2. ALL PIPE FITTINGS AND APPURTENANCES (GASKETS, NUTS, BOLTS, RESTRAINTS) SHALL COMPLY WITH SECTIONS 2–08 & 2–12.
3. SEE STD. NO. W–207, SHEET 2, FOR ABOVE GROUND ASSEMBLY INSTALLATION REQUIREMENTS.
4. THE COMPLETED ASSEMBLY SHALL BE PAINTED PER SECTION 2–14.
5. PVC OR PVCO WATER MAIN CONSTRUCTION SHALL BE PRE–APPROVED BY THE UTILITY PER SECTION 2–02.
6. MECHANICAL JOINT RESTRAINT FOR PVC OR PVCO PIPE SHALL BE PER SECTION 2–12.01.
7. THE ULTIMATE RIGHT OF WAY SHALL BE DETERMINED BY PUBLIC WORKS – DEVELOPMENT SERVICES.

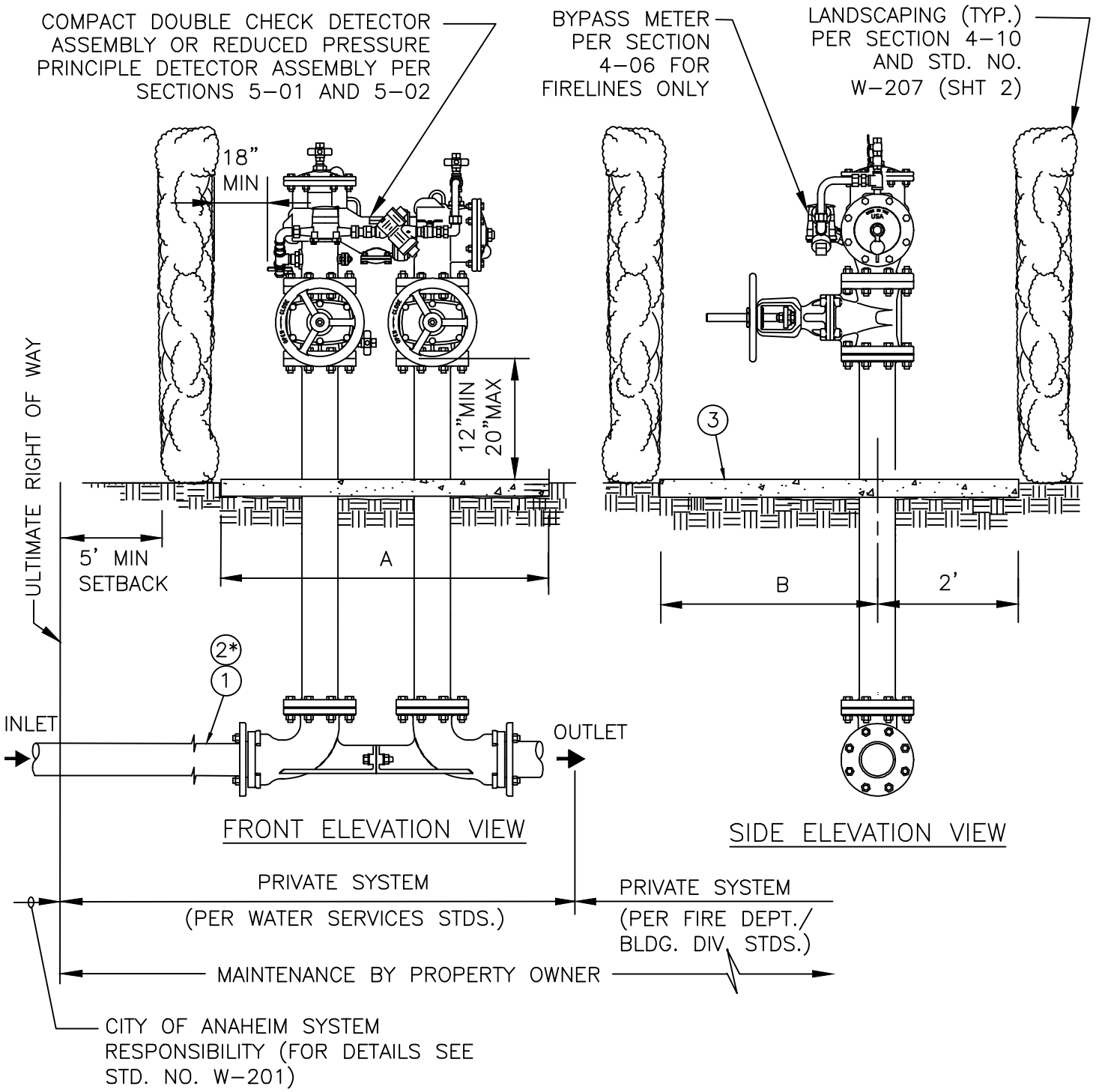
REDUCED PRESSURE PRINCIPLE TYPE ASSEMBLY FOR LARGE SERVICES - EXCLUDING FIRELINES

WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

	BY	DATE		
DRAWN	CE	5–10–21	APPROVED WATER ENGINEERING MANAGER	DATE 5/10/2021
CHECKED	CE	5–10–21	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 5/10/2021
RECOMMENDED	CE	5–10–21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO. **W-221A**

SHEET 2 OF 2



* FOR PVC OR PVCO WATER MAIN CONSTRUCTION ONLY – SEE ITEM 2* AND NOTES 11 AND 12 ON SHEET 2

COMPACT BACKFLOW PREVENTION ASSEMBLY FOR FIRELINE ONLY

PUBLIC UTILITIES DEPARTMENT

WATER SERVICES — CITY OF ANAHEIM

	BY	DATE		
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO. **W-222**

SHEET 1 OF 2

LIST OF MATERIAL	
ITEM	DESCRIPTION
1	PIPE SIZE X FIELD LENGTH D.I. SPOOL, P.E.. X P.E. (TYP).
2*	IN LIEU OF ITEM 1, PIPE SHALL BE AWWA C900 PVC OR AWWA C909 PVCO PIPE, CLASS 305, P.E.XP.E. (SEE NOTES 11 AND 12)
3	CONCRETE PAD 4" THICK, SIZE AS INDICATED HEREIN; CLASS 520-C-2500 CONCRETE

BACKFLOW DEVICE SIZE	A	B
2 1/2"	6.0'	3.0'
3"	6.5'	3.5'
4"	6.5'	4.0'
6"	7.0'	4.5'
8"	7.5'	5.0'
10"	8.0'	6.0'

NOTES:

1. THE BACKFLOW PREVENTER ASSEMBLY SHALL CONSIST OF AN APPROVED DOUBLE CHECK DETECTOR ASSEMBLY OR REDUCED PRESSURE PRINCIPLE DETECTOR ASSEMBLY PER SECTIONS 5-01 AND 5-02
2. LOCATION AND INSTALLATION SHALL BE PER PLAN AS SUBMITTED TO AND APPROVED BY THE UTILITY.
3. FIRE DEPT. CONNECTIONS CANNOT BE PLACED ON THE ASSEMBLY WITHOUT PRIOR APPROVAL, CONTACT FIRE DEPT. AT (714)765-4040. WHERE APPROVED BY FIRE DEPT., A FLG X FLG X FLG, D.I., CEMENT MORTAR LINED TEE MAY BE INSTALLED ON FIRELINES.
4. O.S.&Y. VALVES TO BE LOCKED IN OPEN POSITION WITH CHAIN AND OWNER'S PADLOCK(S). PADLOCK(S) SHALL BE BREAKAWAY TYPE.
5. ALL PIPE SHALL BE DUCTILE IRON PER SECTION 2-01.
6. ALL PIPE FITTINGS AND APPURTENANCES (GASKETS, NUTS, BOLTS, RESTRAINTS) SHALL BE PER SECTIONS 2-08 AND 2-12.
7. SEE STD. NO. W-207, SHEET 2, FOR ABOVE GROUND ASSEMBLY INSTALLATION REQUIREMENTS.
8. THE COMPLETED ASSEMBLY SHALL BE PAINTED PER SECTION 2-14.
9. NO CONNECTIONS TO BE MADE BEFORE BACKFLOW PREVENTER.
10. BACKFLOW DEVICE SIZE SHALL BE EQUAL TO OR GREATER THAN PIPE SIZE.
11. PVC OR PVCO WATER MAIN CONSTRUCTION SHALL BE PRE-APPROVED BY THE UTILITY PER SECTION 2-02.
12. MECHANICAL JOINT RESTRAINTS FOR PVC OR PVCO PIPE SHALL BE PER SECTION 2-12.01.
13. THE ULTIMATE RIGHT OF WAY SHALL BE DETERMINED BY PUBLIC WORKS - DEVELOPMENT SERVICES.

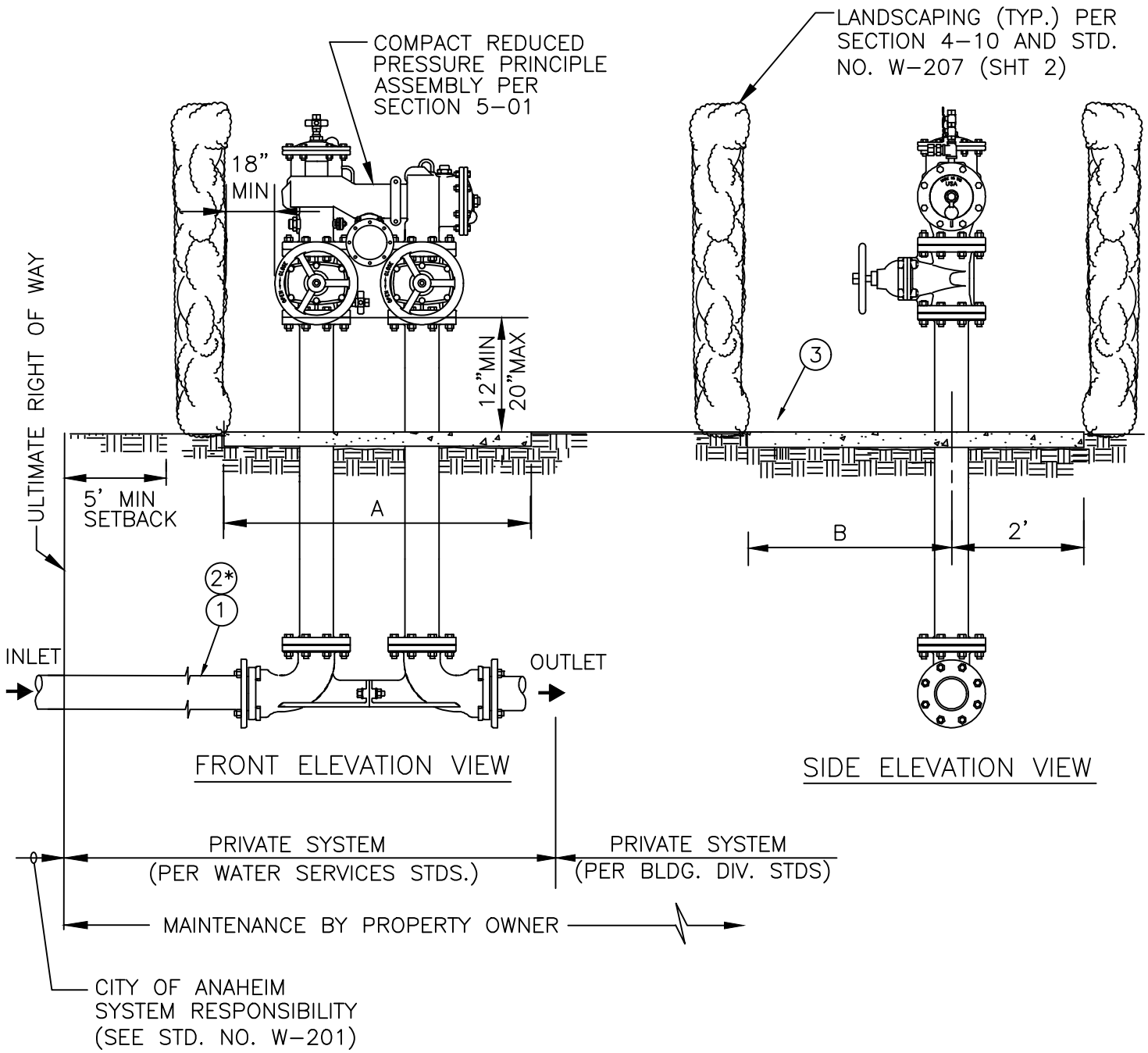
COMPACT BACKFLOW PREVENTION ASSEMBLY FOR FIRELINE ONLY

WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

	BY	DATE		
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO. **W-222**

SHEET 2 OF 2



* FOR PVC OR PVCO WATER MAIN CONSTRUCTION ONLY – SEE ITEM 2* AND NOTES 8 AND 9 ON SHEET 2.

COMPACT BACKFLOW PREVENTION ASSEMBLY FOR LARGE SERVICES - EXCLUDING FIRELINES

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
	BY	DATE			
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021	W-222A
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021	
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 1 OF 2

LIST OF MATERIAL	
ITEM	DESCRIPTION
1	PIPE SIZE X FIELD LENGTH D.I. SPOOL, P.E.. X P.E. (TYP).
2*	IN LIEU OF ITEM 1, PIPE SHALL BE AWWA C900 PVC OR AWWA C909 PVCO PIPE, CLASS 305, P.E.XP.E. (SEE NOTES 8 AND 9)
3	CONCRETE PAD 4" THICK, SIZE AS INDICATED HEREIN; CLASS 520-C-2500 CONCRETE

BACKFLOW DEVICE SIZE	A	B
2 1/2"	6.0'	3.0'
3"	6.5'	3.5'
4"	6.5'	4.0'
6"	7.0'	4.5'
8"	7.5'	5.0'
10"	8.0'	6.0'

NOTES:

1. THE BACKFLOW PREVENTION ASSEMBLY SHALL CONSIST OF AN APPROVED REDUCED PRESSURE ASSEMBLY, SEE SECTION 5-01. THE DEVICE SHALL BE LEAD FREE FOR DOMESTIC SERVICE.
2. LOCATION AND INSTALLATION SHALL BE PER PLANS APPROVED BY THE UTILITY.
3. ALL PIPE SHALL BE DUCTILE IRON PER SECTION 2-01.
4. ALL PIPE FITTINGS AND APPURTENANCES (GASKETS, NUTS, BOLTS, RESTRAINTS) SHALL BE PER SECTIONS 2-08 AND 2-12.
5. SEE STD. NO. W-207, SHEET 2, FOR ABOVE GROUND ASSEMBLY INSTALLATION REQUIREMENTS.
6. THE COMPLETED ASSEMBLY SHALL BE PAINTED PER SECTION 2-14.
7. NO CONNECTIONS SHALL BE MADE BETWEEN METER AND BACKFLOW PREVENTER.
8. PVC OR PVCO WATER CONSTRUCTION SHALL BE PRE-APPROVED BY THE UTILITY PER SECTION 2-02.
9. MECHANICAL JOINT RESTRAINT FOR PVC OR PVCO PIPE SHALL BE PER SECTION 2-12.01.
10. THE ULTIMATE RIGHT OF WAY SHALL BE DETERMINED BY PUBLIC WORKS - DEVELOPMENT SERVICES.

COMPACT BACKFLOW PREVENTION ASSEMBLY FOR LARGE SERVICES - EXCLUDING FIRELINES

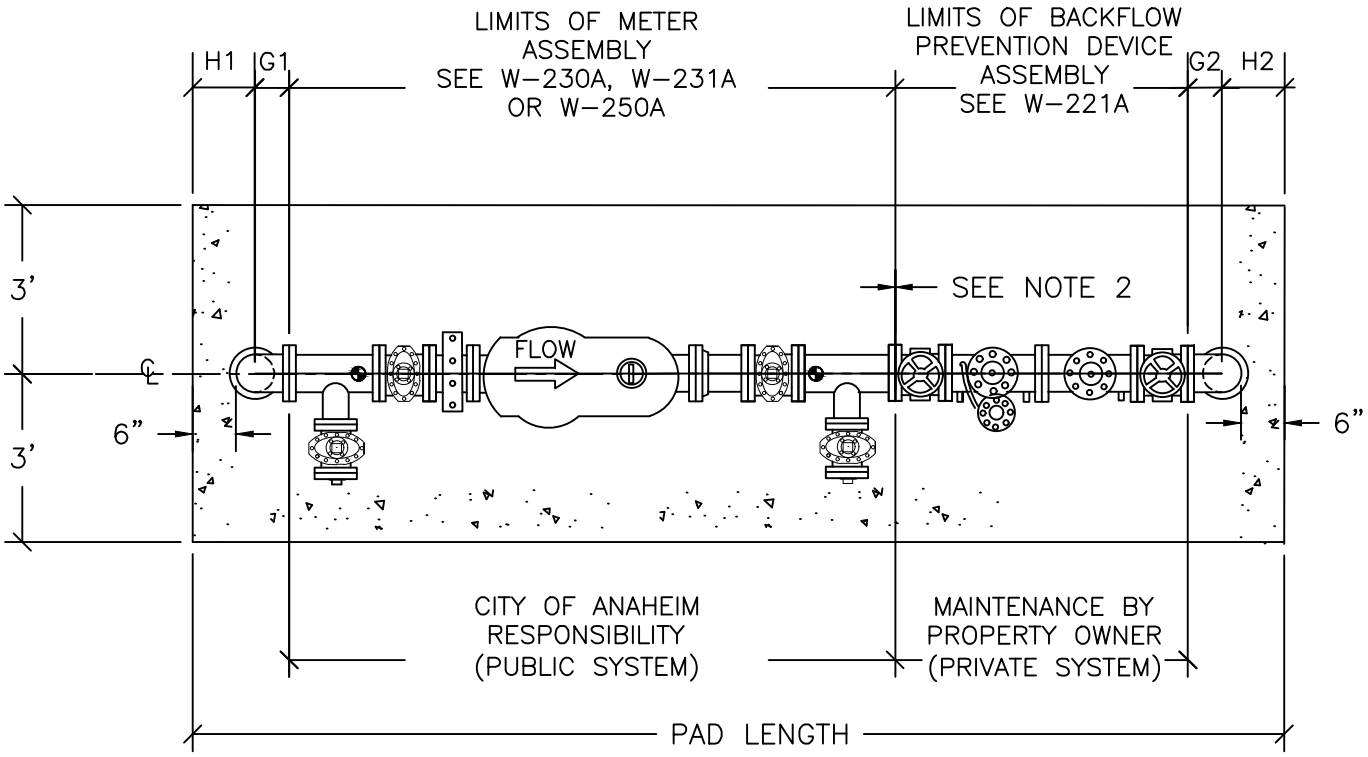
WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

	BY	DATE		
DRAWN	CE	5-10-21	APPROVED WATER ENGINEERING MANAGER	DATE 5/10/2021
CHECKED	CE	5-10-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 5/10/2021
RECOMMENDED	CE	5-10-21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO. **W-222A**

SHEET 2 OF 2

METER SIZE	BACKFLOW PREVENTION DEVICE SIZE	DIMENSION						
		PAD LENGTH	METER ASSEMBLY	BACKFLOW ASSEMBLY	G1	H1	G2	H2
3"	4"	12'–9"	5'–11"	4'–3"	6.5"	9"	6.5"	9"
4"	4"	13'–7"	6'–9 1/2"	4'–3"	6.5"	9"	6.5"	9"
4"	6"	14'–8"	6'–9 1/2"	5'–3"	6.5"	9"	8"	10"
6"	6"	16'–3"	8'–0"	5'–3"	8"	10"	8"	10"
6"	8"	17'–6"	8'–0"	6'–4"	8"	10"	9"	11"
SEE NOTE 3								



PLAN VIEW

NOTES:

1. SEE STD W–207 FOR ABOVE GROUND INSTALLATION REQUIREMENTS.
2. A REDUCER (NOT SHOWN) SHALL BE INSTALLED AS REQUIRED BETWEEN BACKFLOW PREVENTION DEVICE VALVE AND METER BYPASS TEE. ADD REDUCER LAYING LENGTH TO PAD LENGTH.
3. METER SIZE LARGER THAN 6" SHALL BE SUBMITTED TO UTILITY FOR REVIEW AND APPROVAL, INCLUDING ASSEMBLY AND PAD DIMENSIONS.
4. CONCRETE PAD, MINIMUM 4–IN. THICK, PAD SIZE AS INDICATED HEREIN. CONCRETE SHALL BE 520–C–2500. PAD LENGTH MAY VARY SEE NOTES 2 AND 6 HEREIN.
5. AN EASEMENT DEDICATED TO THE CITY IS REQUIRED. SEE STD W–207, SHT 3 OF 3 FOR REQUIRED LIMITS OF EASEMENT.
6. METER ASSEMBLY LENGTH FOR W–231A AND W–250A IS NOT LISTED ABOVE, SEE THOSE DETAILS FOR LAYING LENGTHS, ADJUST PAD LENGTH ACCORDINGLY

COMBINATION METER AND BACKFLOW PREVENTION DEVICE ABOVE GROUND ASSEMBLY

PUBLIC UTILITIES DEPARTMENT

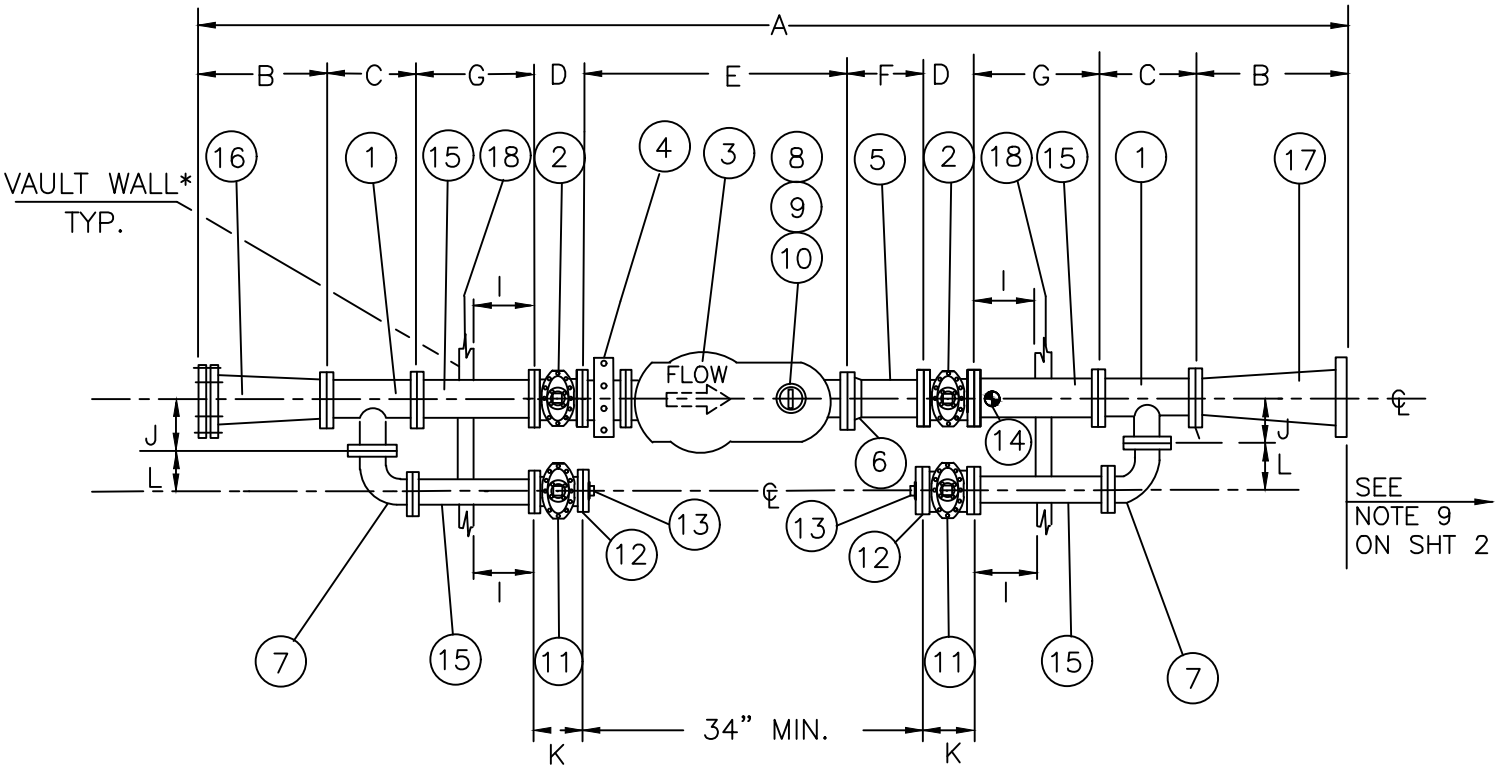
WATER SERVICES — CITY OF ANAHEIM

	BY	DATE		
DRAWN	AA	2–08–06	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	LOC	3–14–06	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021
RECOMMENDED	DEE	4–10–06	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO. **W-229**

SHEET 1 OF 1

METER SIZE	DIMENSION												MAXIMUM RATED FLOW (GPM)
	A	B	C	D	E	F	G	H	I	J	K	L	
3"	10'–3"	7"	11"	8"	23"	12"	18"	—	10"	5.5"	8"	5.5"	350
4"	11'–3 1/2"	9"	13"	9"	27.5"	10"	18"	—	10"	6.5"	8"	5.5"	700
6"	13'–10"	11"	16"	10.5"	33"	10"	24"	—	10"	8"	8"	5.5"	1400



PLAN VIEW

* SEE STD. NO. W–203 FOR VAULT INSTALLATION REQUIREMENTS.

3 INCH, 4 INCH AND 6 INCH COMPOUND METER VAULT ASSEMBLY

WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

	BY	DATE		
DRAWN	TL	1–27–20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2–05–21	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2–05–21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO. **W-230**

SHEET 1 OF 2

LIST OF MATERIAL	
ITEM	DESCRIPTION
1	TEE (PIPE SIZE BY 3" OUTLET), FLANGED
2	GATE VALVE (PIPE SIZE), RESILIENT WEDGE, FLANGED, N.R.S. (SEE NOTE 2)
3	METER, COMPOUND (SEE NOTES 1, 5 AND 11)
4	STRAINER
5	FLG. X P.E. SPOOL (SEE NOTE 3)
6	FLANGE ADAPTER DEVICE PER SECTION 2-09.04
7	90° BEND, FLANGED (2 TYP.)
8	BRASS NIPPLE (TEST PORT SIZE), HEX
9	BALL VALVE (TEST PORT SIZE). FULL OPENING, BRASS, IPS THREAD
10	BRASS PLUG (TEST PORT SIZE), IPS THREAD
11	3" GATE VALVE, RESILIENT WEDGE, FLANGED, N.R.S. (SEE NOTE 2)
12	COMPANION FLANGE W/2" IPS THREAD
13	2" PLUG, IPS THREAD
14	FLAT PIPE SUPPORT (2 TYP.) PER STD. NO. W-270
15	SPOOL, FLANGED, LENGTH AS SHOWN (SEE NOTE 4)
16	ADAPTER REDUCER, M.J. X FLG., MECHANICAL JOINT RESTRAINED PER SECTION 2-12.01
17	REDUCER, FLANGED
18	VAULT (SEE STD. NO. W-203, SHEET 2, FOR APPROVED SUPPLIERS)

NOTES:

1. METERS SHALL BE IN ACCORDANCE WITH SECTION 4-06. APPROVED METERS: NEPTUNE TECHNOLOGY GROUP TRU/FLO COMPOUND METER, BADGER RECORDALL COMPOUND SERIES METER.
2. SEE SECTION 2-05.01.1 FOR APPROVED GATE VALVE MANUFACTURERS.
3. DIMENSIONS SHOWN ARE MINIMUM. CONTRACTOR SHALL INCREASE LENGTH OF SPOOL AS NECESSARY TO MATCH VAULT DIMENSIONS.
4. RESILIENT WEDGE GATE VALVES ARE REQUIRED ON BOTH SIDES OF LOW FLOW METER, AND BOTH SIDES OF BACKFLOW DEVICE (4 TOTAL).
5. COMPOUND METER SHALL READ IN CUBIC FEET.
6. ALL PIPE SHALL BE DUCTILE IRON PER SECTION 2-01.
7. ALL PIPE FITTINGS AND APPURTENANCES (GASKETS, NUTS, BOLTS, ADAPTER) SHALL BE PER SECTION 2-08.
8. THE COMPLETED ASSEMBLY SHALL BE PAINTED PER SECTION 2-14.
9. A BACKFLOW PREVENTION DEVICE SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 5-01.
10. AN EASEMENT DEDICATED TO THE CITY IS REQUIRED IF LOCATED ON PRIVATE PROPERTY. SEE STD. NO. W-203, SHEET 1, FOR REQUIRED LIMITS OF EASEMENT.
11. REMOTE METER READING SYSTEM (READ-O-MATIC BY BADGER METER, INC. OR EQUAL) IS REQUIRED. SEE ALSO STD. NO. W-203, SHEET 3.

3 INCH, 4 INCH AND 6 INCH COMPOUND METER VAULT ASSEMBLY

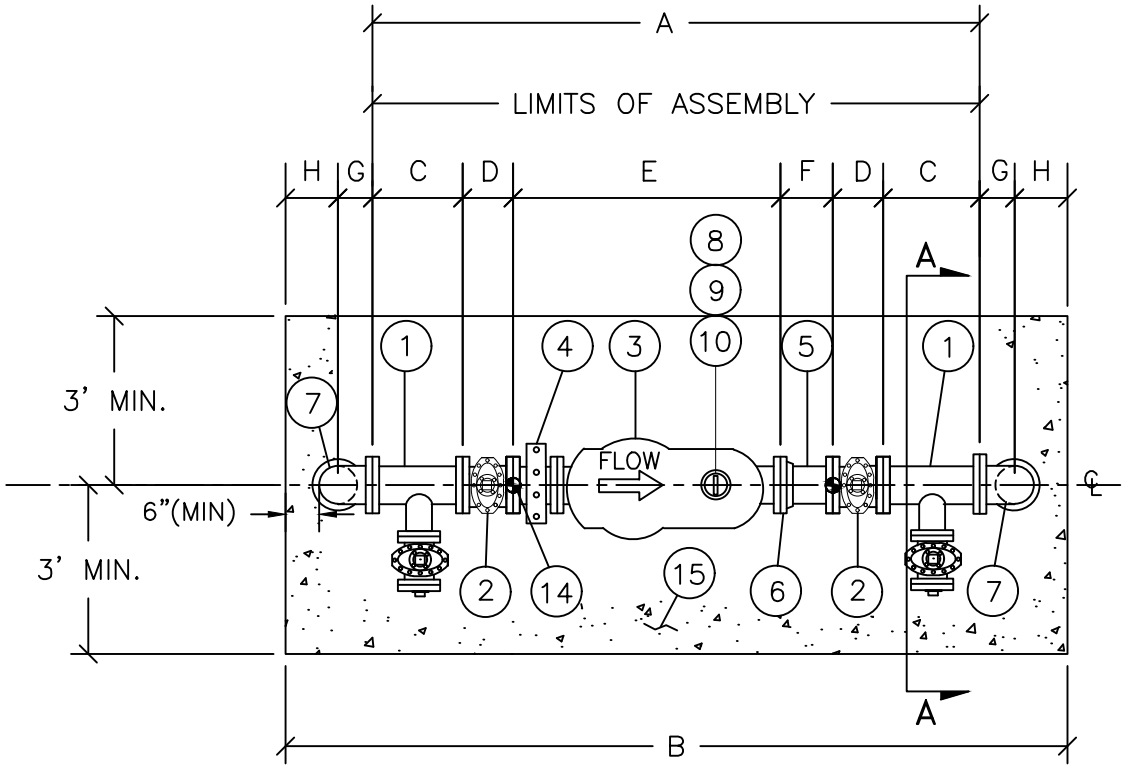
WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

	BY	DATE		
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021

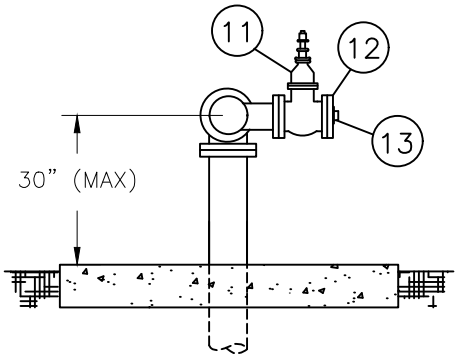
STD. NO. **W-230**

SHEET 2 OF 2

METER SIZE	PIPE SIZE	TEST PORT SIZE	DIMENSION								MAXIMUM RATED FLOW (GPM)
			A	B	C	D	E	F	G	H	
3"	3"	1-1/2"	5'-11"	8'-6"	11"	8"	23"	10"	6.5"	9"	350
4"	4"	2"	6'-9.5"	9'-4"	13"	9"	27.5"	10"	6.5"	9"	700
6"	6"	2"	8'-0"	11'-0"	16"	10.5"	33"	10"	8"	10"	1400



PLAN VIEW



SECTION VIEW A-A
(2 TYP.)

* SEE STD. NO. W-207 FOR ABOVE GROUND ASSEMBLY INSTALLATION REQUIREMENTS

3 INCH, 4 INCH AND 6 INCH COMPOUND METER ABOVE GROUND ASSEMBLY

WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

STD. NO. **W-230A**

	BY	DATE		
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021

SHEET 1 OF 2

LIST OF MATERIAL	
ITEM	DESCRIPTION
1	TEE (PIPE SIZE BY 3" OUTLET), FLANGED
2	GATE VALVE (PIPE SIZE), RESILIENT WEDGE, FLANGED, N.R.S. (SEE NOTE 2)
3	METER, COMPOUND (SEE NOTES 1 AND 3)
4	STRAINER
5	FLG. X P.E. SPOOL
6	FLANGE ADAPTER DEVICE PER SECTION 2-09.04
7	90° BEND, FLANGED (2 TYP.)
8	BRASS NIPPLE (TEST PORT SIZE), HEX
9	BALL VALVE (TEST PORT SIZE), FULL OPENING, BRASS, IPS THREAD
10	BRASS PLUG (TEST PORT SIZE), IPS THREAD
11	3" GATE VALVE, RESILIENT WEDGE, FLANGED, N.R.S. (SEE NOTE 2)
12	COMPANION FLANGE W/2" IPS THREAD
13	2" BRASS PLUG, IPS THREAD
14	FLAT PIPE SUPPORT (2 TYP.) PER STD. NO. W-270
15	CONCRETE PAD, MIN. 4" THICK, SIZE AS INDICATED ON SHEET 1. CLASS 520-C-2500 CONCRETE.

NOTES:

1. METERS SHALL BE IN ACCORDANCE WITH SECTION 4-06. APPROVED METERS: NEPTUNE TECHNOLOGY GROUP TRU/FLO COMPOUND METER, BADGER RECORDALL COMPOUND SERIES METER.
2. SEE SECTION 2-05.01.1 FOR APPROVED GATE VALVE MANUFACTURERS.
3. COMPOUND METER SHALL READ IN CUBIC FEET.
4. ALL PIPE SHALL BE DUCTILE IRON PER SECTION 2-01.
5. ALL PIPE FITTINGS AND APPURTENANCES (GASKETS, NUTS, BOLTS, ADAPTER) SHALL BE PER SECTION 2-08.
6. THE COMPLETED ASSEMBLY SHALL BE PAINTED PER SECTION 2-14.
7. A BACKFLOW PREVENTION DEVICE SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 5-01.
8. AN EASEMENT DEDICATED TO THE CITY IS REQUIRED. SEE STD. NO. W-203, SHEET 1, FOR REQUIRED LIMITS OF EASEMENT.

3 INCH, 4 INCH AND 6 INCH COMPOUND METER ABOVE GROUND ASSEMBLY

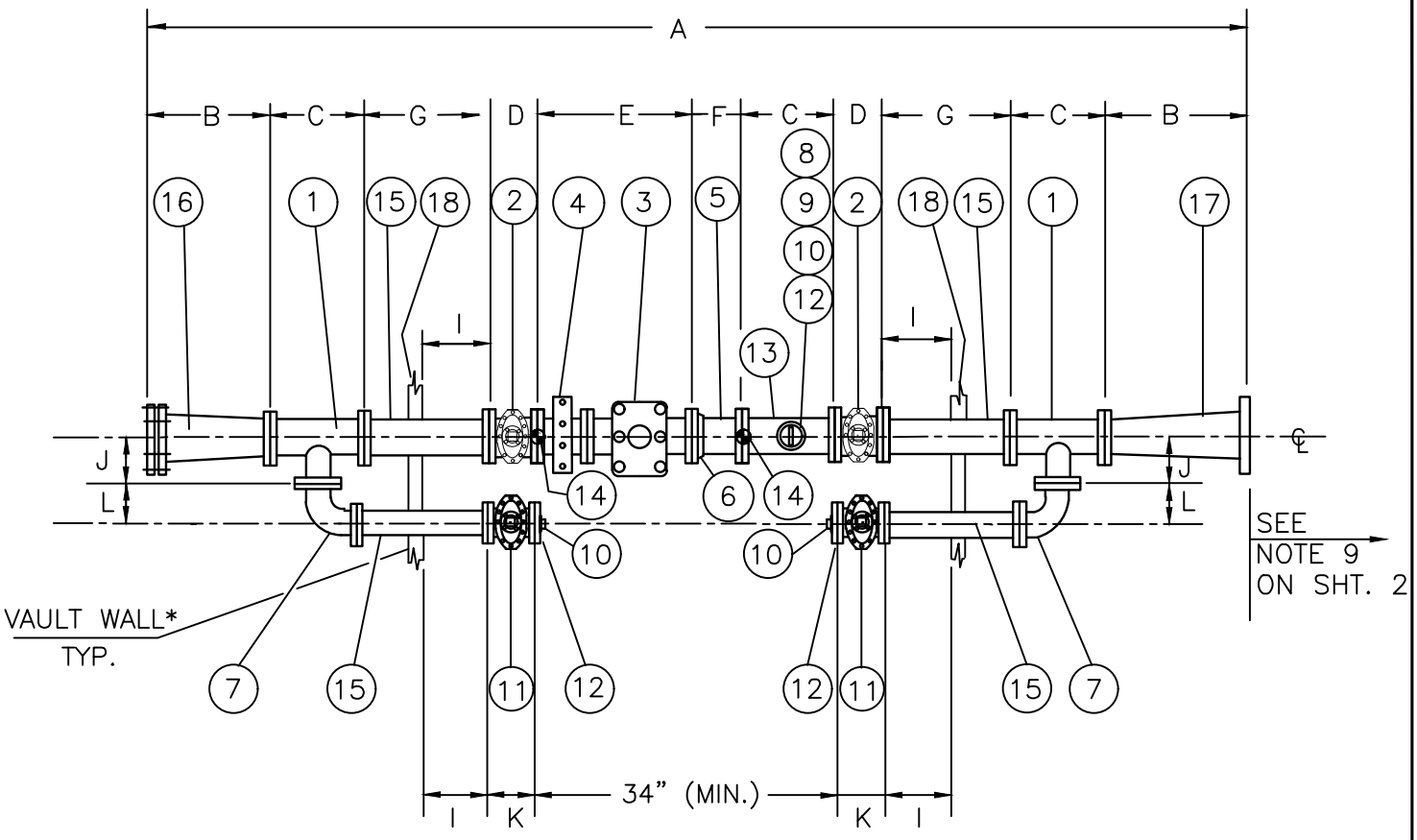
WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

	BY	DATE		
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO. **W-230A**

SHEET 2 OF 2

METER SIZE	DIMENSION												MAXIMUM RATED FLOW (GPM)
	A	B	C	D	E	F	G	H	I	J	K	L	
3"	10'–7"	7"	11"	8"	18"	10"	18"	—	10"	5.5"	8"	5.5"	450
4"	11'–10 1/2"	9"	13"	9"	21.5"	10"	18"	—	10"	6.5"	8"	5.5"	1200
6"	14'–8"	11"	16"	10.5"	27"	10"	24"	—	10"	8"	8"	5.5"	2500



PLAN VIEW

* SEE STD. NO. W–203 FOR VAULT INSTALLATION REQUIREMENTS

3", 4" AND 6" TURBINE METER VAULT ASSEMBLY

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
DRAWN	BY TL	DATE 1–27–20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021	W-231
CHECKED	CE	2–05–21	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021	
RECOMMENDED	CE	2–05–21	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 1 OF 2

LIST OF MATERIAL

ITEM	DESCRIPTION
1	TEE (PIPE SIZE BY 3" OUTLET), FLANGED
2	GATE VALVE (PIPE SIZE), RESILIENT WEDGE, FLANGED, N.R.S. (SEE NOTE 2)
3	METER, TURBINE (SEE NOTES 1, 4, 5 AND 11)
4	STRAINER
5	FLG. X P.E. SPOOL (SEE NOTE 3)
6	FLANGE ADAPTER PER SECTION 2-09.04.
7	BEND, 90°, FLANGED (2 TYP.)
8	2" NIPPLE, HEX, BRASS, IPS THREAD
9	2" VALVE, BALL, FULL OPENING, BRASS, IPS THREAD
10	2" PLUG, BRASS, IPS THREAD
11	3" VALVE, RESILIENT WEDGE, FLANGED, N.R.S. (SEE NOTE 2)
12	COMPANION FLANGE (PIPE SIZE) W/ 2" IPS THREAD
13	TEE (PIPE SIZE BY 2" OUTLET), FLANGED
14	FLAT PIPE SUPPORT (2 TYP.) PER STD. NO. W-270
15	SPOOL, FLANGED, LENGTH AS SHOWN (SEE NOTE 3)
16	ADAPTER REDUCER, M.J. X FLG, MECHANICAL JOINT RESTRAINED PER SECTION 2-12.01
17	REDUCER, FLANGED
18	VAULT (SEE STD. NO. W-203, SHEET 2, FOR APPROVED SUPPLIERS)

NOTES:

1. METERS SHALL BE IN ACCORDANCE WITH SECTION 4-06. APPROVED METERS: NEPTUNE TECHNOLOGY GROUP HP TURBINE W/ STRAINER, SENSUS METERING SYSTEMS "W" TURBO-METER W/ STRAINER, BADGER RECORDALL TURBO SERIES METER.
2. SEE SECTION 2-05.01.1 FOR APPROVED GATE VALVE MANUFACTURERS.
3. DIMENSIONS SHOWN ARE MINIMUM. CONTRACTOR SHALL INCREASE LENGTH OF SPOOL AS NECESSARY TO MATCH VAULT DIMENSIONS.
4. METER SHALL READ IN CUBIC FEET.
5. TURBINE METER TO BE INSTALLED ONLY WHEN APPROVED BY UTILITY. A COMPOUND METER MAY BE REQUIRED FOR CERTAIN APPLICATIONS.
6. ALL PIPE SHALL BE DUCTILE IRON PER SECTION 2-01.
7. ALL PIPE FITTINGS AND APPURTENANCES (GASKETS, NUTS, BOLTS, ADAPTOR) SHALL BE PER SECTION 2-08.
8. THE COMPLETED ASSEMBLY SHALL BE PAINTED PER SECTION 2-14.
9. A BACKFLOW PREVENTION DEVICE SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 5-01.
10. AN EASEMENT DEDICATED TO THE CITY IS REQUIRED IF LOCATED ON PRIVATE PROPERTY. SEE STD. NO. W-203, SHEET 1, FOR REQUIRED LIMITS OF EASEMENT.
11. REMOTE METER READING SYSTEM (READ-O-MATIC BY BADGER METER, INC. OR EQUAL) IS REQUIRED. SEE STD. NO. W-203, SHEET 3.

3", 4" AND 6" TURBINE METER VAULT ASSEMBLY

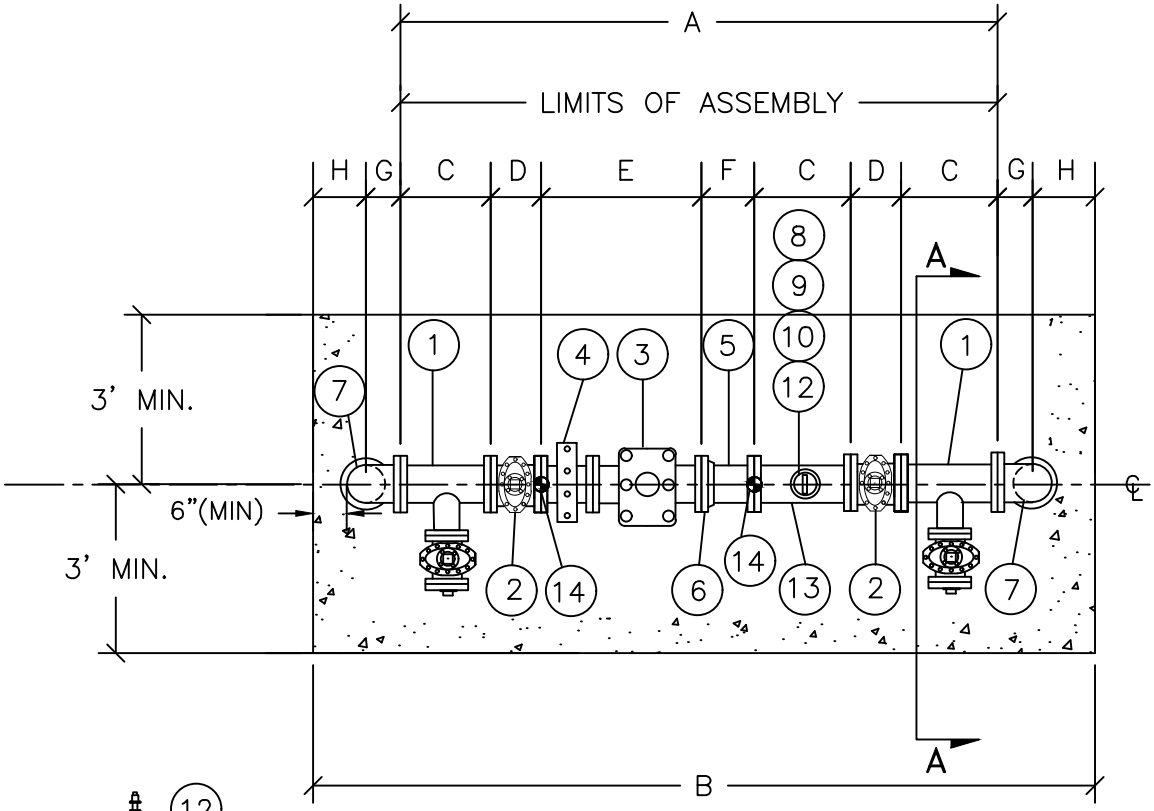
WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

	BY	DATE		
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021

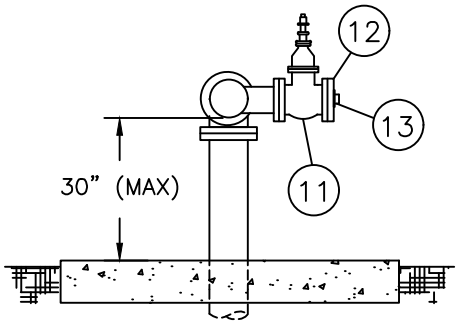
STD. NO. **W-231**

SHEET 2 OF 2

METER SIZE	PIPE SIZE	DIMENSION								MAXIMUM RATED FLOW (GPM)
		A	B	C	D	E	F	G	H	
3"	3"	6'–5"	10'–7"	11"	8"	18"	10"	6.5"	9"	450
4"	4"	7'–5"	10'–6.5"	13"	9"	21.5"	10"	6.5"	9"	1200
6"	6"	8'–10"	12'–6"	16"	10.5"	27"	10"	8"	10"	2500



PLAN VIEW



SECTION VIEW A–A
(2 TYP.)

* SEE STD. NO. W–207 FOR ABOVE GROUND ASSEMBLIES INSTALLATION REQUIREMENTS

3", 4" AND 6" TURBINE METER ABOVE GROUND ASSEMBLY

WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

STD. NO. **W-231A**

	BY	DATE		
DRAWN	TL	1–27–20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2–05–21	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2–05–21	APPROVED CITY ENGINEER	DATE 7/7/2021

SHEET 1 OF 2

LIST OF MATERIAL	
ITEM	DESCRIPTION
1	TEE (PIPE SIZE BY 3" OUTLET), FLANGED
2	GATE VALVE (PIPE SIZE), RESILIENT WEDGE, FLANGED, N.R.S. (SEE NOTE 2)
3	METER, TURBINE (SEE NOTES 1, 3 AND 4)
4	STRAINER
5	FLG. X P.E. SPOOL
6	FLANGE ADAPTER PER SECTION 2-09.04
7	90° BEND, FLANGED (2 TYP.)
8	2" BRASS NIPPLE, HEX
9	2" BALL VALVE, FULL OPENING, BRASS, IPS THREAD
10	2" BRASS PLUG, IPS THREAD.
11	3" GATE VALVE, RESILIENT WEDGE, FLANGED, N.R.S. (SEE NOTE 2)
12	COMPANION FLANGE (PIPE SIZE) W/ 2" IPS THREAD.
13	TEE (PIPE SIZE BY 2" OUTLET), FLANGED
14	FLAT PIPE SUPPORT (2 TYP.) PER STD. NO. W-270

NOTES:

1. METERS SHALL BE IN ACCORDANCE WITH SECTION 4-06. APPROVED METERS: NEPTUNE TECHNOLOGY GROUP HP TURBINE W/ STRAINER, SENSUS METERING SYSTEMS "W" TURBO-METER W/ STRAINER, BADGER RECORDALL TURBO SERIES METER.
2. SEE SECTION 2-05.01.1 FOR APPROVED GATE VALVE MANUFACTURERS.
3. METER SHALL READ IN CUBIC FEET.
4. TURBINE METER TO BE INSTALLED ONLY WHEN APPROVED BY UTILITY. A COMPOUND METER MAY BE REQUIRED FOR CERTAIN APPLICATIONS
5. ALL PIPE SHALL BE DUCTILE IRON PER SECTION 2-01.
6. ALL PIPE FITTINGS AND APPURTENANCES (GASKETS, NUTS, BOLTS, ADAPTOR) SHALL BE PER SECTION 2-08.
7. THE COMPLETED ASSEMBLY SHALL BE PAINTED PER SECTION 2-14.
8. A BACKFLOW PREVENTION DEVICE SHALL BE INSTALLED ACCORDANCE WITH SECTION 5-01.
9. CONCRETE PAD SHALL BE MINIMUM 4-INCH THICK, SIZE AS INDICATED ON SHEET 1. CONCRETE SHALL BE CLASS 520-C-2500.
10. AN EASEMENT DEDICATED TO THE CITY IS REQUIRED. SEE STD. NO. W-207, SHEET 3, FOR REQUIRED LIMITS OF EASEMENT.

3", 4" AND 6" TURBINE METER ABOVE GROUND ASSEMBLY

WATER SERVICES

PUBLIC UTILITIES DEPARTMENT

CITY OF ANAHEIM

	BY	DATE		
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021

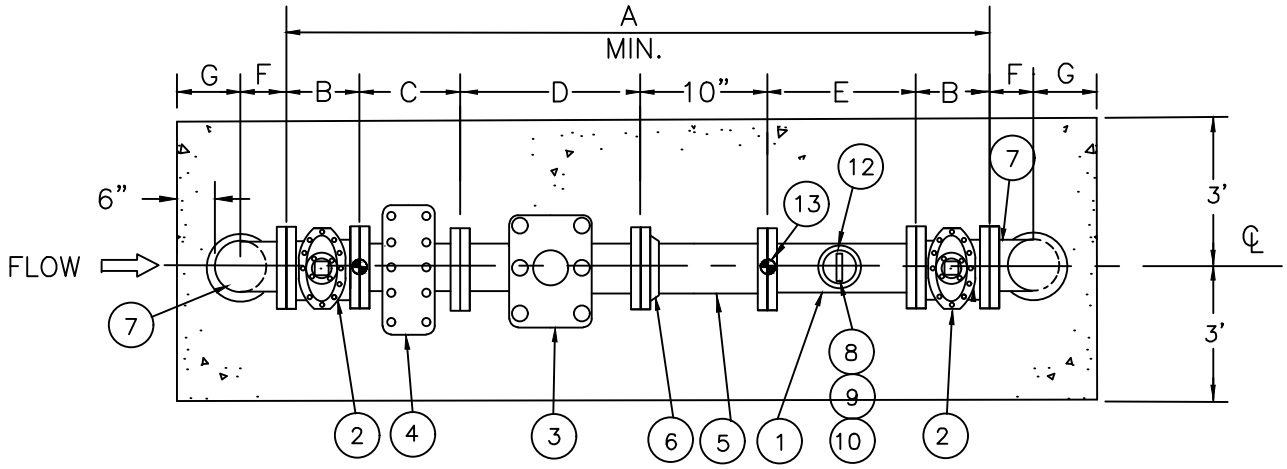
STD. NO.

W-231A

SHEET 2 OF 2

LIST OF MATERIAL	
ITEM	DESCRIPTION
1	TEE (PIPE SIZE BY 2" OUTLET), FLANGED
2	GATE VALVE (PIPE SIZE), RESILIENT WEDGE, FLANGED, N.R.S. W/ HANDWHEEL PER SECTION 2-05.01
3	METER, TURBINE (SEE STD. NO. W-231A, NOTE 1 FOR APPROVED METERS)
4	STRAINER
5	FLG. X P.E. SPOOL
6	FLANGE ADAPTER PER SECTION 2-09.04
7	90° BENDS, FLANGED (2 TYP.)
8	2" BRASS NIPPLE, HEX
9	2" BALL VALVE, FULL OPENING, BRASS, IPS THREAD
10	2" BRASS PLUG, IPS THREAD
11	REDUCER, FLANGED
12	COMPANION FLANGE WITH 2" IPS THREAD
13	FLAT PIPE SUPPORT (2 TYP.) PER STD. NO. W-270

METER SIZE	PAD LENGTH	DIMENSIONS						
		A	B	C	D	E	F	G
3"	7'-2"	55"	8"	6"	12"	11"	6.5"	9"
4"	7'-9"	62.5"	9"	7 1/2"	14"	13"	6.5"	9"
6"	9'-2"	74"	10 1/2"	9"	18"	16"	8"	10"



PLAN VIEW

NOTES:

1. SEE STD. NO. W-207 FOR ABOVE GROUND ASSEMBLIES INSTALLATION REQUIREMENTS.
2. ALL PIPE SHALL BE DUCTILE IRON PER SECTION 2-01.
3. ALL PIPE FITTINGS AND APPURTENANCES (GASKETS, NUTS, BOLTS, ADAPTER) SHALL BE PER SECTION 2-08.
4. THE COMPLETED ASSEMBLY SHALL BE PAINTED PER SECTION 2-14.
5. CONCRETE PAD SHALL BE MINIMUM 4-INCH THICK, SIZE AS INDICATED HEREIN. CONCRETE SHALL BE CLASS 520-C-2500.
6. A BACKFLOW PREVENTION DEVICE SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 5-01.

3", 4" AND 6" IRRIGATION METER VAULT ASSEMBLY

WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

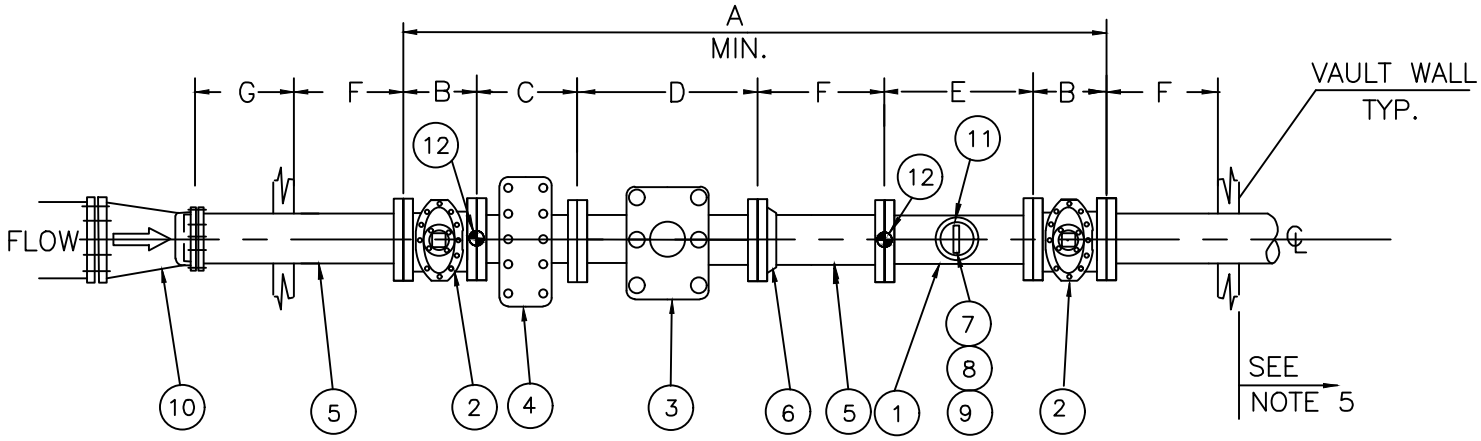
	BY	DATE		
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO. **W-250A**

SHEET 1 OF 1

LIST OF MATERIAL	
ITEM	DESCRIPTION
1	TEE (PIPE SIZE BY 2" OUTLET) FLANGED
2	GATE VALVE, RESILIENT WEDGE, FLANGED, N.R.S. W/ HANDWHEEL PER SECTION 2-05.01
3	METER TURBINE (SEE STD. NO, W-231, NOTE 1 FOR APPROVED METERS)
4	STRAINER
5	FLG. X P.E. SPOOL, LENGTH AS INDICATED OR AS REQUIRED TO MATCH VAULT DIMENSIONS
6	FLANGE ADAPTER PER SECTION 2-09.04
7	2" NIPPLE, HEX, BRASS
8	2" VALVE, BALL, FULL OPENING, BRASS, IPS THREAD
9	2" PLUG, BRASS, IPS THREAD
10	REDUCER, M.J. X M.J., MECHANICAL JOINTS RESTRAINED PER SECTION 2-12.01
11	COMPANION FLANGE WITH 2" IPS THREAD
12	FLAT PIPE SUPPORT (2 TYP.) PER STD. NO. W-270

METER SIZE	DIMENSIONS						
	A	B	C	D	E	F	G
3"	55"	8"	6"	12"	11"	10"	8"
4"	62.5"	9"	7 1/2"	14"	13"	10"	8"
6"	74"	10 1/2"	9"	18"	16"	10"	10"



PLAN VIEW

NOTES:

1. SEE STD. NO. W-203 FOR STANDARD METER VAULT INSTALLATION REQUIREMENTS.
2. ALL PIPE SHALL BE DUCTILE IRON PER SECTION 2-01.
3. ALL PIPE FITTINGS AND APPURTENANCES (GASKETS, NUTS, BOLTS, ADAPTOR) SHALL BE PER SECTION 2-08.
4. THE COMPLETED ASSEMBLY SHALL BE PAINTED PER SECTION 2-14.
5. A BACKFLOW PREVENTION DEVICE SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 5-01.
6. AN EASEMENT DEDICATED TO THE CITY IS REQUIRED IF LOCATED ON PRIVATE PROPERTY. SEE STD. NO. W-203 SHEET 1, FOR REQUIRED LIMITS OF EASEMENT.
7. REMOTE METER READING SYSTEM (READ-O-MATIC BY BADGER METER, INC. OR EQUAL) REQUIRED. SEE STD. NO. W-203, SHEET 3.

3", 4" AND 6" IRRIGATION METER VAULT ASSEMBLY

WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

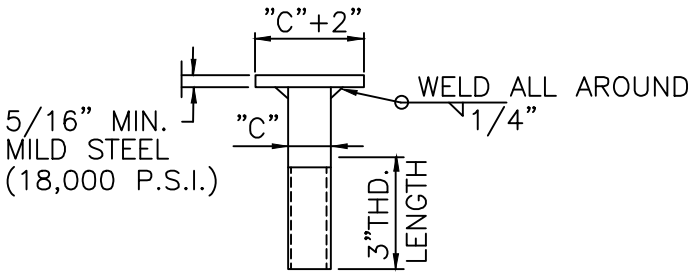
	BY	DATE		
DRAWN	TL	1-27-20	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	CE	2-05-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	CE	2-05-21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO.

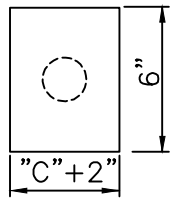
W-250

SHEET 1 OF 1

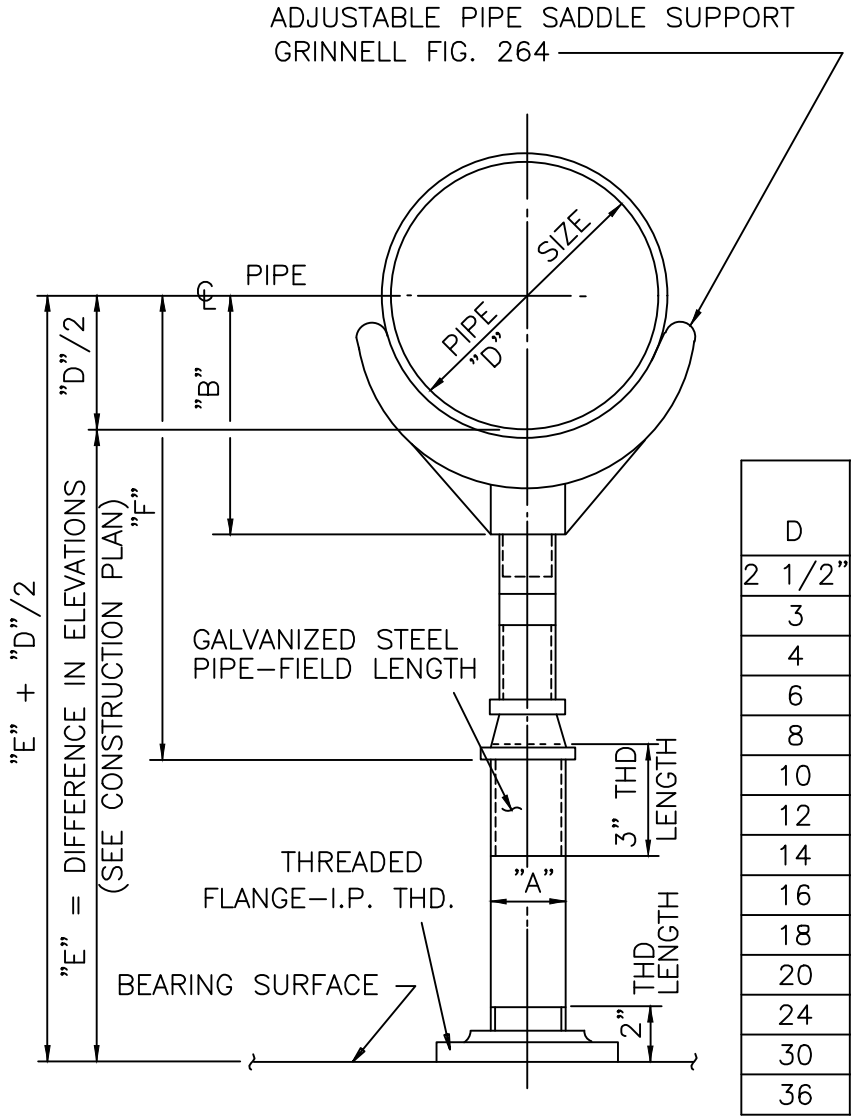
FLAT SUPPORT FOR FIRE LINES & METERS



SIDE VIEW



TOP VIEW



D	A	B	C	F	
				MIN.	MAX.
2 1/2"	2 1/2"	3 1/2"	1 1/2"	8"	13"
3	2 1/2	3 3/4	1 1/2	8 1/4	13 1/4
4	3	4 1/4	2 1/2	9 1/4	14
6	3	5 1/2	2 1/2	10 1/2	15 1/4
8	3	6 7/8	2 1/2	11 3/4	16 1/2
10	3	8 1/2	2 1/2	13 1/2	18 1/4
12	3	9 15/16	2 1/2	15	19 3/4
14	4	10 15/16	3	16 1/4	20 3/4
16	4	12 3/8	3	17 3/4	22 1/4
18	6	13 7/8	3 1/2	19 1/2	24
20	6	15 3/8	3 1/2	21	25 1/2
24	6	17 15/16	4	23 3/4	28 1/4
30	6	21 5/16	4	27	31 1/2
36	6	24 1/2	4	30 1/4	34 3/4

NOTE:

THE FLAT SUPPORT SHOWN IN THIS DETAIL SHALL BE USED FOR ALL METER ASSEMBLIES AND FIRE LINES IN LIEU OF THE SADDLE SUPPORT.

ADJUSTABLE PIPE SUPPORT

PUBLIC UTILITIES DEPARTMENT

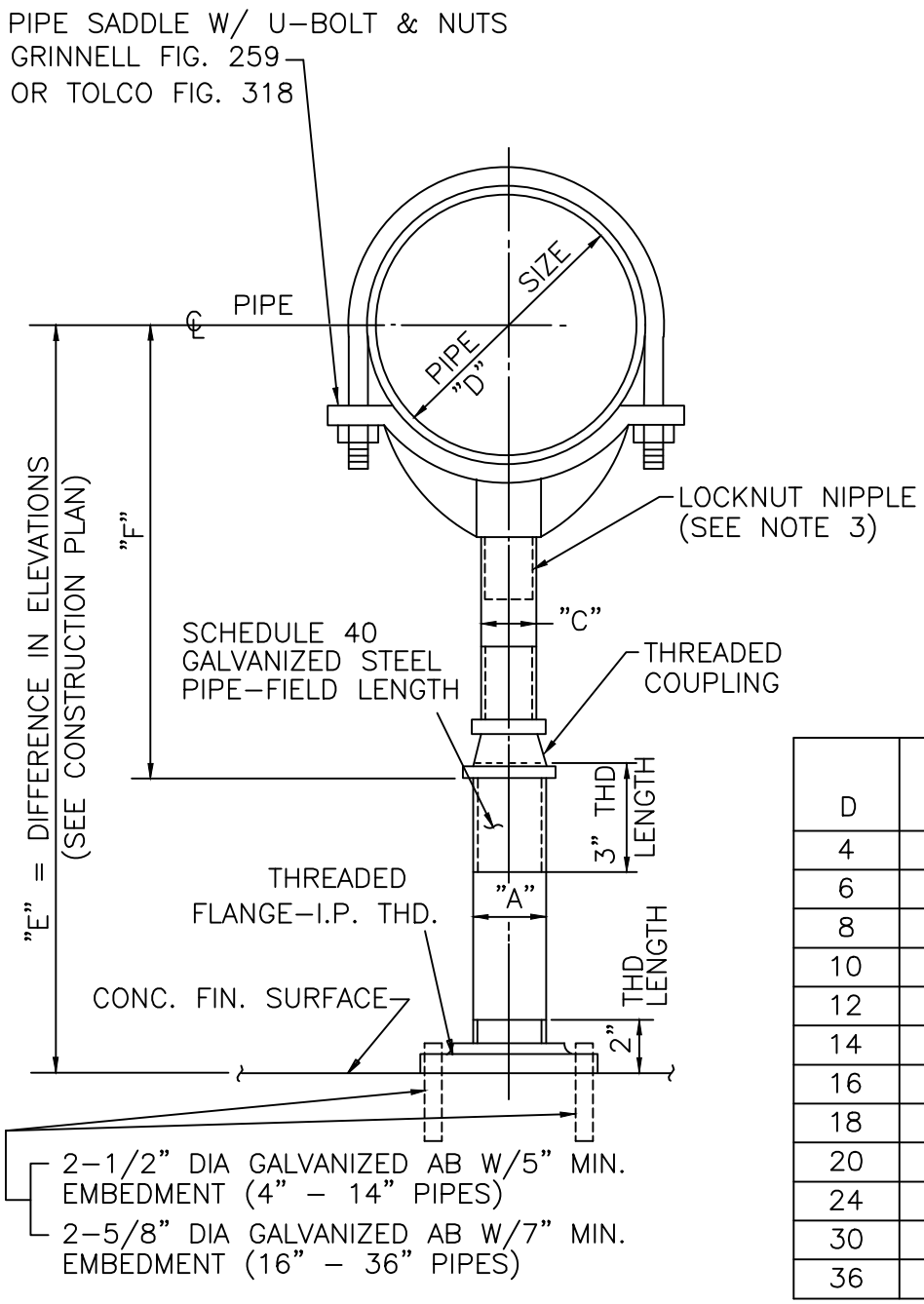
WATER SERVICES — CITY OF ANAHEIM

	BY	DATE		
DRAWN	TL	6–25–91	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	KT	9–13–91	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021
RECOMMENDED	BDB	9–20–91	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO.

W-270

SHEET 1 OF 1



D	A	C	F	
			MIN.	MAX.
4	3	2 1/2	9 1/4	14
6	3	2 1/2	10 1/2	15 1/4
8	3	2 1/2	11 3/4	16 1/2
10	3	2 1/2	13 1/2	18 1/4
12	3	2 1/2	15	19 3/4
14	4	3	16 1/4	20 3/4
16	4	3	17 3/4	22 1/4
18	6	4	19 1/2	24
20	6	4	21	25 1/2
24	6	4	23 3/4	28 1/4
30	6	4	27	31 1/2
36	6	4	30 1/4	34 3/4

NOTE:

1. ALL MATERIALS SHALL BE GALVANIZED STEEL, UNLESS OTHERWISE SPECIFIED.
2. INSTALLED PIPE SUPPORT SHALL PROVIDE VERTICAL ADJUSTMENT OF APPROXIMATELY 4 1/2 INCHES.
3. LOWER END OF NIPPLE SHALL BE STAKED, UPSETTING THE THREADS TO PREVENT SEPARATION OF NIPPLE & COUPLING DURING ADJUSTMENT.

ADJUSTABLE PIPE SUPPORT W/ U-BOLT

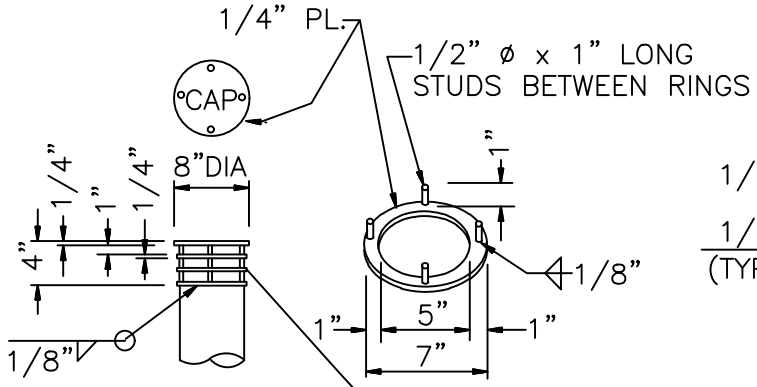
PUBLIC UTILITIES DEPARTMENT

WATER SERVICES — CITY OF ANAHEIM

STD. NO. **W-271**

SHEET 1 OF 1

	BY	DATE		
DRAWN	RD	3-10-00	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	DS	3-10-00	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	MJ	3-10-00	APPROVED CITY ENGINEER	DATE 7/7/2021



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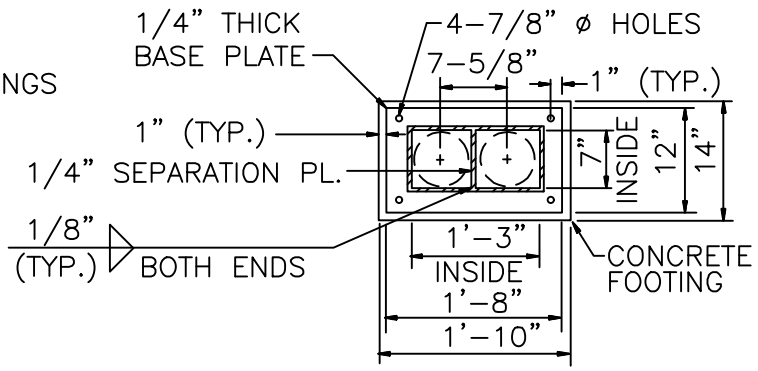
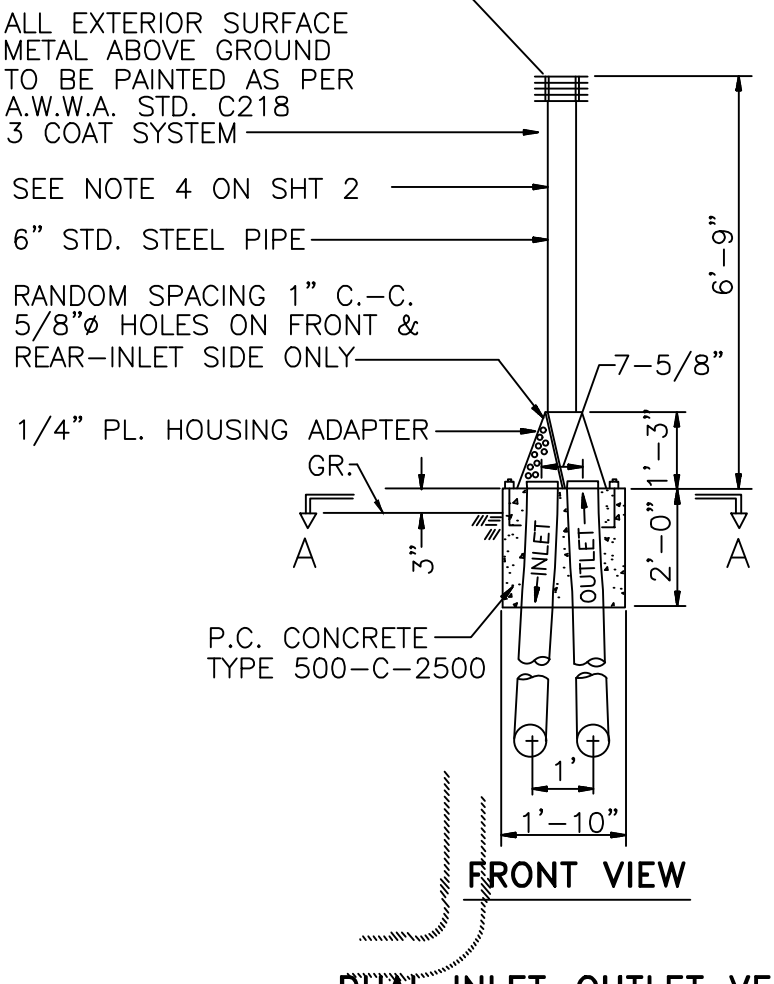
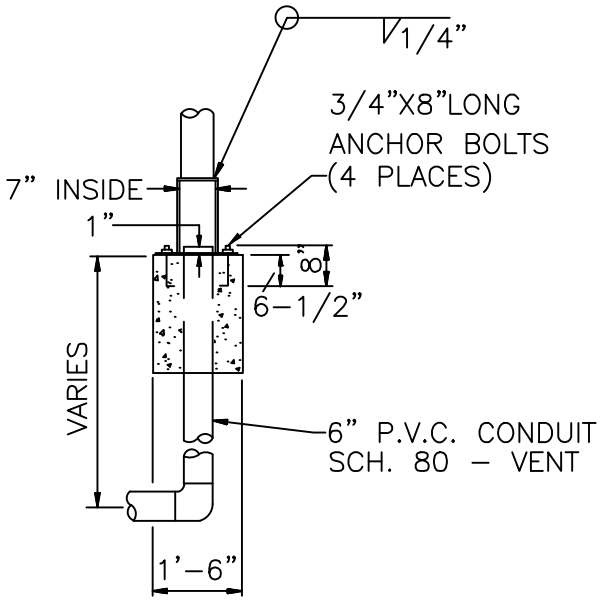


PLAN–VENT BASE SECTION A–A



FRONT VIEW



SIDE VIEW

DUAL INLET–OUTLET VENT STACK TYPE I

SEE NOTES ON SHT. 2.

AIR VENT FOR U.G. STRUCTURES

PUBLIC UTILITIES DEPARTMENT

WATER SERVICES — CITY OF ANAHEIM

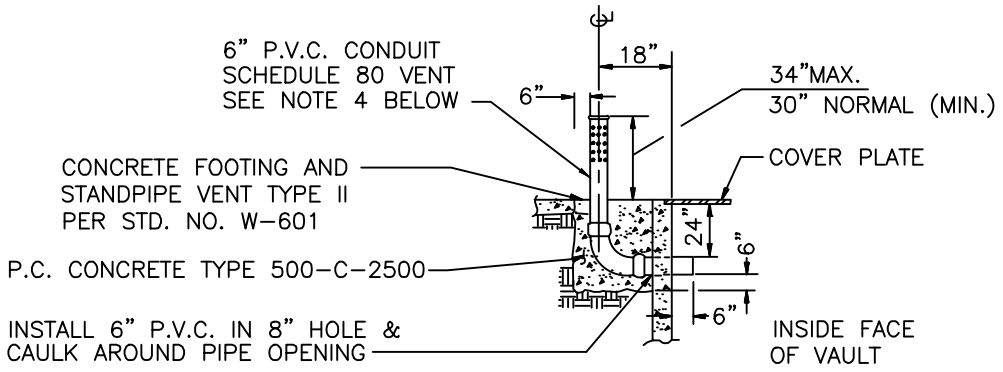
	BY	DATE		
DRAWN	AA	2–08–06	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	LOC	3–14–06	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021
RECOMMENDED	DEE	4–10–06	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO. **W-601**

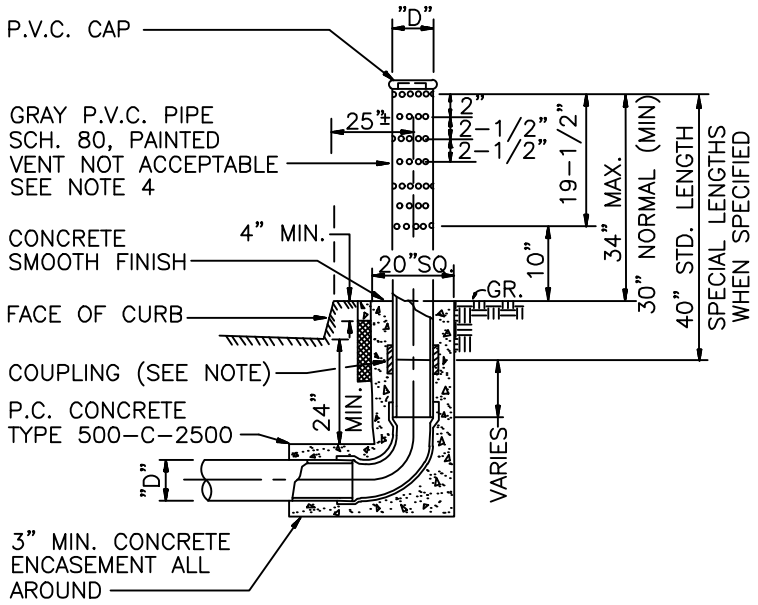
SHEET 1 OF 2

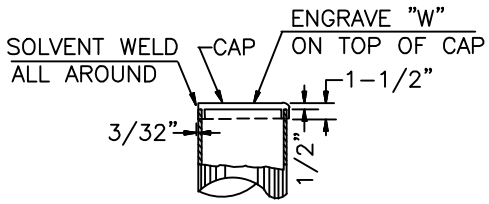
TYPE II VENT HOLE SPECIFICATIONS

STANDPIPE DIA.–"D"	SPACING DESCRIPTION
6"	8 ROWS OF 9 EQUALLY SPACED 1" HOLES (72 HOLES TOTAL)
8"	8 ROWS OF 12 EQUALLY SPACED 1" HOLES (96 HOLES TOTAL)
10"	8 ROWS OF 17 EQUALLY SPACED 1" HOLES (136 HOLES TOTAL)
12"	8 ROWS OF 20 EQUALLY SPACED 1" HOLES (160 HOLES TOTAL)

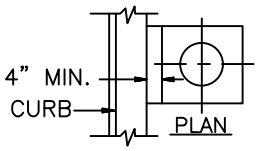


AIR VENT TYPE III





CAP SECTION



INLET OR OUTLET STANDPIPE VENT TYPE II

NOTES:

1. ALL JOINTS ARE TO BE SEALED AGAINST WATER INFILTRATION IN CONFORMANCE WITH CONDUIT MANUFACTURERS RECOMMENDATIONS AND ARE TO BE MADE IN THE PRESENCE OF WATER INSPECTOR (TYPE I, II, & III).
2. WHERE CURBS & GRADES ARE NOT ESTABLISHED, BOTTOM HOLES OF VENTS MUST BE 10" MINIMUM ABOVE SURFACE OF THE GROUND (TYPE II ONLY).
3. GRIND SMOOTH ALL WELDS & SHARP EDGES (TYPE I ONLY).
4. SPECIAL VENTED BALLARD REQUIRED IN THE PLATINUM TRIANGLE AND ANAHEIM RESORT AREA, SEE SEPARATE STANDARD BOOKLET FOR THOSE AREAS.

AIR VENT FOR U.G. STRUCTURES

PUBLIC UTILITIES DEPARTMENT

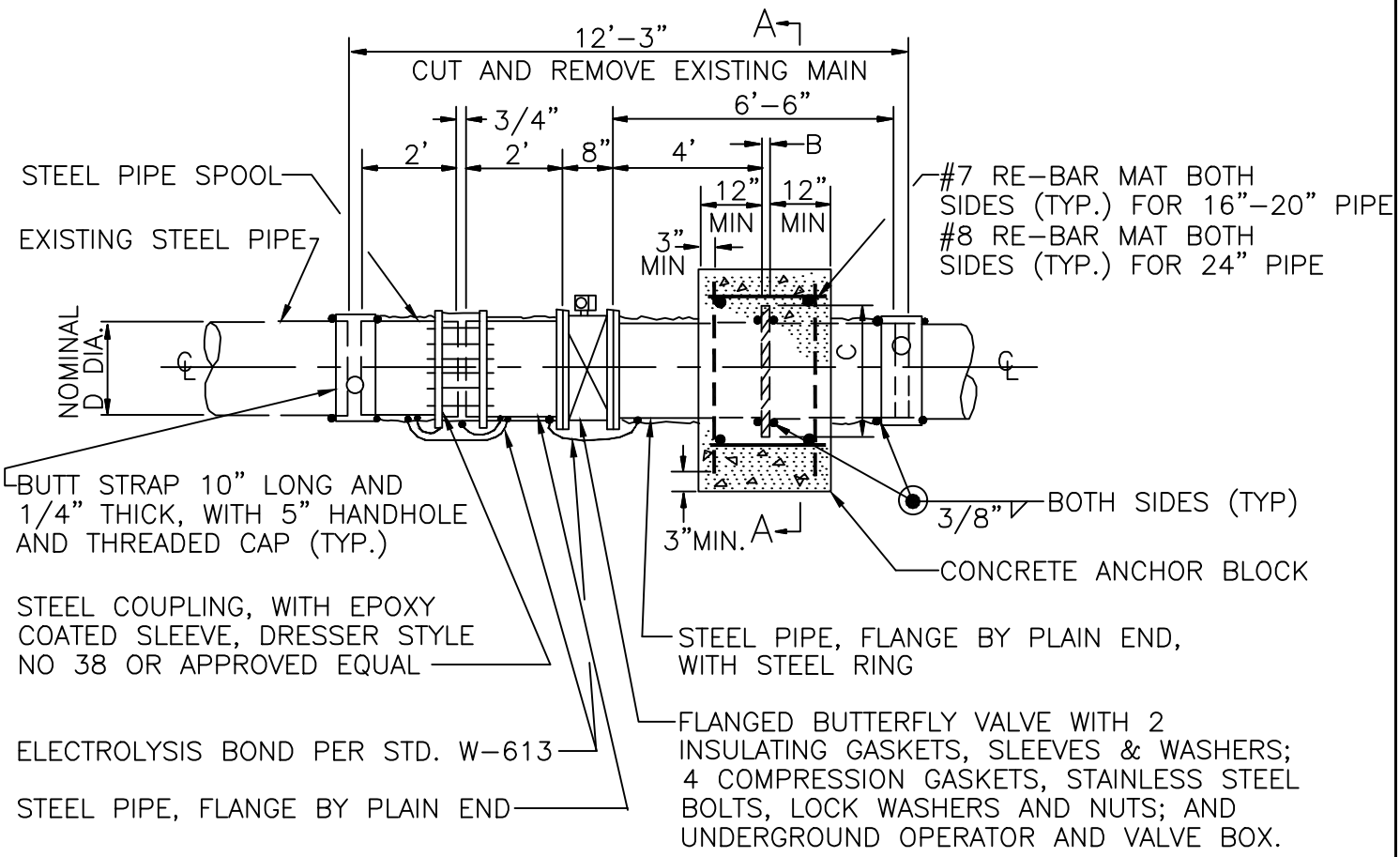
WATER SERVICES — CITY OF ANAHEIM

	BY	DATE		
DRAWN	AA	2-08-06	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	LOC	3-14-06	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	DEE	4-10-06	APPROVED CITY ENGINEER	DATE 7/7/2021

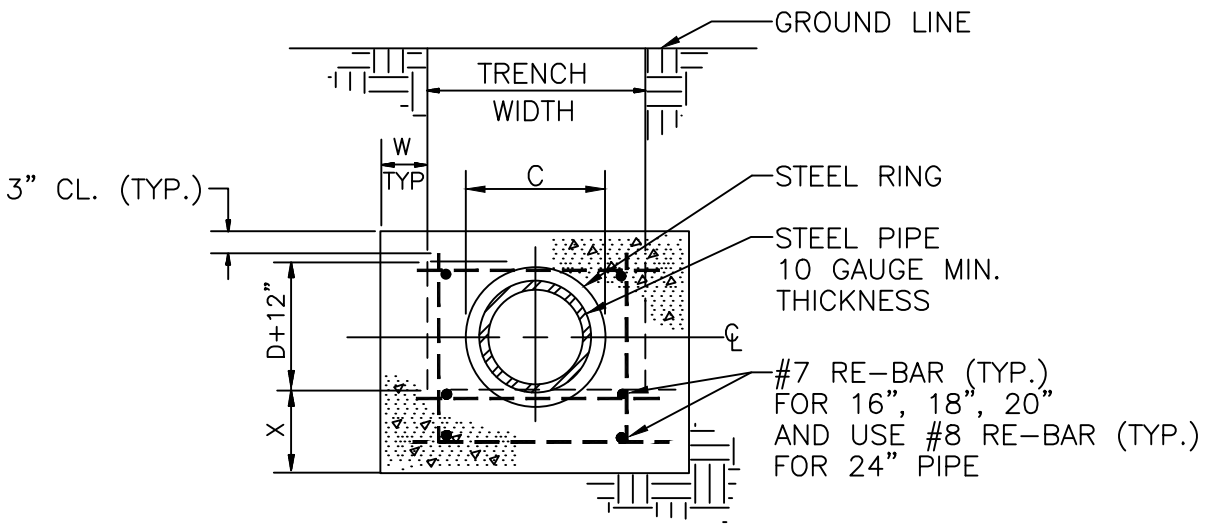
STD. NO.

W-601

SHEET 2 OF 2



PLAN VIEW
NTS



SECTION A-A

VALVE INSTALLATION ON EXISTING STEEL PIPE (CCP)

WATER SERVICES			PUBLIC UTILITIES DEPARTMENT	CITY OF ANAHEIM	STD. NO.
	BY	DATE			
DRAWN	TL	6-25-91	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021	W-605
CHECKED	KT	9-13-91	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021	
RECOMMENDED	BOB	9-20-91	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 1 OF 2

ANCHOR BLOCK AND STEEL RING DIMENSIONS

D	VARIABLE	STATIC WATER PRESSURE – P.S.I. 100	110	120	130	140	150
16"	W(INCH)	18	18	18	18	18	18
	X(INCH)	15	15	18	21	25	30
	B(INCH)	1 7/16	1 7/16	1 7/16	1 7/16	1 7/16	1 7/16
	C(INCH)	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2
18"	W(INCH)	18	18	18	18	18	20
	X(INCH)	21	24	27	30	34	36
	B(INCH)	1 9/16	1 9/16	1 9/16	1 9/16	1 9/16	1 9/16
	C(INCH)	25	25	25	25	25	25
20"	W(INCH)	18	18	18	24	24	26
	X(INCH)	27	30	35	33	34	36
	B(INCH)	1 11/16	1 11/16	1 11/16	1 11/16	1 11/16	1 11/16
	C(INCH)	27 1/2	27 1/2	27 1/2	27 1/2	27 1/2	27 1/2
24"	W(INCH)	27	30	30	32	35	38
	X(INCH)	27	30	34	37	37	38
	B(INCH)	1 7/8	1 7/8	1 7/8	1 7/8	1 7/8	1 7/8
	C(INCH)	32	32	32	32	34	36

NOTES

1. REMOVE CEMENT MORTAR COATING FROM EXISTING PIPE TO FACILITATE WELDING OF BUTT STRAP TO EXISTING PIPE.
2. STEEL PIPE CEMENT MORTAR LINING SHALL BE 1/2" THICK AND CEMENT MORTAR COATING SHALL BE 3/4" THICK.
3. ALL EXPOSED METAL SURFACES SHALL BE COATED WITH "BITUMASTIC" OR APPROVAL EQUAL.
4. CONCRETE FOR ANCHOR BLOCK SHALL BE CLASS 520–C–2500.
5. CONCRETE IN AREAS "W" AND "X" SHALL BE POURED AGAINST UNDISTURBED EARTH
6. AREA REQUIREMENTS ARE BASED UPON 1 1/2 TIMES STATIC WATER PRESSURE AND SOIL BEARING PRESSURE OF 2000 LBS./SQ.FT.

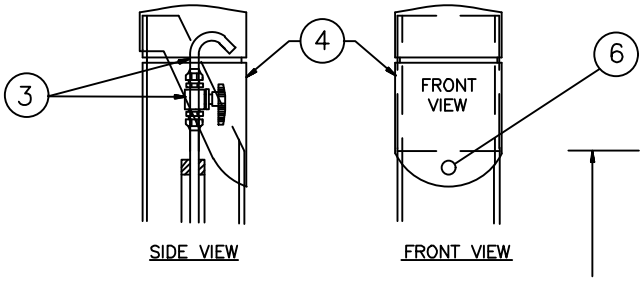
VALVE INSTALLATION ON EXISTING STEEL PIPE (CCP)

WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

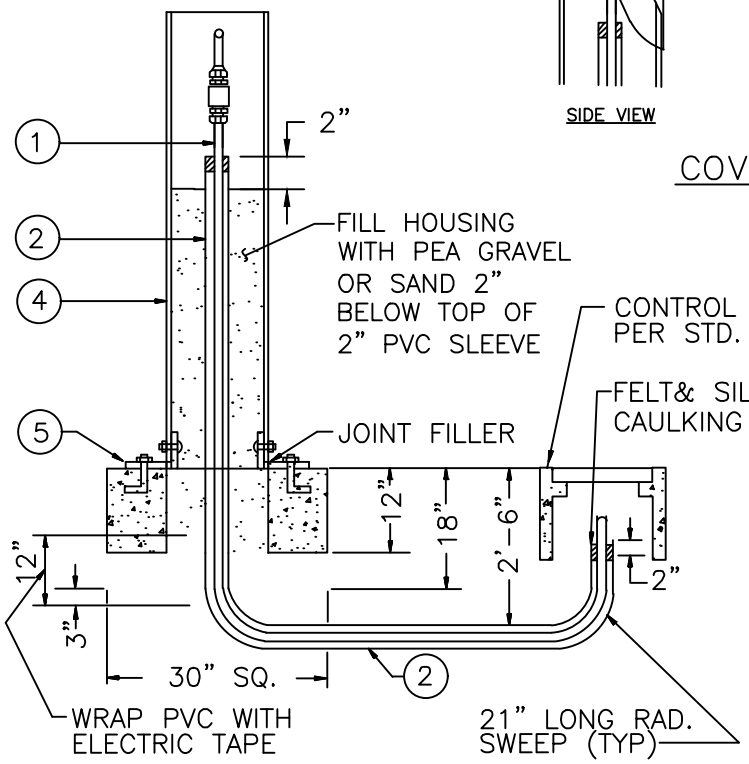
STD. NO. **W-605**

	BY	DATE		
DRAWN	TL	6–25–91	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	KT	9–13–91	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021
RECOMMENDED	BOB	9–20–91	APPROVED CITY ENGINEER	DATE 7/7/2021

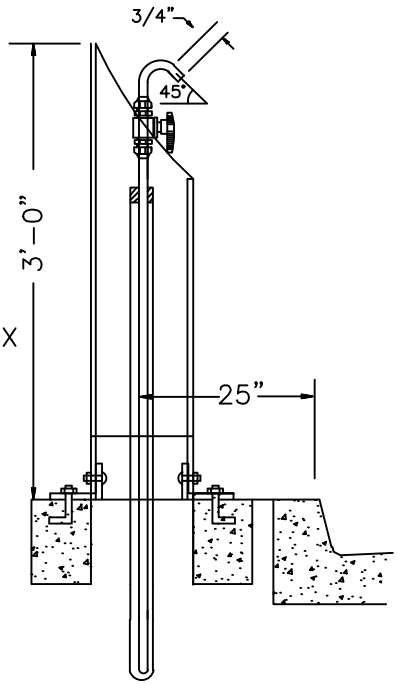
SHEET 2 OF 2



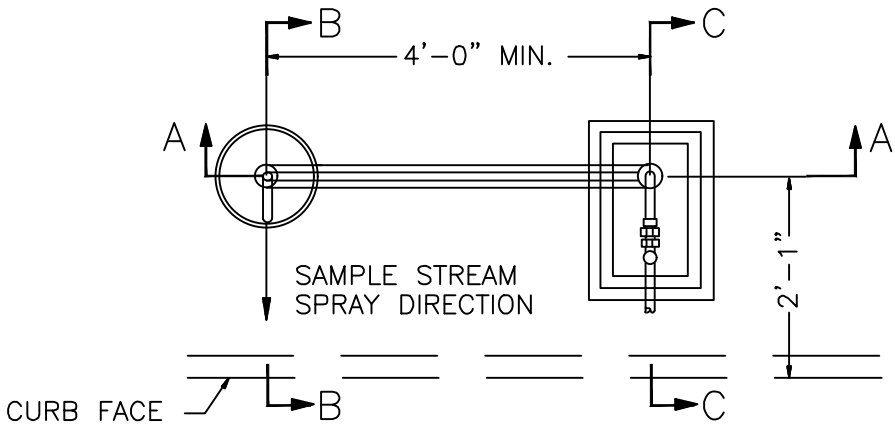
COVER



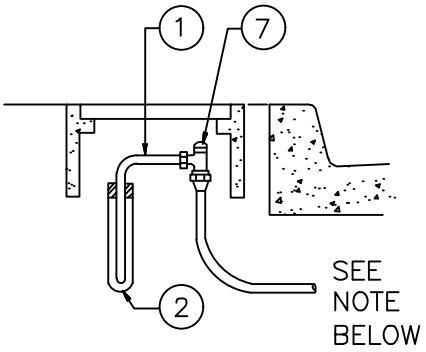
SECTION "A-A"



SECTION"B-B"



PLAN



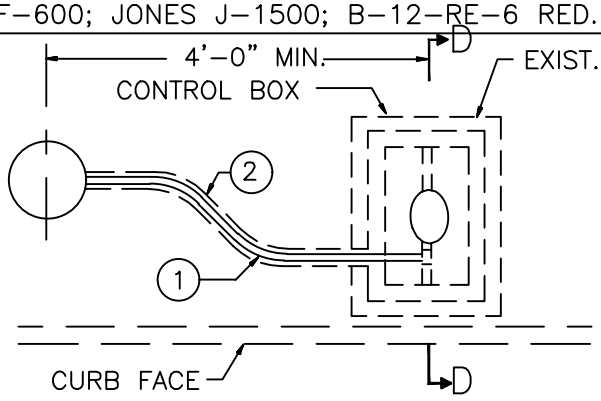
SECTION"C-C"

NOTE: LATERAL INSTALLATION PER STD. NO. W-101 INCLUDING ALL MATERIALS EXCEPT ITEMS 3, 5 AND 9

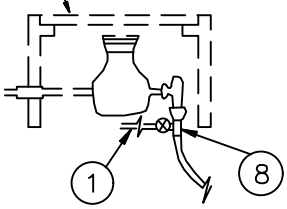
WATER SAMPLING STATION

WATER SERVICES	PUBLIC UTILITIES DEPARTMENT			CITY OF ANAHEIM	STD. NO.
	BY	DATE			
DRAWN	TL	12-22-14	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021	W-607
CHECKED	DRS	12-29-14	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021	
RECOMMENDED	DE	12-29-14	APPROVED CITY ENGINEER	DATE 7/7/2021	SHEET 1 OF 2

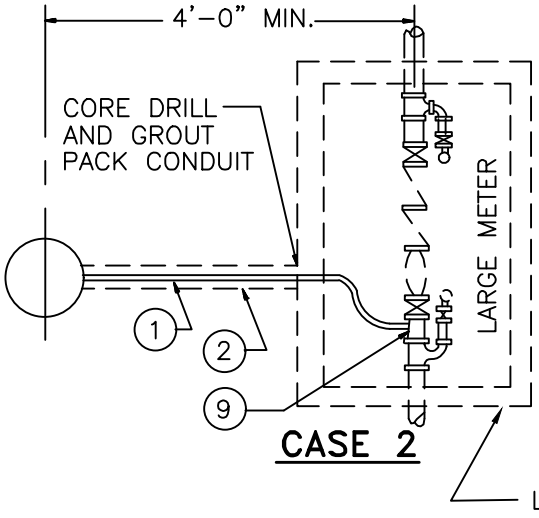
LIST OF MATERIALS	
1	3/8" FLEXIBLE COPPER TUBING, SOFT TYPE "K"
2	2" PVC CONDUIT, SCHEDULE 80
3	1/2" X 3/8" STAINLESS STEEL BALL VALVE WITH HANDLE AND S.S WATER SAMPLING OUTLET. VALVE AND OUTLET PROVIDED WITH SAMPLING STATION BY KORALEEN
4	PREFABRICATED 12" DIA. POLYETHYLENE SAMPLING STATION ENCLOSURE, ARMORCAST, P6002010-HINGED/SND
5	30" X 30" X 12" THICK P.C.C. PAD.
6	CITY OF ANAHEIM PADLOCK
7	B-6 JNA NUPRO JN VALVE ANGLE PATTERN 3/8 SWAGELOK; B-12-RB-6 RED. BUSHING 3/4" TO 3/8"; B-16-RB-12 RED. BUSHING 1" TO 3/4"
8	B-1610-3 1" SWAGELOK UNION TEE; B-44F6 WHITNEY 3/8" F-NPT; B-6-TA-1-1 TUBE ADAPTER 3/8" TO 3/8"; B-12-RA-6 REDUCING ADAPTER 3/4" TO 3/8"; B-16-TA-1-12 TUBE ADAPTER 1" TO 3/4"
9	HOT TAP INSTALL SADDLE FORD 202; JONES J979; MUELLER H16100; 1" X 3/4" CORP. STOP FORD F-600; JONES J-1500; B-12-RE-6 RED. BUSHING 3/4" TO 3/8"



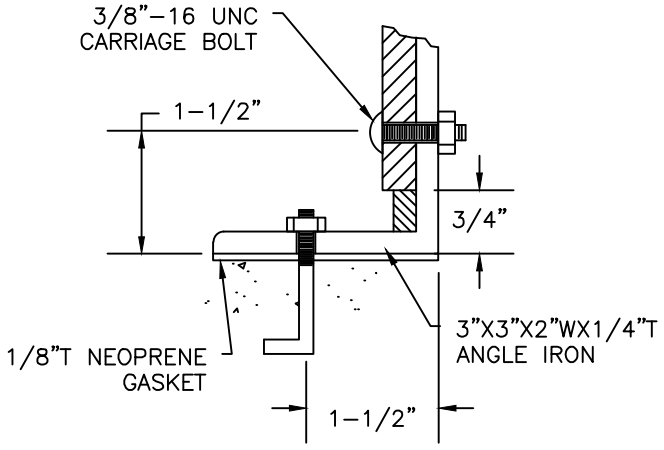
CASE 1



SECTION D-D



CASE 2



BOLT DOWN DETAIL

NOTES:

1. FOR ALL CASES, THE LOCATION OF SAMPLING STATION SHALL MEET ADA REQUIREMENT THAT A MINIMUM 48-INCH CLEARANCE BE MAINTAINED FOR ANY OBSTRUCTION IN THE WALK.
2. SAMPLING STATION SHALL BE LOCATED A MIN. 5-FEET FORM BCR, ECR OR DRIVEWAY APPROACH.
3. FOR ROLLED CURBS OR NO CURBS, THE DISTANCE FROM THE EDGE OF THE PAVEMENT TO THE WATER SAMPLING STATION SHALL BE AS DIRECTED BY THE ENGINEER.

WATER SAMPLING STATION

PUBLIC UTILITIES DEPARTMENT

WATER SERVICES — CITY OF ANAHEIM

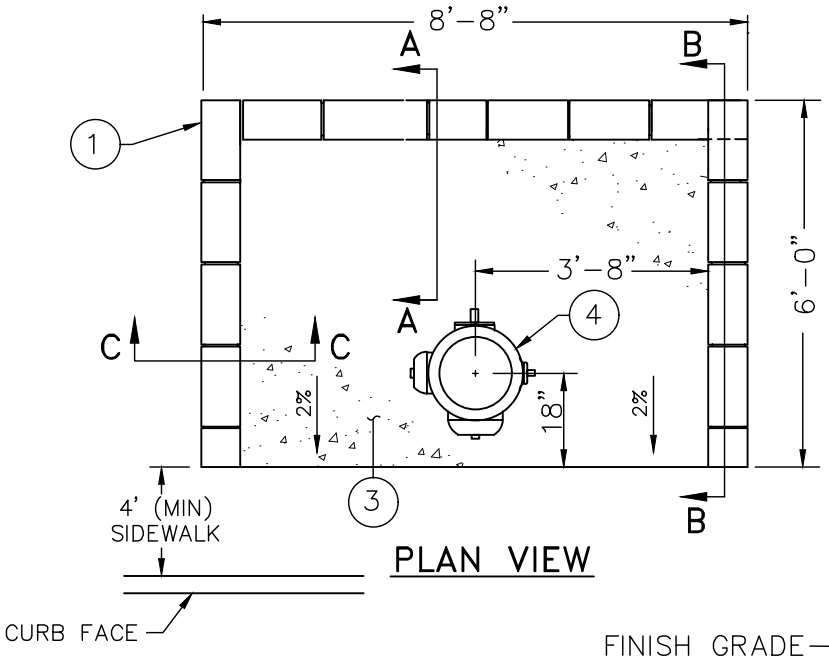
	BY	DATE			
DRAWN	TL	12-22-14	APPROVED WATER ENGINEERING MANAGER	DATE	3/11/2021
CHECKED	DRS	12-29-14	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE	3/11/2021
RECOMMENDED	DE	12-29-14	APPROVED CITY ENGINEER	DATE	7/7/2021

STD. NO.

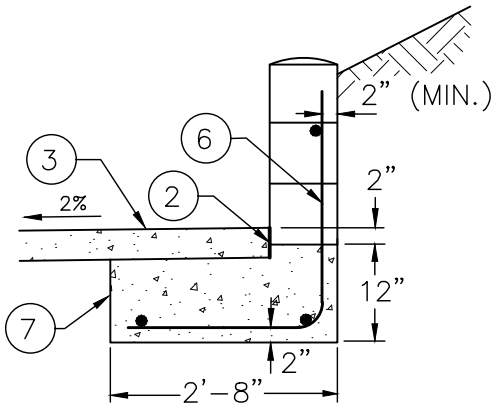
W-607

SHEET 2 OF 2

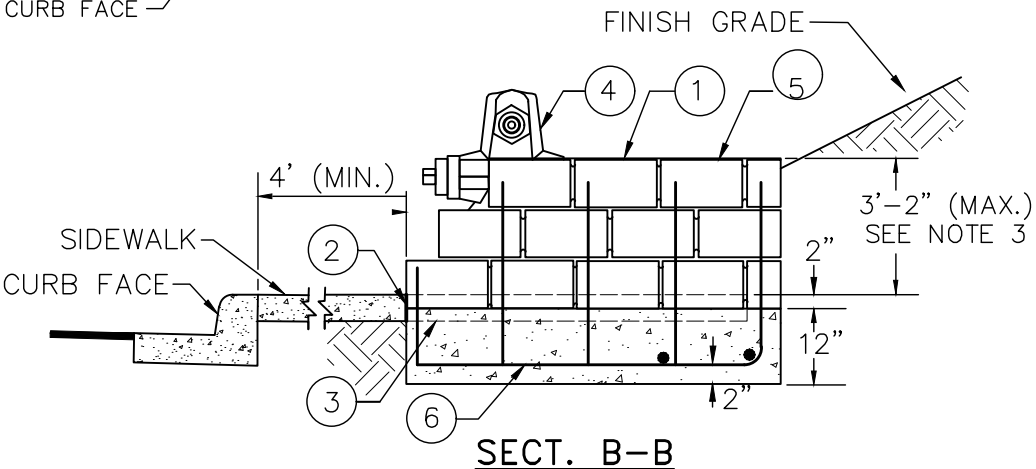
ITEM NO	SIZE AND DESCRIPTION
1	(8" X 8" X 16") CONCRETE OR SLUMP BLOCK (SOLID GROUT ALL CELLS)
2	COLD JOINT STRIP
3	(7'-4" X 5'-4" X 4" THICK) CONCRETE PAD
4	FIRE HYDRANT – SEE NOTE 1.
5	(8" X 8" X 16") CAP BLOCK.
6	#4 REBAR, TYPICAL – SEE NOTE 2. REBAR SHALL CONFORM TO ASTM A615, GRADE 60
7	CONCRETE FOOTING, CLASS 560-C-3250 PER SSPWC SECTION 201



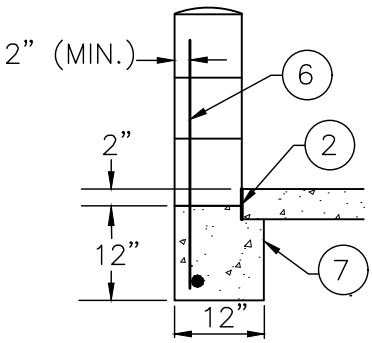
PLAN VIEW



SECT. A-A



SECT. B-B



SECT. C-C

NOTES:

1. RETAINING WALLS SHALL BE INSTALLED WHERE SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
2. VERTICAL BARS TO BE INSTALLED AT 16 INCH ON CENTER.
3. RETAINING WALLS IN EXCESS OF 3'-2" SHALL BE DESIGNED BY THE ENGINEER OF WORK.
4. SUBMIT BLOCK STYLE AND COLOR FOR PRE-APPROVAL BY THE UTILITY.
5. A 36" CLEARANCE SHALL BE MAINTAINED OF ANY OBSTRUCTION FROM FIRE HYDRANT TO THE WALL.
6. OMIT MORTAR FROM VERTICAL JOINT OF FIRST BLOCK COURSE ABOVE FINISHED GRADE TO PROVIDE WEEP HOLES FOR SUB-DRAINAGE PURPOSES.

RETAINING WALL FOR FIRE HYDRANT AND OTHER WATER APPURTENANCES

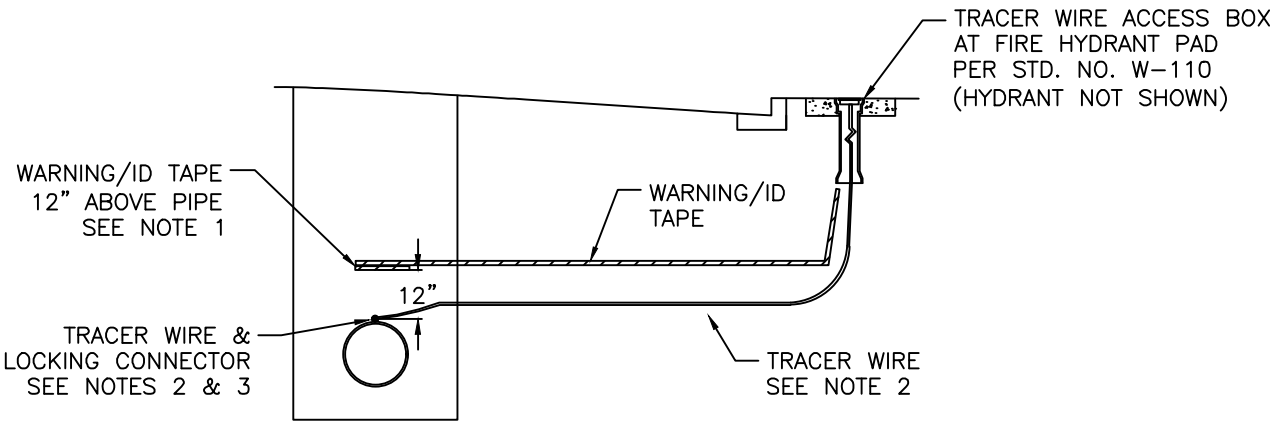
WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

	BY	DATE		
DRAWN	CE	5-10-21	APPROVED WATER ENGINEERING MANAGER	DATE 5/10/2021
CHECKED	CE	5-10-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 5/10/2021
RECOMMENDED	CE	5-10-21	APPROVED CITY ENGINEER	DATE 7/7/2021

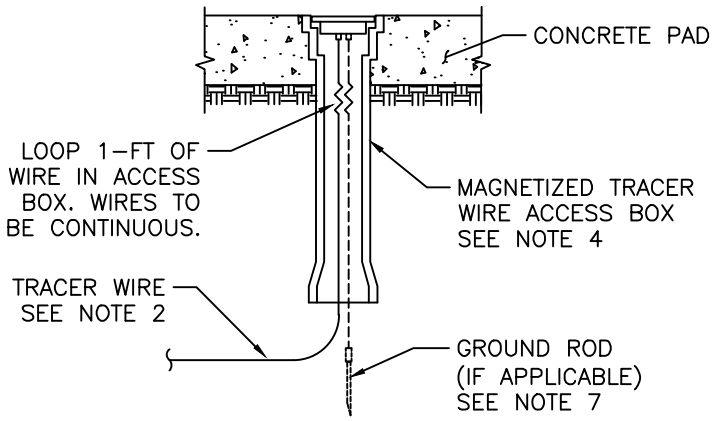
STD. NO.

W-608

SHEET 1 OF 1



SECTION VIEW



TRACER WIRE ACCESS BOX

NOTES:

1. WARNING/IDENTIFICATION TAPE SHALL BE 6-INCH WIDE, BLUE IN COLOR AND MARKED "CAUTION WATER LINE BELOW".
2. TRACER WIRE SHALL BE COPPERHEAD HIGH STRENGTH CCS TRACER WIRE 1030B-HS (BLUE) WITH COPPERHEAD SNAKEBITE LOCKING CONNECTOR LSC1030C OR APPROVED EQUAL. SEE SECTION 2-02.05.
3. TRACER WIRE SHALL BE SECURED TO THE PIPE AT 10-FOOT INTERVALS WITH PLASTIC ADHESIVE TAPE, DUCT TAPE OR PLASTIC TIE STRAPS PER SECTION 3-06. THE WIRE SHALL RUN CONTINUOUSLY ALONG THE TOP OF PIPE FOR THE ENTIRE LENGTH OF PIPE AND CONTINUOUSLY BETWEEN HYDRANT CONNECTIONS, EXCEPT WHEN USING CONNECTORS.
4. TRACER WIRE ACCESS BOX SHALL BE COPPERHEAD SNAKEPIT CONCRETE/DRIVEWAY ACCESS POINT CD14BTP (BLUE WITH SINGLE-TERMINAL LID) OR APPROVED EQUAL. ACCESS BOX SHALL BE INSTALLED WITHIN THE CONCRETE PAD OF ALL EXISTING AND NEW FIRE HYDRANTS UNLESS OTHERWISE NOTED ON PLANS. REPLACE EXISTING CONCRETE PAD TO NEAREST JOINT AS REQUIRED FOR BOX INSTALLATION. ADDITIONAL ACCESS BOXES MAY BE REQUIRED BY THE UTILITY.
5. SUFFICIENT SLACK SHALL BE LEFT IN LEADS NEAR CONNECTIONS TO PIPE TO PREVENT BREAKAGE OF CONNECTION DURING BACKFILLING.
6. UPON INSTALLATION, TESTING SHALL BE CONDUCTED IN THE PRESENCE OF THE WATER UTILITY INSPECTOR AND A REPORT INDICATING POSITIVE TRACING PERFORMANCE FOR EACH SECTION OF THE SYSTEM SHALL BE SUBMITTED TO THE CITY.
7. IF GROUNDING IS REQUIRED ON PLANS, USE COPPERHEAD SNAKEPIT ACCESS POINT CD14B2T-SW (BLUE WITH TWO-TERMINAL SWITCHABLE LID) AND 1.5 LB MAGNESIUM GROUND ROD WITH 12-AWG CCS WIRE (COPPERHEAD ANO-12 OR APPROVED EQUAL) AT EACH ACCESS POINT LID. DRIVE GROUND ROD INTO SOIL BENEATH ACCESS POINT AND CONNECT WIRE TO GROUND ROD TERMINAL ON ACCESS POINT LID WITH 1 FOOT OF EXCESS/SLACK WIRE.

WARNING IDENTIFICATION TAPE AND TRACER WIRE INSTALLATION FOR PVC OR PVCO PIPE

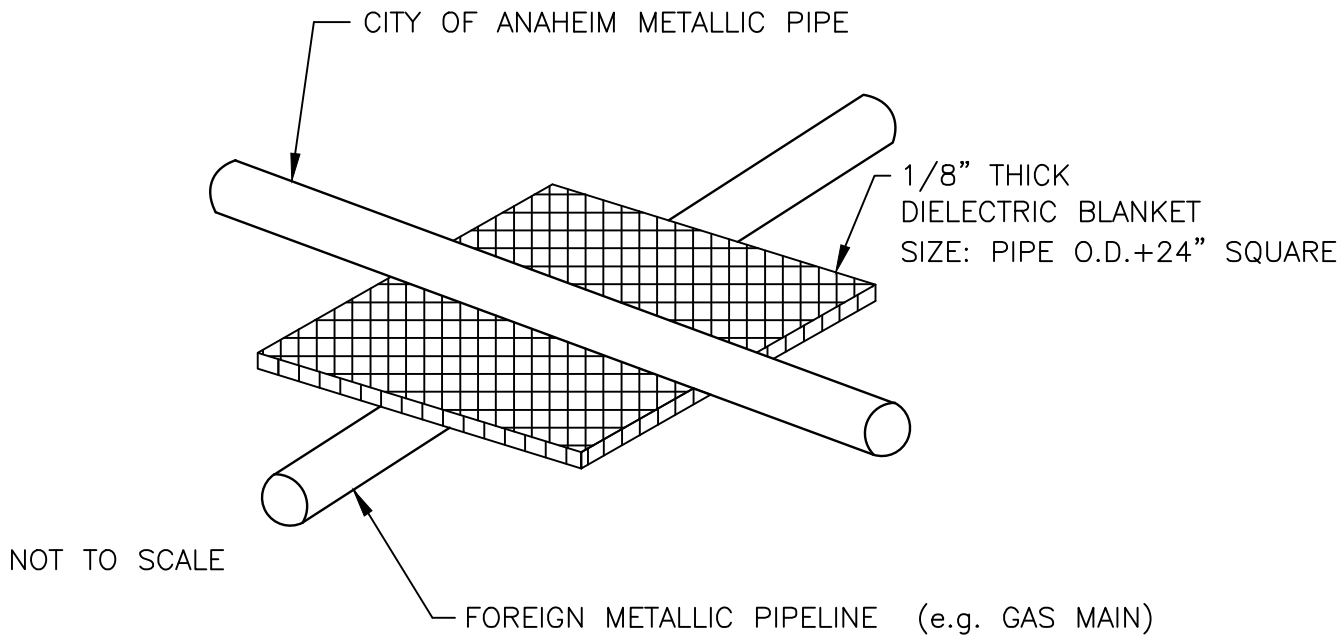
WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

	BY	DATE		
DRAWN	CE	5-10-21	APPROVED WATER ENGINEERING MANAGER	DATE 5/10/2021
CHECKED	CE	5-10-21	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 5/10/2021
RECOMMENDED	CE	5-10-21	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO.

W-609

SHEET 1 OF 1



NOTES:

1. INSTALL INSULATING BLANKET BETWEEN METALLIC PIPELINES WHEN THE DISTANCE SEPARATING THE PIPELINES IS 24" OR LESS.
2. MAKE SURE BLANKET IS FLAT ON SOIL BACKFILL AND CENTERED BETWEEN THE PIPES.
3. BLANKET SHALL BE SQUARE AND MIN. 24" LARGER THAN THE DIAMETER OF THE LARGEST PIPELINE INVOLVED.
4. APPROVED MANUFACTURER: NEOPRENE BLENDED SHEET, STYLE NO.10 SMOOTH FINISH BY BILTRITE, OR APPROVED EQUAL.

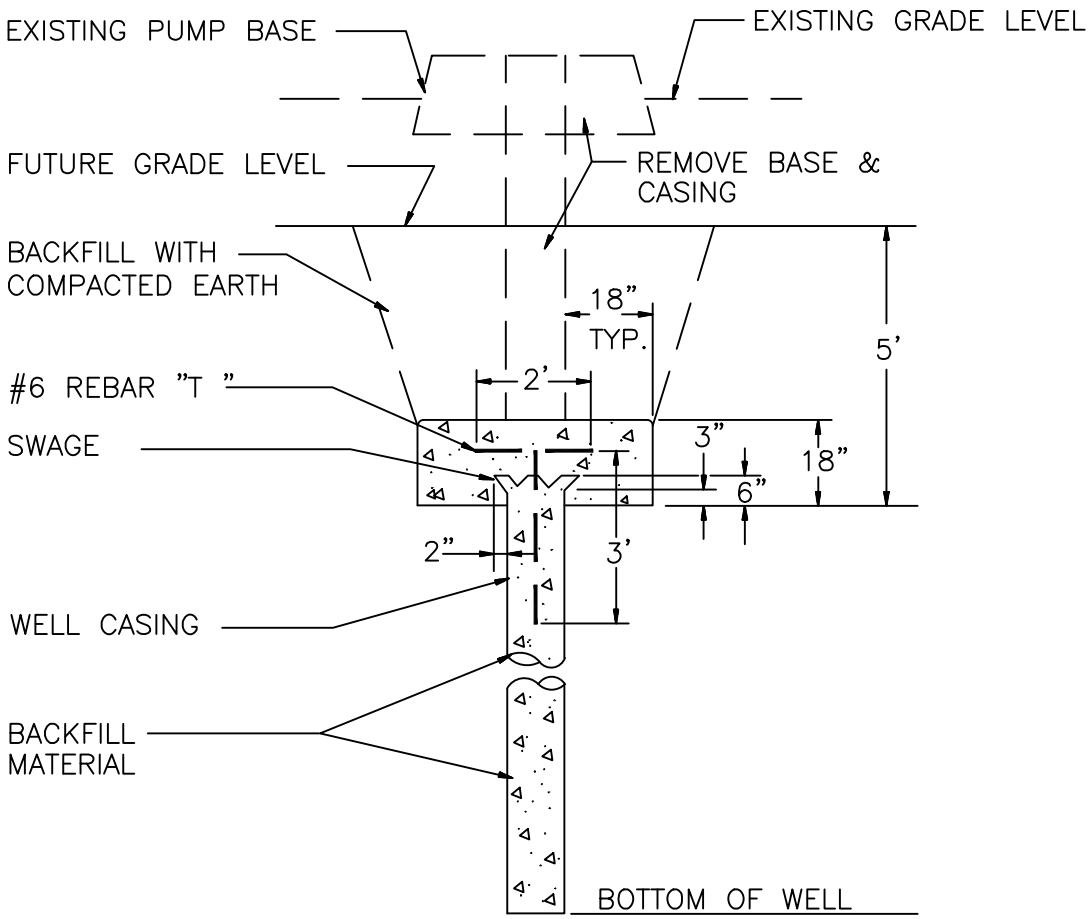
INSULATING BLANKET

WATER SERVICES — **PUBLIC UTILITIES DEPARTMENT** — CITY OF ANAHEIM

STD. NO. **W-610**

SHEET 1 OF 1

	BY	DATE		
DRAWN	SL	3-08-2012	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	DRS	3-08-2012	APPROVED ASST. GEN. MGR.-WATER SERVICES	DATE 3/11/2021
RECOMMENDED	DRS	3-08-2012	APPROVED CITY ENGINEER	DATE 7/7/2021



REFERENCES:

1. STATE OF CALIFORNIA, DEPT. OF WATER RESOURCES BULLETIN 74, "WATER WELL STANDARDS"
2. CITY OF ANAHEIM MUNICIPAL CODE, TITLE 10, CHAPTER 10.20

NOTES:

1. ALL WORK SHALL BE DONE UNDER PERMIT ISSUED BY THE UTILITIES DIRECTOR AND SUBJECT TO HIS INSPECTION.
2. CASING TO BE PERFORATED, IF NECESSARY, TO INSURE BACKFILLING OF ANNULAR SPACE OUTSIDE OF CASING.
3. BACKFILL MATERIAL TO BE INTRODUCED UNDER PRESSURE TO CLOSE ALL VOIDS IN GRAVEL PACKED WELLS.
4. ACCEPTABLE BACKFILL MATERIAL TO BE:
   A. NEAT CEMENT : 5–7 GAL. PER SACK
   B. CEMENT GROUT : 5–7 GAL. PER SACK, 2 PARTS SAND/1 PART CEMENT
   C. CONCRETE : CLASS B, 5 SACK/CU. YD.
   D. BENTONITE (UP TO 5 PERCENT BY WEIGHT OF CEMENT) OR SIMILAR WORKABILITY AGENTS MAY BE USED.

DESTRUCTION OF ABANDONED WATER WELLS

PUBLIC UTILITIES DEPARTMENT

WATER SERVICES — CITY OF ANAHEIM

	BY	DATE		
DRAWN	TL	6-25-91	APPROVED WATER ENGINEERING MANAGER	DATE 3/11/2021
CHECKED	KT	9-13-91	APPROVED ASST. GEN. MGR.–WATER SERVICES	DATE 3/11/2021
RECOMMENDED	BDB	9-20-91	APPROVED CITY ENGINEER	DATE 7/7/2021

STD. NO.

W-630

SHEET 1 OF 1