

**BELLA VISTA WATER DISTRICT**

11368 E. STILLWATER WAY • REDDING, CALIFORNIA 96003-9510  
TELEPHONE (530) 241-1085 • FAX (530) 241-8354



# Bella Vista Water District

## Construction Standards

Adopted: July 27, 2009  
Latest Revision February 13, 2023

## Bella Vista Water District – Construction Standards

The Bella Vista Water District has adopted the City of Redding Construction Standards with the specific exceptions listed below.

1. Substitute “Bella Vista Water District” for all references to the “Water Utility” and substitute “District Engineer” for “City Engineer” wherever they appear in the Construction Standards.
2. Where references are made to AWWA Standards DELETE all of the specific year references. All products shall comply with the most recent version of the applicable AWWA Standard.
3. **PAGE 400.00 – WATER SYSTEM MATERIALS**

**MATERIALS** – After the first sentence ADD the following text: “All products that come in contact with drinking water shall be NSF/ANSI Standard 61 compliant.”

### **Item No. 1 – PIPES & FITTINGS**

- A. SERVICES:** DELETE entire note and REPLACE with the following:

“All 2-inch services shall be SDR 9, 200 psi, copper tube size (CTS) polyethylene with stainless steel sleeves. All services with fire sprinklers shall be a minimum of 2-inch. No copper or galvanized pipe will be allowed.”

- B. MAINS:** Modify as follows:

DELETE all notes regarding pipe sizes 4” – 18”. REPLACE with the following:

The minimum size for water mains shall be 8-inches(6-inch for lines only providing service to a single fire hydrant).

6-inch, 8-inch, 10-inch & 12-inch mains shall be AWWA C900 PVC Class 235, AWWA C909 PVCO Class 235, or AWWA C151 (Class 350) DIP.

16-inch & 18-inch mains shall be AWWA C905 PVC Class 200, DR21 or AWWA C151 (Class 350) DIP.

**Note a** – DELETE the second bullet “MAIN...” and REPLACE with “The minimum size main shall be 8-inch.”

**Note d** – DELETE entire note and REPLACE with the following: “New polyethylene water services 2-inch shall be a continuous run of pipe with no unions.”

**Note f** - DELETE entire note and REPLACE with the following: “All buried ductile iron pipe (DIP) shall be tube encased with (8 mil) polyethylene (AWWA C105) and all buried cast iron or ductile iron fittings shall be (8 mil) polyethylene sheet encased, held together with adhesive tape (AWWA C105).

**Item No. 2 FITTINGS:**

**Note b** – DELETE entire note and REPLACE with the following:

“Bolts and nuts for all fittings and valves shall be low-carbon steel and conform to the chemical and mechanical requirements of ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi tensile strength, grade B. The carbon-steel bolts shall be used where gray-iron flanges are installed with flat ring gaskets that extend only to the bolts. Higher-strength bolts shall be used where gray-iron flanges are installed with full-face gaskets. Higher-strength bolts shall be used where ductile flanges are installed with either ring or full-face gaskets.”

**Item No. 3 – VALVES**

**BLOWOFF VALVES:** ADD the following:

Blowoff valves placed in cul-de-sacs shall be placed in the street a minimum of 11’ from the face of the curb.

**COMBINATION AIR VALVE – (CAV)** – DELETE entire note and REPLACE with the following:

“CAV shall be 2-inch (min) APCO No, 143C or Crispin UL-10, CAV double orifice single body with bronze trim and SS float.”

**Item 4. SADDLES** – DELETE entire text and REPLACE with the following:

“For DIP & PVC water mains with taps 2-inch through 3-inch use: Ford 202BS, 202B, or FC202; Jones J969 or J979; or Mueller BR2B, BR2S, or DE25.” Add (all service saddles will be wrapped with Polyethylene Visqueen WRP-36100C-AWWA)

**Item 6. FIRE HYDRANTS** – Modify note “c” by DELETING “Fire hydrants shall be painted red” and INSERTING the following:

“Fire hydrants within the Bella Vista Water District service area shall be painted high visibility Federal Safety Yellow meeting OSHA specification 1910.144 and ANSI specification 253.1 from the breakaway flange up.”

**Item 7. METER BOXES AND VAULTS** – DELETE entire table and REPLACE with the following table:

**METER BOXES AND VAULTS**

METER CLASS	NOTE*	BOX SIZE MINIMUM I.D.	BOX / VAULT #			
			COOK CONCRETE	CHRISTY	ARMORCAST	DFW Plastics
20 and 30	(A)	10" x 23.5"	---	---	---	DFWB16C-12-1A
50	(A)	10" x 23.5"	---	---	---	DFWB16C-12-1A
100	(A)	13 1/4" X 24"	---	---	P6001868X12	DFW1324C-12-1A
200	(A)	17" X 30"	---	---	P6001534X12	DFW1730C-12-1A
450	(B)	30" X 48"	B4.0	B48	A6001430PCX12	---
900	(B)	30" X 60"	B5.0	B52	A6001460AX_MT	---
2000	(B)	48" X 78"	V4.0 6.5	R37P	A6001448AX_MT	---
4500	(B)	54" X 102"	V4.5 8.5	---	---	---
LARGER THAN 4500	(C)	---	---	---	---	---
MULTIPLE METER BANKS	(F)	---	---	---	---	---

\*Refer to notes in City of Redding standards

**Item 8. TRAFFIC VALVE BOX AND EXTENSIONS** – DELETE Cook Concrete Box # VB10T.

**Item 9. BLOWOFF BOXES** – DELETE Cook Concrete Box # VB10T.

**Item 10. COMBINATION AIR VALVE (CAV) ENCLOSURE/BOX** – DELETE Cook Concrete Box # B2.0 and B3.0.

**Item 12. BACKFLOW DEVICE ASSEMBLY BOXES, VAULTS AND ENCLOSURES** –

**Note a** – REPLACE “OR” with “FOR” and DELETE reference to ¾” size and REPLACE with 1-inch.

**Note b** – DELETE reference to ¾” size and REPLACE with 1-inch.

**Item 13. LOCATING WIRE AND WARNING TAPE** –

Wire - DELETE entire note and REPLACE with the following:

Locator wire shall be installed over all waterlines. Locator wire shall be #10-1 solid insulated copper wire (UF), in a continuous strand, placed on top of the pipe and secured with tape at 10 foot (maximum) intervals. Locator wire shall be brought to the surface at all valve risers and where valves are more than 660 feet apart at the edge of the right-of-way at 660 feet maximum on center in Brooks No. 1-SP, or equal, valve boxes.

After all trench backfill operations are complete, the District will conduct the “locatability” test to confirm that the wire is continuous. The Contractor shall be responsible for all costs to confirm, locate and repair any breaks in the location wire identified in the locatability test. In addition, the Contractor shall reimburse the District for all costs to retest repaired sections of the wire. The Contractor is advised to use care in the installation and backfilling operations to prevent damage to the wire.

**4. PAGE 400.60 – VALVE OPERATION – DELETE the entire text of this City standard and REPLACE with the following:**

Operating Main Line Water Valves within the Bella Vista Water District will be by District personnel only. The District will handle the notification of the customers to be affected by any outage. For shutdowns lasting longer than 4 hours the contractor may be required to provide temporary water service to affected customers. To schedule the shutdown the contractor shall provide the District at least 48 hours notice before the required shutdown. The contact number for the Bella Vista Water District is 530-241-1085 (during work hours and after hours).

**5. PAGE 400.70 – WATER SYSTEM HOT TAPS – ADD note 11 as follows:**

Hot taps 2-inch in size on District water lines shall be performed by District personnel. Hot taps 3-inch and larger shall be performed by prequalified hot-tapping contractors. Contact the District for a list of approved hot-tapping contractors.

**6. PAGE 401.00 – WATER SERVICE CONNECTION**

DELETE all references to Double Service connections.

On note 1, DELETE: “Service connection charges shall be for a Class 30 meter, unless resident requires a larger domestic connection, then the greater connection charges shall apply.”

DELETE note 7 and replace with “All services shall be tapped 0° from the horizontal.”

**7. PAGE 401.20 – WATER SERVICE CONNECTION (Meter & Bypass Detail 3” Services & Larger) – MODIFY the drawing as follows: The bypass valve on all installations shall be located inside the meter vault and shall be lockable.**

**8. PAGE 401.30 – NON-RESIDENTIAL IRRIGATION SUB-METER – DELETE note 3 and REPLACE with the following:**

“The irrigation meter shall be purchased, installed, and maintained by the customer/owner.”

**9. PAGE 403.00 THRUST BLOCKS AND ANCHOR DETAILS – DELETE the “Anchor Block Schedule” and REPLACE with the following table:**

ANCHOR BLOCK SCHEDULE				
Pipe Dia. (inches)	Anchor Rod Dia. (inches)	Minimum Volume (cubic yards)		
		45° bend	22.5° bend	11.25° bend
4	1/2	0.7	0.4	0.2
6	1/2	1.5	0.8	0.4
8	5/8	2.6	1.4	0.7
10	5/8	4.1	2.2	1.1
12	3/4	5.9	3.2	1.6

**10. PAGE 405.00 – Temporary Connection to New Water Main** – ADD the following notes to the “NOTES” on page 2 of 2:

8. Approved backflow prevention assemblies shall be tested immediately after they are installed, relocated or repaired and not placed in service unless they are functioning as required.
9. Testing of backflow prevention assemblies shall be performed by certified backflow prevention assembly testers.
10. The approved backflow assembly shall pass the required test prior to filling the new water main.

**11. PAGE 422.01 – FIRE SERVICES (TYPICAL) CASE I** – MODIFY the drawing as follows:

The shut-off valve on the fire service line shall be located at the connection to the water main. For all dedicated fire sprinkler services an approved RPPDA type backflow device shall be installed at the point of connection (P.O.C.) at the property line. The backflow device and the fire service line downstream of the backflow device shall be the responsibility of the property owner.

**12. PAGE 422.02 – TYP. FIRE SERVICES (TYPICAL) CASE II** – MODIFY the drawing as follows:

For all fire hydrants outside of the public right-of-way an approved RPPDA backflow device shall be installed at the point of connection (P.O.C.) at the property line. The backflow device, fire service line and hydrants downstream of the point of connection shall be the responsibility of the property owner. In cases where the hydrants are clearly visible from the public right-of-way and cross contamination risks are minimal a DCDA may be installed in lieu of an RPPDA based on the review and approval of the District’s Engineer.

**13. PAGE 422.03 – FIRE SERVICES (NON-TYPICAL) CASE III** – DELETE this drawing in its entirety. This type of fire service is not allowed within the Bella Vista Water District water system.

**14. PAGE 422.30 – FIRE SERVICES (NON-TYPICAL) 1”, 1½” and 2” – MODIFY the drawing as follows:**

For all dedicated 1”, 1½” and 2” fire sprinkler services an approved RPPDA type backflow device shall be installed at the point of connection (P.O.C.) at the property line. The backflow device and the fire service line downstream of the backflow device shall be the responsibility of the property owner.

**15. PAGE 422.31 – RESIDENTIAL FIRE SERVICE –**

DELETE note 5 in its entirety and REPLACE with the following: Meters for residential fire services shall be UL rated for domestic fire sprinkler service.

**16. PAGE 422.32 – REDUCED PRESSURE PRINCIPLE BACKFLOW ASSEMBLY, INTERNAL – ALTERNATE LOCATION – DELETE this drawing in its entirety. This type of service is not allowed within the Bella Vista Water District’s water system.**

**17. PAGE 431.00 – REDUCED PRESSURE PRINCIPLE DEVICE (RPP) – Note 2 - REPLACE “within city right-of-way or easement” with “within the public right-of-way or a dedicated easement.” ADD “No connection, outlet, tap, or tee is allowed between the water main and the backflow device.”**

**18. PAGE 431.10 – REDUCED PRESSURE PRINCIPLE DEVICE (RPP) – DELETE note on the drawing saying “Pipe between main and backflow device shall be brass or copper.”**

**19. PAGE 431.20 – Backflow Prevention Assembly – “N” Pattern - ADD Note 3: “Backflow device shall have a detector assembly.**

**20. PAGE 450.00 – TYPICAL BLOW-OFF INSTALLATION – DELETE City of Redding Standard 450.00 and REPLACE with the attached BVWD drawing titled “Typical Installation – 2” Blowoff Assembly.”**

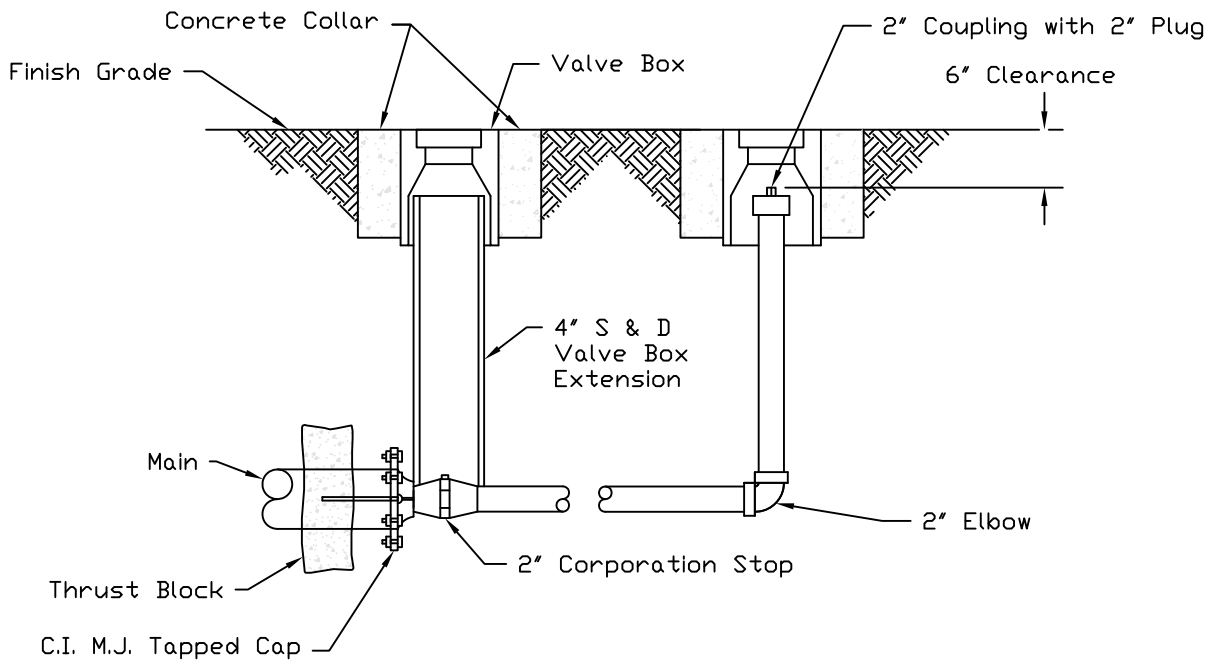
**21. PAGE 480.00 – BACTERIOLOGICAL SAMPLING STATION – DELETE the following from note #5: “per Page 400.00, Item 7. No concrete collar required for installation in unpaved finished surface.” and REPLACE with “per Page 404.00”**

**22. WATERSTOPS** – Waterstops shall be placed when and where shown on the plans or as specified in the contract drawings. See attached detail titled “Typical Installation – Waterstop for Trenches.”

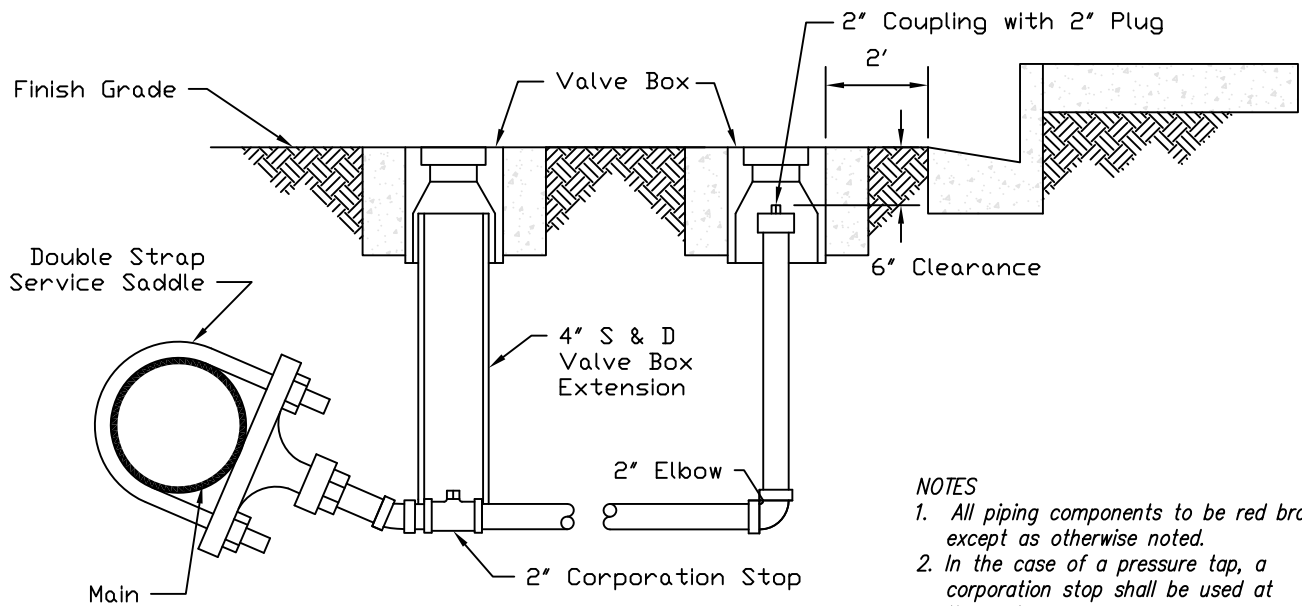
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Note: The City of Redding’s Construction Standards can be found on the City of Redding’s web site <https://www.cityofredding.org/home>; at the following location:

<https://www.cityofredding.org/departments/public-works/engineering/construction-standards>



TYPICAL BLOWOFF  
DEAD END



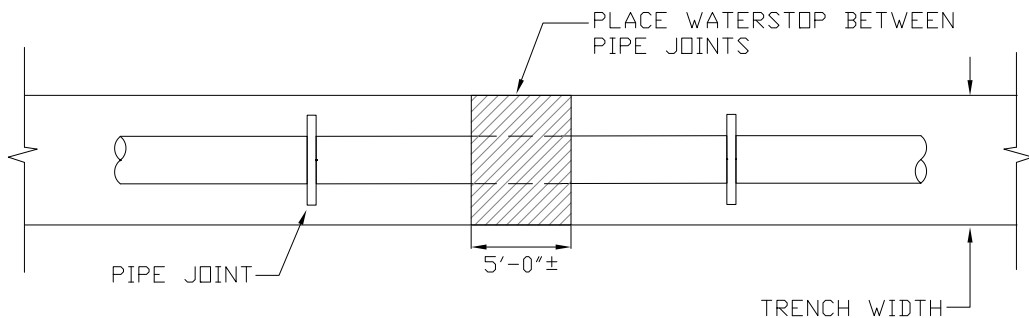
TYPICAL FLUSHOUT  
PERMANENT INSTALLATION

**NOTES**

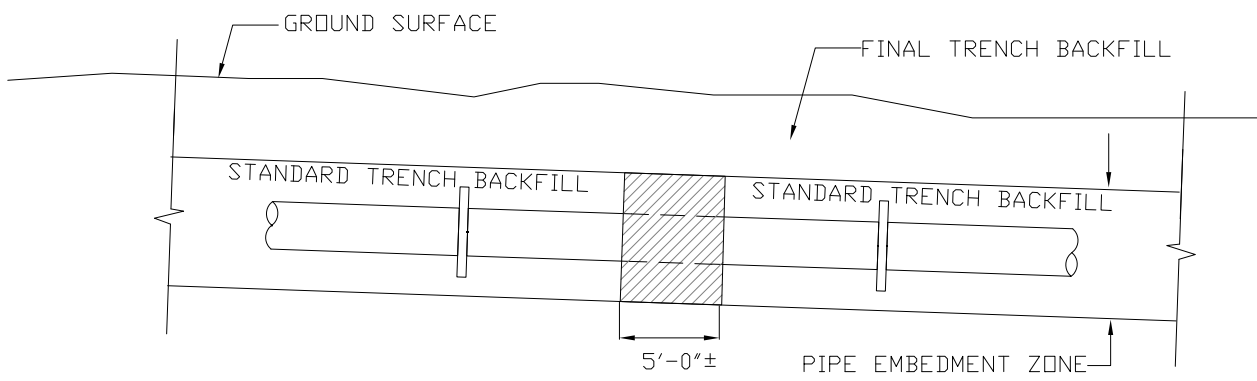
1. All piping components to be red brass except as otherwise noted.
2. In the case of a pressure tap, a corporation stop shall be used at the main.
3. Size blowoff according to California Waterworks Std. Title 22.
4. Replaces City of Redding Standard 450.00

DWG DATE:8-09	SCALE NTS	BELLA VISTA WATER DISTRICT	
		APPROVED BY	<p style="font-size: 1.2em; margin: 0;">TYPICAL INSTALLATION</p> <p style="font-size: 1.5em; margin: 0;">2" BLOWOFF ASSEMBLY</p>
MARK	DATE	<p style="margin: 0;">DISTRICT ENGINEER</p>	
REVISION			

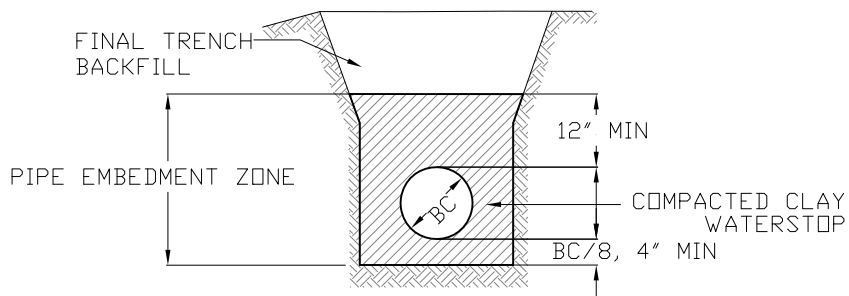




PLAN




PROFILE



SECTION A-A

- NOTES:**
1. PLACE CLAY WATERSTOP IN TRENCH AS SHOWN TO PREVENT WATER FLOW THROUGH GRANULAR TRENCH BACKFILL. COMPACT CLAY WATERSTOP TO MINIMUM 95% DENSITY.
  2. IF STABILIZATION (FOUNDATION) MATERIAL IS REQUIRED, EXTEND WATERSTOP THROUGH STABILIZATION MATERIAL TO BOTTOM OF TRENCH.
  3. BACKFILL REQUIREMENTS ABOVE WATERSTOP (FINAL TRENCH BACKFILL) SHALL BE IN ACCORDANCE WITH THE CITY OF REDDING CONSTRUCTION STANDARDS, PAGES 610.00 (TRENCH BACKFILL) AND 611.00 (TRENCH RESURFACING DETAILS).
  4. WATERSTOPS ARE REQUIRED ONLY WHEN SPECIFIED IN THE CONTRACT DOCUMENTS. WHEN REQUIRED, WATERSTOPS SHALL BE PLACED AT A NOMINAL SPACING OF 800' OR AT LOCATIONS SHOWN ON THE PLANS.
  5. WHEN SUITABLE CLAY MATERIAL IS AVAILABLE ON-SITE, INSTALLATION OF WATERSTOPS SHALL BE CONSIDERED INCIDENTAL.

Dwg. Date: 4/3/14		SCALE NTS	BELLA VISTA WATER DISTRICT	
			APPROVED BY	TYPICAL INSTALLATION WATERSTOP FOR TRENCHES
				
MARK	DATE	REVISION	DISTRICT ENGINEER	

**MATERIALS**

ALL PIPE, FITTINGS, VALVES, DEVICES, APPURTENANCES, AND MATERIALS SHALL BE LEAD FREE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 116875 OF THE CALIFORNIA HEALTH AND SAFETY CODE.

**1. PIPES AND FITTINGS**

A. SERVICES:

**1, 1 1/2" AND 2"** SHALL BE ROLLED COPPER TUBE SOFT TYPE "K", RIGID COPPER TUBE TYPE "K", OR DOMESTIC BRASS (AWWA C800-01).

B. MAINS:

**4"** SHALL BE DUCTILE IRON PIPE (DIP) AWWA C151-09 (PRESSURE CLASS 350)\*, OR POLYVINYL CHLORIDE (PVC) (C900) AWWA DR18 (CLASS 150)\*.

**6" AND 8"** SHALL BE DIP AWWA C151-09 (PRESSURE CLASS 350)\*, OR PVC (C900) AWWA DR18 (CLASS 150)\*.

**12', 16', 18', 20', 24', 30', 36', 42', AND 48'** SHALL BE DIP AWWA C151-09 (PRESSURE CLASS 350)\*.

*\* CLASS IS SUBJECT TO CHANGE WITH HIGHER PRESSURES*

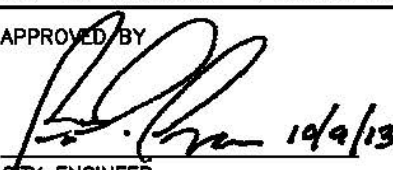
C. TRANSMISSION MAINS:

- TRANSMISSION MAINS, 12" AND LARGER, SHALL CONFORM TO THE CITY OF REDDING MASTER WATER PLAN.
- SYSTEM DESIGN LAYOUT, PIPE SIZING, AND TECHNICAL SPECIFICATIONS SHALL BE A REQUIRED COMPONENT OF THE PROPOSED IMPROVEMENT PLANS.
- FIRE HYDRANTS AND WATER SERVICES SHALL NOT BE DIRECTLY CONNECTED TO TRANSMISSION MAINS WITH THE EXCEPTION OF HYDRANTS ACTING AS BLOW-OFFS.

NOTES:

- a. MINIMUM SIZE:
  - SERVICE: 1" (CONTINGENT ON MEETING FIRE FLOW). SEE PAGE 422.31 FOR MINIMUM RESIDENTIAL FIRE SERVICE.
  - MAIN: 8" (6" WITH FIRE HYDRANT) CONTINGENT ON MEETING FIRE FLOW.
- b. SIZE AND PIPE MATERIAL OTHER THAN THAT SHOWN ABOVE IS SUBJECT TO APPROVAL BY THE WATER UTILITY AND THE CITY ENGINEER.
- c. MAIN DEPTH:
  - TOP OF PIPE FROM FINISH GRADE: 36" MINIMUM, 48" MAXIMUM.
  - PIPE DEPTH INSTALLATION **NOT** MEETING THIS REQUIREMENT SHALL BE WITH PRIOR APPROVAL OF THE WATER UTILITY AND THE CITY ENGINEER.
  - CONCRETE CAP, IF REQUIRED, SHALL BE PER PAGE 610.00.
- d. NEW COPPER WATER SERVICES 1" THROUGH 2" SHALL BE A CONTINUOUS RUN OF PIPE WITH NO 3-PART UNIONS. THE MAXIMUM LENGTH SERVICE SHALL BE 60 FEET USING 2" COPPER PIPE.
- e. ALL MAINS IN UNDEVELOPED OR UNPAVED AREAS, BETWEEN PARCELS, OR WITHIN 20 FEET OF STRUCTURES SHALL BE DUCTILE IRON PIPE (DIP) AWWA C151.
- f. FOR CORROSIVE SOIL CONDITIONS:
  - ALL BURIED DIP SHALL BE TUBE ENCASED WITH (8 MIL) POLYETHYLENE (AWWA C105).
  - ALL BURIED CAST IRON OR DUCTILE IRON FITTINGS SHALL BE (8 MIL) POLYETHYLENE SHEET ENCASED HELD TOGETHER WITH ADHESIVE TAPE (AWWA C105).
 POTENTIALLY CORROSIVE SOIL CONDITIONS SHALL BE DETERMINED BY THE GEOTECH REPORT.

P:\STANDARDS\CONSTRUCTION STANDARDS\DWG\400-4000.DWG, 1 OF 7 PAGES, 10/23/2013 10:35:03 AM, bidnet

DWG DATE: 3/92		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
4	10/13	EDIT NOTES	APPROVED BY  10/9/13 CITY ENGINEER	
3	4/06	EDIT NOTES		
MARK	DATE	REVISION		

**WATER SYSTEM  
MATERIALS**

- g. ALL DIP SHALL BE CEMENT MORTAR LINED AND BITUMINOUS COATED (AWWA C104 AND C153).
- h. FIELD WELDING SHALL NOT BE ALLOWED ON DUCTILE IRON PIPE. WELDING SHALL ONLY BE PERMITTED BY THE PIPE MANUFACTURER UNDER FACTORY CONTROLLED CONDITIONS.
- i. PVC (C900) PIPE SHALL NOT BE STORED OR HANDLED IN A MANNER THAT WILL PERMIT PROLONGED EXPOSURE TO SUNLIGHT OR HIGH TEMPERATURES FOR EXTENDED PERIODS.
- j. PERMEATION REGULATIONS:
- DIP SHALL BE USED IN AREAS OF KNOWN OR SUSPECTED SOIL CONTAMINATION.
  - SUCH AREAS INCLUDE: GASOLINE STATIONS, FUEL STORAGE AREAS, LANDFILL/SOLID WASTE DISPOSAL SITES, INDUSTRIAL AND/OR COMMERCIAL AREAS.
  - PVC (C900) PIPE SHALL NOT BE USED WHEN A PETROLEUM ODOR EXISTS IN THE TRENCH.
  - THE INSTALLATION OF PVC (C900) PIPE IN DIRECT CONTACT WITH NATURAL GAS SERVICE IS PROHIBITED.
  - ANY PVC (C900) PIPE THAT HAS BEEN PERMEATED BY ORGANIC COMPOUNDS SHALL BE REPLACED.
- k. DISTANCE BETWEEN SERVICE TAPS:
- DUCTILE IRON PIPE:
- 1" THROUGH 2" TAPS SHALL BE 2 FEET APART
  - LARGER THAN 2" TAP SHALL BE 4 FEET APART
- TAPS FOR BOTH CASES SHALL BE 4 FEET FROM ANY BELL FITTING OR COUPLING.
- POLYVINYL CHLORIDE (PVC) C900 PIPE:
- 1" TAPS SHALL BE 2 FEET APART
  - LARGER THAN 1" TAPS SHALL BE 4 FEET APART
- TAPS FOR BOTH CASES SHALL BE 4 FEET FROM ANY BELL FITTING OR COUPLING.
- l. PIPE MATERIALS USED FOR THE CONNECTION BETWEEN THE WATER METER AND A BACKFLOW PREVENTION DEVICE SHALL BE CONSISTENT WITH THE SIZE AND MATERIAL REQUIREMENTS LISTED ON PAGES 431.00 OR 431.10.
- m. WATER MAINS CROSSING SEWER OR STORM DRAINS SHALL BE INSTALLED PER CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH) TITLE 22 STANDARDS. PVC WATER MAINS AT CROSSINGS SHALL BE AWWA DR14 (CLASS 200).

## 2. FITTINGS

### FOR 1" THROUGH 2":

- ALL FITTINGS SHALL BE BRASS THREADED, COMPRESSION, OR PACK JOINT (A.Y. MCDONALD, FORD, JONES, OR MUELLER) AWWA C800. **NO SUBSTITUTES.**
- COMPLIMENTARY THREADED BRASS (I.E. 45, 90, UNIONS, ETC.) SHALL BE DOMESTICALLY MANUFACTURED.
- BRASS FITTINGS INSTALLED ABOVE GROUND SHALL BE THREADED.

### FOR DIP - 4' AND LARGER

- FITTINGS SHALL BE EITHER TYTON JOINT, FLANGED, OR MECHANICAL JOINT (DUCTILE IRON AWWA C110 OR AWWA C153).

### FOR PVC C-900 PIPE - 4' THROUGH 8'

- FITTINGS SHALL BE EITHER PUSH ON, FLANGED, OR MECHANICAL JOINT (DUCTILE IRON AWWA C110 OR AWWA C153).

### NOTES:

- a. ALL DUCTILE IRON FITTINGS SHALL BE CEMENT MORTAR LINED (AWWA C104) AND OUTSIDE COATING SHALL BE A PETROLEUM ASPHALTIC COATING 1 MIL THICK (AWWA C110).
- b. BOLTS AND NUTS SHALL BE LOW ALLOY STEEL WITH ZINC COATING/PLATING OR STAINLESS STEEL SUCH THAT THE BOLTS ARE CATHODIC TO THE COUPLING.

### 3. VALVES

#### A. RESILIENT WEDGE (RW) GATE VALVE \*

**VALVES 2" THROUGH 8"** SHALL BE 125-POUND, FULLY ENCAPSULATED WEDGE IN SYNTHETIC RUBBER, NON-RISING STEM (NRS) AND OPEN TO LEFT.

- EXPOSED VALVES SHALL BE HAND WHEEL OPERATED.
  - BURIED VALVES SHALL HAVE 2" SQUARE OPERATING NUT.
- VALVES SHALL MEET AWWA C509-01 OR C515-99 REQUIREMENTS.

#### B. BUTTERFLY VALVE \*

**VALVES 12" AND UP** SHALL BE RUBBER SEATED, CAST IRON BODY, CAST IRON OR DUCTILE IRON DISC, STAINLESS STEEL SHAFT, FACTORY EPOXY LINING INSIDE DISC AND WATERWAY AND BEARING REQUIRING NO LUBRICATION (PRATT, M & H, OR MUELLER) CLASS 150 TO CONFORM TO AWWA C504-00.

- \* **NOTE: WELLS, PUMPING STATIONS, AND BACKFLOW DEVICES MAY REQUIRE HAND WHEEL OPERATED VALVES WITH OUTSIDE SCREW AND YOKE (OS+Y) RISING STEM VALVES.**

#### C. ANGLE METER STOP, CORPORATION STOP, CURB STOP, AND METER SETTER

**VALVES THROUGH 2"** SHALL BE BALL VALVES WITH FULL PORT (FORD, JONES, A. Y. MCDONALD, OR MUELLER UNLESS OTHERWISE SPECIFIED BY WATER UTILITY). ANGLE METER STOPS SHALL HAVE LOCKING WINGS.

#### D. GATE VALVE, EXPOSED, UNDER 2"

**VALVES 125 POUND, WEDGE DISC TYPE**, WITH NON-RISING STEM, SCREWED CONNECTIONS, WITH HAND WHEEL OPERATORS. VALVES SHALL BE BRONZE, AND OPEN LEFT (NIBCO OR CRANE).

#### E. BLOWOFF VALVE

BLOWOFF VALVES SHALL BE A. Y. MCDONALD CO. MOD. # 76109BF.

#### F. COMBINATION AIR VALVE (CAV)

CAV SHALL BE "APCO" 2" (MIN) CAV DOUBLE ORIFICE SINGLE CI BODY WITH BRONZE TRIM AND SS FLOAT (OR APPROVED EQUAL).

#### G. BACKFLOW PREVENTION ASSEMBLY

THE CITY OF REDDING WATER UTILITY REQUIRES BACKFLOW PREVENTION ASSEMBLIES INSTALLED AS POINT OF CONNECTION PROTECTION FOR THE CITY'S WATER DISTRIBUTION SYSTEM TO HAVE APPROVAL THROUGH THE FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH OF THE UNIVERSITY OF SOUTHERN CALIFORNIA (USC).

- ALL REDUCED PRESSURE PRINCIPLE, DOUBLE CHECK, AND PRESSURE VACUUM BREAKER BACKFLOW PREVENTION ASSEMBLIES IN SIZES **3/4" THROUGH 2"** WITH THE ABOVE APPROVAL ARE AUTHORIZED FOR INSTALLATION.
- THE FOLLOWING BACKFLOW PREVENTION ASSEMBLIES IN SIZES **3" THROUGH 10"** WITH THE ABOVE APPROVAL ARE APPROVED FOR INSTALLATION: AMES, FEBCO, WATTS, AND WILKINS.

### 4. SADDLES

FOR DIP & PVC C900 PIPE WITH TAPS **1" THROUGH 4"** USE:

- FORD FC 202 WITH STAINLESS STEEL BAND AND EPOXY COATED DUCTILE IRON BODY
- SMITH BLAIR 317 WITH STAINLESS STEEL STRAPS AND EPOXY COATED DUCTILE IRON BODY
- ROMAC 202NS WITH STAINLESS STEEL STRAPS AND NYLON COATED DUCTILE IRON BODY

**NOTE:** FOR HOT TAP SADDLES **4" AND LARGER** SEE STANDARD PAGE 400.70.

**5. FLEXIBLE COUPLING (FC) AND FLANGED COUPLING ADAPTORS (FCA)**

COUPLINGS SHALL BE OF THE STYLE AND TYPE RECOMMENDED BY THE MANUFACTURER AND APPROVED BY THE WATER UTILITY OR ENGINEERING DEPARTMENT. COUPLINGS SHALL BE SIZED TO ACCOMMODATE THE TYPE AND SIZE OF PIPES OR FITTINGS TO BE CONNECTED. COUPLINGS SHALL BE THE MANUFACTURER STANDARD LENGTH, UNLESS OTHERWISE NOTED. ALL COUPLINGS MADE OF DIP OR STEEL SHALL BE FUSION BONDED EPOXY OR NYLON COATED (SMITH-BLAIR, ROMAC, OR APPROVED EQUAL).

**6. FIRE HYDRANTS**

HYDRANTS SHALL MEET THE REQUIREMENTS OF THE LATEST EDITION OF AWWA C502-05, "STANDARD FOR DRY BARREL FIRE HYDRANTS". HYDRANTS SHALL BE:

- MUELLER SUPER CENTURION A423 - 250
- AMERICAN AVK
- CLOW MEDALLION
- WATEROUS PACER WB-67 (ONLY WITH THE FOLLOWING REQUIRED OPTIONS):
  - OIL RESERVOIRS
  - BRONZE SEAT RING
  - WEATHER SHIELD AND ONE PIECE BRONZE NUT
  - MECHANICAL ATTACHED NOZZLES

NOTES:

- a. ALL PARTS AND ACCESSORIES PURCHASED FOR FIRE HYDRANTS SHALL BE MANUFACTURED AND WARRANTED BY THE HYDRANT MANUFACTURER.
- b. ALL FIRE HYDRANTS SHALL HAVE 5 1/4" MAIN VALVE OPENING, TWO 2 1/2" HOSE NOZZLES AND ONE 4 1/2" PUMPER NOZZLE.
- c. ALL FIRE HYDRANTS SHALL HAVE A 1 1/2" PENTAGON OPERATING NUT AND SHALL OPEN LEFT. FIRE HYDRANTS SHALL BE PAINTED RED. AT RIGHT ANGLES TO FIRE HYDRANT AND 1' OFF THE CENTERLINE OF STREET ON THE HYDRANT SIDE, PLACE A "BLUE" REFLECTIVE MARKER ATTACHED TO PAVEMENT WITH AN APPROVED ADHESIVE.

**7. METER BOXES AND VAULTS**

METER SIZE	SEE NOTE BELOW	BOX SIZE MINIMUM I.D.	COOK CONCRETE* BOX/VAULT #	CHRISTY* BOX/VAULT #	BES CONCRETE* BOX/VAULT #
5/8" & 3/4"	(a)	10 1/4" x 17 1/4"	B0.75	B9	C9W
1"	(a)	12" x 20"	B1.0	B12	C12W
1 1/2"	(a)	13 1/4" x 24"	B1.5	B30	C30
2"	(a)	17" x 30"	B2.0	B36	C36
3"	(b)	30" x 48"	B4.0	B48	C48
4"	(b)	30" x 60"	B5.0	B52	C52
6"	(b)	48" x 78"	V4.0 6.5	R37P	
8"	(b)	54" x 102"	V4.5 8.5	-	
LARGER THAN 8"	(c)	-	-	-	
MULTIPLE METER BANKS	(f)				

\* OR APPROVED EQUAL

NOTES: (ON METER BOXES & VAULTS)

- a. REINFORCED CONCRETE COVER WITH 5"x8" CAST IRON HINGED READING LID.
- b. STEEL CHECKER PLATE LIDS WITH 5"x8" OR 10" ROUND READING LID CENTERED OVER METER REGISTER. FOR 3" & 4" METERS, A TWO PIECE LID IS REQUIRED. FOR 6" & 8" METERS, A FOUR PIECE LID IS REQUIRED.
- c. VAULT DESIGN FOR METERS AND ASSOCIATED EQUIPMENT LARGER THAN 8" REQUIRES THE APPROVAL OF THE CITY WATER UTILITY. SIZE AND DEPTH SHALL ALLOW ACCESS FOR MAINTENANCE AND/OR METER REMOVAL AND BYPASS LINE.

- d. VAULT DESIGN FOR COMBINATION DOMESTIC/FIRE DETECTOR METERS SHALL MEET MANUFACTURERS RECOMMENDATIONS. APPROVAL OF THE CITY WATER UTILITY SHALL BE OBTAINED PRIOR TO INSTALLATION OF THE VAULT.
- e. H-20 STEEL TRAFFIC LIDS SHALL BE REQUIRED IN DRIVEWAYS OR AREAS WITH ROLLED CURB.
- f. FOR MULTIPLE METER BANKS OF FOUR OR MORE METERS, ALTERNATE METER BOX DESIGNS MAY BE USED WITH PRIOR REVIEW AND APPROVAL BY WATER UTILITY.

**8. TRAFFIC VALVE BOXES AND EXTENSIONS (SEE PAGE 404.00)**

VALVE BOX SIZE (MINIMUM)	SEE NOTES	COOK CONCRETE* BOX #	CHRISTY* BOX #	BES CONCRETE* BOX #
10" I.D. x 12" HIGH	(a,b)	VB10T	G5	G5

\* OR APPROVED EQUAL

**9. BLOWOFF BOXES (SEE PAGE 450.00)**

VALVE BOX SIZE (MINIMUM)	SEE NOTES	COOK CONCRETE* BOX #	CHRISTY* BOX #	BES CONCRETE* BOX #
10" I.D. x 12" HIGH	(a,b)	VB10T	G5	G5

\* OR APPROVED EQUAL

NOTES: (ON TRAFFIC VALVE & BLOWOFF BOXES)

- a. WITH CAST IRON BOX RIM AND LID
- b. EXTENSIONS: CONTINUOUS LENGTH, 8" PVC SDR 35 OR 8" PVC C-900 PIPE

**10. COMBINATION AIR VALVE (CAV) ENCLOSURES/BOXES**

CASE 1 ABOVE GRADE ENCLOSURE: COOK CONCRETE C-265 (WITH PRECAST CONCRETE SLAB) OR APPROVED EQUAL. SEE STANDARD PAGE 451.10.

CASE 2 BELOW GRADE BOX:

VALVE SIZE	SEE NOTES	BOX SIZE (MINIMUM I.D.)	COOK CONCRETE* BOX #	CHRISTY* BOX #	BES CONCRETE* BOX #
2", 3", & 4"	(a,c)	17" x 30"	B2.0	B36	C36
6" & 8"	(b,c)	30" x 48"	B3.0	B48	C48

\* OR APPROVED EQUAL

NOTES:

- a. FOR 2", 3" & 4" VALVE BOX A ONE PIECE LID SHALL BE REQUIRED.
- b. FOR 6" & 8" VALVE BOX A TWO PIECE LID SHALL BE REQUIRED.
- c. LIDS SHALL BE SOLID REINFORCED CONCRETE MARKED "WATER"; EXCEPT WHEN BOXES ARE IN DRIVEWAY TRAFFIC AREAS OR NEXT TO ROLLED CURB AND GUTTER, WHERE H-10 STEEL TRAFFIC LIDS ARE REQUIRED.
- d. ABOVE GRADE ENCLOSURE SHALL HAVE REFLECTIVE SHEETING – SEE DESCRIPTION BELOW.

## **11. BACTERIOLOGICAL SAMPLING STATION ENCLOSURES**

THE SAMPLING STATION ENCLOSURE SHALL BE AN ECLIPSE NO. 88-WC MODEL OR APPROVED EQUAL.

NOTES:

- a. THIS UNIT CAN BE PURCHASED FROM ANY WATER WORKS PRODUCT DISTRIBUTOR.
- b. SEE STANDARD PAGE 480.00 FOR ENCLOSURE INSTALLATION.

## **12. BACKFLOW PREVENTION ASSEMBLY ENCLOSURES**

NOTES:

- a. OR BACKFLOW PREVENTION ASSEMBLIES IN SIZES 3/4" THROUGH 2" SEE ABOVE GRADE ENCLOSURE STANDARD PAGE 432.25.
- b. INSULATION JACKETING FOR 3/4" THROUGH 2" SHALL BE REPCOR OR EQUAL. METAL ENCLOSURES REQUIRED ON ALL IRRIGATION APPLICATIONS ASSOCIATED WITH THE CITY OF REDDING PARKS DEPARTMENT AND LANDSCAPE MAINTENANCE DISTRICTS.
- c. ENCLOSURES SHALL BE COR A, F, W-1, W-2, W-3, W-4 OR EQUAL. FOR ENCLOSURE MATERIALS AND INSTALLATION, SEE PAGE 432.20 OR 432.25 .
- d. OTHER ALTERNATIVE ENCLOSURE DESIGNS ARE AVAILABLE WITH PRIOR APPROVAL OF THE WATER UTILITY (i.e. HOT ROK).

## **13. LOCATING WIRE AND WARNING TAPE (SEE PAGE 608.00)**

A. WIRE

BLUE COATED #10 AWG SOLID COPPER, SOFT DRAWN WIRE SHALL BE INSTALLED (TAPED @ 10' MINIMUM INTERVALS) WITH ALL MAINS, SERVICES, AIR RELIEF, BLOWOFF, FIRE SERVICES, AND HYDRANTS.

B. TAPE

A DETECTABLE METALLIC 2" WIDE WARNING TAPE, BLUE COLOR CODED, IMPRINTED WITH "CAUTION-BURIED WATER LINE BELOW" SHALL BE INSTALLED 12" ABOVE ALL WATER MAINS INSTALLED IN UNPAVED AREAS. TAPE SHALL BE LINEGUARD DETECTABLE MARKING TAPE, TYPE III OR APPROVED EQUAL.

## **14. PIPE AND FITTINGS WRAP**

ALL PIPE AND FITTINGS SHALL BE PROTECTED WITH PIPE WRAP PRIOR TO INSTALLATION WITHIN CONCRETE PADS OR THRUST BLOCKS. USE PLASTI-SLEEVE (OR APPROVED EQUAL) OR POLYETHYLENE SHEETING WITH ADHESIVE TAPE PER AWWA C105.

## **15. REFLECTIVE SHEETING**

3M SCOTCHLITE (HIGH INTENSITY) REFLECTIVE SHEETING NO. 3820 4" (384L), OR APPROVED EQUAL, TO BE INSTALLED ON ABOVE GRADE AIR RELIEF ENCLOSURES.

**16. BEDDING MATERIAL**

BEDDING MATERIAL SHALL BE SAND. SAND SHALL BE FREE FROM CLAY OR ORGANIC MATERIAL, SUITABLE FOR THE PURPOSE INTENDED, AND SHALL CONFORM TO THE PHYSICAL PROPERTIES LISTED BELOW. EITHER GRADATION IS ACCEPTABLE (REU OR PG&E).

PROPERTY	TEST METHOD	SPECIFICATION REQUIREMENT	
ORGANIC IMPURITIES	ASTM C-40	SUPERNATANT SHALL NOT BE DARKER THAN PLATE 3 WHEN COMPARED TO STANDARD GARDINAR COLOR SERIES	
SAND EQUIVALENT	ASTM D-2419	EQUAL TO OR GREATER THAN 20	
COMPACTION CHARACTERISTICS	ASTM D-1557	RELATIVE COMPACTION OF 95% OR GREATER	
GRADATION	ASTM C-136 & ASTM C-117	SIEVE	PERCENT PASSING (BY WEIGHT)
REU		NO. 4 (4.75mm)	100
		NO. 8 (2.36mm)	90-100
		NO. 16 (1.18mm)	80-100
		NO. 30 (600um)	65-100
		NO. 50 (300um)	40-70
		NO. 100 (150um)	0-30
PG&E		1/2"	100
		NO. 4	75-100
		NO. 50	0-70
		NO. 100	0-30
		NO. 200	0-15

ALTERNATE BEDDING MATERIAL FOR DUCTILE IRON PIPE MAY BE USED WITH CITY ENGINEER'S APPROVAL.

**17. ABANDON WATER SERVICE**

ANY UNUSED WATER SERVICE TO A PROPERTY THAT IS TO BE DEVELOPED OR REDEVELOPED SHALL BE ABANDONED.

THE CONTRACTOR SHALL PERFORM ALL NOTIFICATIONS TO EXISTING CUSTOMERS THAT ARE AFFECTED BY THE SHUT DOWN OF THE EXISTING WATER MAIN DURING THE DISCONNECTION OF THE SERVICE(S). THE CONTRACTOR SHALL MAKE ANY REQUEST FOR DISCONNECTION TO THE CITY WATER UTILITY A MINIMUM OF 2 WORKING DAYS PRIOR TO THE DATE THE WORK IS TO BE PERFORMED.

THE CONTRACTOR SHALL EXPOSE THE SERVICE LINE(S) AT THE WATER MAIN. THE CITY WATER UTILITY WILL DISCONNECT THE SERVICE LINE(S) AT THE MAIN AT THE CITY'S EXPENSE. THE CONTRACTOR SHALL BACKFILL AND RESURFACE TO PREVIOUS (OR BETTER) CONDITION.



**DISINFECTING WATER MAINS**

DISINFECTION SHALL BE COMPLETED AND BACTERIA TEST RESULTS SHALL BE APPROVED BY PUBLIC WORKS INSPECTION PERSONNEL PRIOR TO CONNECTING TO THE EXISTING WATER SYSTEM.

AFTER FINAL FLUSHING AND BEFORE THE NEW MAIN IS CONNECTED TO THE DISTRIBUTION SYSTEM, TWO CONSECUTIVE SAMPLES TAKEN 24 HOURS APART SHALL BE COLLECTED FROM THE NEW MAIN FOR TESTING. A RESIDUAL CHLORINE LEVEL OF 10 MG/L OR MORE SHALL BE PRESENT AFTER 24 HOURS. IF RESIDUAL LEVEL IS LESS THAN 10 MG/L, THE DISINFECTION PROCESS SHALL BE REPEATED.

**AWWA C651-05** – THIS STANDARD PRESENTS ESSENTIAL PROCEDURES FOR DISINFECTING NEW AND REPAIRED WATER MAINS. ALL NEW WATER MAINS SHALL BE DISINFECTED BEFORE THEY ARE PLACED IN SERVICE. ALL WATER MAINS TAKEN OUT OF SERVICE FOR INSPECTION, REPAIR, OR OTHER ACTIVITY THAT MIGHT LEAD TO CONTAMINATION OF WATER SHALL BE DISINFECTED BEFORE THEY ARE RETURNED TO SERVICE.

**CHLORINATION OF NEW WATER MAINS BY TABLET METHOD**

THE CITY REQUIRES THAT NEW WATER MAINS BE DISINFECTED BY THE INTRODUCTION OF CHLORINE SUCH THAT THE FINAL SOLUTION SHOULD HAVE A RESIDUAL OF 50 MG/L (50 PPM) AND SHALL REMAIN IN CONTACT FOR A MINIMUM OF 24 HOURS. THIS MAY BE ACCOMPLISHED BY THE TABLET METHOD ON SMALL DIAMETER MAINS.

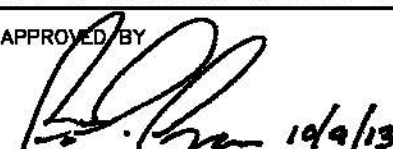
THE TABLET METHOD IS DESCRIBED AS FOLLOWS:

1. CALCIUM HYPOCHLORITE TABLETS SHALL BE PLACED IN EACH SECTION OF PIPE, HYDRANTS, AND OTHER APPURTENANCES. THE TABLETS SHALL BE ATTACHED BY AN NSF APPROVED ADHESIVE. THERE SHALL BE NO ADHESIVE ON THE TABLET, EXCEPT ON THE BROAD SIDE ATTACHED TO THE SURFACE OF THE PIPE. IF THE TABLETS ARE ATTACHED BEFORE THE PIPE SECTION IS PLACED IN THE TRENCH, THEIR POSITION SHALL BE MARKED ON THE SECTION, SO IT CAN BE READILY DETERMINED THAT THE PIPE IS INSTALLED WITH THE TABLETS AT THE TOP.

CHLORINE CONCENTRATION REQUIREMENTS CAN BE ACHIEVED AS FOLLOWS:

<b>NO. OF 5-G CALCIUM HYPOCHLORITE TABLETS TO OBTAIN 50 PPM (BASED ON TABLETS CONTAINING 65% AVAILABLE CHLORINE)</b>					
<b>PPE DIAMETER (INCHES)</b>	<b>LENGTH OF PIPE SECTION (FEET)</b>				
	<b>13' OR LESS</b>	<b>18'</b>	<b>20'</b>	<b>30'</b>	<b>40'</b>
4	2	2	2	2	2
6	2	2	2	4	4
8	2	4	4	6	8
10	4	6	6	8	10
12	6	8	8	12	14
16	8	12	14	20	26

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DWG DATE: 1/98		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION		
2	7/13	ADD NOTE UPDATE	APPROVED BY		<b>CHLORINATION – DISINFECTION</b>
1	2/03		 10/9/13		
MARK	DATE	REVISION	CITY ENGINEER		

2. WHEN INSTALLATION HAS BEEN COMPLETED, THE MAIN SHALL BE FILLED WITH WATER AT A RATE SUCH THAT WATER WITHIN THE MAIN WILL FLOW AT A VELOCITY NO GREATER THAN 1 FT/SEC. PRECAUTIONS SHALL BE TAKEN TO ASSURE THAT AIR POCKETS ARE ELIMINATED. THIS WATER SHALL REMAIN IN THE PIPE FOR AT LEAST 24 HOURS. IF THE WATER TEMPERATURE IS LESS THAN 41°F (5°C), THE WATER SHALL REMAIN IN THE PIPE FOR AT LEAST 48 HOURS. VALVES SHALL BE POSITIONED SO THAT THE STRONG CHLORINE SOLUTION IN THE TREATED MAIN WILL NOT FLOW INTO WATER MAINS IN ACTIVE SERVICE.
3. AT WATER TIE-INS, MINIMUM DISINFECTION SHALL BE ACHIEVED BY SWABBING THE NEW PIPE SECTIONS AND FITTINGS WITH A 5 PERCENT HYPOCHLORITE SOLUTION BEFORE INSTALLATION AND FLUSHING THE MAIN FROM BOTH DIRECTIONS, IF POSSIBLE, BEFORE RETURNING THE SYSTEM TO SERVICE.

**NOTE:** THIS INFORMATION IS A COMPILATION OF INFORMATION FROM THE AWWA MANUAL ON WATER CHLORINATION, AND AWWA STANDARD C651-05.

### **DEWATERING**

ALL FLOWS FROM DEWATERING OF PIPELINES SHALL BE CAPTURED OR DIVERTED SUCH THAT NO FLOWS DIRECTLY OR INDIRECTLY ENTER RIVERS, CREEKS, DRAINAGES, OR STORM DRAINS WITHOUT APPROVAL FROM BOTH THE STATE REGIONAL WATER QUALITY CONTROL BOARD AND THE CITY. A PERMIT SHALL BE OBTAINED FROM THE CITY PRIOR TO DEWATERING INTO THE THE CITY SANITARY SEWER SYSTEM.

### **DISINFECTION OF WATER STORAGE FACILITIES**

REFER TO AWWA C652-11.

### **DISINFECTION OF WATER TREATMENT PLANTS**

REFER TO AWWA C653-03.

### **DISINFECTION OF WELLS**

REFER TO AWWA C654-03.

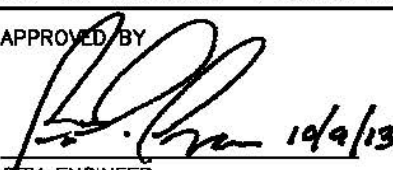
**PRESSURE TESTING**

1. PRESSURE AND BACTERIA TESTING OF NEW WATER MAINS SHALL BE SUCCESSFULLY PERFORMED PRIOR TO PLACING THE NEW PIPELINE INTO SERVICE.
2. REFER TO PAGE 400.00 AND 405.00 FOR BACKFLOW PREVENTION INFORMATION AND REQUIREMENTS.
3. THE CONTRACTOR SHALL CONDUCT COMBINATION HYDROSTATIC PRESSURE AND LEAKAGE TESTS IN ACCORDANCE WITH AWWA C600 ON ALL NEW WATER MAINS, NEW WATER SERVICES, AND TEMPORARY WATER SERVICE PIPING, AND SHALL FURNISH ALL NECESSARY EQUIPMENT AND MATERIAL TO COMPLETE THE WORK, INCLUDING A HYDRAULIC FORCE PUMP WITH A CALIBRATED TEST GAUGE. THE INSPECTOR SHALL MONITOR THE TEST, AND SHALL WITNESS ALL GAUGE CALIBRATIONS.
4. ON BURIED PIPELINES, THE CONTRACTOR MAY, IF FIELD CONDITIONS PERMIT, PARTIALLY BACKFILL THE TRENCH AND LEAVE THE JOINTS OPEN FOR INSPECTION AND CONDUCT AN INITIAL PRESSURE TEST TO SATISFY HIMSELF THAT THE PIPELINE WILL PASS. HOWEVER, THE ACCEPTANCE TEST ON BURIED WATER MAINS SHALL ONLY BE CONDUCTED ONCE ALL BACKFILLING HAS BEEN COMPLETED.
5. ON EXPOSED WATER MAINS, THE ACCEPTANCE TEST SHALL BE CONDUCTED AFTER THE PIPING HAS BEEN COMPLETELY INSTALLED, INCLUDING ALL SUPPORTS AND HANGERS.
6. TEST PRESSURE SHALL NOT BE LESS THAN 150 PSIG AT ANY LOCATION.
7. TEST PRESSURE SHALL NOT BE LESS THAN 1.25 TIMES THE WORKING PRESSURE AT THE HIGHEST POINT ALONG THE TEST SECTION.  
 EXAMPLE: IF WORKING PRESSURE = 150 PSI, THEN TESTING PRESSURE = 180 PSI  
 CONTACT THE WATER UTILITY AT (530) 224-6068 FOR WORKING PRESSURES.

**PROCEDURE FOR HYDROSTATIC TESTING PIPELINES:**

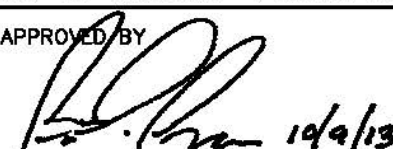
1. AFTER THE PIPELINE HAS BEEN INSTALLED, BACKFILLED, AND COMPACTED, THE CONTRACTOR SHALL CONDUCT A COMBINATION HYDROSTATIC PRESSURE AND LEAKAGE TEST OF THE PIPELINE BETWEEN EACH VALVE SECTION OR PIPE RUN AS DETERMINED BY THE INSPECTOR. THE PIPE SHALL BE SLOWLY FILLED WITH WATER SO THAT AS MUCH AIR AS POSSIBLE IS REMOVED, AND THE PIPE SHALL BE TESTED HYDROSTATICALLY AT THE LOCATION AND TO THE TEST PRESSURE IN THE APPROVED CALCULATIONS FOR A MINIMUM OF TWO HOURS.
2. LEAKAGE FOR DUCTILE IRON PRESSURE PIPE SHALL NOT EXCEED THE ALLOWABLE LEAKAGE AS CALCULATED IN AWWA C600 BY THE FOLLOWING FORMULA:  

$$L = \frac{SD\sqrt{P}}{133,200}$$
 WHERE: L= ALLOWABLE LEAKAGE, GALLONS PER HOUR  
 S= LENGTH OF PIPELINE TESTED, FEET  
 D= NOMINAL DIAMETER OF PIPE, INCHES  
 P= AVERAGE TEST
3. WHEN THE PRESSURE TEST IS CONDUCTED AGAINST CLOSED METAL-SEATED VALVES, AN ADDITIONAL LEAKAGE ALLOWANCE OF 0.0078 GAL/HOUR/NOMINAL VALVE DIAMETER (INCHES) FOR EACH CLOSED VALVE WITHIN THE SECTION BEING TESTED SHALL BE MADE.
4. IF THE PRESSURE TEST DISCLOSES LEAKAGE GREATER THAN THAT ALLOWED, THE CONTRACTOR SHALL AT HIS SOLE EXPENSE LOCATE AND REPAIR THE DEFECTIVE JOINTS UNTIL THE LEAKAGE IS WITHIN THE SPECIFIED ALLOWANCE. AFTER THE DEFECTS ARE CORRECTED, THE PRESSURE TEST SHALL BE REPEATED PER STEP No. 1 ABOVE. THIS PROCESS SHALL BE REPEATED AS NECESSARY UNTIL THE NEW WATER MAIN PASSES THE PRESSURE TEST.

DWG DATE: 4/06		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
3	7/13	UPDATE	APPROVED BY  10/9/13 CITY ENGINEER	<b>WATER PRESSURE TEST</b>
2	4/06	NEW STD		
MARK	DATE	REVISION		

**OPERATING MAIN LINE WATER VALVES WITHIN THE CITY OF REDDING**

1. THE ACTUAL OPERATION OF THE CITY OF REDDING WATER UTILITY MAIN LINE VALVES WILL BE MADE BY WATER UTILITY EMPLOYEES ONLY. THE CITY WILL REQUIRE THE ASSISTANCE OF CONTRACTOR PERSONNEL.
2. THE CITY WILL ASSIST CONTRACTORS WITH INFORMATION ON CUSTOMER LOCATIONS FOR THE AREAS OF SHUTDOWN.
3. THE CONTRACTOR WILL BE REQUIRED TO NOTIFY THE CITY INSPECTOR, THE WATER UTILITY, AND ALL AFFECTED CUSTOMERS AT LEAST 48 HOURS IN ADVANCE OF A SHUTDOWN.
4. SHUTDOWN SHALL LAST NO LONGER THAN 4 HOURS.
5. TO SCHEDULE THE SHUTDOWN OR OPERATION OF THE SYSTEM VALVES, THE CONTRACTOR SHALL CONTACT THE CITY INSPECTOR ASSIGNED TO THE JOB AT 225-4170 AT LEAST 72 HOURS IN ADVANCE.
6. THE INSPECTOR WILL COORDINATE THE SHUTDOWN WITH THE WATER UTILITY.
7. IN CASE OF AN EMERGENCY:
  - DURING WORK HOURS, CONTACT C.O.R. WATER UTILITY AT (530) 224-6068.
  - AFTER HOURS, CALL (530) 225-4000.

DWG DATE: 1/98		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
			APPROVED BY	<b>VALVE OPERATION</b>
3 2	7/13 4/06	UPDATE EDIT STD	 10/9/13	
MARK	DATE	REVISION	CITY ENGINEER	

**HOT TAPS ON WATER SYSTEM IN THE CITY OF REDDING**

1. HOT TAPS ARE ALLOWED ON:

- DUCTILE IRON
- CAST IRON
- ASBESTOS CEMENT
- PVC C900
- BITUMINOUS, TAR, OR CEMENT COATED STEEL

2. HOT TAPS ARE NOT ALLOWED WHENEVER THE DIAMETER OF THE SERVICE LINE IS GREATER THAN THREE-QUARTERS (3/4) OF THE DIAMETER OF THE MAIN.

EXAMPLES: MAXIMUM TAP SIZE: 4" ON 6", 6" ON 8", 8" ON 12", 12" ON 16", 12" ON 18"

3. HOT TAPS ARE NOT ALLOWED WITHIN FOUR FEET OF END OF PIPE, FITTINGS, OR SERVICE TAPS. PIPE SHALL BE EXPOSED TO CONFIRM BY CITY INSPECTION.

4. CONTRACTOR SHALL HAVE TAPPING SLEEVE AND VALVE FULLY INSTALLED WITH CONCRETE SUPPORT UNDER VALVE, AND APPROVED BY THE CITY INSPECTOR PRIOR TO MAKING THE HOT TAP.

5. APPROVED TAPPING SLEEVES AND SADDLES (OR APPROVED EQUAL):

- FORD FAST ALL STAINLESS TAPPING SLEEVE (FAST)
- FORD TAPPING SLEEVE STYLE (FTSC) WITH STAINLESS STEEL OR DUCTILE IRON FLANGE
- ROMAC STAINLESS STEEL TAPPING SLEEVE (SST) WITH STAINLESS STEEL OR DUCTILE IRON FLANGE
- APAC FABRICATED STEEL FUSION BONDED EPOXY COATED WELD-ON #504 SADDLE

6. TAPPING SLEEVES OR SADDLES TO BE AIR-PRESSURE TESTED AT 50 PSI.

7. EPOXY COATING BURNED OFF DURING WELDING OF SADDLES TO PIPES SHALL BE REPLACED WITH SCOTCHKOTE #203, NOT LESS THAN 10 MIL THICKNESS.

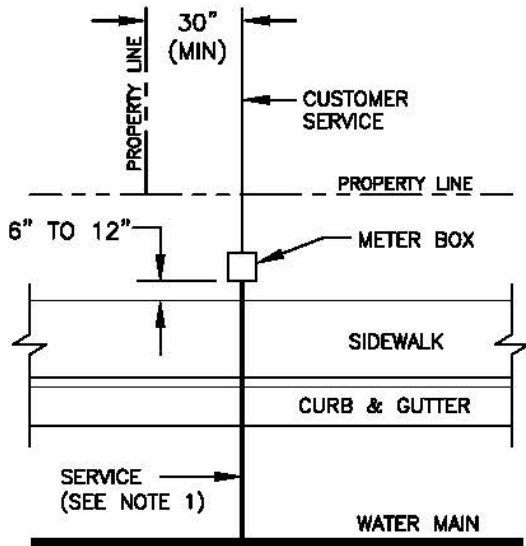
8. CONCRETE COATING REMOVED FROM PIPE TO BE REPLACED WITH ALL-CRETE OR SPEED-CRETE CONCRETE MIX USING A CONCRETE AND PLASTER ADHESIVE. METHOD: PAINT PIPE SURFACE WITH ADHESIVE, THEN COAT WITH CONCRETE MIX EQUAL TO EXISTING COATING THICKNESS.

9. ASPHALT COATING REMOVED FROM PIPE TO BE REPLACED WITH BITUMASTIC MATERIAL.

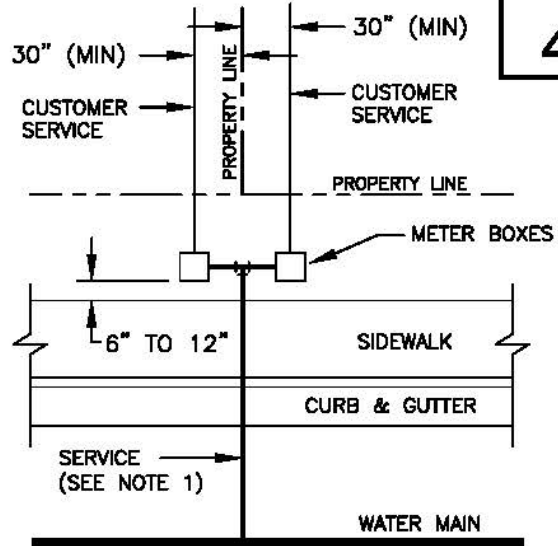
10. VALVES SPECIFICALLY DESIGNED FOR HOT TAPS OR RESILIENT SEAT VALVES SHALL BE INSTALLED FOR HOT TAPS.

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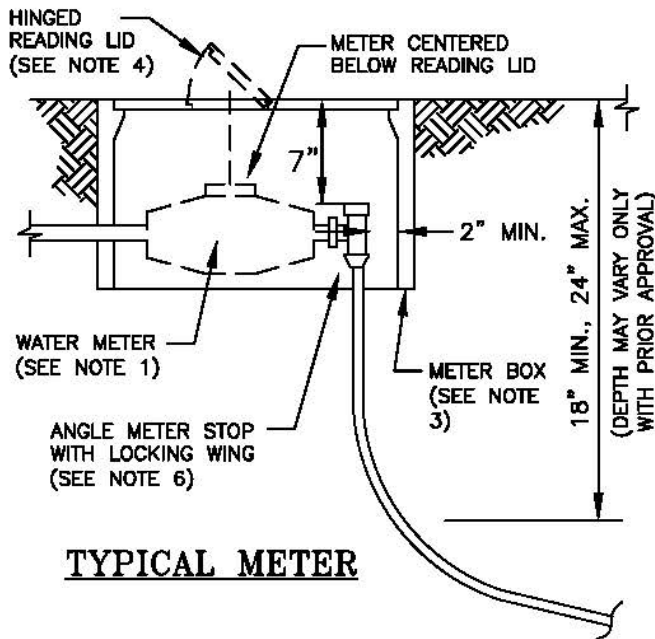
DWG DATE: 12/92		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
			APPROVED BY	<b>WATER SYSTEM HOT TAPS</b>
3	7/13	UPDATE		
2	1/98	EDIT NOTE 2		
MARK	DATE	REVISION		



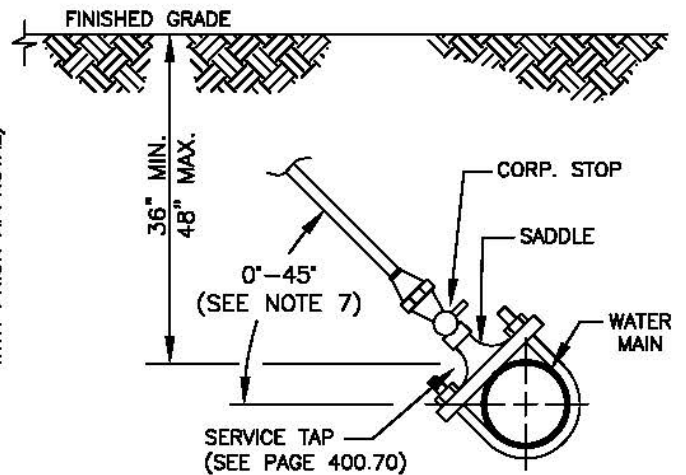
**SINGLE SERVICE**



**DOUBLE SERVICE**



**TYPICAL METER**



**TYPICAL SERVICE CONNECTION**

**NOTES:**

1. WATER SERVICE AND METER SIZE SHALL BE DETERMINED BY AN ENGINEER TO MEET BOTH DOMESTIC AND FIRE SERVICE DEMAND AT THE SAME TIME. MINIMUM WATER SERVICE SIZE SHALL BE 1". METER CHARGE AND MONTHLY FEE SHALL BE FOR THE SIZE OF METER INSTALLED. SERVICE CONNECTION CHARGES SHALL BE FOR A 5/8" METER, UNLESS RESIDENT REQUIRES A LARGER DOMESTIC CONNECTION, THEN THE GREATER CONNECTION CHARGES SHALL APPLY.
2. ALL MATERIALS SHALL BE PER APPROVED MATERIALS AS LISTED ON PAGE 400.00.
3. METER BOXES AND SERVICE PIPING SHALL BE INSTALLED BY CONTRACTOR; WATER METER SHALL BE FURNISHED AND INSTALLED BY THE CITY OF REDDING.
4. METER BOXES AND SERVICE PIPING SHALL BE INSTALLED WITH A MINIMUM OF 30" CLEARANCE FROM ALL ELECTRICAL TRANSFORMERS, LIGHT STANDARDS, AND OTHER UTILITY BOXES OR VAULTS.
5. METER BOXES SHALL HAVE REINFORCED CONCRETE LIDS (STEEL TRAFFIC LIDS IN DRIVEWAYS OR AREAS WITH ROLL CURB) WITH HINGED READING LIDS PER PAGE 400.00, ITEM #6.
6. ANGLE METER STOP VALVE SHALL BE POSITIONED IN METER BOX SO THAT METER REGISTER WILL BE CENTERED UNDER READING LID.
7. ONLY SERVICE TAPS FOR 1 1/2" AND 2" MAY BE TAPPED AT AN ANGLE OTHER THAN 45°, BUT ONLY WITH PRIOR APPROVAL OF THE CITY ENGINEER.

DWG DATE: 5/91

SCALE: NTS

CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION

6  
5

7/13  
4/06

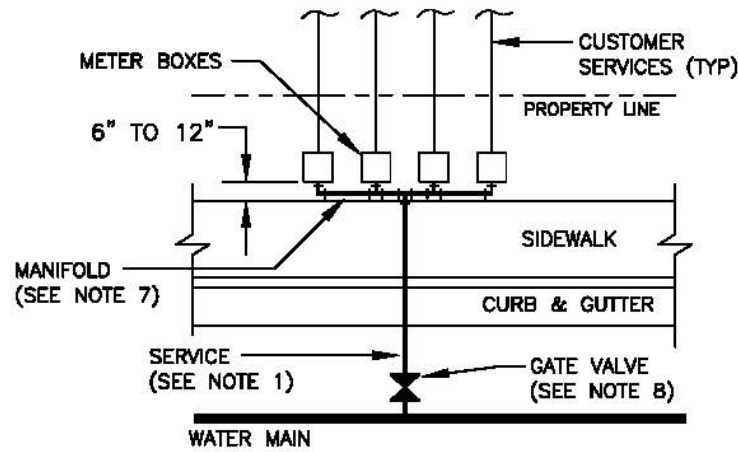
REVISE STD  
EDIT NOTES

APPROVED BY

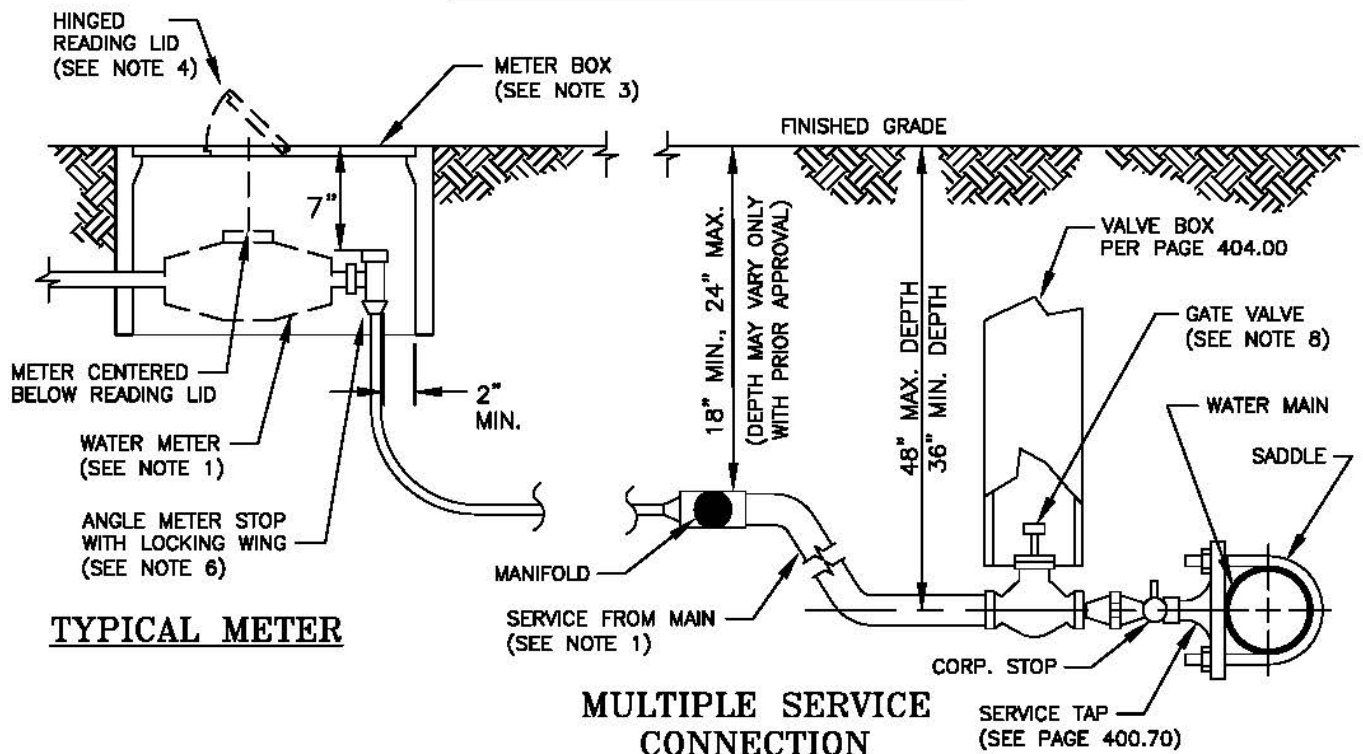
*[Signature]*  
10/9/13  
CITY ENGINEER

**WATER SERVICE  
CONNECTION**

SINGLE / DOUBLE



**TYPICAL MULTIPLE SERVICE**



**TYPICAL METER**

**MULTIPLE SERVICE CONNECTION**

**NOTES:**

1. WATER SERVICE AND METER SIZES SHALL BE DETERMINED BY AN ENGINEER TO MEET BOTH DOMESTIC AND FIRE SERVICE DEMAND AT THE SAME TIME. MINIMUM WATER SERVICE SIZE SHALL BE 1". METER CHARGE AND MONTHLY FEE SHALL BE FOR THE SIZE OF METER INSTALLED. SERVICE CONNECTION CHARGES SHALL BE FOR A 5/8" METER, UNLESS RESIDENT REQUIRES A LARGER DOMESTIC CONNECTION, THEN THE GREATER CONNECTION CHARGES SHALL APPLY.
2. ALL MATERIALS SHALL BE PER APPROVED MATERIALS AS LISTED ON PAGE 400.00.
3. METER BOXES AND SERVICE PIPING SHALL BE INSTALLED BY CONTRACTOR; WATER METER SHALL BE INSTALLED BY THE CITY OF REDDING.
4. METER BOXES AND SERVICE PIPING SHALL BE INSTALLED WITH A MINIMUM OF 30" CLEARANCE FROM ALL ELECTRICAL TRANSFORMERS, LIGHT STANDARDS, AND OTHER UTILITY BOXES OR VAULTS.
5. METER BOXES SHALL HAVE REINFORCED CONCRETE LIDS (STEEL TRAFFIC LIDS IN DRIVEWAYS OR AREAS WITH ROLL CURB) WITH HINGED READING LIDS PER PAGE 400.00, ITEM #6.
6. ANGLE METER STOP VALVE SHALL BE POSITIONED IN METER BOX SO THAT METER REGISTER WILL BE CENTERED UNDER READING LID.
7. MANIFOLD TO BE SAME SIZE AS SERVICE FROM MAIN PER PAGE 400.00, ITEM #1. MANIFOLD SHALL HAVE A MAXIMUM OF FOUR (4) SERVICES.
8. GATE VALVE (2" MIN.) REQUIRED ON MULTIPLE SERVICES. VALVE PER PAGE 400.00, ITEM #2

DWG DATE: 2/91

SCALE: NTS

CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION

6  
5

7/13  
4/06

REVISE STD  
EDIT NOTES

APPROVED BY

*[Signature]*  
10/9/13  
CITY ENGINEER

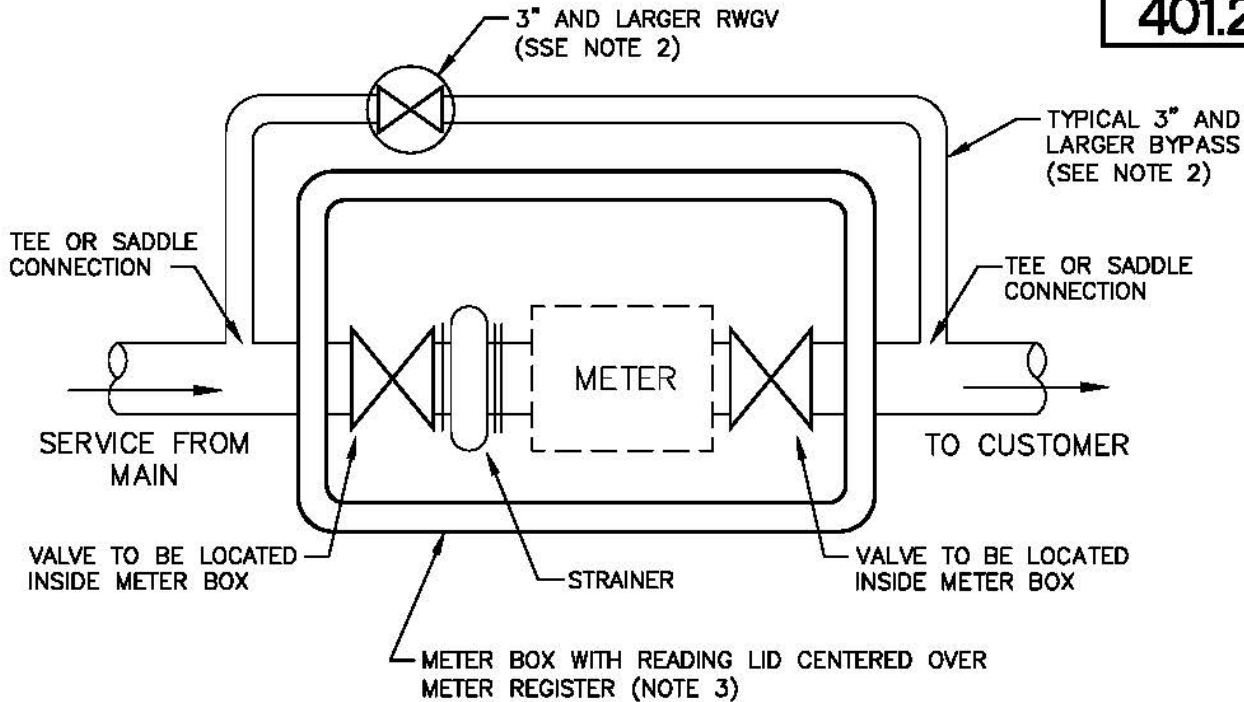
**WATER SERVICE CONNECTION**

THREE OR MORE SERVICES

MARK

DATE

REVISION



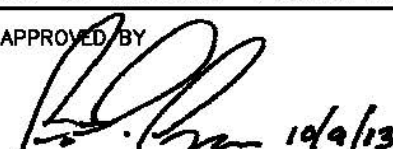
### TYPICAL BYPASS INSTALLATION

FLANGED 3 INCH AND LARGER WATER METER

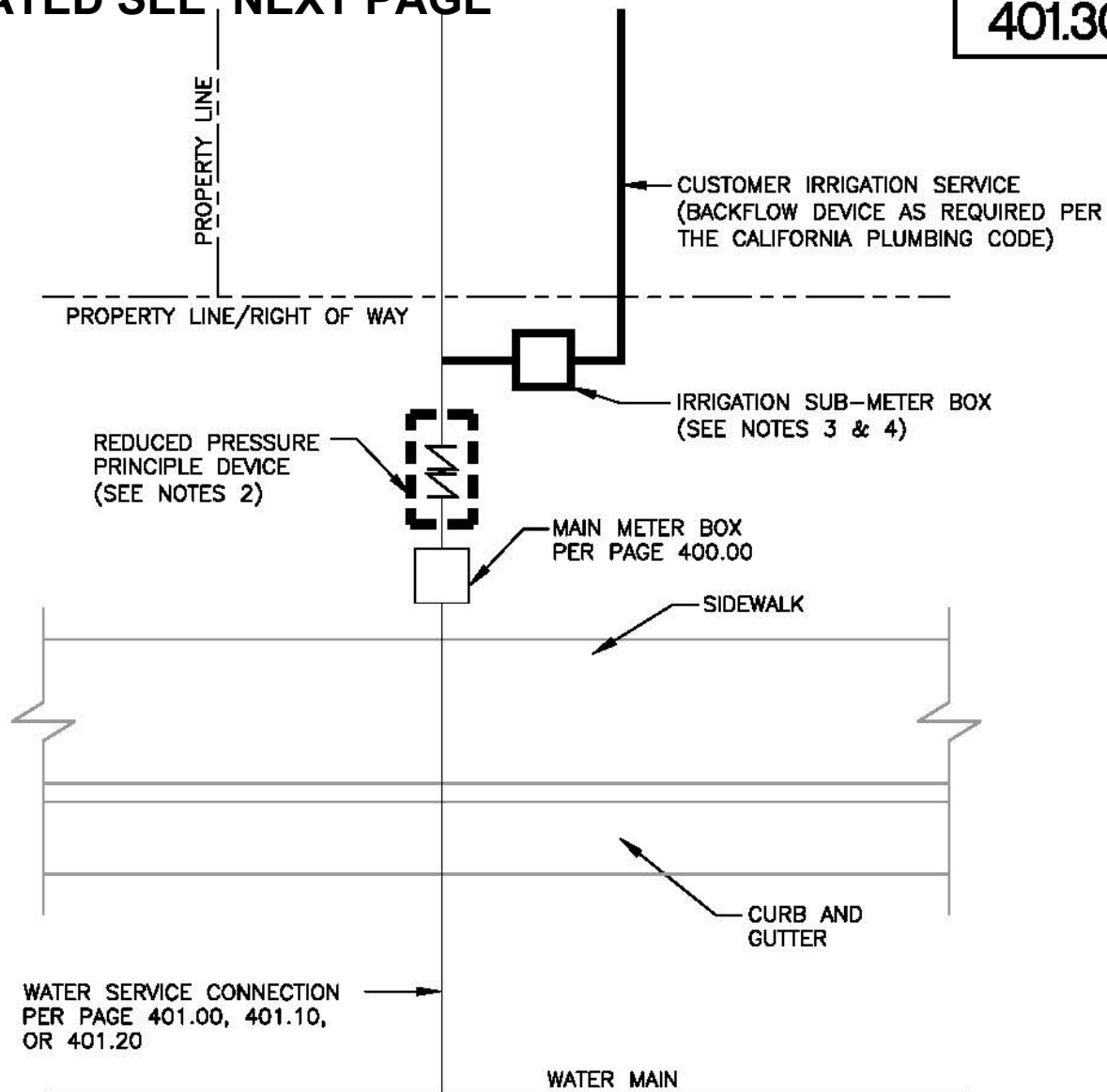
METER SIZE (INCHES)	BYPASS SIZE (INCHES)	VALVE TYPE	LOCATION (SEE NOTE 2)
3"	2"	BALL	IN METER VAULT
4"	4"	RWGV	ADJACENT IN VALVE BOX
6"	4"	RWGV	ADJACENT IN VALVE BOX
8"	6"	RWGV	ADJACENT IN VALVE BOX
10"	8"	RWGV	ADJACENT IN VALVE BOX

**NOTES:**

1. ALL MATERIALS SHALL BE PER APPROVED MATERIALS AS LISTED ON PAGE 400.00.
2. BYPASS VALVES LARGER THAN 2" SHALL BE INSTALLED OUTSIDE OF THE METER VAULT AND INSTALLED IN INDIVIDUAL VALVE BOXES.
3. METER BOX SIZE SHALL BE SUFFICIENT TO HOUSE ITEMS AS SPECIFIED. FOR METER DIMENSIONS, CALL THE CITY OF REDDING WATER UTILITY.
4. MAXIMUM DEPTH OF METER REGISTER TO BE TWENTY FOUR (24) INCHES.
5. LARGE VAULTS REQUIRE COBBLES OR OTHER MEANS TO PROVIDE ADEQUATE DRAINAGE. METHOD USED TO BE APPROVAL BY THE CITY ENGINEER PRIOR TO INSTALLATION.
6. SERVICE TAPS OF 4" OR LARGER SHALL BE A MINIMUM OF 48" FROM END OF PIPE AND FITTINGS.

DWG DATE: 12/87		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
7	7/13	EDIT NOTES	APPROVED BY  10/9/13 CITY ENGINEER	<b>WATER SERVICE CONNECTION</b> METER & BYPASS DETAIL 3" SERVICES & LARGER
6	2/03	REVISE STD		
MARK	DATE	REVISION		

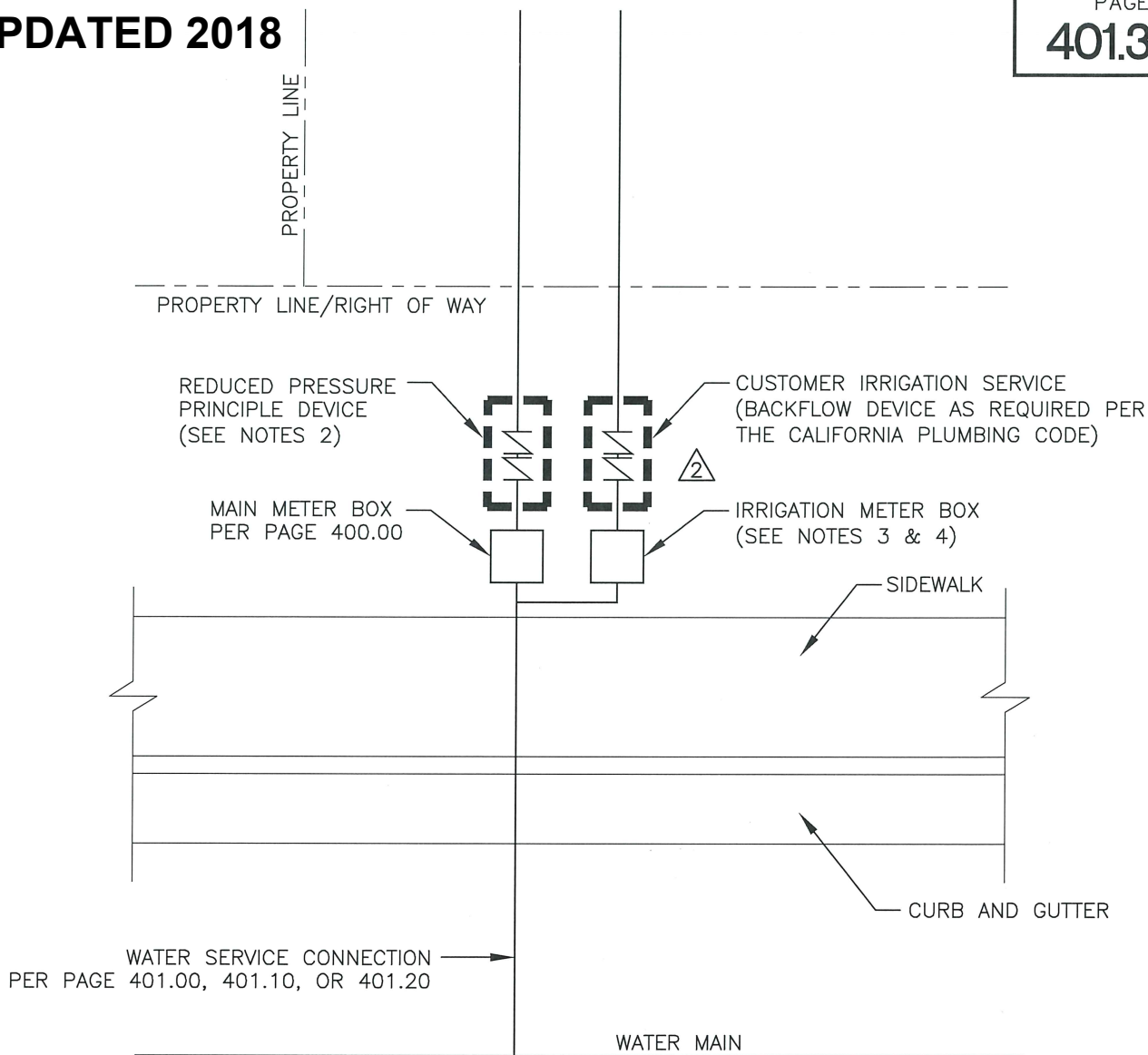




**NOTES:**

1. ALL MATERIALS SHALL BE PER PAGE 400.00 AND SHALL BE INSTALLED IN ACCORDANCE WITH THE APPROPRIATE STANDARDS AS LISTED.
2. AN APPROVED REDUCED PRESSURE PRINCIPLE (RPP) DEVICE SHALL BE LOCATED AS CLOSE AS PRACTICAL (3 FEET MAX.) FROM THE BACK OF THE MAIN WATER METER PER PAGE 431.00.
3. IRRIGATION METER SHALL BE PURCHASED FROM THE CITY OF REDDING BY THE CUSTOMER/OWNER AND SHALL BE CLASSIFIED AS A SUB-METER. THE SUB-METER WILL BE INSTALLED AND MAINTAINED BY THE CITY OF REDDING.
4. IRRIGATION SUB-METER SHALL BE LOCATED WITHIN THE CITY RIGHT OF WAY, AS CLOSE AS PRACTICAL TO AND ACCESSIBLE FROM THE SIDEWALK.


DWG DATE: 10/11		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
	7/13	NEW STD	APPROVED BY <i>[Signature]</i> 10/9/13	<b>NON-RESIDENTIAL IRRIGATION SUB-METER</b>
MARK	DATE	REVISION	CITY ENGINEER	



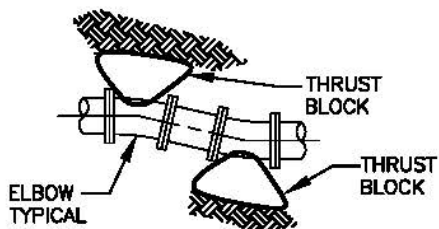
**NOTES:**

1. ALL MATERIALS SHALL BE PER PAGE 400.00 AND SHALL BE INSTALLED IN ACCORDANCE WITH THE APPROPRIATE STANDARDS AS LISTED.
2. AN APPROVED REDUCED PRESSURE PRINCIPLE (RPP) DEVICE SHALL BE LOCATED AS CLOSE AS PRACTICAL (3 FEET MAX.) FROM THE BACK OF THE MAIN WATER METER PER PAGE 431.00.
3. IRRIGATION METER SHALL BE PURCHASED FROM THE CITY OF REDDING BY THE CUSTOMER/OWNER AND SHALL BE CLASSIFIED AS A IRRIGATION METER. THE IRRIGATION METER WILL BE INSTALLED AND MAINTAINED BY THE CITY OF REDDING.
4. IRRIGATION METER SHALL BE LOCATED WITHIN THE CITY RIGHT OF WAY, AS CLOSE AS PRACTICAL TO AND ACCESSIBLE FROM THE SIDEWALK.
5. IRRIGATION METER SIZE SHALL BE EQUAL TO OR SMALLER THAN THE MAIN METER SIZE. IF THE IRRIGATION METER IS REQUIRED TO BE LARGER THAN THE MAIN METER SIZE, CITY ENGINEER APPROVAL IS REQUIRED.

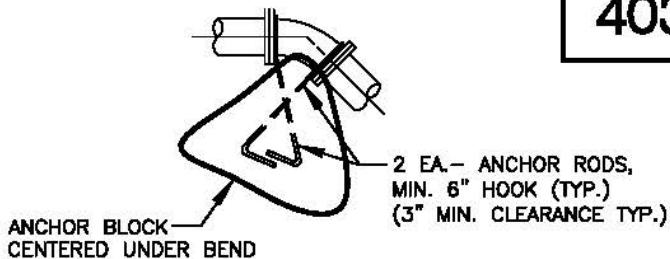
DWG DATE: 10/11      SCALE: NTS      CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION

			APPROVED BY
2	3/18	SUB TO IRRIG.	 3/19/18 CITY ENGINEER
1	8/16	SHOW RPP	
	7/13	NEW STD	
MARK	DATE	REVISION	

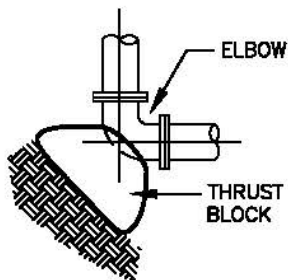
**NON-RESIDENTIAL  
IRRIGATION METER**



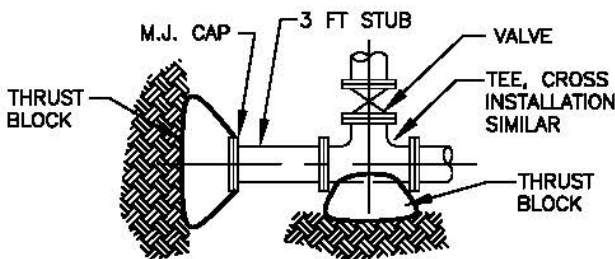
**45° BEND**  
**22-1/2° BEND**  
**11-1/4° BEND**  
PLAN VIEW



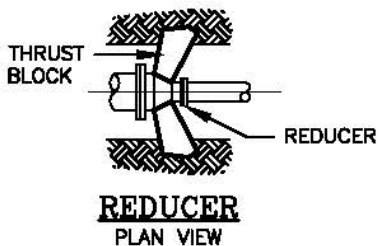
**ANCHOR BLOCK**  
PROFILE VIEW  
(TO PREVENT UPLIFT)



**90° BEND**  
PLAN VIEW



**TYPICAL DEAD END/TEE**  
PLAN VIEW  
(ALLOWING FOR FUTURE EXTENSION)



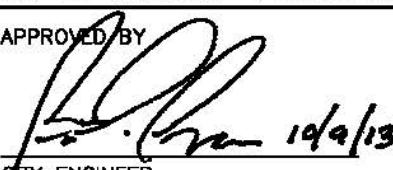
**REDUCER**  
PLAN VIEW

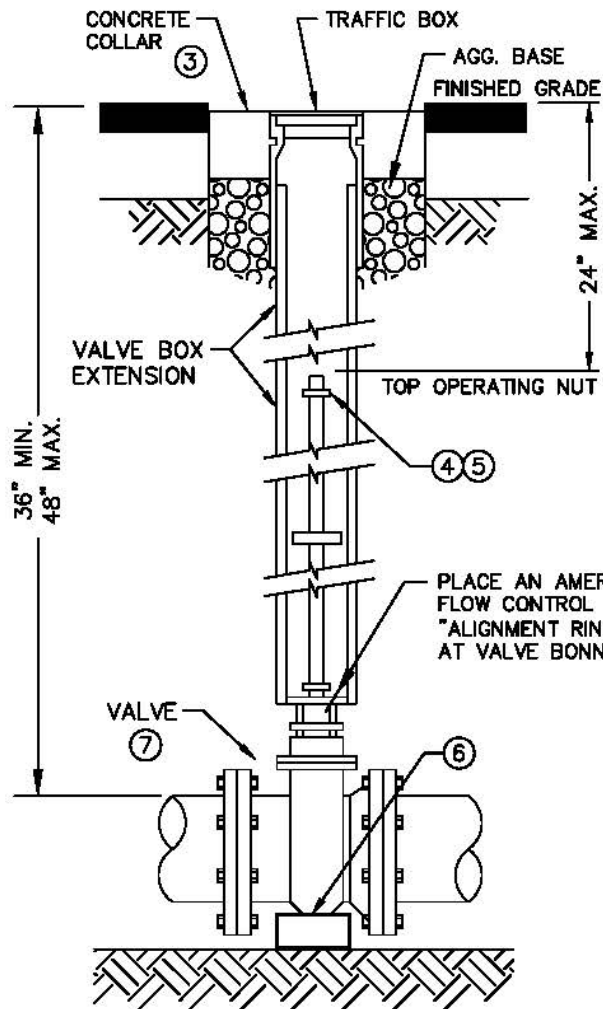
ANCHOR BLOCK SCHEDULE				
PIPE DIA. (IN)	ANCHOR ROD DIA. (IN)	MINIMUM VOLUME (CY)		
		45° BEND	22-1/2° BEND	11-1/4° BEND
4	1/2	0.3	0.2	0.1
6	1/2	0.7	0.4	0.2
8	5/8	1.0	0.6	0.3
10	5/8	1.7	0.9	0.4
12	3/4	2.2	1.2	0.7

THRUST BLOCK SCHEDULE										
PIPE DIA. (IN)	REDUCERS, DEAD END TEES, WYES, & VALVES		90° BEND		45° BEND		22-1/2° BEND		11-1/4° BEND	
	BEARING AREA	CY	BEARING AREA	CY	BEARING AREA	CY	BEARING AREA	CY	BEARING AREA	CY
4	1.5' x 2'	0.2	2' x 2'	0.3	1' x 2'	0.2	1' x 1'	0.1	1' x 1'	0.1
6	2' x 3'	0.4	3' x 3'	0.7	2' x 2.5'	0.4	1.5' x 1.5'	0.2	1' x 1.5'	0.1
8	3' x 3.5'	0.8	3.5' x 4'	1.0	2.5' x 3'	0.6	2' x 2'	0.3	2' x 1'	0.2
10	4' x 4'	1.2	4.5' x 5'	1.7	3' x 4'	0.9	2' x 3'	0.4	1.5' x 2'	0.2
12	4.5' x 4.5'	1.5	5.5' x 5.5'	2.2	4' x 4'	1.2	3' x 3'	0.7	2' x 2'	0.3

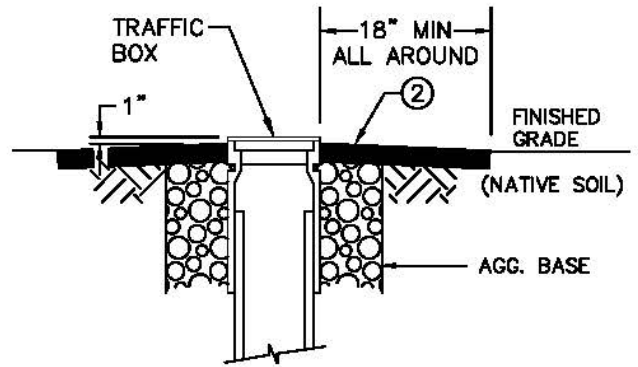
**NOTES:**

- ALL CONCRETE SHALL BE PER PAGE 100.00.
- THRUST BLOCKS SHALL BE CONSTRUCTED SO THAT MAJOR BEARING SURFACE IS IN DIRECT LINE WITH THE MAJOR FORCE CREATED BY THE PIPE OR FITTINGS. THE BEARING SURFACE SHALL BE PLACED AGAINST UNDISTURBED EARTH.
- THRUST BLOCK SIZES SHOWN IN TABLES ARE BASED ON AN ASSUMED TEST PRESSURE OF 200 PSI AND SOIL BEARING CAPACITY OF 2,000 PSF. THRUST BLOCKS SHALL BE ENGINEERED IF THE TEST PRESSURE IS HIGHER OR BEARING CAPACITY IS LOWER THAN THE ASSUMED VALUES.
- THRUST AND ANCHOR BLOCK CONFIGURATIONS OTHER THAN THOSE SHOWN ON THIS PAGE SHALL BE ENGINEERED.
- ALL THRUST BLOCKS FOR PIPES LARGER THAN 12" SHALL BE ENGINEERED.
- A DOUBLE LAYER OF 6 MIL POLYETHYLENE FILM SHALL BE PLACED BETWEEN CONCRETE AND FITTINGS.
- CONCRETE SHALL BE KEPT BEHIND THE BELL OF THE FITTING.
- FITTINGS SHALL NOT BE RENDERED INACCESSIBLE BY THE CONCRETE. CLEARANCE SHALL BE PROVIDED FOR BOLT REMOVAL.

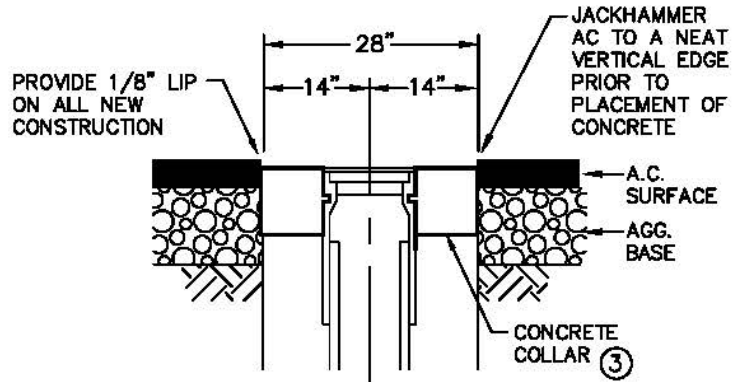
DWG DATE: 5/91		SCALE: NTS		CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION			
8	7/13	UPDATE	APPROVED BY  10/9/13 CITY ENGINEER		<b>THRUST BLOCKS AND ANCHOR DETAILS</b>		
7	4/06	REPLACE STD					
6	2/03	REVISE STD					
MARK	DATE	REVISION					



**OPERATING NUT  
EXTENSION DETAIL**  
REQUIRED WHERE DISTANCE BETWEEN  
FINISHED GRADE AND TOP OF OPERATING  
NUT EXCEED 36 INCHES



**VALVE BOX PLACEMENT**  
UNPAVED LOCATION DETAIL

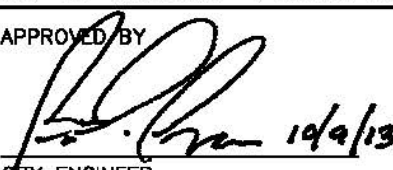


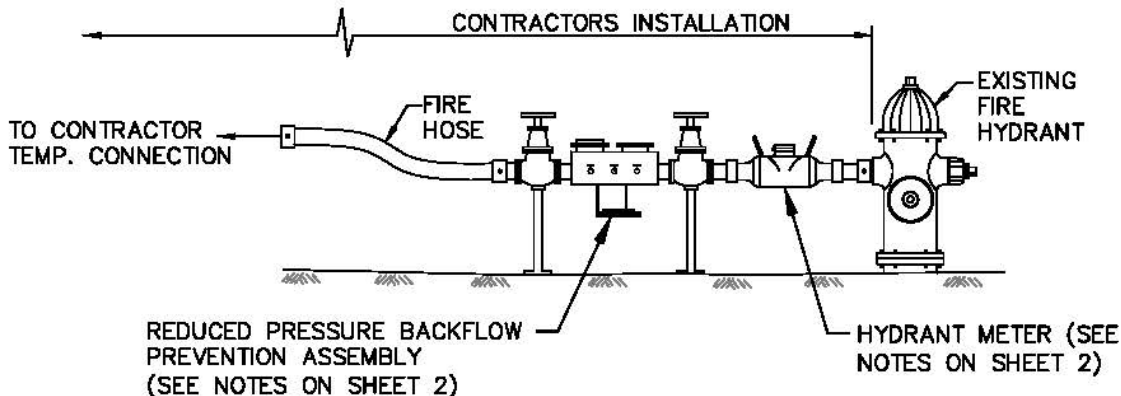
**VALVE BOX ADJUSTMENT**  
PAVED LOCATION DETAIL

**NOTES:**

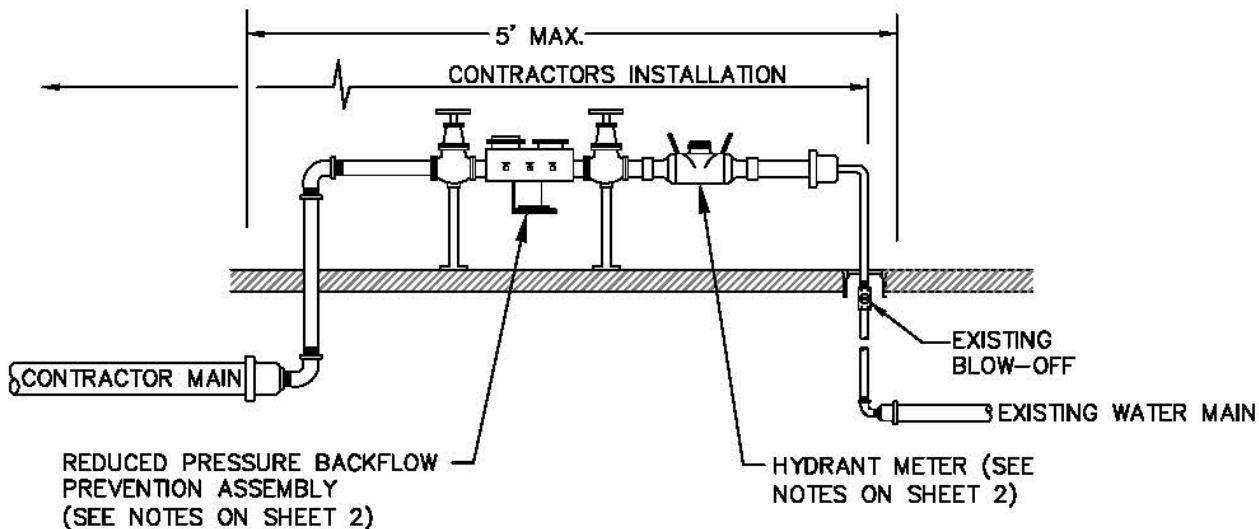
1. ALL MATERIALS SHALL BE PER APPROVED MATERIALS AS LISTED ON PAGE 100.00.
2. PLACE 4" THICK PCC COLLAR 18" AROUND VALVE BOX.
3. 28" DIA. X 12" CONCRETE COLLAR. PLACE CONCRETE FLUSH WITH AC SURFACE ON EXISTING STREETS.
4. OPERATING NUT EXTENSION SHALL BE PINNED TO VALVE OPERATING NUT W/ 6" DIA. PLATE WASHER WELDED TO EXTENSION AT MIDPOINT OF ROD (MINIMUM LENGTH OF ROD SHALL BE 24 INCHES AND SHALL BRING TOP OPERATING NUT WITHIN 24" OF FINISH GRADE).
5. NO OPERATING NUT EXTENSION REQUIRED WHERE DISTANCE BETWEEN FINISHED GRADE AND TOP OF VALVE OPERATION NUT IS LESS THAN 48 INCHES.
6. PROVIDE CONCRETE SUPPORT UNDER 12" & LARGER VALVES. SOLID CONCRETE BLOCK MAY BE INSTALLED ON SMOOTH UNDISTURBED SOIL, OTHERWISE POUR CONCRETE PAD.
7. WHEN VALVE IS IN AN UP-LIFT SITUATION, SEE ANCHOR BLOCK DETAIL, PAGE 403.00.

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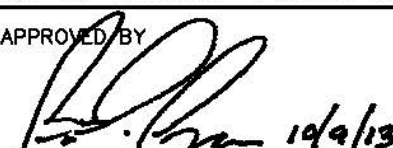
DWG DATE: 12/87		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
7	7/13	EDIT NOTES	APPROVED BY  10/9/13 CITY ENGINEER	
6	4/06	EDIT DETAILS		
MARK	DATE	REVISION	<b>WATER VALVE DETAILS</b> PAVED AND UNPAVED SURFACES	

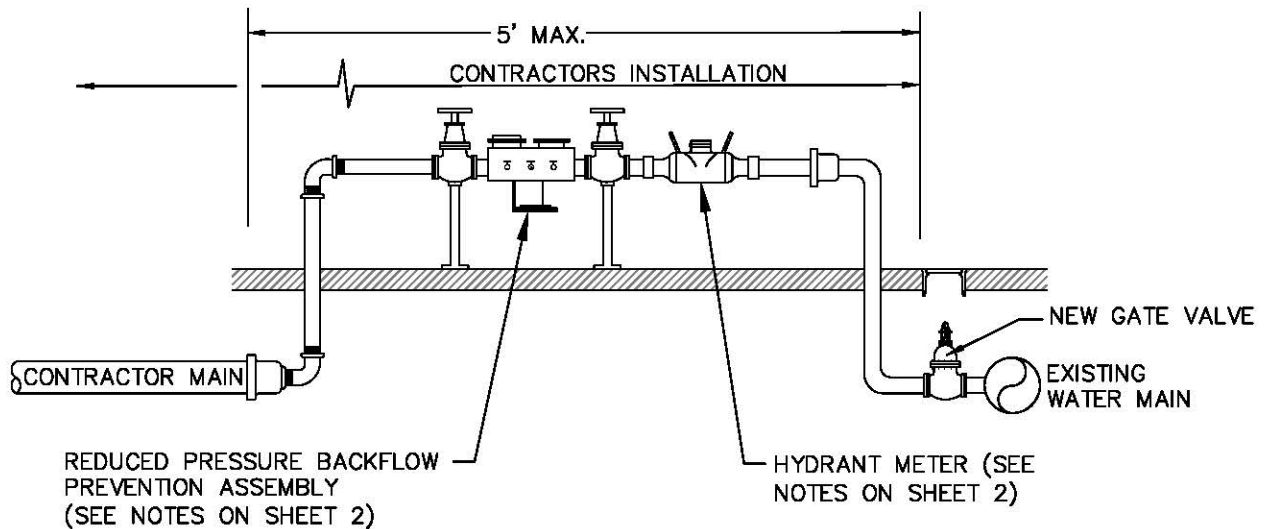


**TEMPORARY CONNECTION FROM EXISTING FIRE HYDRANT**



**TEMPORARY CONNECTION FROM EXISTING BLOW-OFF**

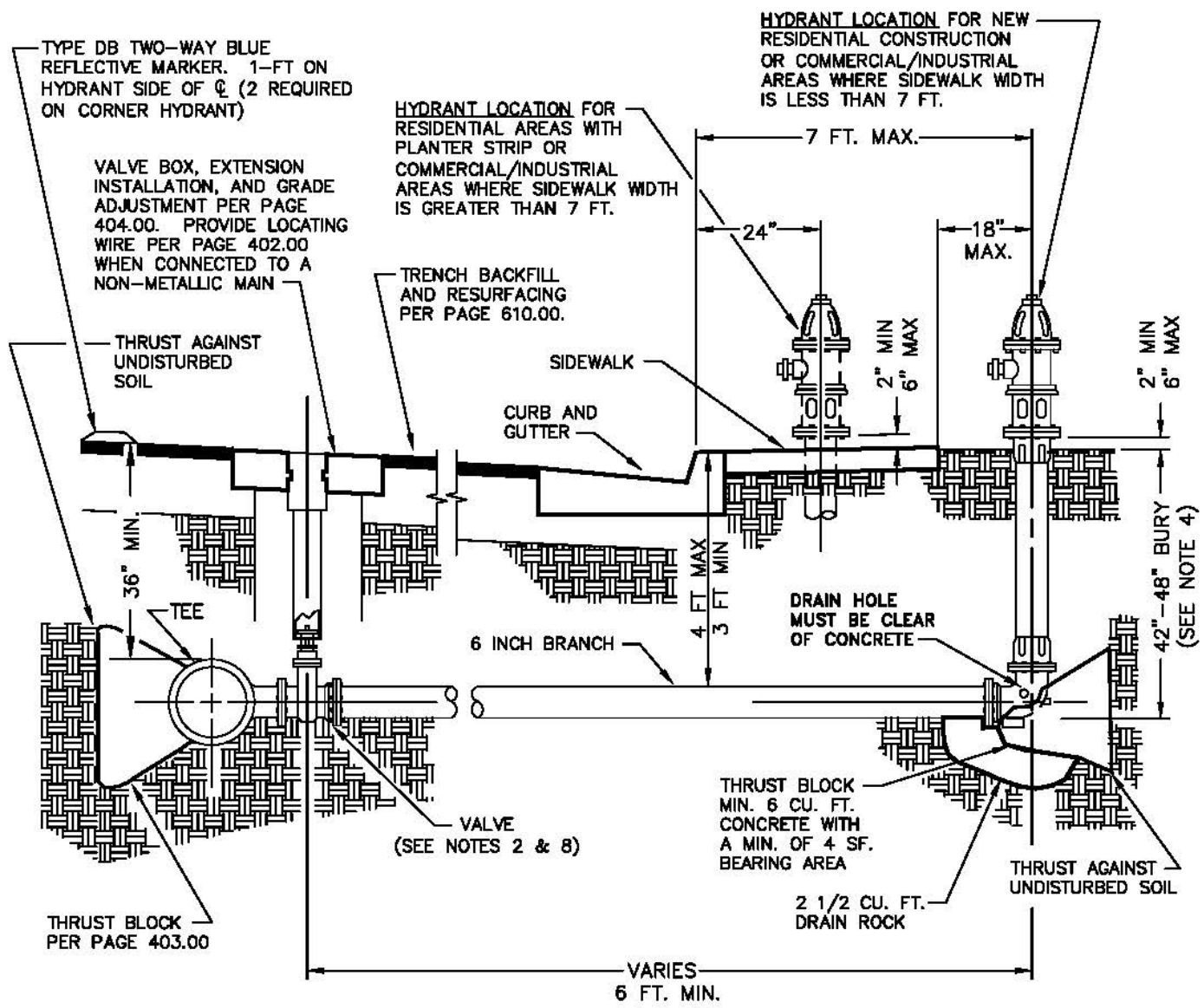
DWG DATE: 10/11		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
1	7/13 4/06	REVISED STD NEW STD	APPROVED BY  10/9/13 CITY ENGINEER	
MARK	DATE	REVISION	<b>TEMPORARY CONNECTION TO NEW WATER MAIN</b>	



TEMPORARY CONNECTION FROM  
 EXISTING WATER MAIN

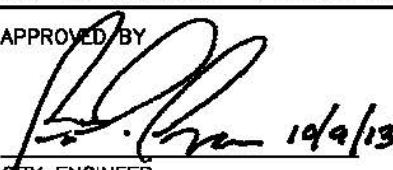
NOTES:

1. BACKFLOW PREVENTION ASSEMBLIES SHALL CONFORM TO THE MATERIAL REQUIREMENTS OF PAGE 400.00, WATER SYSTEM MATERIALS, SECTION 2, VALVES.
2. HYDRANT METERS SHALL BE OBTAINED FROM REDDING MUNICIPAL UTILITIES, 20055 VIKING WAY, BLDG. #3, REDDING, CALIFORNIA 96002, (530) 224-6068.
3. EXISTING WATER MAIN MUST BE SHUT DOWN BY THE CITY WATER UTILITY AND DEWATERED BY THE CONTRACTOR. NOTIFICATION OF AFFECTED CUSTOMERS IS THE RESPONSIBILITY OF THE CONTRACTOR.
4. WATER SHALL ONLY BE DRAWN INTO THE CONTRACTOR'S WATER MAIN THROUGH A CITY APPROVED REDUCED PRESSURE PRINCIPLE BACKFLOW DEVICE.
5. PRIOR TO PERMANENT CONNECTION TO THE CITY WATER MAIN, THE CONTRACTOR'S MAIN SHALL HAVE PASSED A PRESSURE TEST, CHLORINE TEST, BACTERIOLOGICAL TEST, AND HAVE APPROVAL FROM THE CITY INSPECTOR.
6. UPON SATISFACTION OF NOTES 4 AND 5 AND WITH APPROVAL OF CITY INSPECTOR, CONNECTION TO THE CITY WATER DISTRIBUTION SYSTEM MAY BE MADE. THE CITY INSPECTOR SHALL BE NOTIFIED A MINIMUM OF TWO (2) WORKING DAYS PRIOR TO START OF WORK.
7. FINAL SYSTEM TIE-IN COMPONENTS SHALL BE PRE-CHLORINATED AND PRE-FLUSHED IN THE PRESENCE OF THE CITY INSPECTOR.

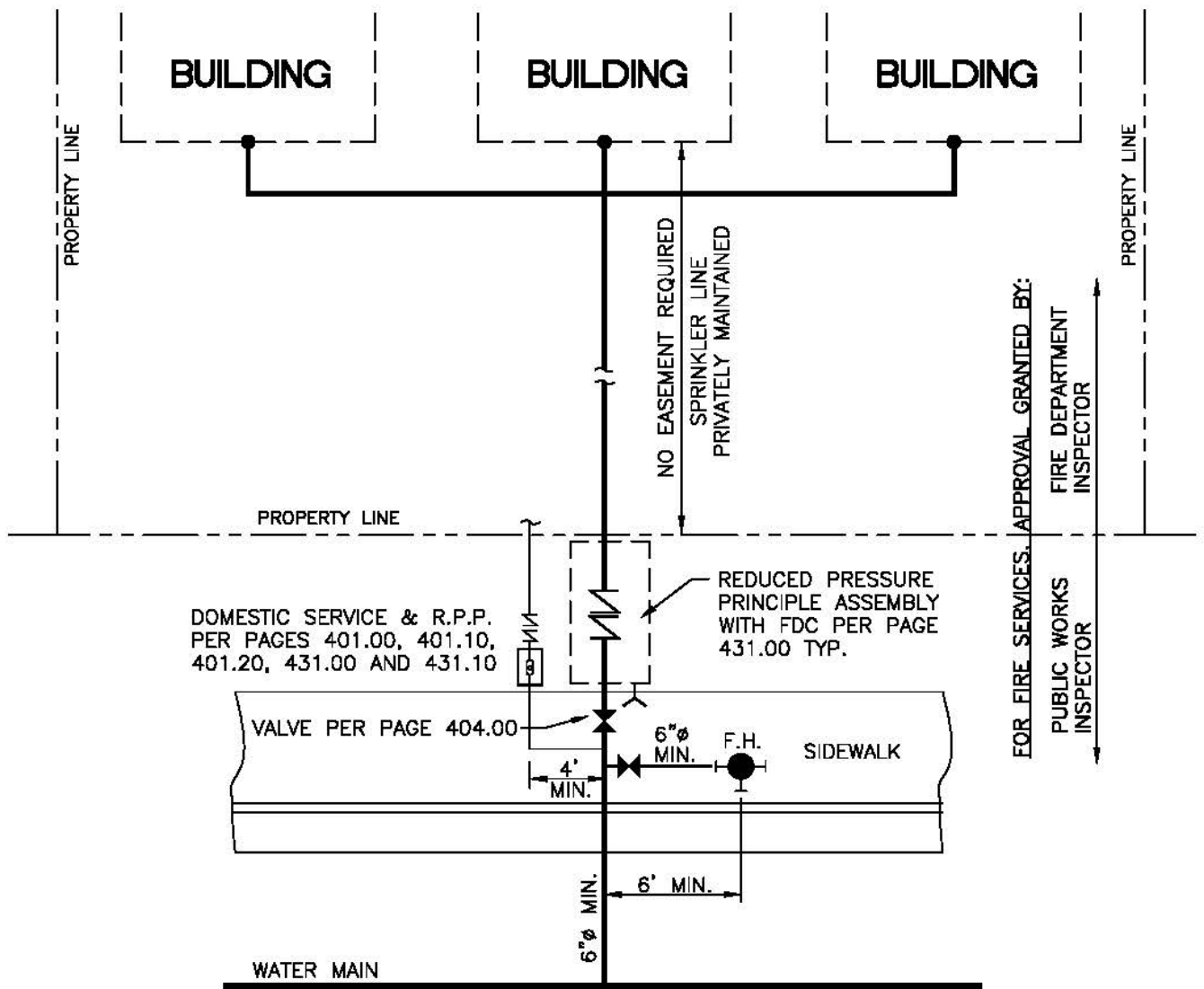


**NOTES:**

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF REDDING CONSTRUCTION STANDARDS (CORCS), STANDARDS FOR PUBLIC WORKS CONSTRUCTION (GREENBOOK), AND THE UNIFORM FIRE CODE.
2. FOR ALLOWABLE FIRE HYDRANTS, VALVES, PIPES, AND FITTINGS, SEE MATERIALS LIST PAGE 400.00.
3. FOR HOT TAP REQUIREMENTS SEE PAGE 400.70.
4. HYDRANT BURY DEPTH MAY VARY WITH PRIOR APPROVAL OF THE CITY ENGINEER.
5. HYDRANT SHALL BE COVERED WITH AN APPROVED BAG UNTIL ACCEPTED AND PLACED IN SERVICE.
6. A MINIMUM DISTANCE OF 3 FT. SHALL BE CLEAR OF ALL VEGETATION AND OTHER OBSTRUCTIONS AROUND FIRE HYDRANT, PER UNIFORM FIRE CODE SECTION 10.206.
7. NO UNDERGROUND UTILITY SHALL BE LOCATED WITHIN 48" EA. SIDE OF FIRE SERVICE TRENCH.
8. NO PRIMARY ELECTRIC VAULT, ABOVE-GROUND ELECTRIC SERVICE CABINET, OR STREET LIGHT SHALL BE INSTALLED WITHIN SEVEN (7) FEET OF THE FIRE HYDRANT. WHERE RESTRAINED-JOINT FITTINGS ARE USED, WHICH ELIMINATES THE NEED FOR A THRUST BLOCK, THIS DISTANCE MAY BE REDUCED TO THREE (3) FEET.
9. HYDRANT VALVE SHALL BE CONNECTED TO WATER MAIN BY FLANGED JOINT.

DWG DATE: 12/87		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
MARK	9	7/13	UPDATE	APPROVED BY  10/9/13 CITY ENGINEER
	8	4/06	EDIT NOTE	
	7	2/03	ADD BL. MKR.	
		DATE	REVISION	<b>FIRE HYDRANT INSTALLATION</b>

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**CASE I**

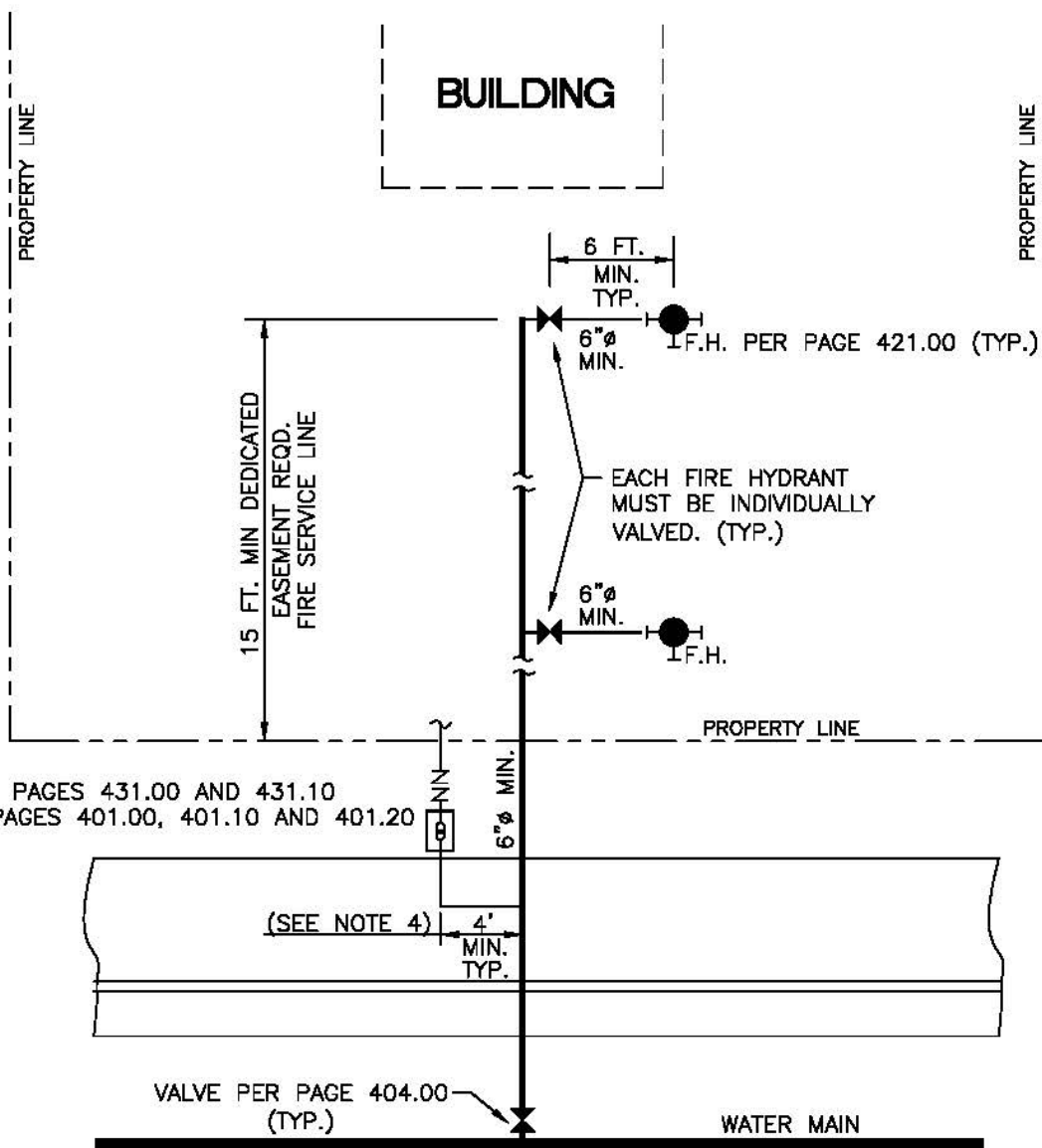
FIRE SERVICE WITH SPRINKLER SYSTEM ONLY

**NOTES:**

1. FIRE DEPARTMENT CONNECTIONS (FDC) SHALL BE 'FM' OR 'UL' LISTED.
2. DISTANCE BETWEEN FDC AND FIRE HYDRANT SHALL BE 40 FEET MAXIMUM UNLESS APPROVED BY THE REDDING FIRE DEPARTMENT.
3. WHEN VALVES ARE REQUIRED ON FIRE SERVICE LINE, INDICATOR TYPE VALVES SHALL BE 'FM' OR 'UL' LISTED AND SHALL BE APPROVED BOTH BY THE CITY OF REDDING ENGINEERING DEPARTMENT AND THE CITY OF REDDING FIRE DEPARTMENT.
4. FIRE SERVICE PIPING AND APPURTENANCES SHALL BE INSPECTED WITHIN THE RIGHT-OF-WAY BY THE PUBLIC WORKS INSPECTOR AND ON PRIVATE PROPERTY BY THE REDDING FIRE DEPARTMENT INSPECTOR.
5. LOCATING WIRE SHALL BE INSTALLED WITH ALL NON-METALLIC PIPING AND SHALL INCLUDE PIPE RUN TO HYDRANT.

DWG DATE: 4/06		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
1	7/13 4/06	RELOC. FDC NEW STD	APPROVED BY <i>[Signature]</i> 10/9/13 CITY ENGINEER	
MARK	DATE	REVISION	<p style="text-align: center;"><b>FIRE SERVICES (TYPICAL) CASE I</b></p>	

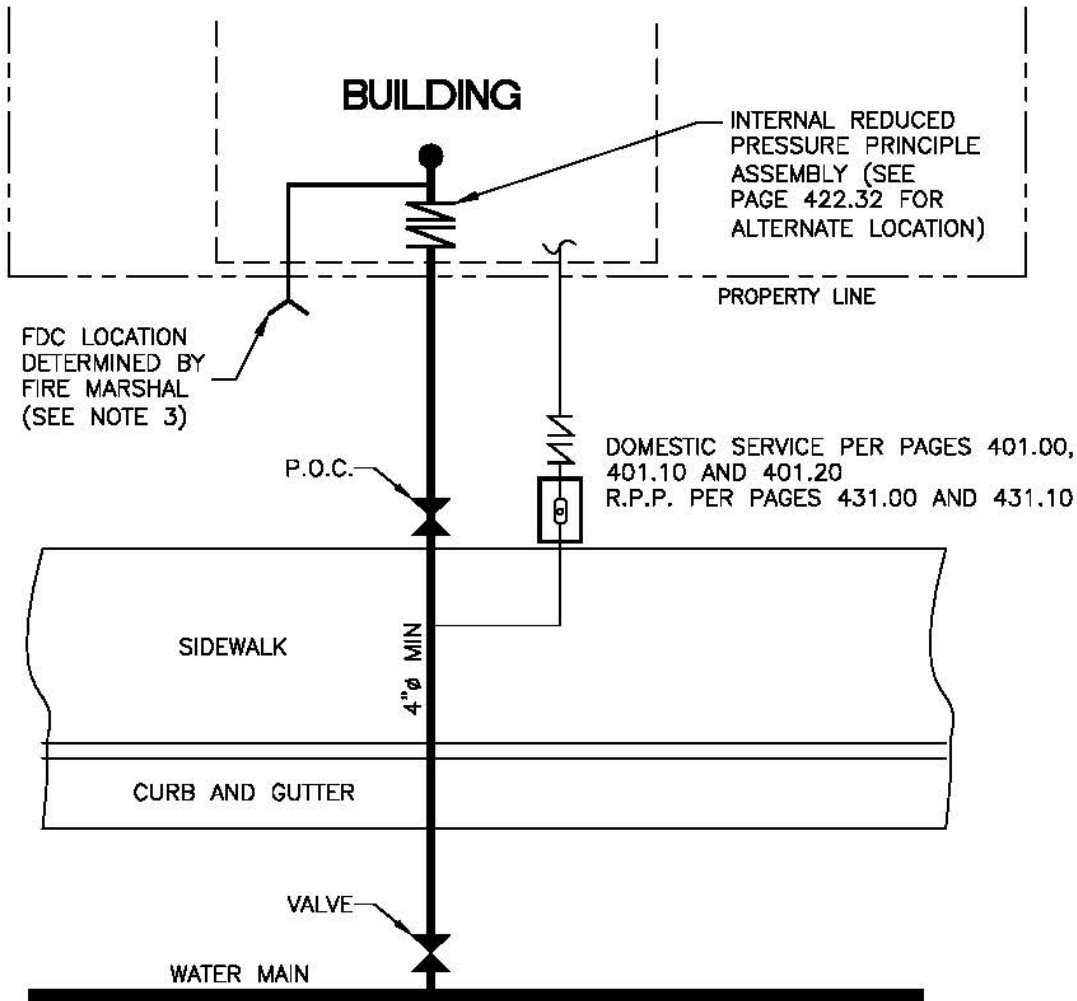




**CASE II**  
FIRE SERVICE WITH HYDRANTS ONLY

- NOTES:**
1. FIRE SERVICE PIPING AND APPURTENANCES SHALL BE INSPECTED WITHIN THE RIGHT-OF-WAY BY THE PUBLIC WORKS INSPECTOR AND ON PRIVATE PROPERTY BY THE REDDING FIRE DEPARTMENT INSPECTOR.
  2. LOCATING WIRE SHALL BE INSTALLED WITH ALL NON-METALLIC PIPING TO ALL FIRE HYDRANT INSTALLATIONS AND SHALL INCLUDE PIPE RUN TO HYDRANT.
  3. FOR PIPE REQUIREMENTS SEE MATERIALS LIST, ITEM 1, PAGE 400.00.
  4. DOMESTIC SERVICE (D.S.) SHALL BE OUTSIDE OF FIRE SERVICE EASEMENT.

DWG DATE: 4/06		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
1	7/13 4/06	UPDATE NEW STD	APPROVED BY <i>[Signature]</i> 10/9/13	FIRE SERVICES (TYPICAL) CASE II
MARK	DATE	REVISION	CITY ENGINEER	

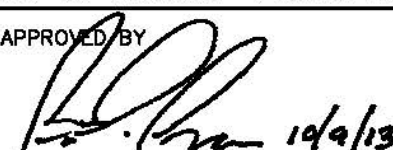


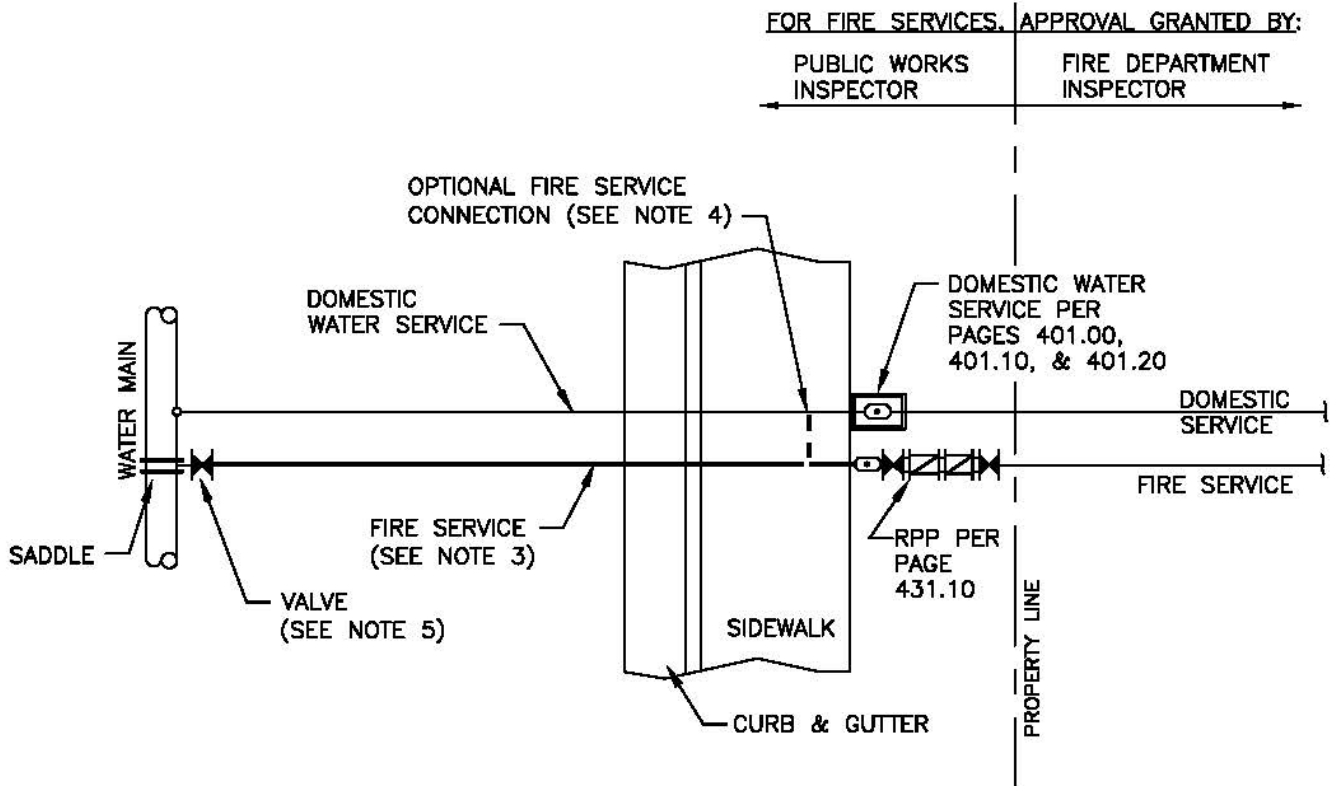
**CASE III**

FIRE SERVICE WITH HYDRANT AT INTERNAL LOCATION

**NOTES:**

1. THIS INTERNAL, ALTERNATE LOCATION INSTALLATION SHALL ONLY BE ALLOWED WITH PRIOR WRITTEN APPROVAL FROM THE WATER UTILITY.
2. FIRE DEPARTMENT CONNECTIONS (FDC) SHALL BE 'FM' OR 'UL' LISTED.
3. DISTANCE BETWEEN FDC AND FIRE HYDRANT SHALL BE 40 FEET MAXIMUM UNLESS APPROVED BY THE REDDING FIRE DEPARTMENT.
4. WHEN VALVES ARE REQUIRED ON FIRE SERVICE LINE, INDICATOR TYPE VALVES SHALL BE 'FM' OR 'UL' LISTED AND SHALL BE APPROVED BOTH BY THE CITY OF REDDING ENGINEERING DEPARTMENT AND THE CITY OF REDDING FIRE DEPARTMENT.
5. FIRE SERVICE PIPING AND APPURTENANCES SHALL BE INSPECTED WITHIN THE RIGHT-OF-WAY BY THE PUBLIC WORKS INSPECTOR AND ON PRIVATE PROPERTY BY THE REDDING FIRE DEPARTMENT INSPECTOR.
6. LOCATING WIRE SHALL BE INSTALLED WITH ALL NON-METALLIC PIPING AND SHALL INCLUDE PIPE RUN TO HYDRANT.

DWG DATE: 4/06		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
1	7/13 4/06	REVISE NOTES NEW STD	APPROVED BY  10/9/13 CITY ENGINEER	
MARK	DATE	REVISION	<b>FIRE SERVICES (NON-TYPICAL) CASE III</b>	

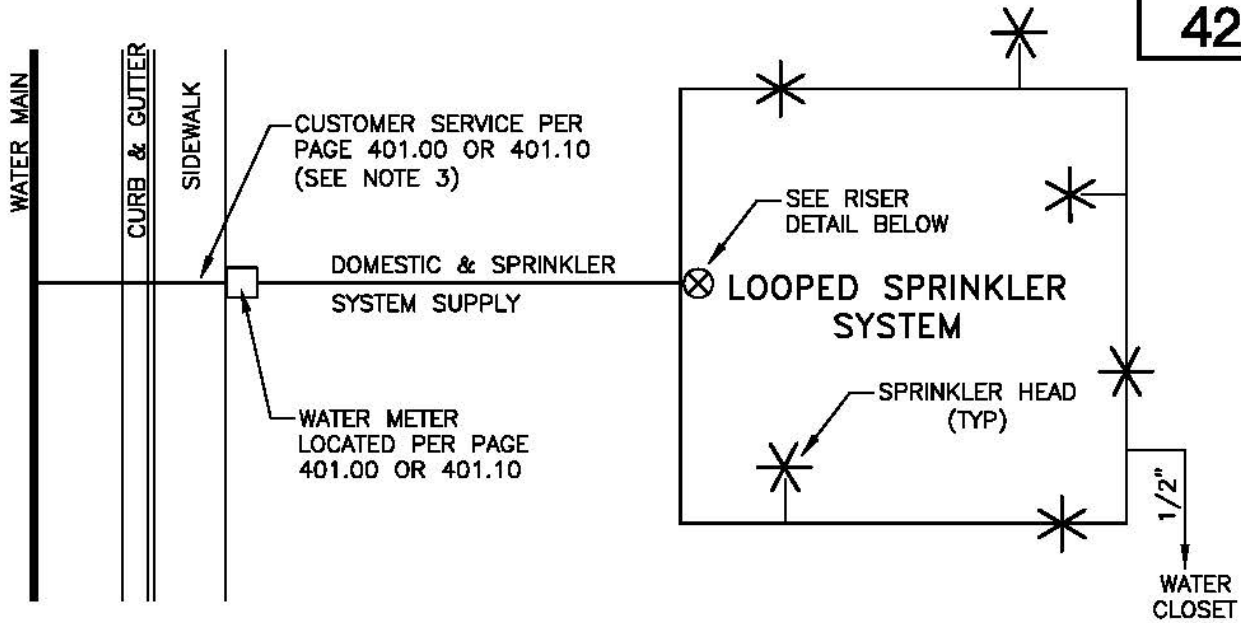


FOR FIRE SERVICES, APPROVAL GRANTED BY:  
PUBLIC WORKS INSPECTOR      FIRE DEPARTMENT INSPECTOR

**NOTES:**

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF REDDING CONSTRUCTION STANDARDS (CORCS) AND THE STANDARD SPECIFICATIONS (GREENBOOK).
2. FIRE SERVICE PIPING AND APPURTENANCES SHALL BE INSPECTED WITHIN THE RIGHT-OF-WAY BY THE PUBLIC WORKS INSPECTOR AND ON PRIVATE PROPERTY BY THE REDDING FIRE DEPARTMENT INSPECTOR.
3. A SEPARATE FIRE SERVICE SHALL BE INSTALLED WHERE THE EXISTING DOMESTIC SERVICE IS SMALLER THAN THE REQUIRED FIRE SERVICE.
4. A DOMESTIC SERVICE MAY BE USED FOR A FIRE SERVICE UNDER THE FOLLOWING CONDITIONS:
  - DOMESTIC SERVICE SHALL BE A MINIMUM SIZE OF 1 INCH AND THE FIRE SERVICE SHALL NOT BE LARGER THAN THE DOMESTIC SERVICE.
  - FIRE SERVICE TAP SHALL BE INSTALLED UPSTREAM OF DOMESTIC METER.
5. A VALVE IS REQUIRED FOR 1 1/2" AND LARGER SERVICE. ADJUST TO GRADE PER PAGE 404.00.
6. FACTORY MUTUAL (FM), UNDERWRITERS LABORATORY (UL), AND REDUCED PRESSURE PRINCIPLE (RPP) VALVES REQUIRED.
7. RPP VALVE SHALL BE INSTALLED ABOVE GROUND WITH A 12-INCH MIN./24-INCH MAX. DISCHARGE PORT CLEARANCE.
8. ALL BACKFLOW DEVICES SHALL BE INSPECTED AND TESTED UPON INITIAL INSTALLATION BY A CERTIFIED BACKFLOW TESTER (AWWA OR ABPA).
9. ALL BACKFLOW DEVICES SHALL BE PLACED IN AN APPROVED ENCLOSURE PER PAGE 432.20 OR 432.25.
10. ALL BACKFLOW DEVICE ENCLOSURES SHALL BE LOCKED. LOCKS TO BE PROVIDED BY THE CITY OF REDDING.
11. FOR PIPE REQUIREMENTS SEE MATERIALS LIST, PAGE 400.00.
12. AN AREA OF 12" WIDE ON ALL SIDES SHALL BE KEPT FREE OF ALL VEGETATIVE OBSTRUCTIONS.

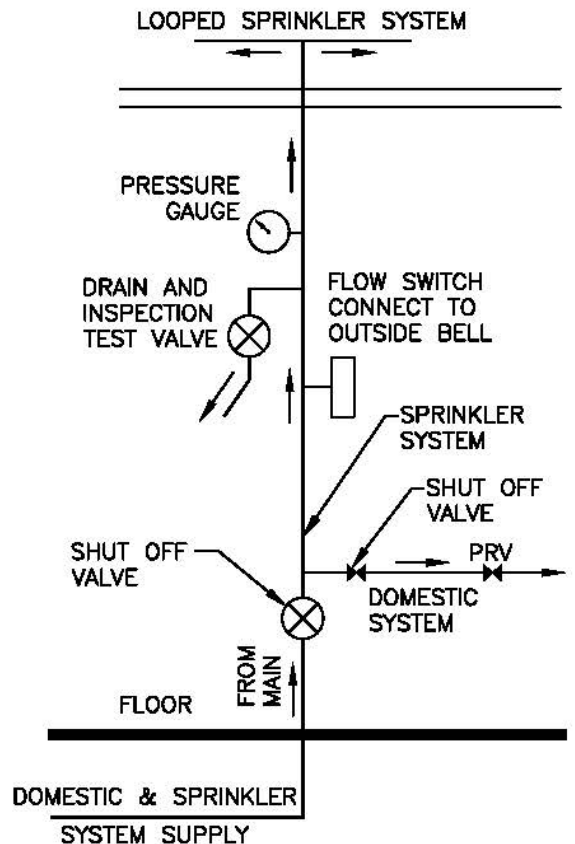
DWG DATE: 7/89		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
6	7/13	REVISE NOTES MOD. STD	APPROVED BY  10/9/13 CITY ENGINEER	
5	4/06			
MARK	DATE	REVISION	<b>FIRE SERVICES (NON-TYPICAL)</b> 1", 1 1/2" and 2"	



**RESIDENTIAL FIRE SPRINKLER CONNECTION**

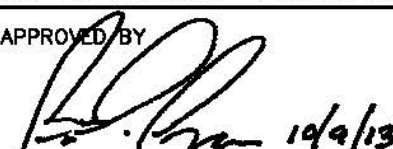
**NOTES:**

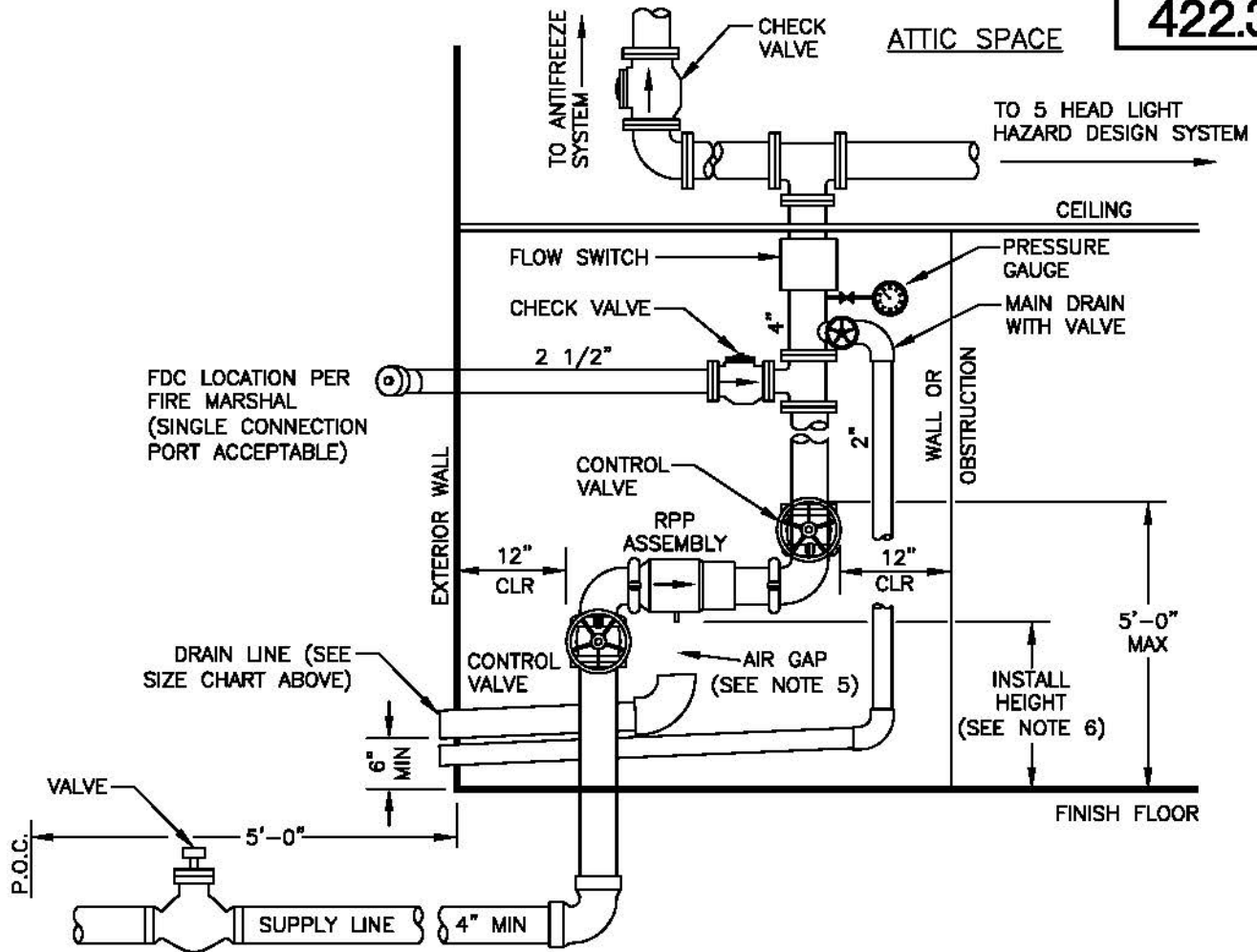
1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF REDDING CONSTRUCTION STANDARDS (CORCS), THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (GREENBOOK), AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) SECTION 13D.
2. FIRE SERVICE PIPING AND APPURTENANCES SHALL BE INSPECTED WITHIN THE RIGHT-OF-WAY BY THE PUBLIC WORKS INSPECTOR AND ON PRIVATE PROPERTY BY THE REDDING FIRE DEPARTMENT INSPECTOR
3. A SEPARATE FIRE SERVICE SHALL BE INSTALLED WHERE THE EXISTING DOMESTIC SERVICE IS SMALLER THAN THE REQUIRED RESIDENTIAL FIRE FLOW (SEE PAGE 422.30).
4. BACK FLOW DEVICES WILL NOT BE REQUIRED FOR A LOOPED SYSTEM CONNECTED TO A WATER CLOSET.
5. METER CHARGE AND MONTHLY FEE SHALL BE FOR THE SIZE OF METER INSTALLED. SERVICE CONNECTION CHARGES SHALL BE FOR A 5/8" METER, UNLESS RESIDENT REQUIRES A LARGER DOMESTIC CONNECTION, THEN THE GREATER CONNECTION CHARGES SHALL APPLY.
6. AN AREA OF 12" WIDE ON ALL SIDES OF PIPE TRENCH SHALL BE KEPT FREE OF ALL VEGETATIVE OBSTRUCTIONS.
7. ALL UNDERGROUND PIPING SHALL BE PER NFPA 13D OR THE MATERIALS LISTED ON PAGE 400.00. ALL ABOVE GROUND PIPING SHALL BE PER NFPA 13D.
8. ALL ABOVE GRADE PIPING AND VALVES SHALL BE WRAPPED WITH ADEQUATE INSULATION OR OTHER MEANS OF PROTECTION TO PREVENT FREEZING.
9. ALL FIRE SPRINKLER UNDERGROUND PIPE SHALL BE WRAPPED WITH 2" WIDE DETECTABLE METALIZED WARNING TAPE OR PIPED WITH FIRE SPRINKLER CPVC PIPE.
10. ALL PIPING PASSING THROUGH A SLAB SHALL PASS THROUGH A SLEEVE FOR THE FULL THICKNESS OF THE SLAB. THE SLEEVE SHALL HAVE AN INSIDE DIAMETER OF 1/2" LARGER THAN THE OUTSIDE DIAMETER OF THE SYSTEM PIPE.



**RISER DETAIL**

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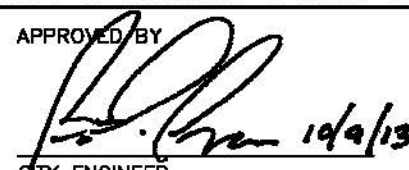
DWG DATE: 2/03		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
2	7/13	EDIT NOTES	APPROVED BY  10/9/13 CITY ENGINEER	
1	4/06	EDIT NOTES		
MARK	DATE	REVISION	<b>RESIDENTIAL FIRE SERVICE</b>	

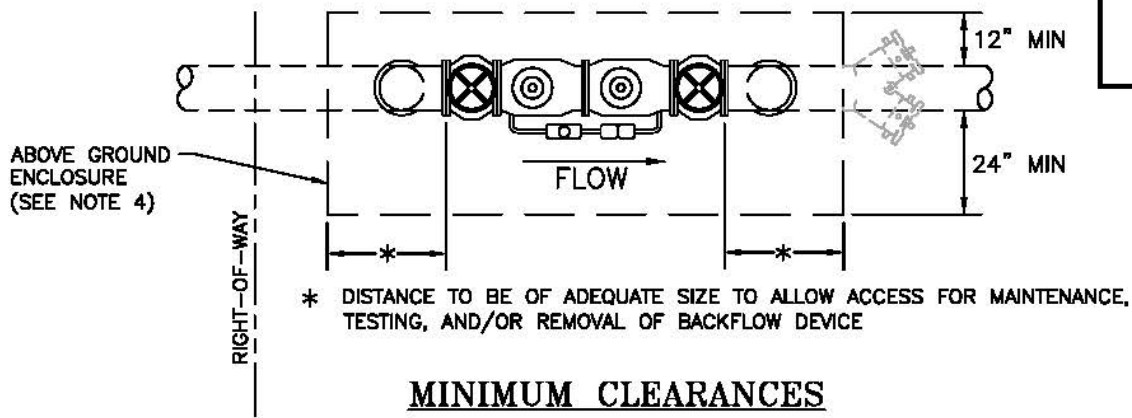


SUPPLY MAIN (INCHES)	ASSEMBLY SIZE (INCHES)	DRAIN SIZE (INCHES)	AIR GAP (INCHES)	INSTALL HEIGHT (INCHES)
4"	2"-3"	4"	8"	12"
6"	4"	6"	12"	18"
8"	6"	8"	16"	24"

**NOTES:**

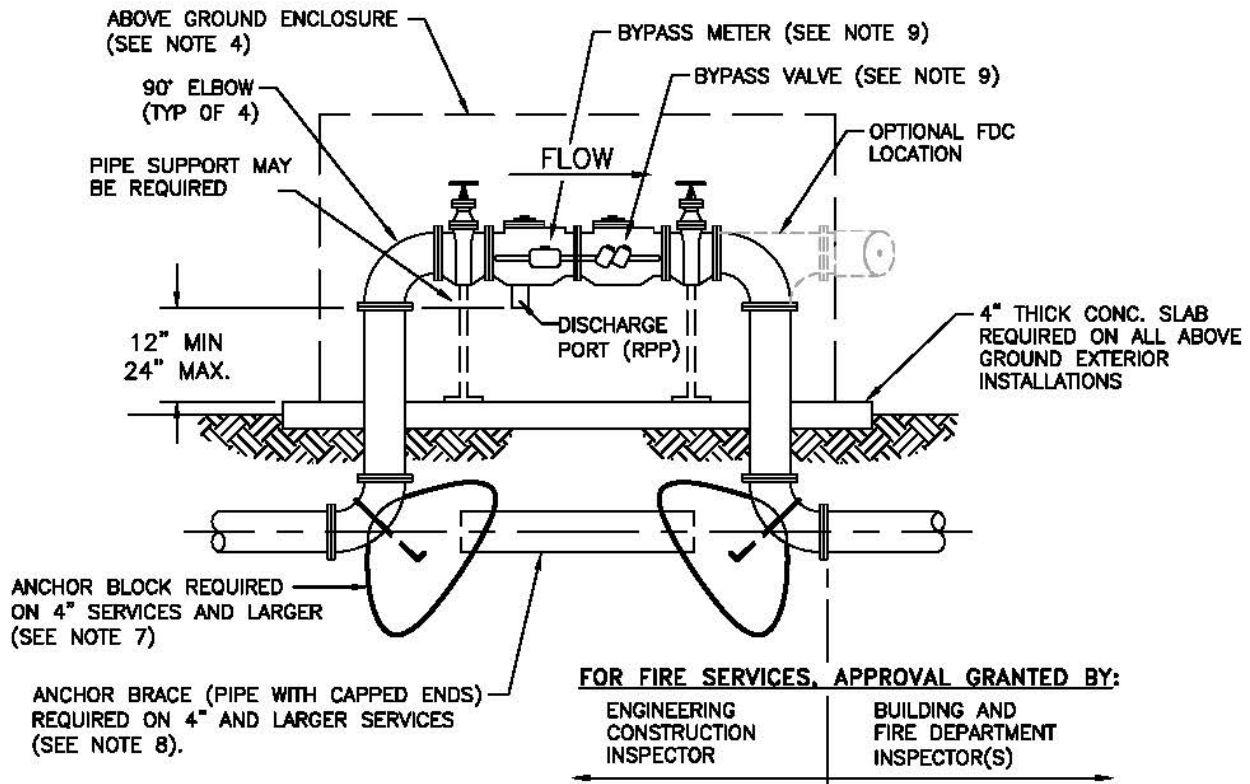
1. THIS INTERNAL-ALTERNATE LOCATION SHALL BE USED ONLY WITH PRIOR APPROVAL FROM WATER UTILITY.
2. WATER SYSTEM CONSTRUCTION AND MATERIALS TO POINT OF CONNECTION (P.O.C.) SHALL BE PER CITY OF REDDING CONSTRUCTION STANDARDS (CORCS) PAGE 400.00.
3. ALL BACK FLOW PREVENTION ASSEMBLY INSTALLATIONS PER THIS STANDARD SHALL BE INSPECTED BY THE CITY BUILDING DEPARTMENT AND THE CITY OF REDDING MUNICIPAL WATER UTILITY.
4. ALL BACK FLOW PREVENTION ASSEMBLIES SHALL BE INSPECTED AND CERTIFIED UPON INITIAL INSTALLATION BY A CERTIFIED BACK FLOW TESTER (AWWA OR ABPA) PRIOR TO BEING PUT INTO SERVICE.
5. ALL BACK FLOW PREVENTION ASSEMBLIES INSTALLED WITHIN THE CONFINES OF A STRUCTURE SHALL HAVE A MIN. 2" DIA. DRAIN TO THE OUTSIDE OF THE STRUCTURE AS SHOWN IN THIS STANDARD. DRAIN PIPING SHALL NOT BE AFFIXED TO AND/OR SUPPORTED BY THE BACK FLOW PREVENTION ASSEMBLY.
6. AN AIR GAP OF NOT LESS THAN 2 TIMES THE DIA. OF THE SUPPLY PIPE SHALL BE PROVIDED BETWEEN THE RELIEF VALVE OPENING AND THE OPENING OF THE DRAIN PIPE AS SHOWN IN THIS STANDARD.
7. A MIN. OF 12" VERTICAL CLEARANCE SHALL BE PROVIDED BETWEEN THE RELIEF VALVE OPENING AND THE FINISHED FLOOR. THE FOLLOWING INSTALLATION HEIGHTS SHALL APPLY.
8. ASSEMBLY SHALL BE LOCATED ON EXTERIOR WALL.

DWG DATE: 7/05		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
1	7/13 4/06	UPDATE NEW STD	APPROVED BY  10/9/13 CITY ENGINEER	
MARK	DATE	REVISION	REDUCED PRESSURE PRINCIPLE (RPP) BACKFLOW ASSEMBLY INTERNAL-ALTERNATE LOCATION	



\* DISTANCE TO BE OF ADEQUATE SIZE TO ALLOW ACCESS FOR MAINTENANCE, TESTING, AND/OR REMOVAL OF BACKFLOW DEVICE

**MINIMUM CLEARANCES**  
PLAN VIEW

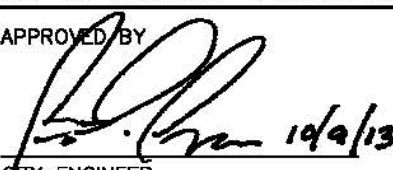


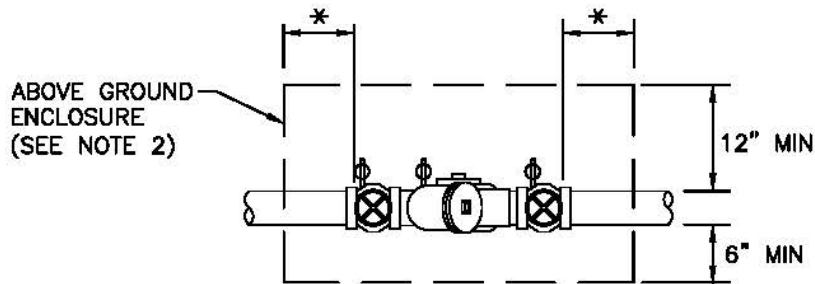
**FOR FIRE SERVICES, APPROVAL GRANTED BY:**  
ENGINEERING CONSTRUCTION INSPECTOR  
BUILDING AND FIRE DEPARTMENT INSPECTOR(S)

**ABOVE GROUND INSTALLATION**

**NOTES:**

- BACKFLOW DEVICES ARE REQUIRED UNDER THE STATE OF CALIFORNIA ADMINISTRATION CODE, TITLE 17, AND SHALL BE INSTALLED IN ACCORDANCE THEREOF.
- BACKFLOW DEVICES SHALL BE INSTALLED WITHIN CITY RIGHT-OF-WAY OR EASEMENT, AS CLOSE AS PRACTICAL TO THE WATER MAIN CONNECTION, PER CCR TITLE 22.
- ALL BACKFLOW DEVICES SHALL BE INSPECTED AND TESTED UPON INITIAL INSTALLATION BY A CERTIFIED BACKFLOW TESTER (AWWA OR ABPA).
- ALL BACKFLOW DEVICES SHALL BE PLACED IN AN APPROVED ENCLOSURE PER PAGE 432.20.
- ALL CONSTRUCTION AND ALL MATERIALS USED SHALL BE IN ACCORDANCE WITH THE CITY OF REDDING CONSTRUCTION STANDARDS (CORCS) AND THE SPECIFICATION FOR PUBLIC WORKS CONSTRUCTION (GREENBOOK).
- ALL ABOVE GROUND PIPING INSTALLATIONS, 4" AND LARGER SHALL BE DUCTILE IRON PIPE WITH FLANGED FITTINGS.
- ALL THRUST BLOCKS OR ANCHORS TO BE DESIGNED ON AN INDIVIDUAL BASIS PER PAGE 403.00.
- CONTRACTOR HAS THE OPTION OF DESIGNING AND CONSTRUCTING CONCRETE ANCHORS AS SHOWN OR PLACING A CONTINUOUS CONCRETE BLOCK BETWEEN ELBOWS. IF SOIL IS UNDISTURBED, CONTRACTOR MAY OMIT BRACE WITH PRIOR CITY APPROVAL.
- ALL FIRE SERVICES ARE REQUIRED TO HAVE A BYPASS LINE WHICH SHALL HAVE A DETECTOR CHECK VALVE AND A METER AND ATTACHMENT OF BYPASS LINE SHALL BE THREADED.

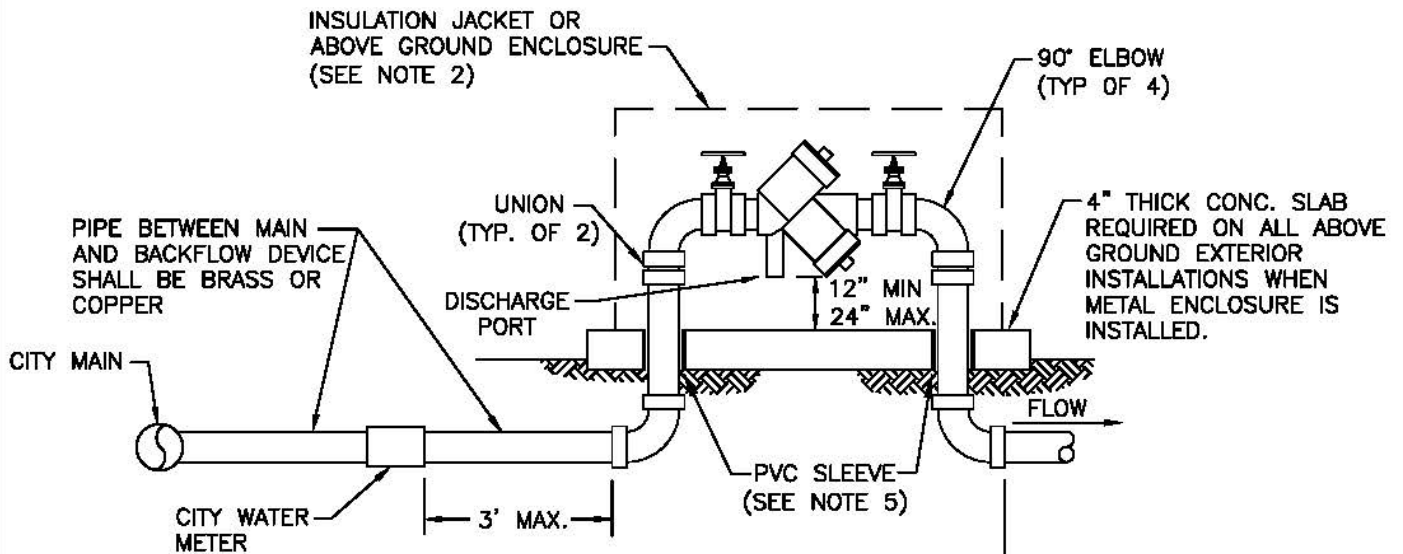
DWG DATE: 5/91		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
6	7/13	UPDATE STD	APPROVED BY  10/9/13 CITY ENGINEER	<b>REDUCED PRESSURE PRINCIPLE DEVICE (RPP)</b> 4" AND LARGER
5	4/06	EDIT NOTE		
MARK	DATE	REVISION		



\* DISTANCE TO BE OF ADEQUATE SIZE TO ALLOW ACCESS FOR MAINTENANCE, TESTING OR REMOVAL OF BACKFLOW DEVICE.

**MINIMUM CLEARANCES**

PLAN VIEW



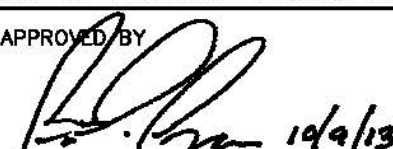
FOR FIRE SERVICES, APPROVAL GRANTED BY:  
PUBLIC WORKS INSPECTOR      FIRE DEPARTMENT INSPECTOR

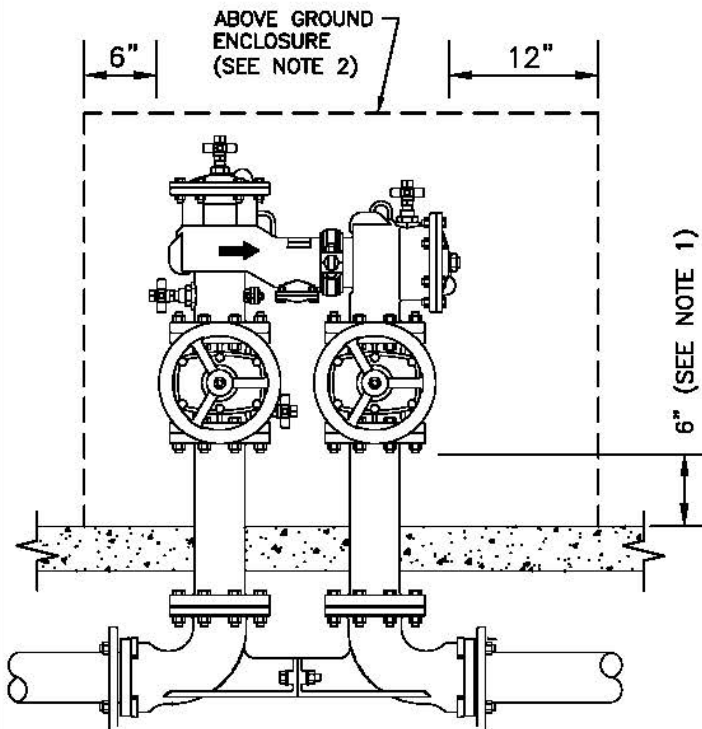
**ABOVE GROUND INSTALLATION**

**NOTES:**

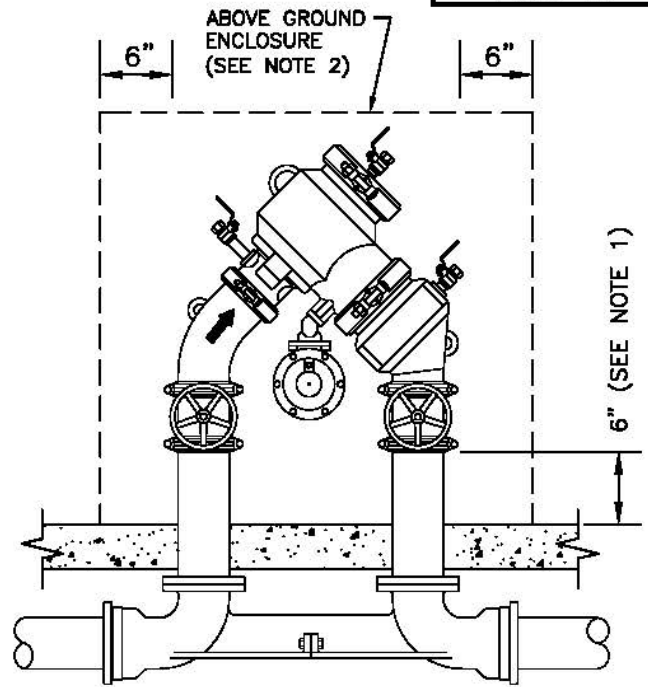
1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF REDDING CONSTRUCTION STANDARDS (CORCS), THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (GREENBOOK) AND THE UNIFORM PLUMBING CODE (U.P.C.).
2. ABOVE GROUND ENCLOSURES PER PAGE 432.25 SHALL BE REQUIRED ON ALL IRRIGATION APPLICATIONS.
3. NO CONNECTION, OUTLET, TAP, OR TEE IS ALLOWED BETWEEN THE WATER MAIN AND THE BACKFLOW DEVICE.
4. ALL ABOVE GROUND PIPING INSTALLATIONS, 2" & SMALLER, SHALL BE RIGID COPPER OR BRASS PIPE.
5. ALL PIPING PASSING THROUGH A SLAB SHALL PASS THROUGH A PVC SLEEVE FOR THE FULL THICKNESS OF THE SLAB. THE SLEEVE SHALL HAVE A DIAMETER OF 1/2 INCH LARGER THAN THAT OF THE PIPE.
6. BACKFLOW DEVICE SHALL BE LOCATED 3' MAX. FROM THE BACK OF THE METER.
7. ALL BACKFLOW DEVICES SHALL BE INSPECTED AND TESTED UPON INITIAL INSTALLATION BY A CERTIFIED BACKFLOW TESTER (AWWA OR ABPA).
8. WHEN ANY TYPE OF CHECK VALVE IS INSTALLED ON A DOMESTIC WATER SYSTEM MAKING IT A CLOSED SYSTEM, THE INSTALLATION OF AN EXPANSION CHAMBER ON THE WATER HEATER IS REQUIRED BY LAW (U.P.C. SEC. 1007).

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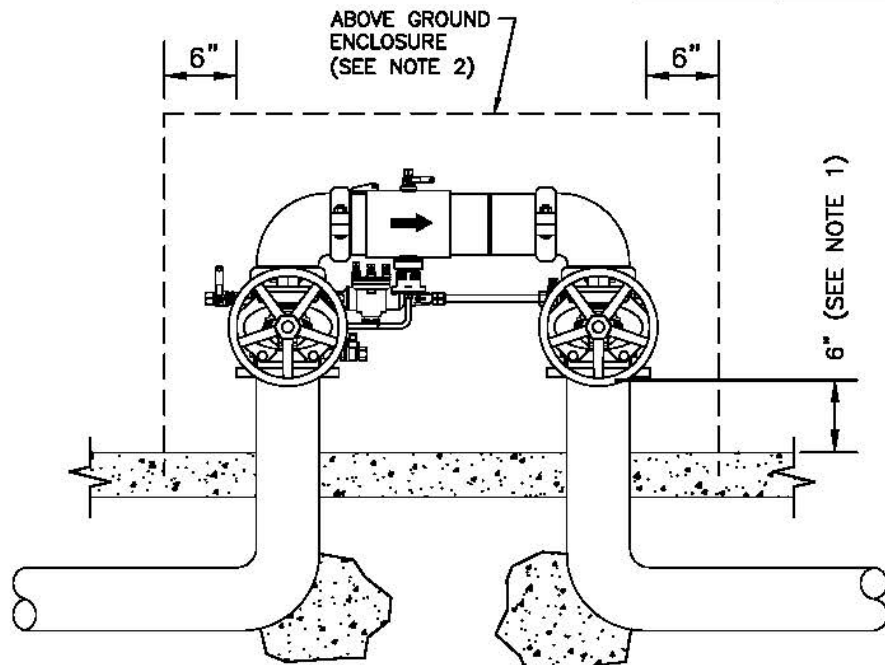
DWG DATE: 3/92		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
5	7/13	UPDATE	APPROVED BY  10/9/13 CITY ENGINEER	
4	4/06	NAME CHG		
MARK	DATE	REVISION	<b>REDUCED PRESSURE PRINCIPLE DEVICE (RPP)</b> 3/4" THROUGH 2"	



**FEBCO**



**WATTS / WILKINS**



**AMES**

**NOTES:**

1. VALVE HANDLES SHALL BE INSTALLED EXACTLY SIX INCHES ABOVE ENCLOSURE MOUNTING SLAB.
2. ALL BACKFLOW DEVICES SHALL BE PLACED IN AN APPROVED ENCLOSURE PER PAGE 432.30.

DWG DATE: 10/11

SCALE: NTS

CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION

APPROVED BY

*[Signature]*  
10/9/13  
CITY ENGINEER

**BACKFLOW PREVENTION  
ASSEMBLY - "N" PATTERN**

3" THROUGH 10"

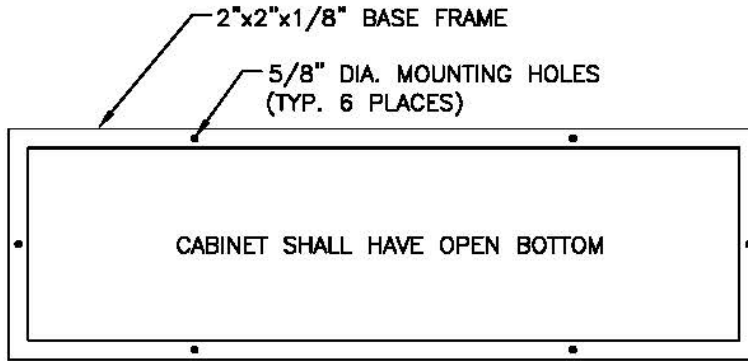
MARK

DATE

NEW STD

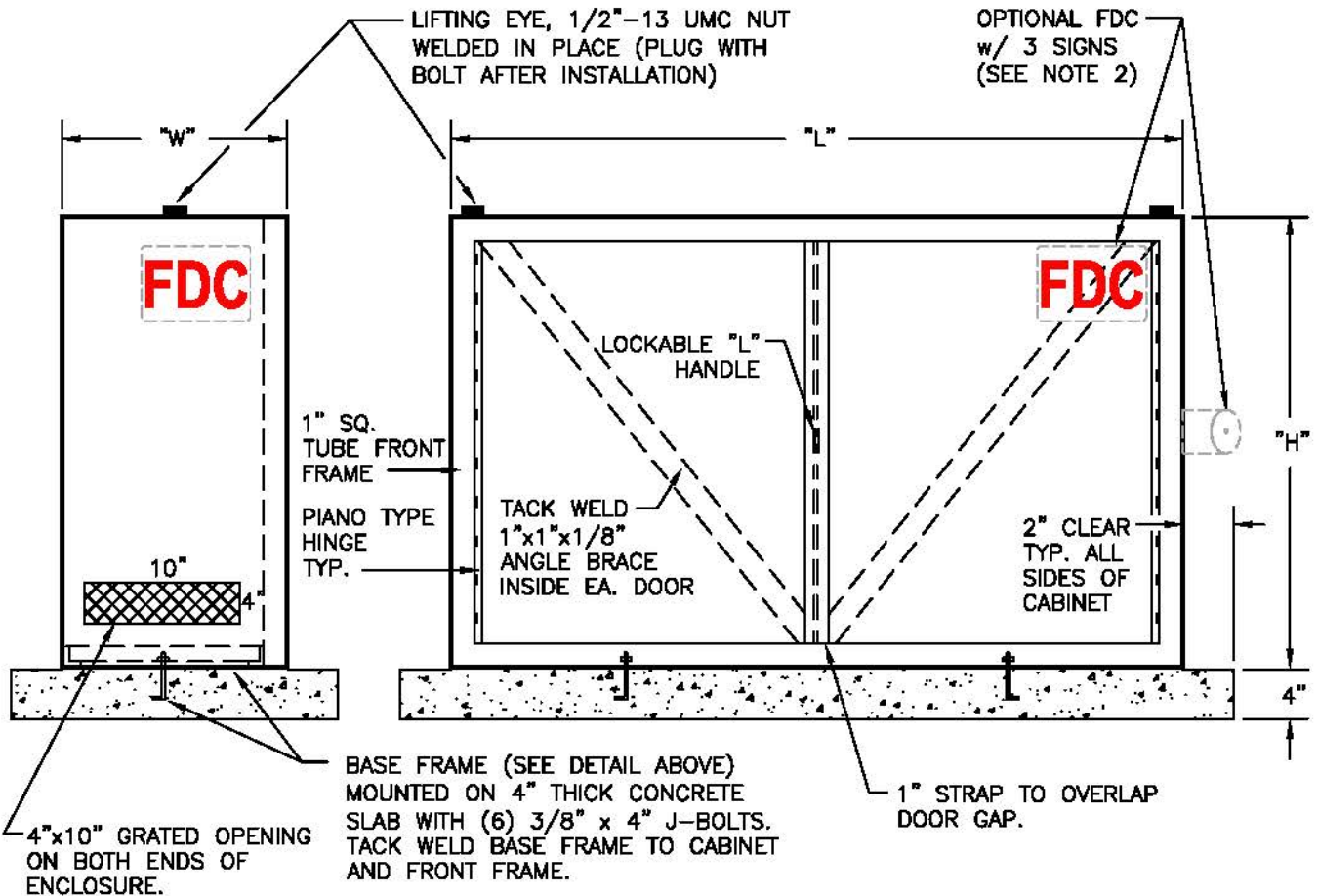
REVISION





**BOTTOM MOUNTING FRAME**

CABINET DIMENSIONS			
UNIT SIZE	'L'	'W'	'H'
3" & 4"	78"	24"	52"
6"	98"	24"	60"
8"	108"	30"	69"



**NOTES:**

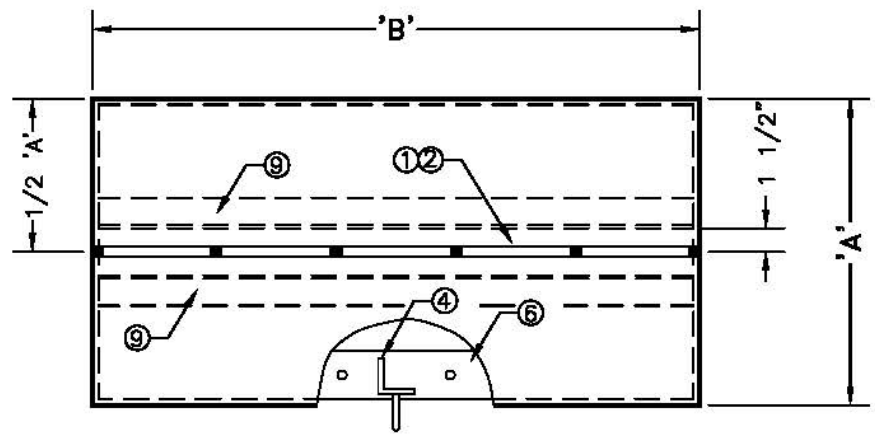
- CABINET AND DOORS TO BE 14 GA. STEEL PAINTED OLIVE GREEN POWDER COAT PAINT INSIDE & OUT.
- WHEN A FIRE DEPARTMENT CONNECTION (FDC) IS INCLUDED IN BACKFLOW ASSEMBLY, A SIGN SHALL BE INSTALLED ON THE THREE (3) SIDES OF THE ENCLOSURE VISIBLE FROM THE STREET, IN THE UPPER CORNER AS SHOWN. THE SIGNS SHALL READ "FDC" IN 6" HIGH, RED REFLECTIVE, BLOCK LETTERING.

DWG DATE: 5/91      SCALE: NTS      CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION

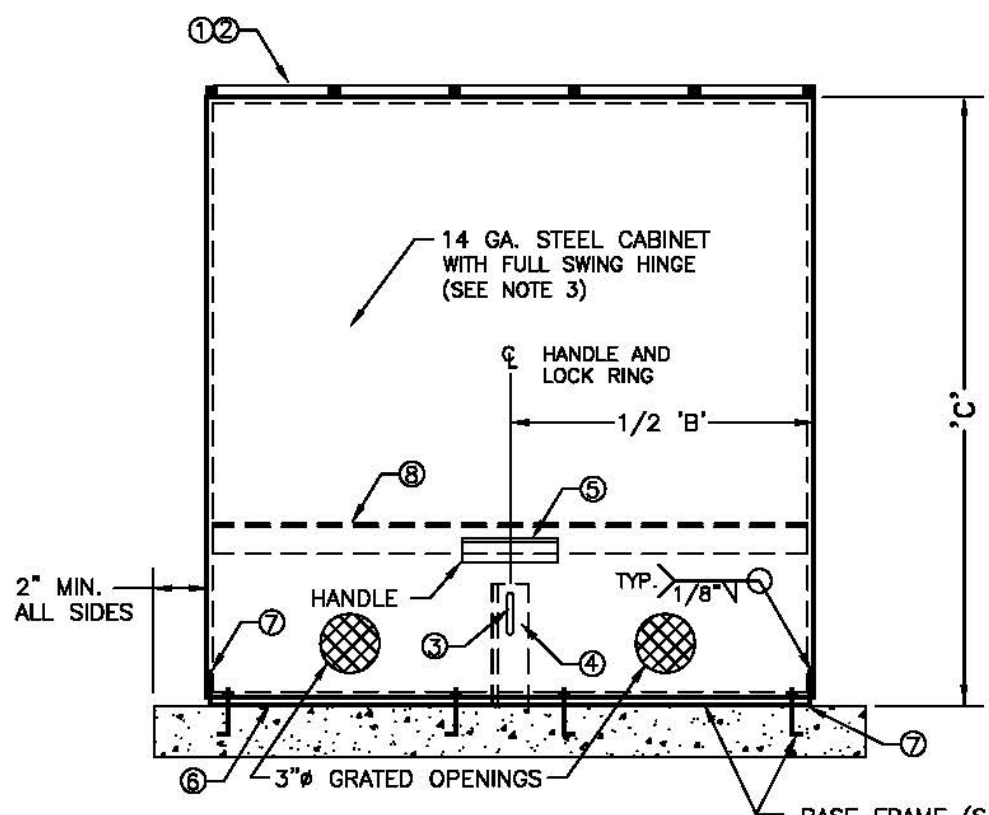
5	7/13	ADD NOTES
4	4/06	ADD VENT
MARK	DATE	REVISION

APPROVED BY  
*[Signature]* 10/9/13  
CITY ENGINEER

**BACKFLOW ENCLOSURE  
HORIZONTAL ASSEMBLY**  
3" AND LARGER



**TOP VIEW**

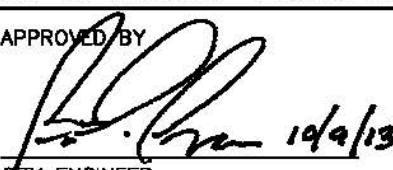


**FRONT VIEW**

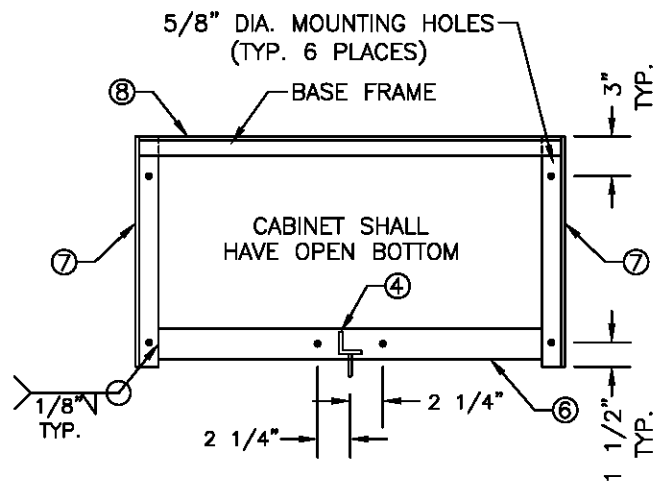
BASE FRAME (SEE DETAIL AND NOTES 1 & 2 ON NEXT PAGE). TACK WELD BASE FRAME TO CABINET FRAME (BACK HALF).

CABINET DIMENSIONS			
DIMENSIONS FOR:	'A'	'B'	'C'
3/4" & 1" DEVICES	12 1/2"	25"	25"
1 1/2" & 2" DEVICES	20 1/2"	32"	25"

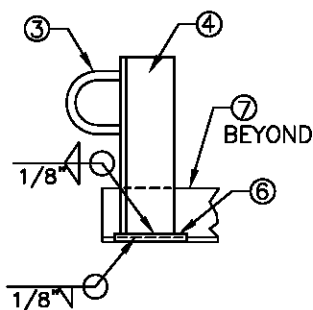
\* DIMENSIONS MAY VARY TO ACCOMMODATE NON-TYPICAL FIRE SERVICE DEVICE INSTALLATION

DWG DATE: 10-11		SCALE: NTS	CITY OF REDDING PUBLIC WORKS DEPARTMENT ENGINEERING DIVISION	
4	7/13	REVISE STD	APPROVED BY  10/9/13 CITY ENGINEER	<b>BACKFLOW DEVICE ENCLOSURE</b> 3/4" THROUGH 2"
3	4/06	ADD VENTS		
MARK	DATE	REVISION		

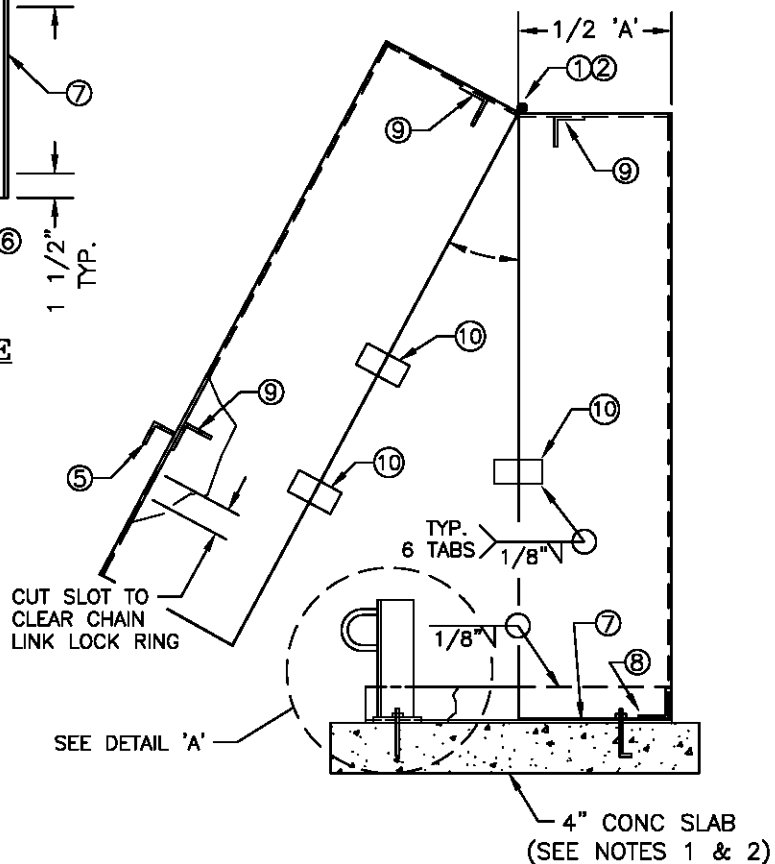
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**BOTTOM MOUNTING FRAME**



**DETAIL 'A'**

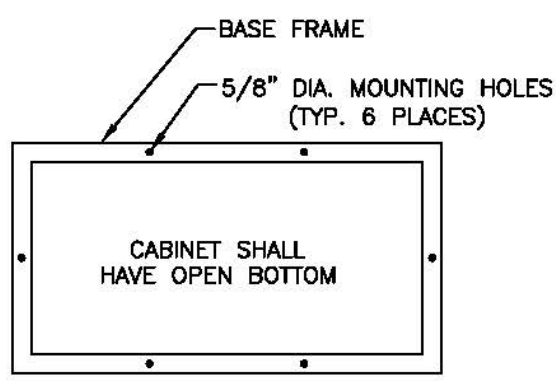


**SIDE VIEW**

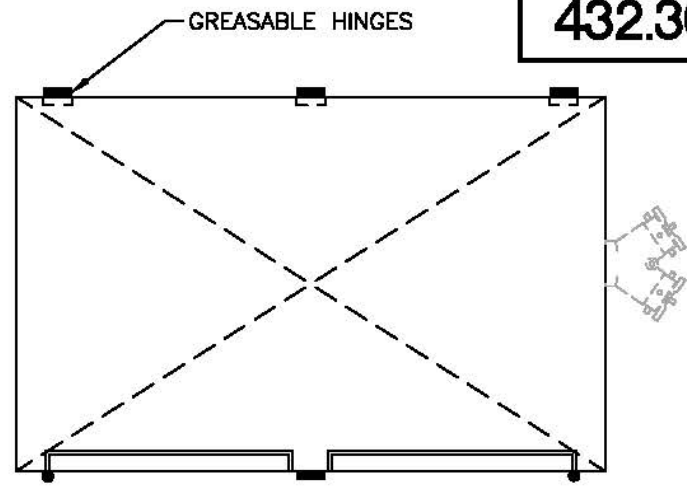
MATERIALS LIST FOR BACKFLOW DEVICE ENCLOSURE				
ITEM NO.	DESCRIPTION	LENGTH FOR DEVICES:		QTY
		3/4" & 1"	1 1/2" & 2"	
①	5/16" COLD ROLL HINGE PIN	25"	32"	1
②	1/4" PIPE HINGE	25"	32"	1
③	1/4" x 1 1/2" x 1 1/2" CHAIN LINK	n/a	n/a	1
④	1/4" x 1 1/2" x 1 1/2" ANGLE	5"	5"	1
⑤	1/8" x 1" x 1" ANGLE HANDLE	4"	4"	1
⑥	1/4" x 2" FLAT BAR	22"	29"	1
⑦	1/8" x 1 1/2" x 1 1/2" ANGLE	12 1/2"	20 1/2"	2
⑧	1/8" x 1 1/4" x 1 1/4" ANGLE BRACE	24 3/4"	31 3/4"	1
⑨	1/8" x 1 1/4" x 1 1/4" ANGLE BRACE	25"	32"	3
⑩	1/8" x 1" ALIGNMENT TABS	2"	2"	6

**NOTES:**

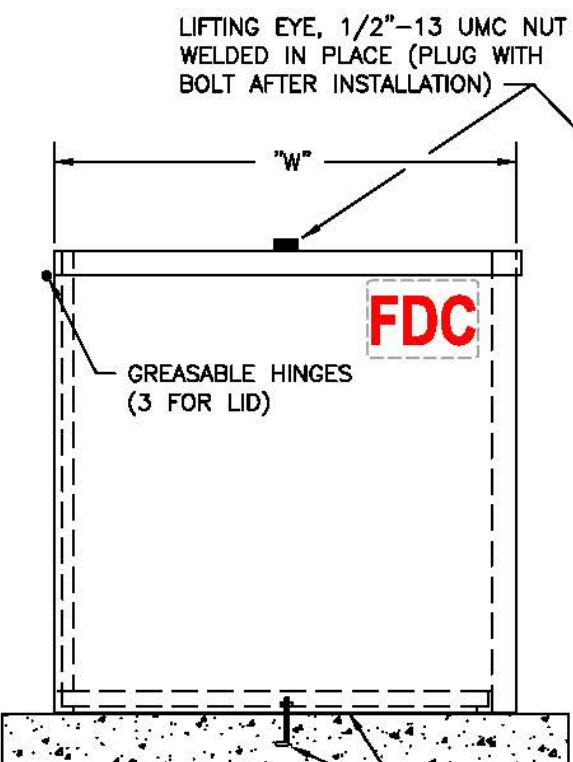
- CABINET SHALL BE MOUNTED ON A 4" THICK CONCRETE SLAB WITH 3/8"x4" 'J' BOLTS (TYP. OF 6). SLAB TO EXTEND MINIMUM OF 2" BEYOND CABINET.
- ALL PIPING PASSING THROUGH SLAB SHALL PASS THROUGH A PVC SLEEVE FOR THE FULL THICKNESS OF THE SLAB. THE SLEEVE SHALL HAVE A DIAMETER 1/2" LARGER THAN THAT OF THE PIPE.
- CABINET SHALL BE PAINTED WITH OLIVE GREEN POWDER COAT PAINT INSIDE & OUT.



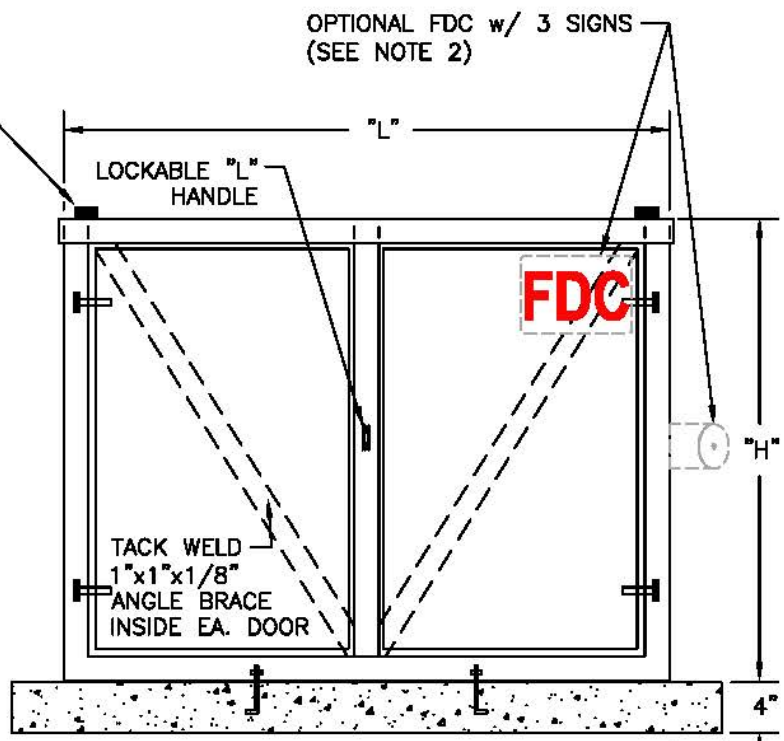
**BOTTOM MOUNTING FRAME**



**TOP VIEW**



**LEFT VIEW**



**FRONT VIEW**

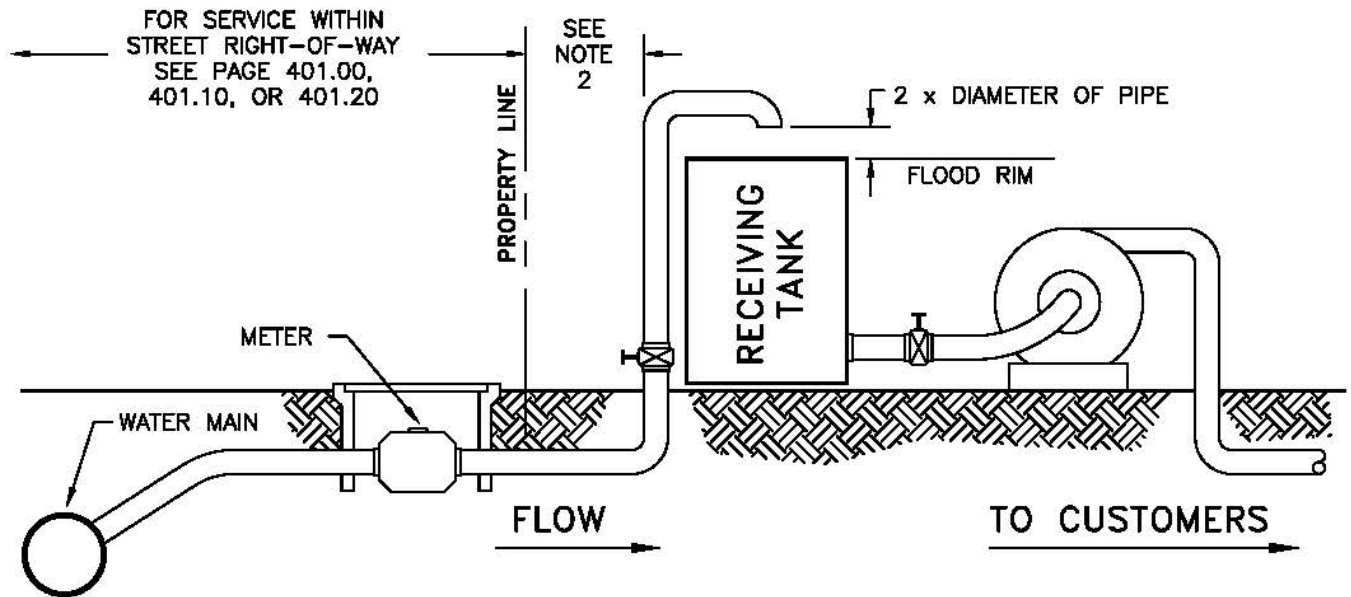
BASE FRAME (SEE DETAIL ABOVE) MOUNTED ON 4" THICK CONCRETE SLAB WITH (6) 3/8" x 4" J-BOLTS. TACK WELD BASE FRAME TO CABINET AND FRONT FRAME.

**NOTES:**

1. CABINET AND DOORS TO BE 14 GA. STEEL, PAINTED OLIVE GREEN POWDER COAT PAINT INSIDE & OUT.
2. WHEN A FIRE DEPARTMENT CONNECTION (FDC) IS INCLUDED IN BACKFLOW ASSEMBLY, A SIGN SHALL BE INSTALLED ON THE THREE (3) SIDES OF THE ENCLOSURE VISIBLE FROM THE STREET, IN THE UPPER CORNER AS SHOWN. THE SIGNS SHALL READ "FDC" IN 6" HIGH, RED REFLECTIVE, BLOCK LETTERING.
3. CABINET DIMENSIONS SHALL OF ADEQUATE SIZE TO PROVIDE SUFFICIENT CLEARANCE TO ALLOW ACCESS TO ALL SIDES FOR MAINTENANCE, TESTING, AND/OR REMOVAL OF BACKFLOW ASSEMBLY.

DWG DATE: 10/11		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
			APPROVED BY	<b>BACKFLOW PREVENTION ASSEMBLY ENCLOSURE - "N" PATTERN</b>
		NEW STD	<i>[Signature]</i> 10/9/13	
MARK	DATE	REVISION	CITY ENGINEER	3" THROUGH 10"

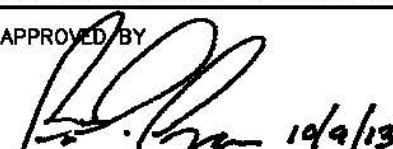
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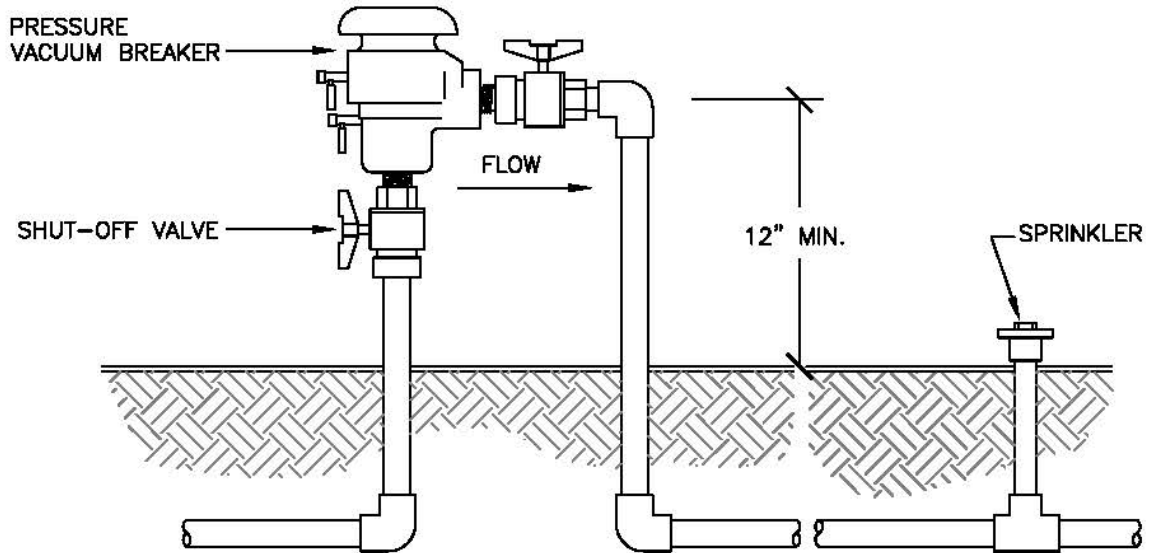


AIR GAP SEPARATION

NOTES:

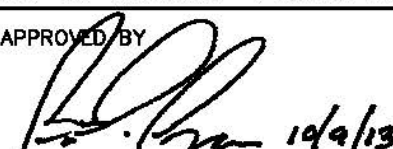
1. BACKFLOW DEVICES ARE REQUIRED UNDER STATE OF CALIFORNIA ADMINISTRATIVE CODE, TITLE 17, AND SHALL BE INSTALLED IN ACCORDANCE THEREOF.
2. RECEIVING TANK SHALL BE LOCATED AS CLOSE TO PROPERTY LINE AS PRACTICAL. LOCATION TO BE APPROVED BY THE CITY ENGINEER.
3. NO CONNECTIONS OR TEE SHALL BE ALLOWED IN SERVICE LINE BETWEEN METER AND RECEIVING TANK.
4. SERVICE PIPE TO RECEIVING TANK SHALL BE 1 INCH MINIMUM.

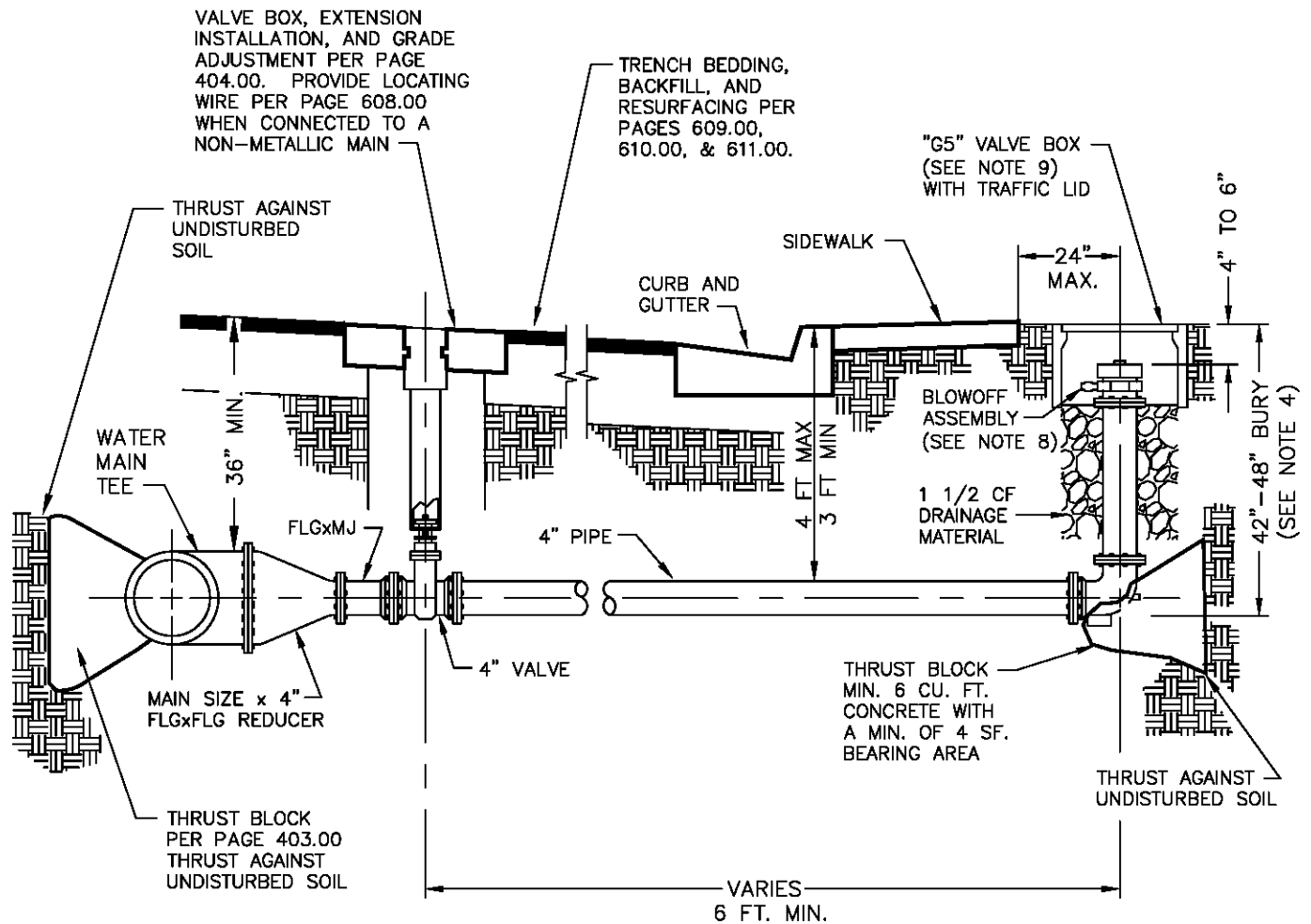
DWG DATE: 5/91		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
7	7/13	REVISE NOTES	APPROVED BY  10/9/13 CITY ENGINEER	AIR GAP SEPARATION DETAIL
6	4/06	ADD VALVE		
5	2/03	REVISE STD		
MARK	DATE	REVISION		



**NOTES:**

1. PRESSURE VACUUM BREAKERS ARE ALLOWED ON MEDIAN STRIP IRRIGATION SYSTEMS PER THE JANUARY 1989 POLICY STATEMENT FROM THE CALIFORNIA DEPARTMENT OF HEALTH SERVICES TITLED, POLICY STATEMENT REGARDING THE USE OF PRESSURE STYLE VACUUM BREAKERS ON MEDIAN STRIP IRRIGATION SYSTEMS.
2. INSTALLATION OF PRESSURE VACUUM BREAKERS (PVB) IS ALLOWED PROVIDED THE INSTALLATION CONFORMS TO THE FOLLOWING:
  - A. WATER IS USED FOR IRRIGATION PURPOSES ONLY.
  - B. THE PVB IS INSTALLED AT LEAST 12" ABOVE THE HIGHEST SPRINKLER HEAD IN THE SYSTEM.
  - C. ADEQUATE CLEARANCE IS PROVIDED FOR TESTING AND SERVICING THE ASSEMBLY.
  - D. THE IRRIGATION SYSTEM HAS NO MEANS OF INDUCING BACK PRESSURE CONDITIONS.
  - E. THE SYSTEM IS SUPPLIED FROM ONLY ONE SERVICE CONNECTION.
  - F. INJECTION OF CHEMICALS INTO THE SYSTEM IS NOT PRACTICED NOR PROVIDED FOR.
  - G. THE SYSTEM IS ONLY SUPPLIED WITH DOMESTIC WATER.
2. ALL BACKFLOW DEVICES SHALL BE INSPECTED AND TESTED UPON INITIAL INSTALLATION BY A CERTIFIED BACKFLOW TESTER (AWWA OR ABPA).
3. ALL BACKFLOW DEVICES SHALL BE PLACED IN AN APPROVED ENCLOSURE PER PAGE 432.20 OR 432.25.
4. THE PRESSURE VACUUM BREAKER MUST BE INSTALLED WITH THE AIR OUTLET IN A LEVEL POSITION.
5. THE PRESSURE VACUUM BREAKER SHALL BE RATED TO 150 PSI WORKING PRESSURE.

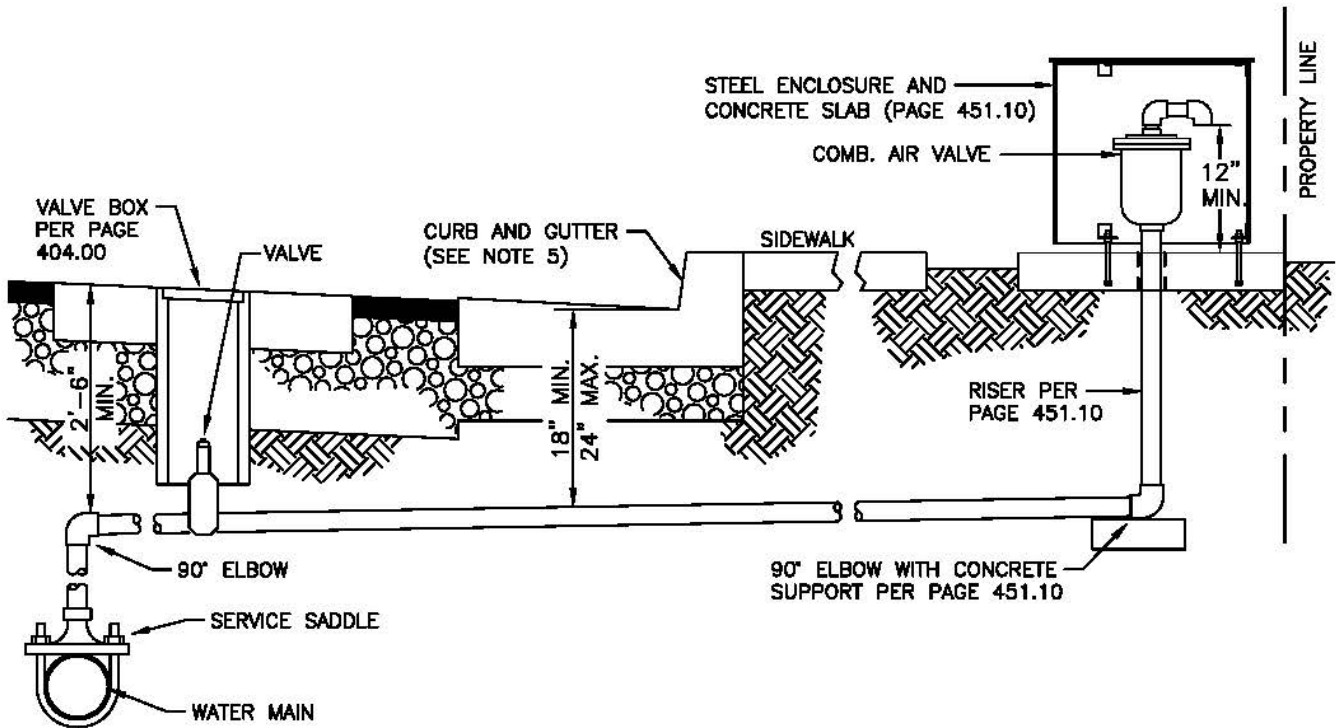
DWG DATE: 1/98		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
3	7/13	UPDATE	APPROVED BY  10/9/13 CITY ENGINEER	
2	4/06	EDIT NOTE		
MARK	DATE	REVISION	<b>PRESSURE VACUUM BREAKER DETAIL (PVB)</b>	



**TYPICAL 4" BLOWOFF**  
 FOR 12" & LARGER MAINS

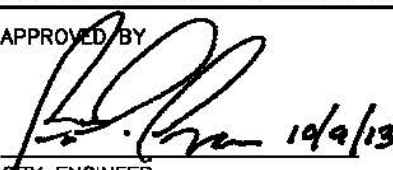
**NOTES:**

1. ALL MATERIALS SHALL BE PER APPROVED MATERIALS AS LISTED ON PAGE 400.00.
2. BLOWOFF SHALL NOT DISCHARGE TO A DRAIN WITHOUT AN AIR GAP SEPARATION.
3. A BLOWOFF SHALL BE INSTALLED AT THE END OF EACH DEAD END WATER MAIN WHERE STAGNANT CONDITIONS ARE LIKELY TO DEVELOP AND AT DIPS IN THE ELEVATION OF THE WATER MAIN WHERE SEDIMENT MAY COLLECT.
4. A MINIMUM DISTANCE OF 3 FT. SHALL BE CLEAR OF ALL VEGETATION AND OTHER OBSTRUCTIONS AROUND BLOWOFF, PER UNIFORM FIRE CODE SECTION 10.206.
5. NO UNDERGROUND UTILITY SHALL BE LOCATED WITHIN 48" EA. SIDE OF BLOWOFF TRENCH.
6. NO PRIMARY ELECTRIC VAULT, ABOVE-GROUND ELECTRIC SERVICE CABINET, OR STREET LIGHT SHALL BE INSTALLED WITHIN SEVEN (7) FEET OF THE BLOWOFF. WHERE RESTRAINED-JOINT FITTINGS ARE USED, WHICH ELIMINATES THE NEED FOR A THRUST BLOCK, THIS DISTANCE MAY BE REDUCED TO THREE (3) FEET.
7. ALL PIPE EXPOSED TO CONCRETE SHALL BE WRAPPED WITH A DOUBLE LAYER OF 6 MIL POLYETHYLENE FILM.
8. BLOWOFF ASSEMBLY SHALL CONSIST OF: 4" FLANGED COMPANION x FIPT, 1/4" PRESSURE RELEASE PET COCK, AND 4" NTP x 4-1/2" HYDRANT THREAD WITH FIRE HYDRANT CAP.
9. SET VALVE BOX FLUSH TO FINISH GRADE.

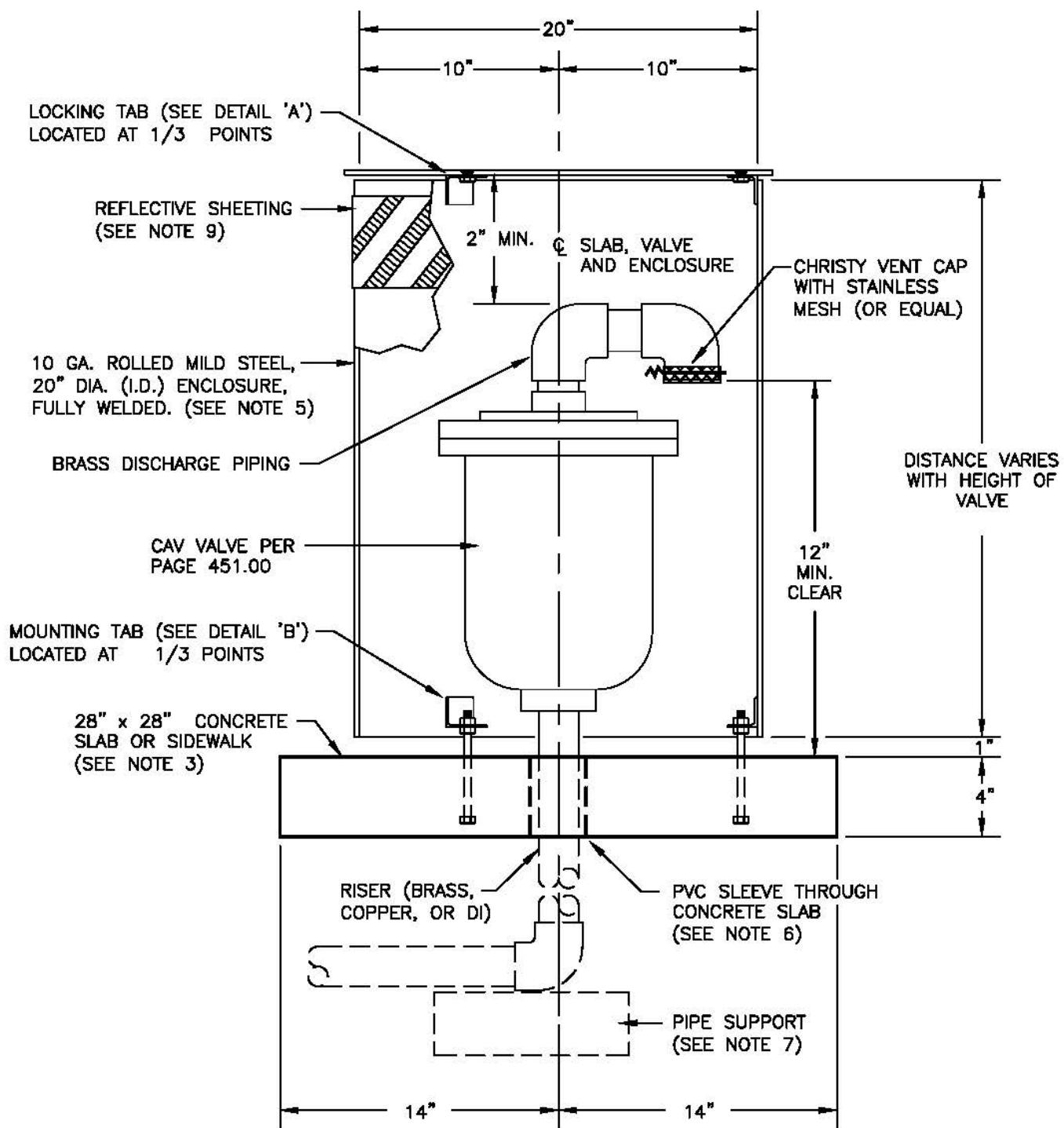


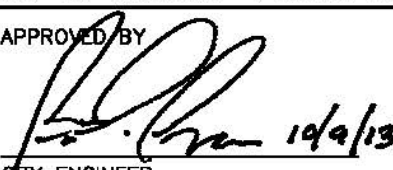
**NOTES:**

1. CALIFORNIA WATERWORKS STANDARDS, TITLE 22, FOR AIR AND VACUUM RELIEF VALVES STATES THE FOLLOWING:
  - (A) VENT OPENINGS FOR AIR AND VACUUM RELIEF AND AIR RELEASE VALVES (CASE 1) SHALL BE:
    - (1) EXTENDED AT LEAST ONE (1) FOOT (0.3m) ABOVE GRADE AND ABOVE MAXIMUM RECORDED HIGH WATER LEVEL.
    - (2) DOWNWARD FACING AND SCREENED.
  - (B) WHERE THE REQUIREMENTS OF (A)(1) CANNOT BE PRACTICABLY MET, VENT OPENINGS MAY BE LOCATED IN A SUBSURFACE CHAMBER OR PIT (CASE 2) UNDER THE FOLLOWING CONDITIONS:
    - (1) PIT IS ADEQUATELY DRAINED (METHOD TO BE APPROVED BY THE CITY ENGINEER).
    - (2) THE PIT DRAIN IS NOT CONNECTED BY PIPE OR OTHER CLOSED CONDUIT TO A SEWER OR STORM DRAIN WITHOUT AN AIR SEPARATION.
2. COMBINATION AIR VALVE (CAV) SHALL BE INSTALLED ON ALL PIPELINE HIGH POINTS AND IN CHANGE-IN-GRADE LOCATIONS WHERE AIR POCKETS MAY ACCUMULATE. A CAV SHALL BE INSTALLED AT HIGH POINTS AND AT INTERVALS OF 1500 TO 2000 FEET ON LONG PIPE RUNS LACKING A CLEARLY DEFINED HIGH POINT.
3. ALL MATERIALS SHALL BE PER MATERIALS LIST, PAGE 400.00 AND SHALL BE INSTALLED IN ACCORDANCE WITH THE APPROPRIATE STANDARDS AS LISTED.
4. IN THE CASE OF PRESSURE (HOT) TAP, A CORPORATION STOP SHALL BE INSTALLED.
5. THE MINIMUM ACCEPTABLE SIZE COMBINATION AIR VALVE (CAV) SHALL BE 2 INCH. SIZE OF CAV SHALL BE ENGINEERED TO MANUFACTURER'S SPECIFICATIONS.

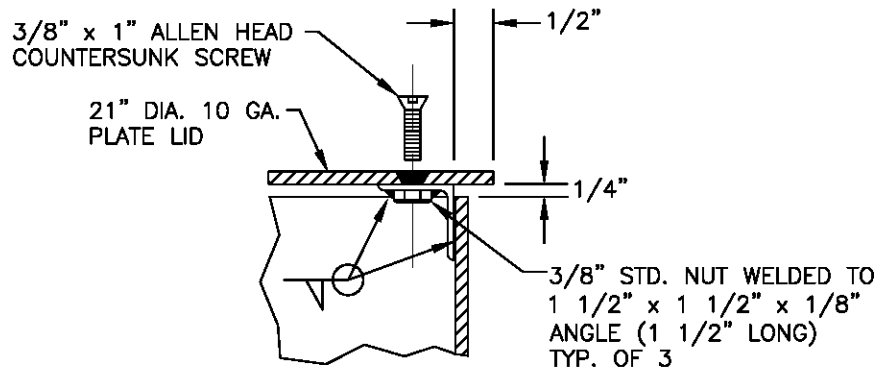
DWG DATE: 5/91		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
6	7/13	EDIT NOTES CHG NO.	APPROVED BY  10/9/13 CITY ENGINEER	
5	1/98			
MARK	DATE	REVISION	COMBINATION AIR VALVE (CAV) AIR AND VACUUM-AIR RELEASE	



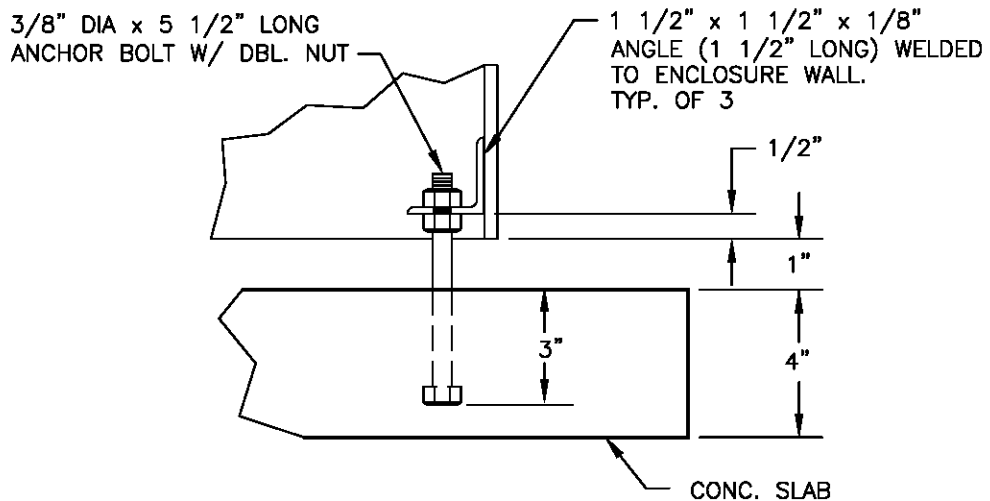


DWG DATE: 1/93		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
6	7/13	UPDATE 2 PGS	APPROVED BY  10/9/13 CITY ENGINEER	<b>COMBINATION AIR          VALVE (CAV)          ENCLOSURE DETAIL</b>
5	4/06	RENUM. NOTES		
MARK	DATE	REVISION		

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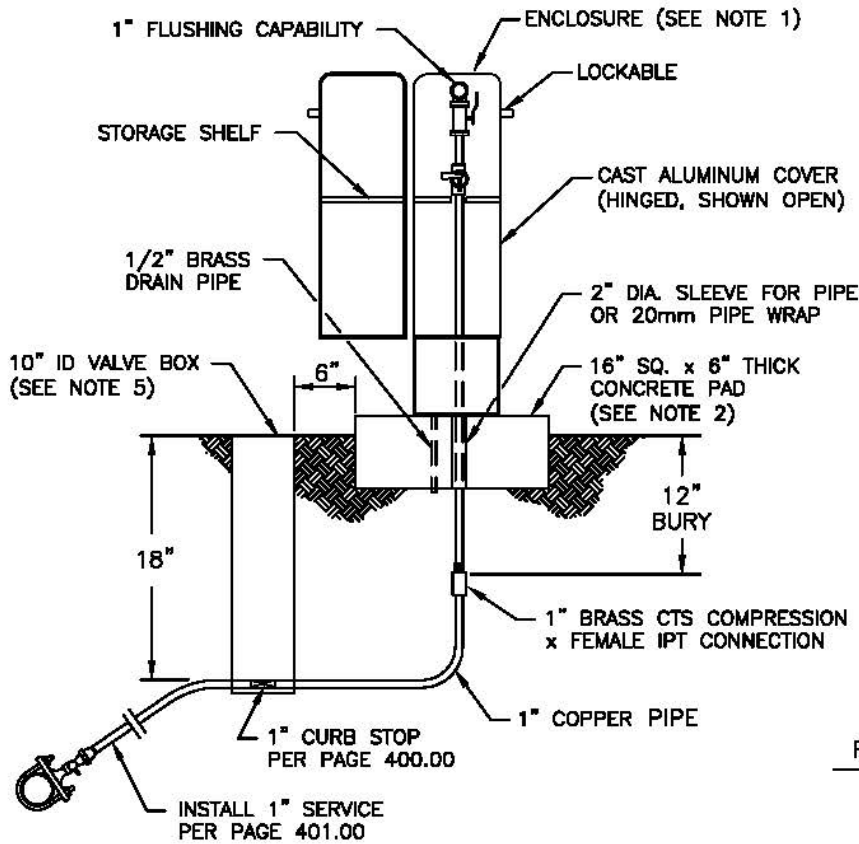
**DETAIL 'A'**



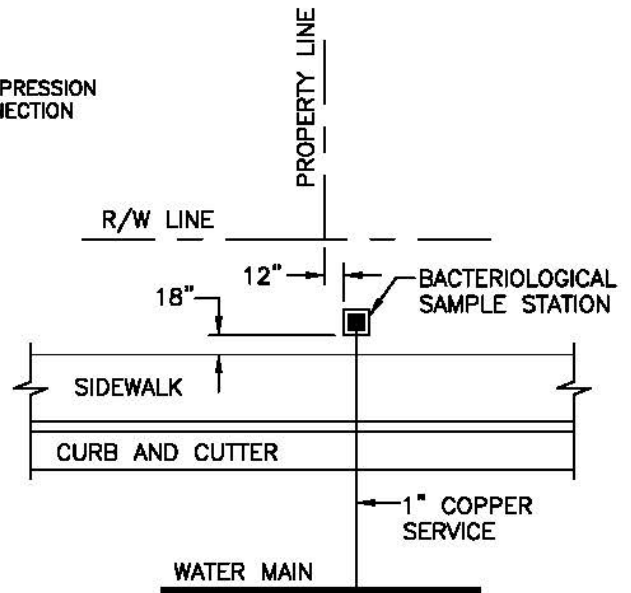
**DETAIL 'B'**

**NOTES:**

1. THIS STANDARD TO BE USED IN CONJUNCTION WITH PAGE 451.00 OR AS SPECIFIED BY THE ENGINEER.
2. ALL SERVICES PER MATERIALS LIST, PAGE 400.00.
3. CONCRETE TO BE PER PAGE 100.00.
4. ALL BOLTS, NUTS, ETC. TO BE GALVANIZED.
5. ALL METAL SURFACES NOT GALVANIZED SHALL BE PAINTED WITH OLIVE GREEN POWDER COAT PAINT.
6. PLACE PVC PIPE SLEEVE THROUGH SLAB. PIPE SLEEVE SIZE SHALL BE 1/2" LARGER THAN RISER.
7. PROVIDE CONCRETE SUPPORT OF ADEQUATE SIZE TO SUPPORT WEIGHT OF AIR VALVE.
8. ENCLOSURE DESIGN IS FOR 2", 3", & 4" VALVES. FOR 6" & 8" VALVES, ENCLOSURE MUST BE ENLARGED TO ACCOMMODATE LARGER VALVES.
9. REFLECTIVE SHEETING SHALL BE INSTALLED AT TOP OF EXTERIOR SIDEWALL. WRAP SHEETING 360° AROUND ENCLOSURE. SEE MATERIALS LIST, PAGE 400.00.
10. ALL ABOVE GRADE PIPING AND CAV SHALL BE WRAPPED WITH ADEQUATE PIPE INSULATION TO PREVENT FREEZING. METHOD SHALL REQUIRE PRIOR APPROVAL OF THE CITY ENGINEER.



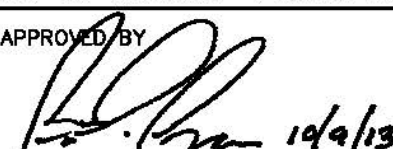
**INSTALLATION DETAIL**



**TYPICAL LOCATION**  
PLAN VIEW

**NOTES:**

1. FIXED BACTERIOLOGICAL SAMPLING STATIONS ARE REQUIRED BY "CALIFORNIA WATERWORKS STANDARDS, TITLE 22". THE ESTABLISHMENT OF REPRESENTATIVE SAMPLE POINTS IS ESSENTIAL TO ASSURE THAT THE SAMPLING RESULTS FOUND ARE GIVING A TRUE INDICATION OF THE BACTERIOLOGICAL QUALITY OF THE WATER SUPPLIED THROUGHOUT THE DISTRIBUTION SYSTEM. BACTERIOLOGICAL SAMPLE STATIONS ARE REQUIRED AND SHALL BE INSTALLED IN NEW SUBDIVISIONS AT LOCATIONS AS DETERMINED BY THE CITY WATER UTILITY.
2. FOR ENCLOSURE REQUIREMENTS SEE MATERIALS LIST, PAGE 400.00.
3. CONCRETE TO BE CLASS 'B' AND INSTALLED FLUSH WITH BOTTOM OF ENCLOSURE BASE AT BRASS PIPING.
4. LONG SHANKED PADLOCK TO BE SUPPLIED BY WATER UTILITY.
5. VALVE BOX PER PAGE 400.00, ITEM 7. NO CONCRETE COLLAR REQUIRED FOR INSTALLATION IN UNPAVED FINISHED SURFACE.

DWG DATE: 5/91		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
4	7/13	UPDATE NOTES	APPROVED BY  10/9/13 CITY ENGINEER	<b>BACTERIOLOGICAL SAMPLE STATION INSTALLATION</b>
3	4/06	ADD NOTE 5		
MARK	DATE	REVISION		

# PROFILE SYMBOLS

EXISTING GROUND		
ASPHALT CONCRETE (AC)		
AGGREGATE BASE (AB)		
CONCRETE W/O REBAR		
SAND		
NATIVE GROUND		
	EXISTING	PROPOSED
SEWER		
WATER		
STORM DRAIN		
GAS		
ELECTRICAL		
TELEPHONE		
TELEVISION		
ROLL CURB		
VERTICAL CURB		
COMMERCIAL DRIVEWAY		
RESIDENTIAL DRIVEWAY		
CATCH BASIN		
DROP INLET	D.I.	D.I.
MANHOLE		
ROD HOLE		
WATER VALVE		
FIRE HYDRANT		
WATER METER	SINGLE DOUBLE	SINGLE DOUBLE
REDUCER		
BLOW-OFF		

# PLAN SYMBOLS

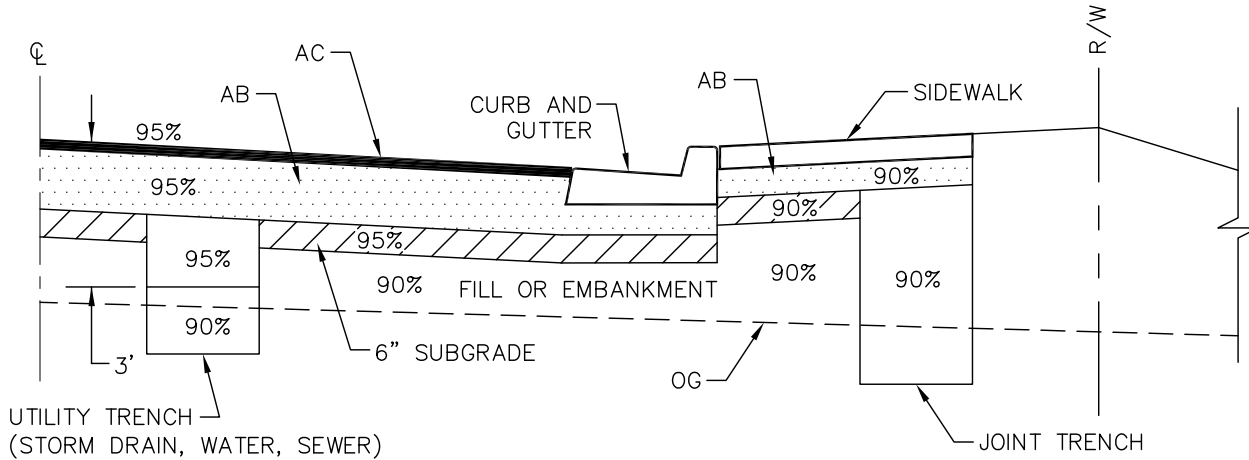
CITY LIMIT LINE		
R/W OF PROPERTY LINE		
CENTERLINE OF R/W		
EDGE OF TRAVELED WAY		
DRAINAGE DITCH		
FENCE W/ GATE		
RAIL ROAD TRACKS		
TOP OF SLOPE		
TOE OF SLOPE		
BUILDING		
TIMBER BARRICADE		
STREET NAME SIGN		
CENTERLINE MONUMENT		
BENCH MARK		
	EXISTING      PROPOSED	
TRANSFORMER		
ELEC. PULL BOX W/ SERVICE		
POLE AND GUY		
ELECTROLIER		
TRAFFIC SIGNAL		

### NOTES:

1. STREET GRADES TO BE LABELED AS PERCENT, I.E. (2%).
2. PIPE GRADES TO BE LABELED AS SLOPE, I.E. (S=0.020).
3. PLACE PLAN DIRECTLY BELOW PROFILE, MATCHING STATIONS.
4. STATIONS TO RUN LEFT TO RIGHT.
5. NORTH ARROW SHALL POINT UPWARD OR TO THE RIGHT.
6. USE ESTABLISHED CITY STATIONING FOR ALL STREET WORK OR EXTENSIONS.
7. BENCH MARK INFORMATION SHALL BE SHOWN.
8. TITLE SHEET, PLAN SHEET, AND PROFILE SHEETS SHALL BE IN A FORMAT ACCEPTABLE BY THE CITY OF REDDING.

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DWG DATE: 8/92		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
3	1/98	UPDATE	APPROVED BY  10/9/13 CITY ENGINEER	
MARK	DATE	REVISION	STANDARD DRAFTING SYMBOLS	



## TYPICAL HALF SECTION

### DENSITY REFERENCES:

THE FOLLOWING CRITERIA SHALL APPLY TO THE COMPACTION OF STREET SUBGRADE AND BASE MATERIALS:

FILLS/EMBANKMENTS	(90%)	- PAGE 700.00 & 705.10, GREENBOOK SECTION 300-6.5
SUBGRADE	(90%-95%)	- THIS PAGE & GREENBOOK SECTION 301-1.3
AGGREGATE BASE	(90%-95%)	- THIS PAGE & GREENBOOK SECTION 301-2.3
ASPHALT CONCRETE	(95%)	- THIS PAGE & GREENBOOK SECTION 302-5.6.2
JOINT TRENCH	(90%-95%)	- PAGE 620.00 & THIS PAGE
UTILITY TRENCH	(90%-95%)	- PAGE 610.00 & THIS PAGE

- MAXIMUM DENSITY AND OPTIMUM MOISTURE RELATIONSHIPS (COMPACTION TESTS) WILL BE DETERMINED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS (GREENBOOK), SECTION 211-2.1.

### MINIMUM TESTING FREQUENCY

RESULTS FOR THE FOLLOWING TESTS SHALL BE TAKEN BY AN INDEPENDENT GEOTECHNICAL ENGINEER AND SHALL BE PROVIDED TO THE CITY CONSTRUCTION INSPECTOR PRIOR TO ANY SUBSEQUENT LAYER OF MATERIAL BEING PLACED.

TRENCHES - ONE (1) TEST FOR EVERY 500 FEET OF TRENCH LENGTH AND FOR EVERY THREE (3) FOOT OF TRENCH DEPTH WITH A MINIMUM OF THREE (3) TESTS PER PROJECT, OR AS DETERMINED NECESSARY BY THE GEOTECHNICAL ENGINEER.

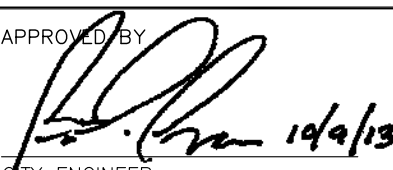
SUBGRADE & AGGREGATE BASE - ONE (1) TEST FOR EVERY 300 FEET OF STREET LENGTH WITH A MINIMUM OF THREE (3) TESTS PER PROJECT.

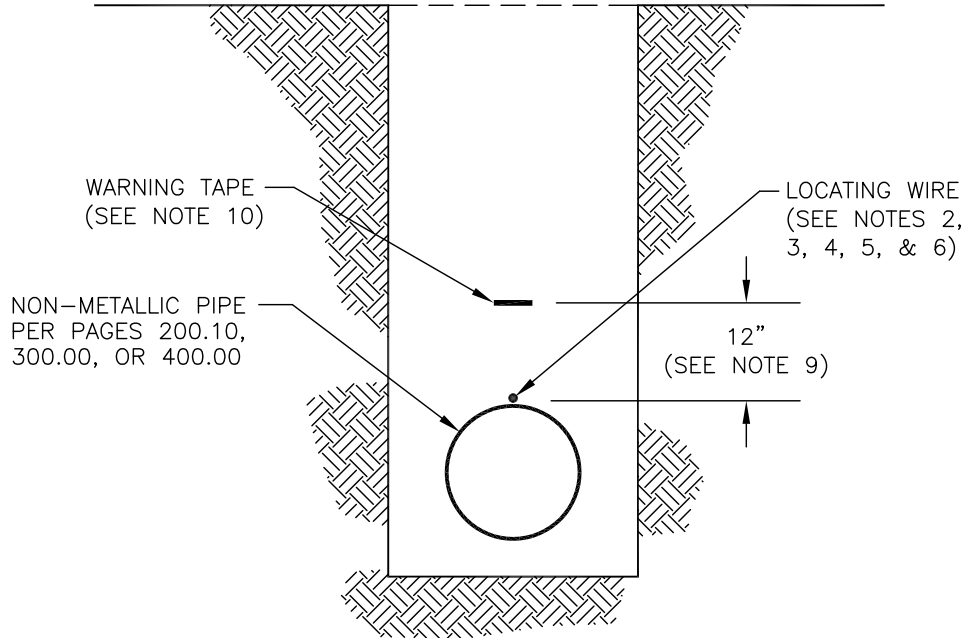
ASPHALT PAVING - ONE (1) TEST FOR EVERY 200 FEET OF PAVEMENT PASS WITH A MINIMUM OF TEN (10) TESTS PER PROJECT.

RE-TESTING - ANY TESTED AREA FAILING TO MEET THE SPECIFIED COMPACTION REQUIREMENT SHALL BE REWORKED AND/OR RE-COMPACTED UNTIL A MINIMUM OF TWO (2) PASSING TESTS ARE ACHIEVED.

THE ABOVE FREQUENCIES MAY BE ALTERED UPON THE RECOMMENDATION OF THE GEOTECHNICAL ENGINEER WITH THE APPROVAL OF THE CITY ENGINEER.

THE REQUIREMENTS FOR MAXIMUM DENSITY-OPTIMUM MOISTURE RELATIONSHIPS FOR ALL OTHER FILLS (AS SPECIFIED IN THE GRADING ORDINANCE) SHALL APPLY TO THOSE FILLS PLACED ON PRIVATE PROPERTIES OUTSIDE OF STREET RIGHTS-OF-WAY.

DWG DATE: 4/06		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
1	7/13	ADD TESTING FROM 705.00	APPROVED BY  10/9/13 CITY ENGINEER	<h2 style="margin: 0;">DENSITY REFERENCE GUIDELINE</h2>
MARK	DATE	REVISION		

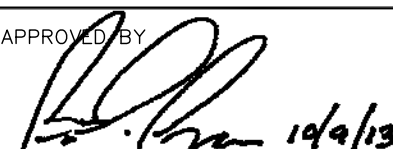


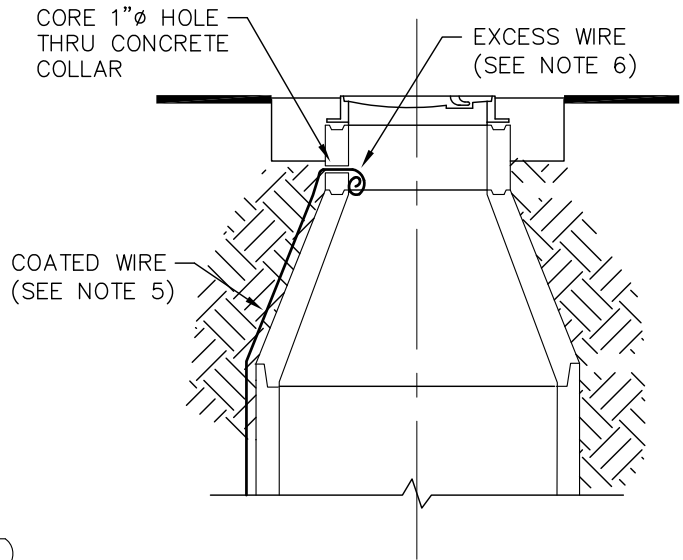
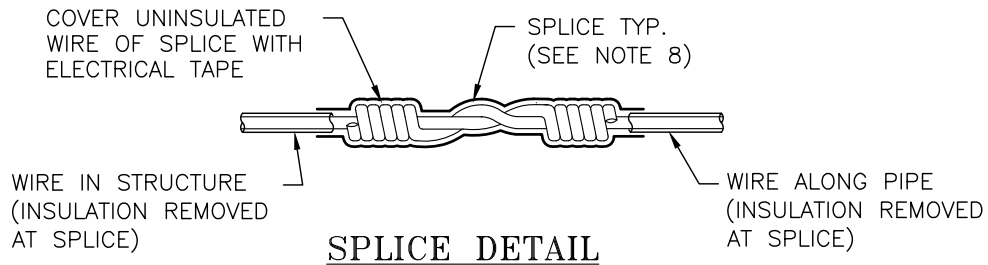
**TYPICAL TRENCH**  
 END VIEW

**NOTES:**

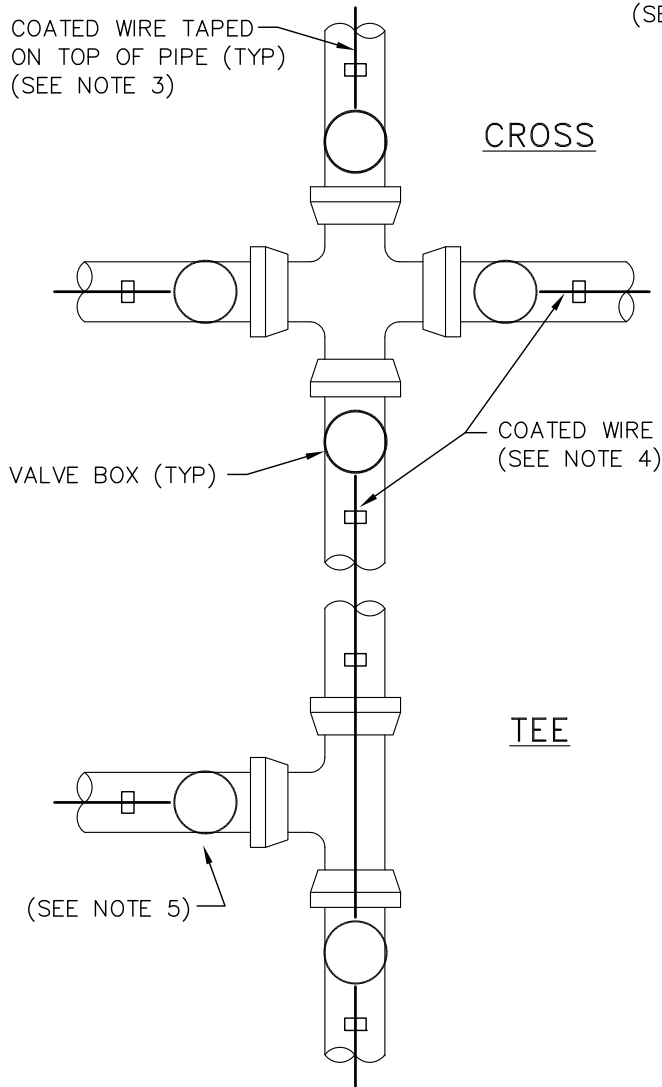
1. LOCATING WIRE SHALL BE INSTALLED WITH ALL NON-METALLIC MAINS AND OFF STREET FIRE SERVICES AND HYDRANTS.
2. WIRE SHALL BE BLUE COATED (WATER) OR GREEN COATED (SEWER/STORM) #10 AWG SOLID COPPER.
3. WIRE SHALL BE PLACED ON TOP OF PIPE, ATTACHED TO THE PIPE w/ DUCT TAPE @ 10' O.C.
4. WIRE SHALL BE CONTINUOUS BETWEEN STRUCTURES, EXCEPT WHERE WATER VALVE BOXES ARE WITHIN TEN (10) FEET OF PIPE INTERSECTION.
5. WIRE SHALL NOT TOUCH METALLIC STRUCTURES, VALVES, OR FITTINGS (MAINTAIN 3 INCHES CLEAR DISTANCE).
6. WIRE SHALL BE PLACED WITHIN 6"–12" OF TOP OF STRUCTURES AND WITH SUFFICIENT EXCESS TO ALLOW FOR ABOVE GROUND CONNECTION TO LOCATING EQUIPMENT (TWO FOOT MINIMUM).
7. ALL VALVES, INCLUDING FIRE HYDRANT VALVES, SHALL HAVE LOCATING WIRES.
8. ALL SPLICE INSTALLATIONS SHALL BE WITHIN A STRUCTURE.
9. ALL NON-METALLIC UTILITY MAIN INSTALLATIONS OUTSIDE OF THE PUBLIC RIGHT-OF-WAY SHALL INCLUDE LOCATING WARNING TAPE INSTALLED 12 INCHES ABOVE THE MAIN AND SHALL BE UNBROKEN THE ENTIRE RUN OF THE PIPE.
10. TAPE SHALL BE 2 INCH WIDE DETECTABLE METALLIC WARNING TAPE, COLOR CODED AND IMPRINTED APPROPRIATE TO THE MATERIAL TO BE CONTAINED WITHIN THE PIPE (E.G. POTABLE WATER, RAW SEWAGE) (I.E. "CAUTION – BURIED WATER LINE BELOW").

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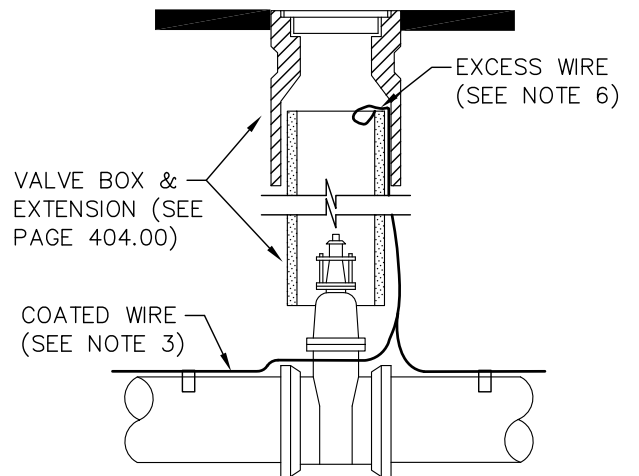
DWG DATE: 10/11		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
9	7/13	CHG NO. & REVISE STD ADD INSUL WIRE	APPROVED BY  10/9/13 CITY ENGINEER	
8	1/98			
MARK	DATE	REVISION	<b>LOCATING WIRE          &amp; WARNING TAPE</b> FOR NON-METALLIC PIPE	



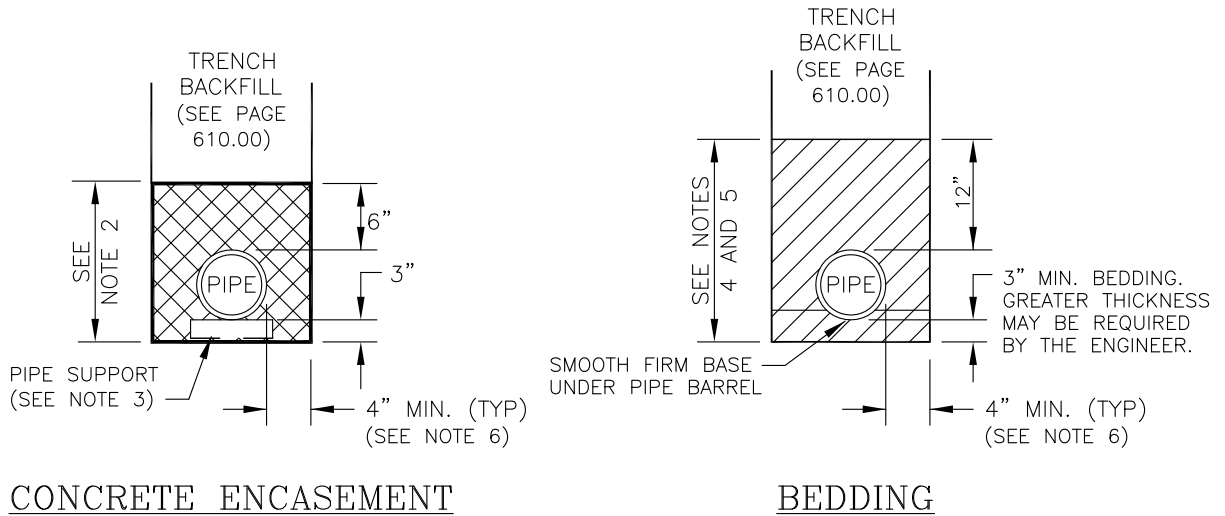
**DETAIL AT MANHOLE**



**TYPICAL WATER LAYOUT**



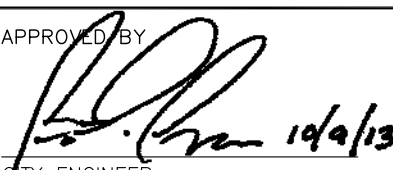
**DETAIL AT WATER VALVE**



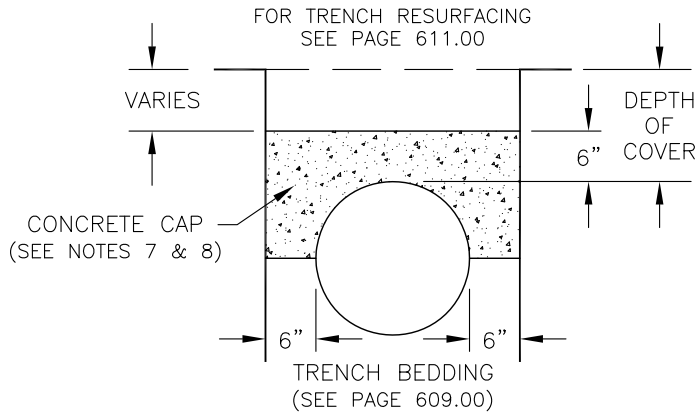
**NOTES:**

1. THIS STANDARD DOES NOT APPLY TO JOINT UTILITY TRENCHING. FOR DETAILS, SEE PAGE 620.00.
2. CONCRETE FOR ENCASING PIPE SHALL BE CLASS 450-C-2000 PER THE STANDARD SPECIFICATIONS.
3. ON ALL CONCRETE ENCASED PIPES, PIPE SHALL BE SUPPORTED ON CONCRETE BLOCKS, GROUT PADS, OR BY OTHER APPROVED METHOD. TWO SUPPORTS SHALL BE REQUIRED PER JOINT OF PIPE. CARE SHALL BE TAKEN NOT TO FLOAT PIPE WHILE PLACING CONCRETE.
4. BACKFILL BY HAND, COMPACT OR CONSOLIDATE TO PROVIDE SOLID BEDDING UNDER AND AROUND PIPE.
5. BEDDING MATERIAL FOR:
  - FLEXIBLE SEWER PIPE SHALL BE PER PAGE 300.80.
  - WATER MAINS SHALL BE SAND PER PAGE 400.00.
  - REINFORCED CONCRETE PIPE AND CORRUGATED HDPE PIPE SHALL MEET THE "COARSE" GRADING REQUIREMENTS OF SECTION 200-1.2.1 OF THE STANDARD SPECIFICATIONS.
6. TRENCH WIDTH ON EACH SIDE OF THE PIPE SHALL BE A MINIMUM OF EITHER FOUR (4) INCHES OR THE PIPE MANUFACTURER'S RECOMMENDED MINIMUM, WHICHEVER IS GREATER.
7. FOR REQUIRED COMPACTION DENSITY AND TESTING FREQUENCY, SEE PAGE 601.00.

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DWG DATE: 9/13		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
5	9/13	NEW STD SPLIT FROM 610.00	APPROVED BY  10/9/13 CITY ENGINEER	
4	4/06	EDIT NOTE		
MARK	DATE	REVISION	<h1>TRENCH BEDDING</h1>	

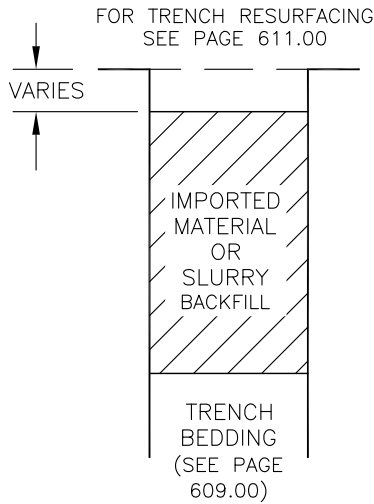




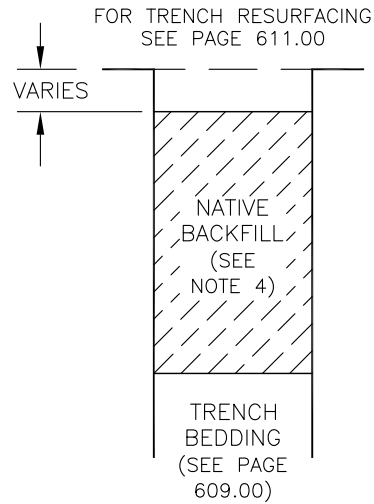
CONCRETE CAP

SLURRY BACKFILL MIX DESIGN:

2600# PEA GRAVEL  
800# SAND  
1 SACK CEMENT  
11 GAL WATER



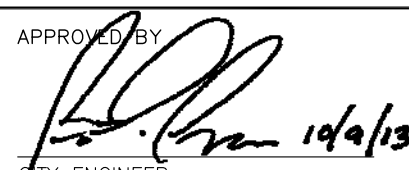
CLASS 'A'

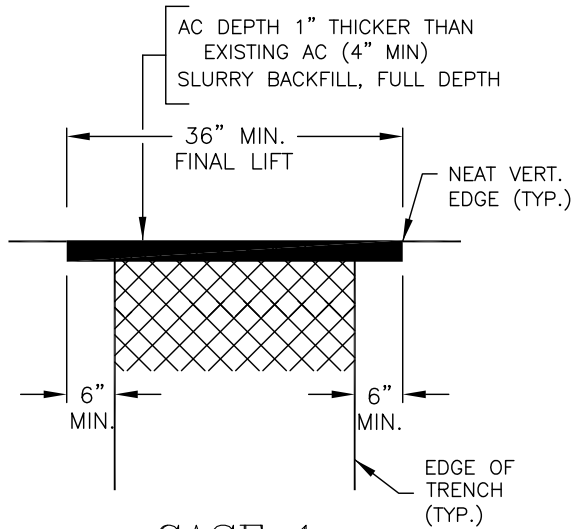


CLASS 'B'

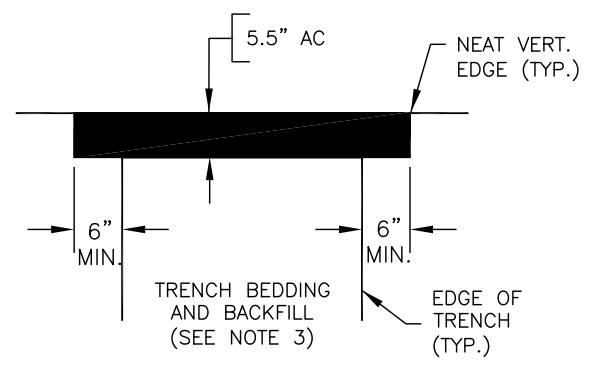
NOTES:

1. THIS STANDARD DOES NOT APPLY TO JOINT UTILITY TRENCHING. FOR DETAILS, SEE PAGE 620.00.
2. IMPORT BACKFILL MATERIAL:
  - MAY BE STREAM GRAVEL OR CRUSHED ROCK, AND
  - SHALL BE REASONABLY WELL GRADED FROM COARSE TO FINE WITH A MAXIMUM SIZE OF 3" AND A MINIMUM SAND EQUIVALENT GREATER THAN 25.
3. SLURRY BACKFILL SHALL BE PER MIX DESIGN ABOVE, AND SHALL BE PLACED AND COMPACTED IN LIFTS NOT EXCEEDING THREE (3) FEET.
4. NATIVE BACKFILL MAY BE USED IN-LIEU OF IMPORT BACKFILL ONLY IF AN INDEPENDENT GEOTECHNICAL ENGINEERING COMPANY MONITORS AND TESTS THE BACKFILL DURING THE ENTIRE BACKFILLING OPERATION.
5. FOR REQUIRED COMPACTION DENSITY AND TESTING FREQUENCY, SEE PAGE 601.00.
6. COMPACTION BY JETTING IS NOT PERMITTED.
7. CONCRETE CAP SHALL BE PLACED OVER PIPE WHEN THE DEPTH OF COVER IS LESS THAN THE MINIMUM FOR THE SPECIFIC TYPE OF PIPE PER THESE STANDARDS.
8. CONCRETE FOR CAP SHALL BE CLASS 450-C-2000 PER THE STANDARD SPECIFICATIONS.

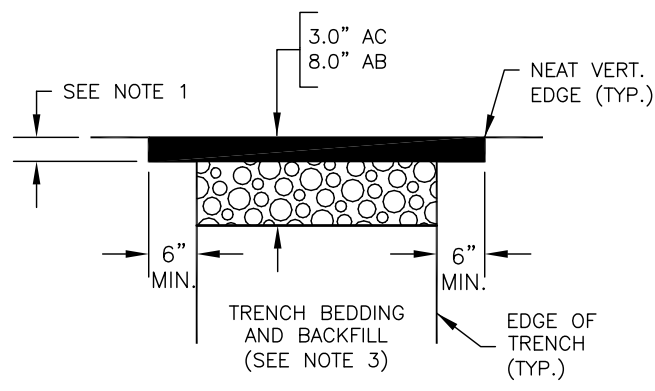
DWG DATE: 9/13		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
5	9/13	REVISED STD	APPROVED BY  10/9/13 CITY ENGINEER	
4	4/06	REM. BEDDING		
		ADD NOTES		
MARK	DATE	REVISION	<h2>TRENCH BACKFILL</h2>	



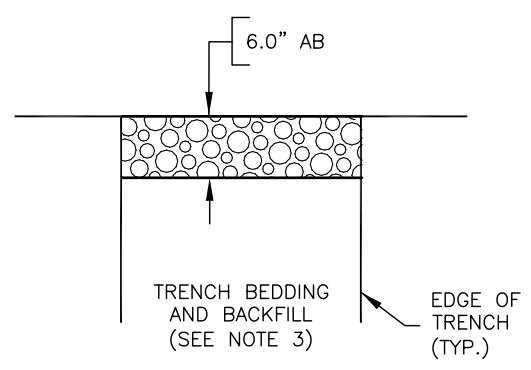
**CASE 1**  
CASE '1' REQUIRED ON ALL ARTERIALS AND COLLECTORS



**CASE 2**  
FULL DEPTH AC PAVEMENT OPTION



**CASE 3**



**CASE 4**  
UNIMPROVED AREAS

**DEFINITIONS:**

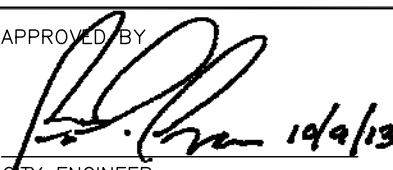
- AB - AGGREGATE BASE
- AC - ASPHALT CONCRETE

AC THICKNESS	PAVING LIFTS
0 - 2.5"	1 LIFT
2.6 - 5.0"	2 LIFTS
5.1 - 7.5"	3 LIFTS
> 7.5"	2.5" PER LIFT

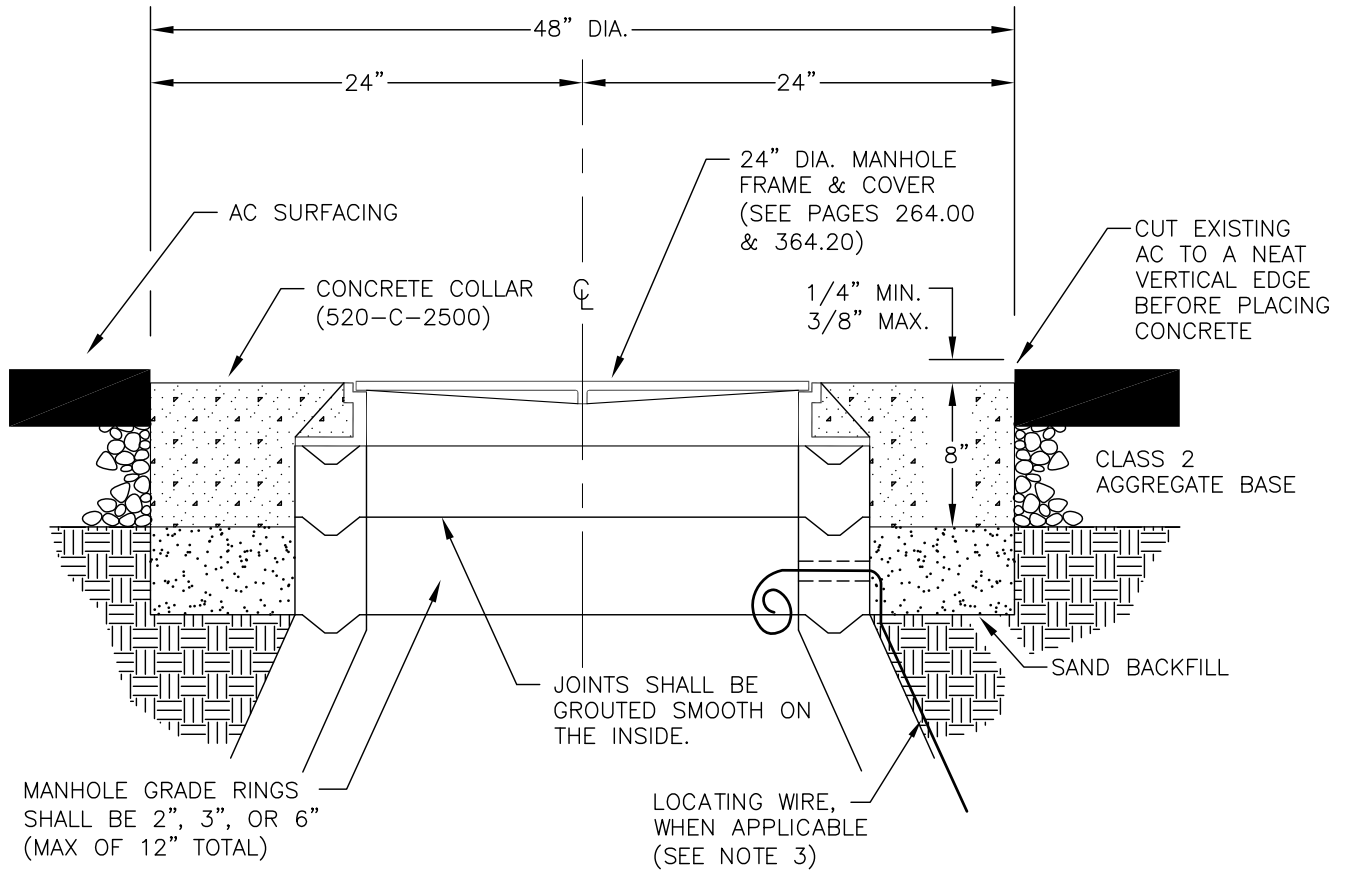
**NOTES:**

1. EXCEPT AS NOTED IN CASE 1, MINIMUM THICKNESS OF AC RESURFACING IS THREE (3) INCHES OR MATCH EXISTING THICKNESS, WHICHEVER IS GREATER.
2. FOR TRENCH BEDDING, SEE PAGE 609.00 AND FOR TRENCH BACKFILL, SEE PAGE 610.00.
3. FOR REQUIRED COMPACTION DENSITY AND TESTING FREQUENCY, SEE PAGE 601.00.
4. FOR ANY TRENCH CUT WITHIN TWO (2) FEET OF THE EDGE OF PAVEMENT AND/OR AN EXISTING PAVEMENT REPAIR, THE EXISTING AC SHALL BE REMOVED AND RESURFACED TO THE EDGE OF THE ADJACENT FEATURE.
5. ANY PAVEMENT DELINEATION AND/OR MARKINGS REMOVED DURING TRENCHING OPERATIONS SHALL BE REPLACED IN KIND AS THERMOPLASTIC STRIPING AT 90 MIL (MIN) AND MARKINGS AT 120 MIL (MIN) THICK.

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DWG DATE: 7/91		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
5	9/13	REVISE STD	APPROVED BY  10/9/13 CITY ENGINEER	
4	2/03	ADD NOTES		
3	1/97	ADD SLURRY		
MARK	DATE	REVISION	<b>TRENCH RESURFACING DETAILS</b>	

**OUTDATED SEE FOLLOWING PAGE**

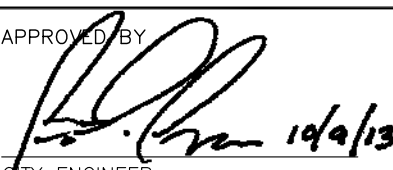


ADJUSTMENT DETAIL

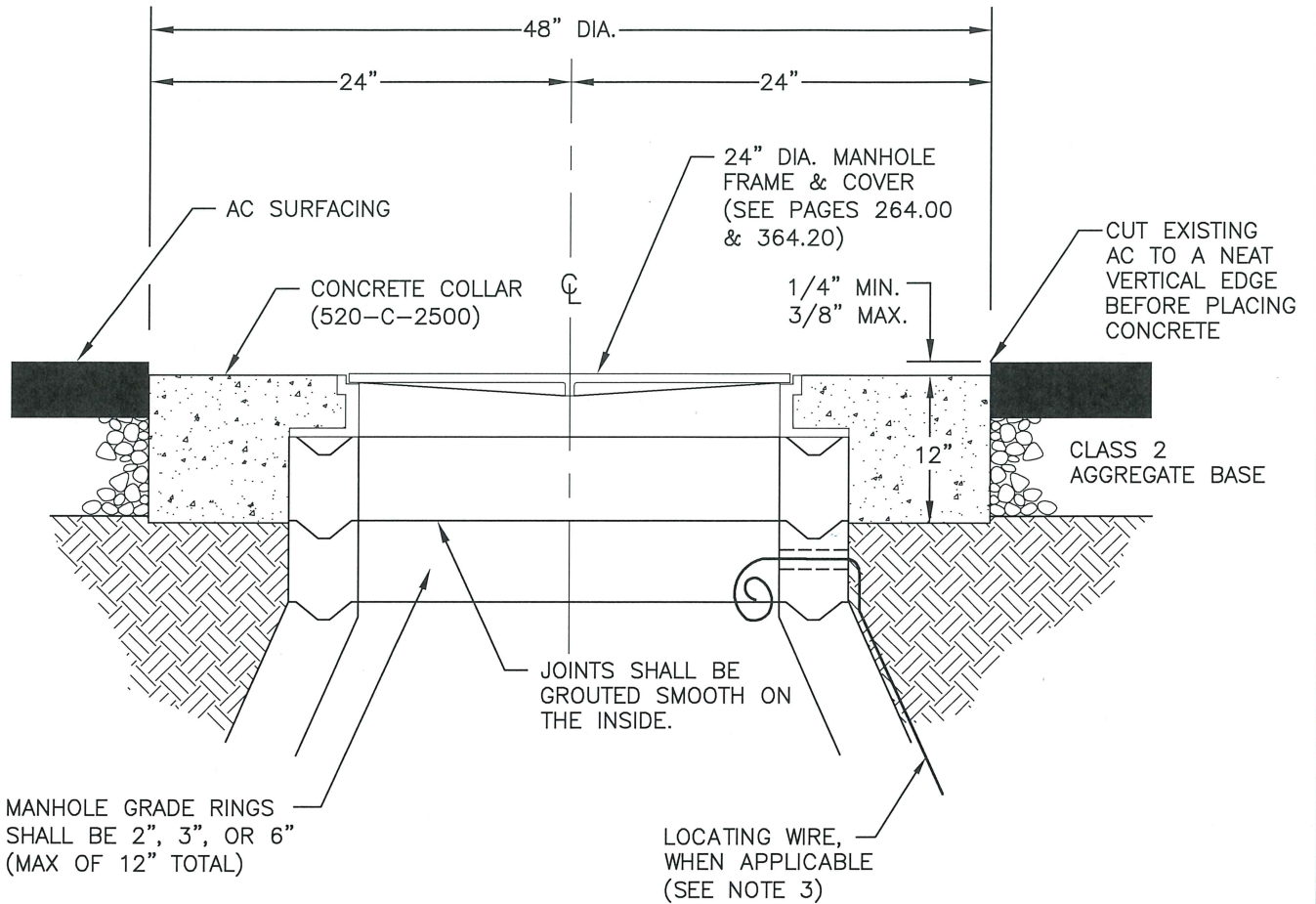
TO BE USED IN PAVED STREET SECTIONS

NOTES:

1. FOR SEWER MANHOLE CONSTRUCTION, SEE PAGE 360.00.
2. FOR STORM DRAIN MANHOLE CONSTRUCTION, SEE PAGE 260.00.
3. WHEN MANHOLE IS PART OF A NON-METALLIC PIPE NETWORK, LOCATING WIRE PER PAGE 608.00 SHALL BE MAINTAINED. CORE 1"Ø HOLE THRU GRADE RING AS NECESSARY TO MAINTAIN REQUIREMENT FOR EXCESS WIRE TO BE WITHIN 6"-12" OF THE FINISHED GRADE.

DWG DATE: 7/92		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
5	7/13	ADD LOC. WIRE REVISED STD	APPROVED BY  10/9/13 CITY ENGINEER	
4	4/06			
MARK	DATE	REVISION	MANHOLE ADJUSTMENT DETAIL	


**UPDATED 2018**



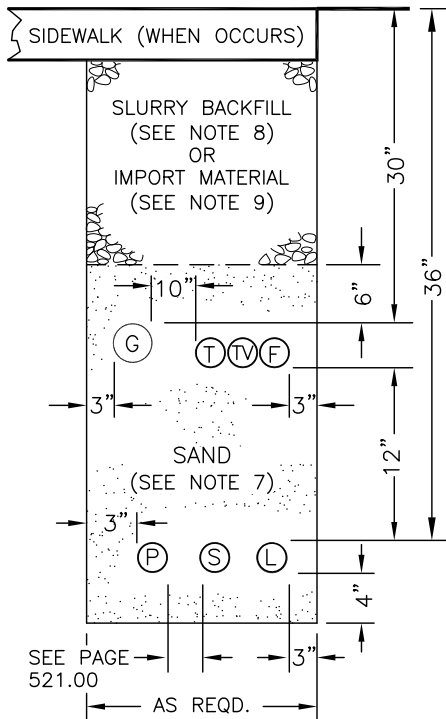
ADJUSTMENT DETAIL  
TO BE USED IN PAVED STREET SECTIONS

NOTES:

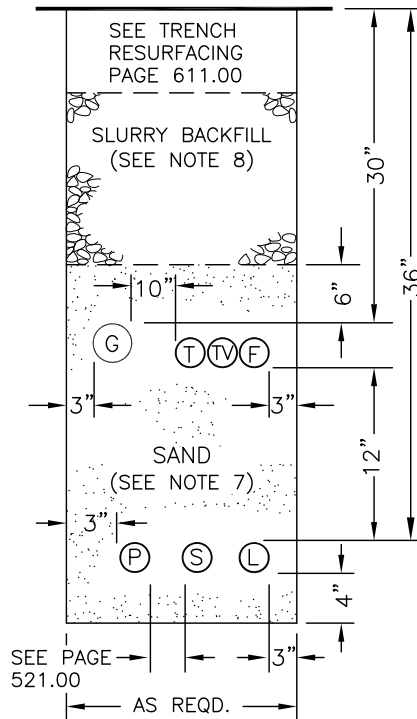
1. FOR SEWER MANHOLE CONSTRUCTION, SEE PAGE 360.00.
2. FOR STORM DRAIN MANHOLE CONSTRUCTION, SEE PAGE 260.00.
3. WHEN MANHOLE IS PART OF A NON-METALLIC PIPE NETWORK, LOCATING WIRE PER PAGE 608.00 SHALL BE MAINTAINED. CORE 1"Ø HOLE THRU GRADE RING AS NECESSARY TO MAINTAIN REQUIREMENT FOR EXCESS WIRE TO BE WITHIN 6"-12" OF THE FINISHED GRADE.

DWG DATE: 7/92		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
6	3/18	12" COLLAR	APPROVED BY	<p><b>MANHOLE ADJUSTMENT DETAIL</b></p>
5	7/13	ADD LOC. WIRE		
4	4/06	REVISED STD		
MARK	DATE	REVISION	CITY ENGINEER	

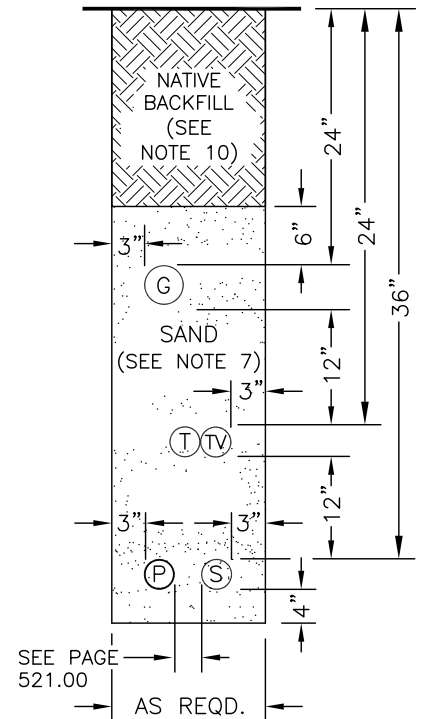
- LEGEND**
- (G) GAS (P.G.&E.)
  - (T) TELEPHONE
  - (TV) CABLE TV
  - (F) FIRE ALARM
  - (P) PRIMARY ELECTRIC
  - (S) SECONDARY ELECTRIC
  - (L) STREET LIGHT



**RIGHT-OF-WAY**  
PARALLEL TO STREET



**RIGHT-OF-WAY**  
CROSSING STREET

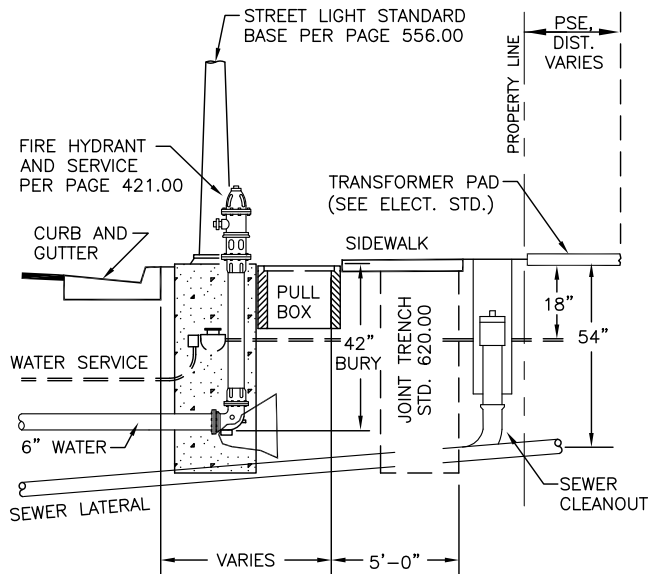


**OFF RIGHT-OF-WAY**  
UTILITY DISTRIBUTION LINES

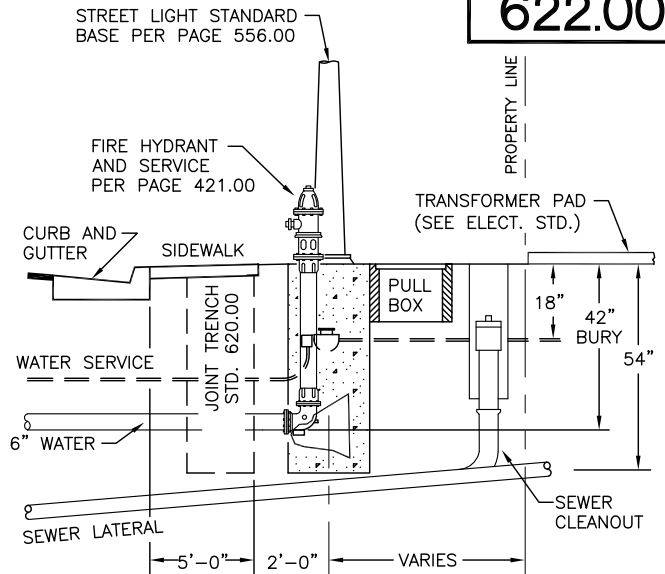
**NOTES:**

1. ALL DIMENSIONS SHOWN ARE MINIMUM REQUIREMENTS. TRENCH DEPTHS AND CONDUIT SEPARATIONS WILL VARY DUE TO CONDUIT SIZE, LATERAL INTERFERENCE, AND CONFLICT WITH OTHER UTILITIES.
2. NORMAL LOCATION FOR UTILITY TRENCH IN PARKWAY SHALL BE UNDER SIDEWALK SECTION.
3. ALL UNDERGROUND CABLE OR CONDUCTORS SHALL BE INSTALLED IN APPROVED CONDUIT (e.g. NO DIRECT BURIAL CABLE WILL BE PERMITTED).
  - A. PLASTIC CONDUIT FOR ELECTRIC CONDUCTORS SHALL BE NEMA PVC-DB-TC-6, AS APPROVED FOR DIRECT BURIAL INSTALLATION PER PAGE 521.00.
  - B. ALL CONDUITS INSTALLED SHALL INCLUDE PULL STRINGS PER PAGE 501.00.
4. AT NO TIME SHALL "DRY" UTILITIES (GAS, PRIMARY OR SECONDARY ELECTRIC, PHONE, OR CABLE) BE ALLOWED TO OCCUPY THE SAME TRENCH AS ANY "WET" UTILITY (WATER, SEWER, OR STORM DRAIN).
5. GAS FACILITIES MUST ADHERE BY G0112A:
  - A. WHERE 10" SEPARATION CANNOT BE OBTAINED IN A 18" WIDE TRENCH, SEPARATION MAY BE REDUCED TO NOT LESS THAN 6" INSTEAD OF WIDENING TRENCH.
  - B. WHERE PRIMARY ELECTRICAL AND GAS ARE NOT INVOLVED, SECONDARY ELECTRICAL MAY OCCUPY THE POSITION SHOWN FOR GAS.
6. EACH UTILITY MAY HAVE ONE OR MORE CONDUITS IN A TRENCH.
7. SAND SHALL BE USED TO PROVIDE A SMOOTH BEDDING AND COVER FOR THE CONDUITS. CRUSHED ROCK OR SHARP-EDGED MATERIAL OF ANY KIND IS UNACCEPTABLE PER PAGES 400.00 AND 520.80.
8. SLURRY BACKFILL SHALL CONFORM WITH PAGE 610.00, AND SHALL BE PLACED AND COMPACTED IN LIFTS NOT EXCEEDING THREE (3) FEET. WHERE STREETS HAVE NOT YET BEEN CONSTRUCTED, IMPORT MATERIAL MAY BE USED IN LIEU OF SLURRY.
9. IMPORT MATERIAL SHALL BE STREAM GRAVEL OR CRUSHED ROCK, AND SHALL BE REASONABLY WELL GRADED FROM COARSE TO FINE WITH A MAXIMUM SIZE OF 3" AND A MINIMUM SAND EQUIVALENT GREATER THAN 25.
10. COMPACTION OF NATIVE SOILS BY JETTING IS NOT PERMITTED.
11. FOR REQUIRED COMPACTION DENSITY AND TESTING FREQUENCY, SEE PAGE 601.00.

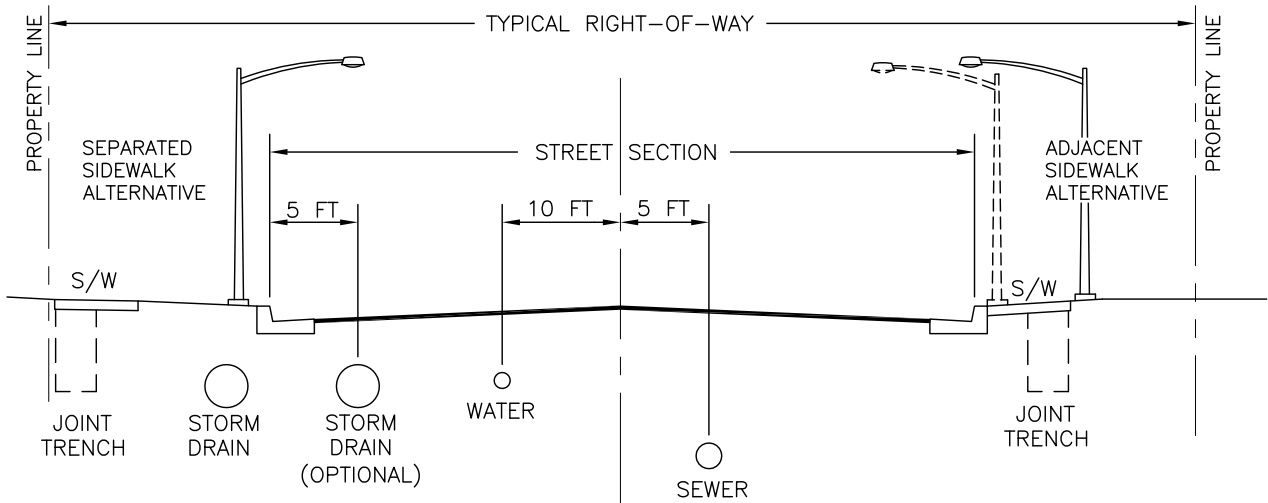
DWG DATE: 8/92		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
6 5	7/13	REVISE STD ADD SLURRY	APPROVED BY	
	4/06		10/9/13 CITY ENGINEER	
MARK	DATE	REVISION	<h2 style="margin: 0;">JOINT UTILITY TRENCH DETAILS</h2>	



**SEPARATED SIDEWALK DETAIL**



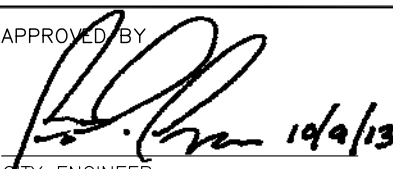
**ADJACENT SIDEWALK DETAIL**












**TYPICAL STREET SECTION**

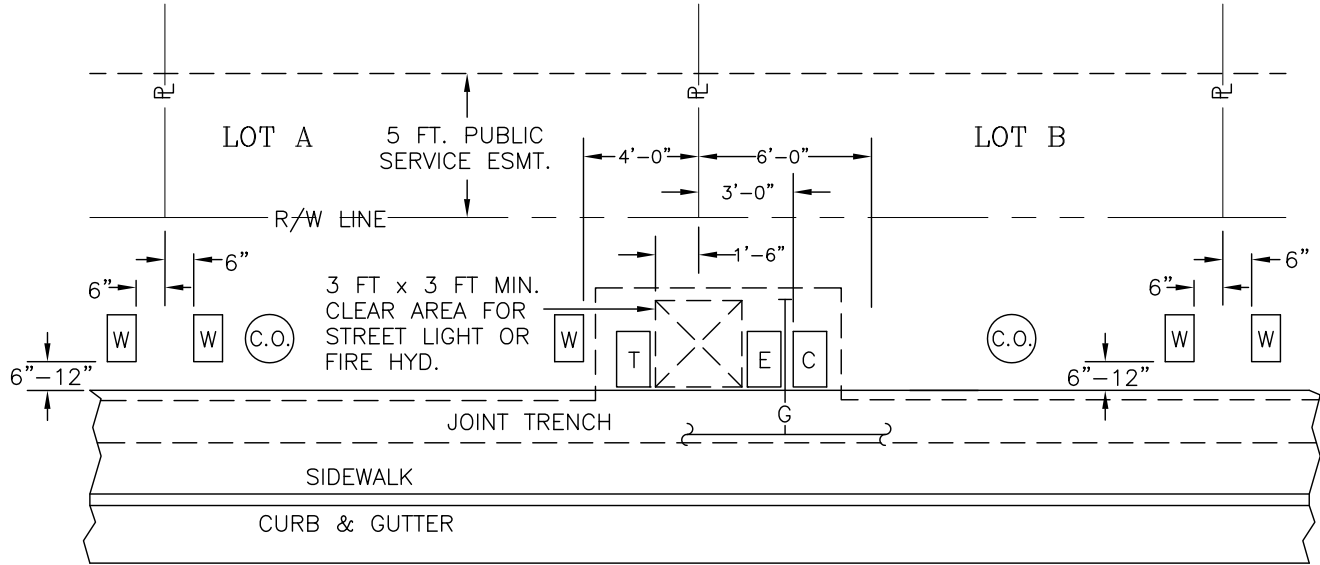
**NOTES:**

1. ALL DIMENSIONS SHOWN ARE DESIRABLE MINIMUMS. TRENCH DEPTHS AND CONDUIT SEPARATIONS WILL VARY DUE TO CONDUIT SIZE, LATERAL INTERFERENCE, AND CONFLICT WITH OTHER UTILITIES.
2. NORMAL LOCATION FOR UTILITY TRENCH IN PARKWAY SHALL BE UNDER SIDEWALK (SEE SECTION ABOVE).
3. ALL ELECTRIC CONDUCTORS PLACED UNDERGROUND SHALL BE INSTALLED IN APPROVED CONDUIT:
  - A. PLASTIC CONDUIT SHALL BE NEMA PVC-DB-TC-6 PVC, APPROVED FOR DIRECT BURIAL INSTALLATION PER PAGE 521.00.
  - B. ALL CONDUITS INSTALLED SHALL INCLUDE PULL STRINGS PER PAGE 501.00.
4. ALL CABLE OR CONDUCTORS SHALL BE IN CONDUIT AT ALL STREET CROSSINGS (e.g. NO DIRECT BURIAL CABLE WILL BE INSTALLED IN STREET).
5. AT NO TIME SHALL "DRY" UTILITIES (GAS, PRIMARY OR SECONDARY ELECTRIC, PHONE, OR CABLE) BE ALLOWED TO OCCUPY THE SAME TRENCH AS ANY "WET" UTILITY (WATER, SEWER, OR STORM DRAIN).
6. FOR SPECIFIC JOINT TRENCH DETAILS, SEE PAGE 620.00.

DWG DATE: 7/92		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
6	7/13	UPDATE	APPROVED BY  10/9/13 CITY ENGINEER	UTILITY LOCATIONS
5	4/06	CHG DEPTH		
MARK	DATE	REVISION		

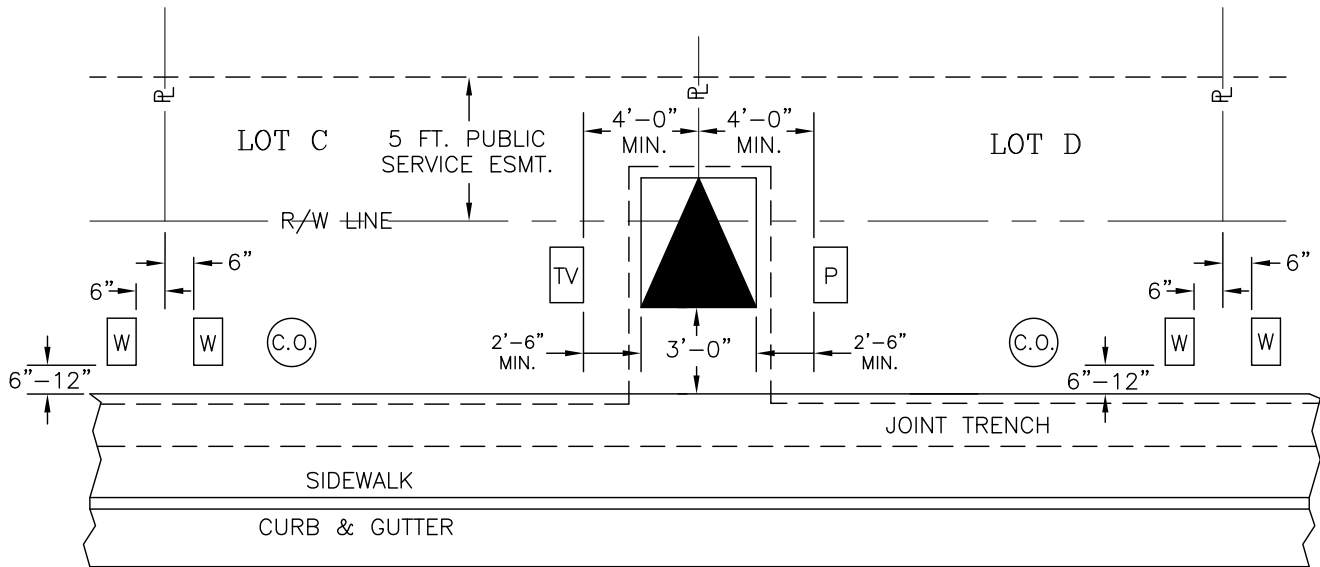
LEGEND

- |   |  |   |
|---|--|---|
|  ELECTRIC BOX  |  TELEPHONE PEDESTAL |  GAS                   |
|  CABLE TV BOX  |  CABLE PEDESTAL     |  S.S. LATERAL CLEANOUT |
|  TELEPHONE BOX |  WATER METER        |  TRANSFORMER           |



LOCATION A

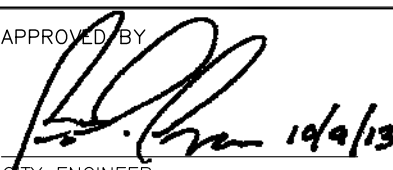
FOR FIRE HYDRANT OR STREET LIGHT

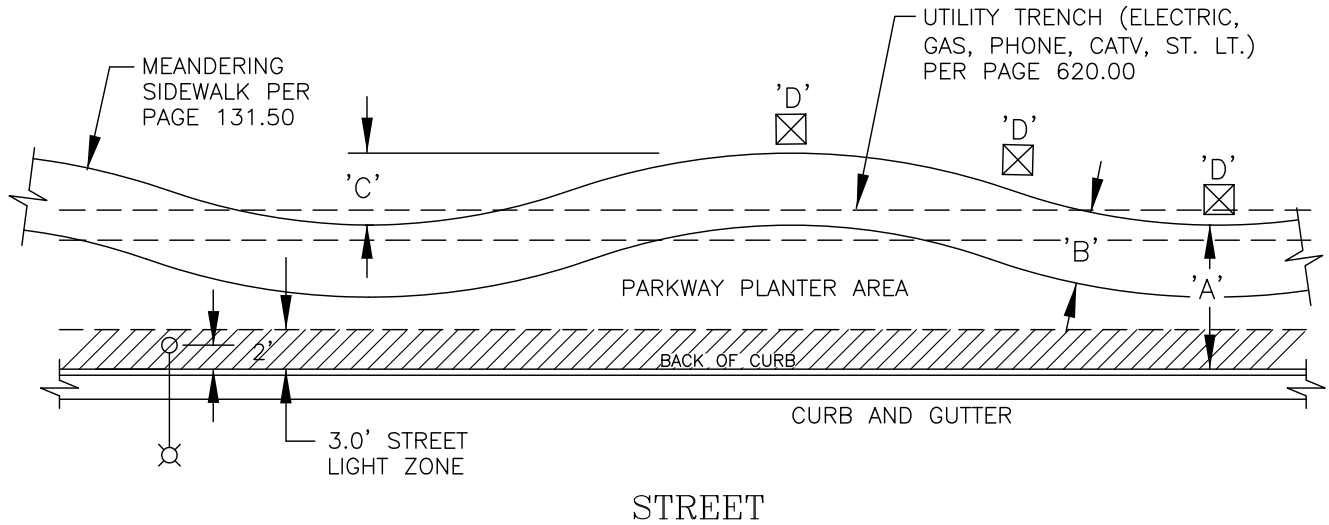


LOCATION B

FOR ELECTRIC TRANSFORMER

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DWG DATE: 1/98		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
4	7/13	UPDATE	 APPROVED BY 10/9/13 CITY ENGINEER	UTILITY SERVICE BOX LOCATION
3	4/06	ADD SS C.O.		
MARK	DATE	REVISION		

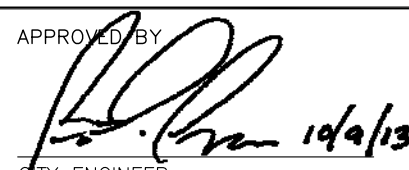


DIMENSIONS:

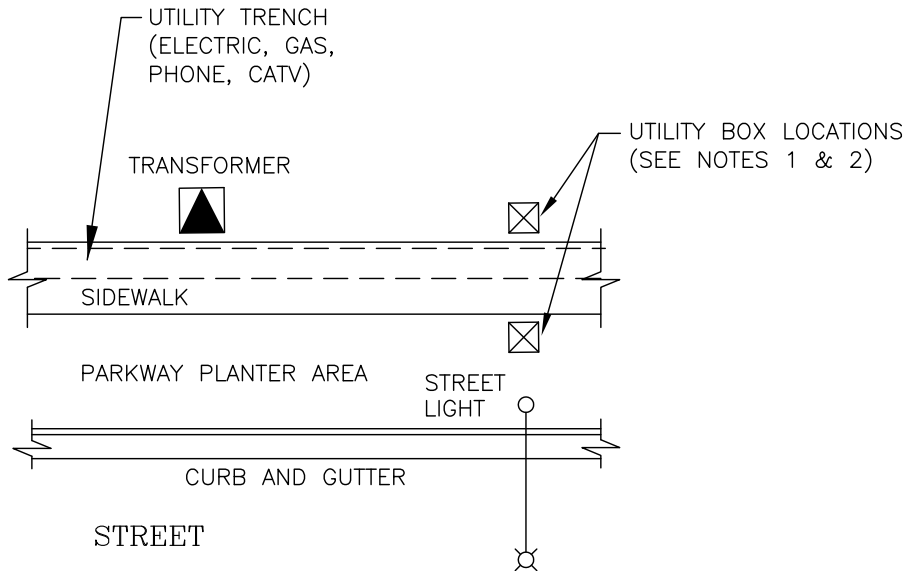
- 'A' – THE DISTANCE WHERE THE BACK EDGE OF THE MEANDERING SIDEWALK IS AT ITS CLOSEST TO THE BACK OF CURB.
- 'B' – WIDTH OF SIDEWALK PER IMPROVEMENT PLANS.
- 'C' – NO GREATER THAN THE WIDTH OF THE SIDEWALK.
- 'D' – LOCATION OF UTILITY SPLICE BOXES, TRANSFORMERS, TERMINATIONS, VALVES, ETC. (AS SHOWN ON UTILITY CONSTRUCTION PLANS). SEE PAGE 623.00 FOR DETAILS.

NOTES:

1. THE MAIN UTILITY TRENCH SHALL ALWAYS BE LOCATED UNDER THE MEANDERING SIDEWALK, SHALL PARALLEL THE BACK EDGE OF THE CURB, AND SHALL REMAIN EQUAL DISTANCE TO THE CURB BETWEEN STREET INTERSECTIONS OR PROJECT BOUNDARIES.
2. UNDERGROUND UTILITIES LOCATED WITHIN THE STREET LIGHT ZONE SHALL ACCOMMODATE STREET LIGHT FOUNDATIONS PER PAGE 556.00.
3. UTILITY SPLICE BOXES, TRANSFORMERS, TERMINATIONS, HAND HOLDS, PEDESTALS, ETC., SHALL ALWAYS BE LOCATED BEHIND THE SIDEWALK. SEE PAGE 623.00.
4. DEPENDING ON LOCATION OF SIDEWALK, A PUBLIC SERVICE EASEMENT MAY BE REQUIRED. THE EASEMENT WIDTH SHALL BE 5' MINIMUM AND SHALL NOT EXCEED THE BUILDING SETBACK LINE.

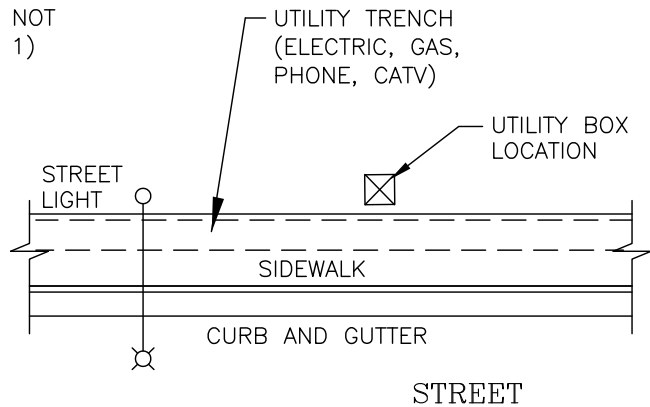
DWG DATE: 1/98		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
1	7/13	ADD S.L. ZONE	APPROVED BY  10/9/13 CITY ENGINEER	
MARK	DATE	REVISION		
			TRENCH LOCATION FOR MEANDERING SIDEWALK	





**LOCATION B**

LOCATION OF UTILITY TRENCH AND BOX LOCATION(S) IF SIDEWALK IS NOT ADJACENT TO CURB (SEE NOTE 1)



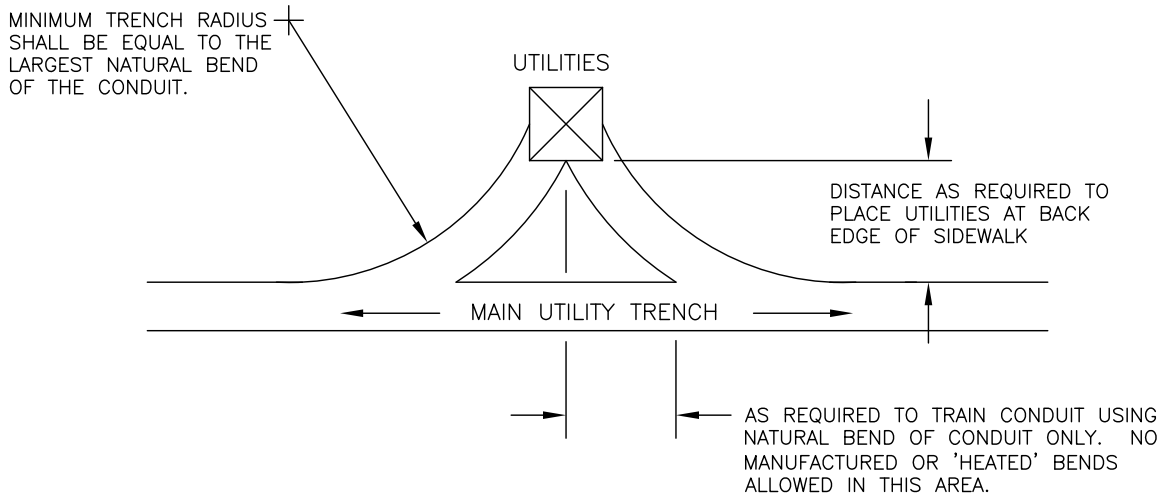
**LOCATION A**

LOCATION OF UTILITY TRENCH AND BOX LOCATION(S) IF SIDEWALK IS ADJACENT TO CURB (SEE NOTE 1)

NOTES:

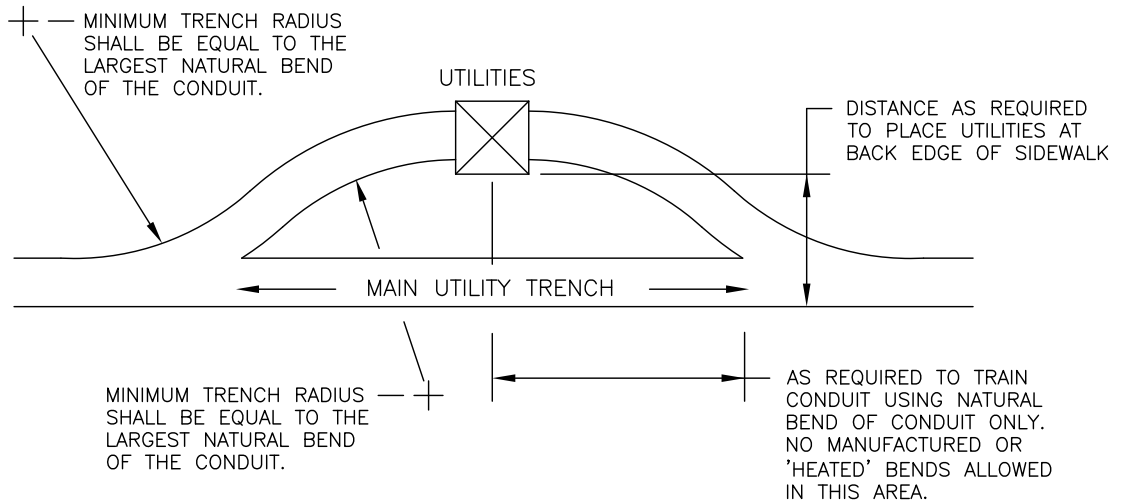
1. MAIN UTILITY TRENCH SHALL BE LOCATED UNDER THE SIDEWALK.
  - a. THE TRENCH SHALL BE LOCATED UNDER THE BACK EDGE OF SIDEWALK IF THE SIDEWALK IS ADJACENT TO THE CURB OR IF PARKWAY STRIP WIDTH IS LESS THAN 5 FEET.
  - b. IF PARKWAY STRIP WIDTH IS GREATER THAN 5 FEET, THE UTILITY TRENCH MAY BE LOCATED ON EITHER SIDE OF THE SIDEWALK.
2. ALL ABOVE GROUND STRUCTURES SHALL BE PLACED BEHIND THE SIDEWALK. ALL BELOW GROUND SPLICE BOXES, TERMINATIONS, HAND HOLDS, ETC., SHALL BE LOCATED ON THE SAME SIDE OF THE SIDEWALK AS THE TRENCH.
3. ELECTRICAL TRANSFORMERS SHALL ALWAYS BE LOCATED AT BACK SIDE OF SIDEWALK.

DWG DATE: 1/98		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
1	7/13	UPDATE STD	APPROVED BY <i>[Signature]</i> 10/9/13	TRENCH LOCATION FOR NON-MEANDERING SIDEWALK
MARK	DATE	REVISION	CITY ENGINEER	



**EXHIBIT 'A'**

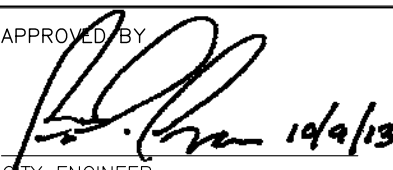
WHERE ALL UTILITY CONDUITS ENTER THE BOTTOM OF SPLICE BOXES, ETC. WITH 90° BENDS.

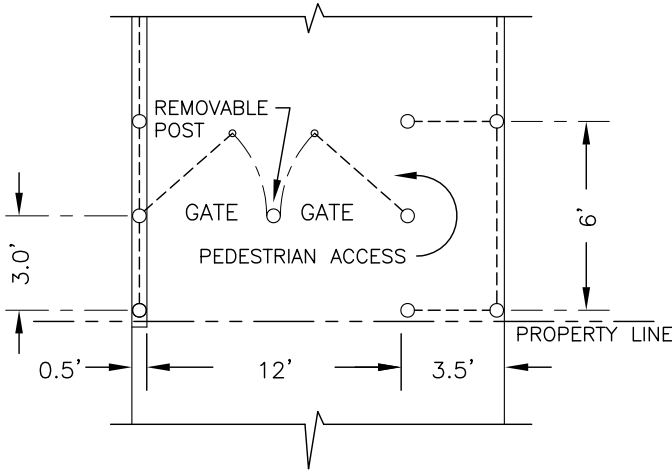


**EXHIBIT 'B'**

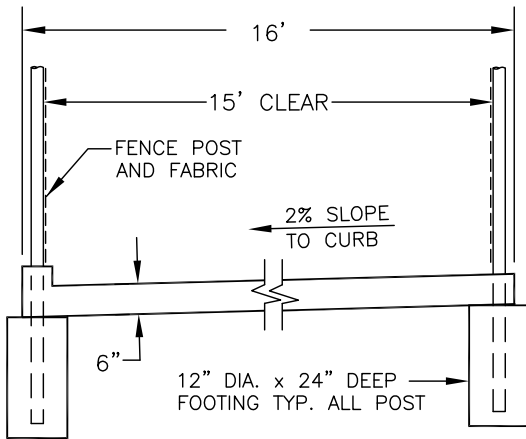
WHERE ONE OR MORE CONDUITS MUST ENTER A BOX PERPENDICULAR (90°) TO THE BOX WALL OR WHERE A GAS LINE MUST BE TAPPED.

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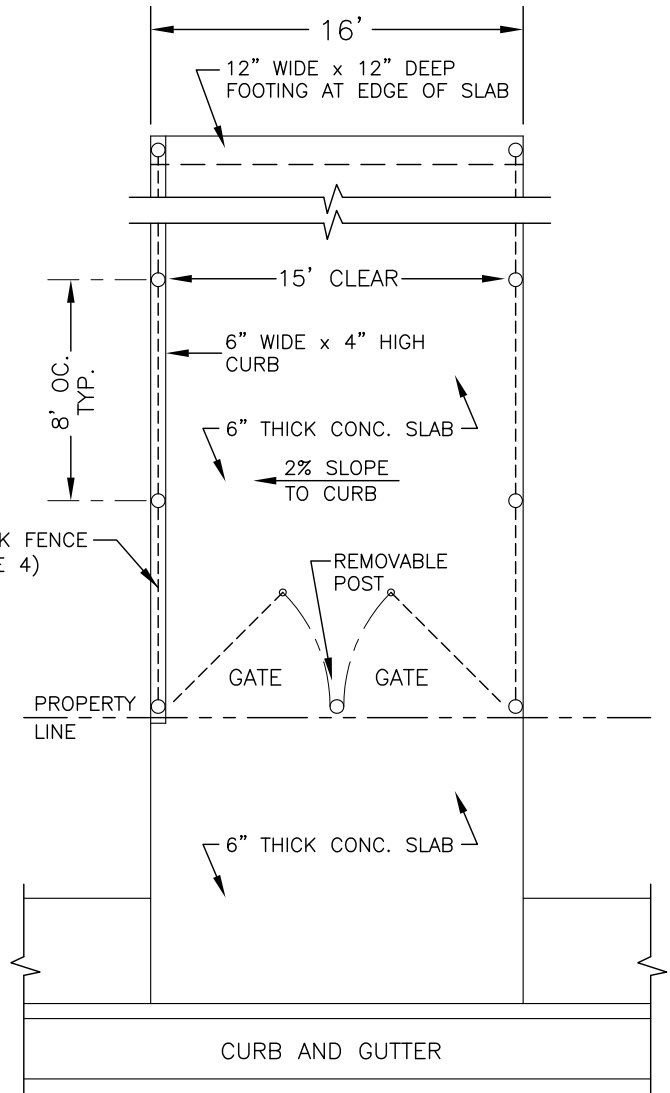
DWG DATE: 1/98		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
1	7/13	UPDATE	APPROVED BY  10/9/13 CITY ENGINEER	
MARK	DATE	REVISION		
			<b>TRENCH LOCATION</b>	



**PUBLIC OPEN SPACE  
ACCESS DETAIL**



**TYPICAL SECTION**



**GREEN BELT ACCESS**

**NOTES:**

1. ALL MATERIALS SUPPLIED AND ALL WORK DONE SHALL BE PER STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (GREENBOOK).
2. A SIGN READING "EMERGENCY ACCESS ONLY" SHALL BE INSTALLED ON GATE.
3. CONCRETE SLAB SHALL BE A MIN. OF 6" THICK AND SHALL HAVE A 2% SLOPE TO THE CURB.
4. CHAIN LINK FENCE SHALL BE SIX (6) FOOT HIGH, EXCEPT WITHIN THE FRONT YARD SETBACK WHERE THE HEIGHT SHALL BE THREE (3) FOOT MAXIMUM.
5. WHEN PUBLIC ACCESS IS TO BE GRANTED TO OPEN SPACE AREAS, CONFIGURE GATE TO PROVIDE ACCESSIBLE PASSAGE PER DETAIL ABOVE.

DWG DATE: 9/93

SCALE: NTS

CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION

APPROVED BY

*[Signature]*  
10/9/13  
CITY ENGINEER

**GREEN BELT  
ACCESS DETAILS**

3  
2

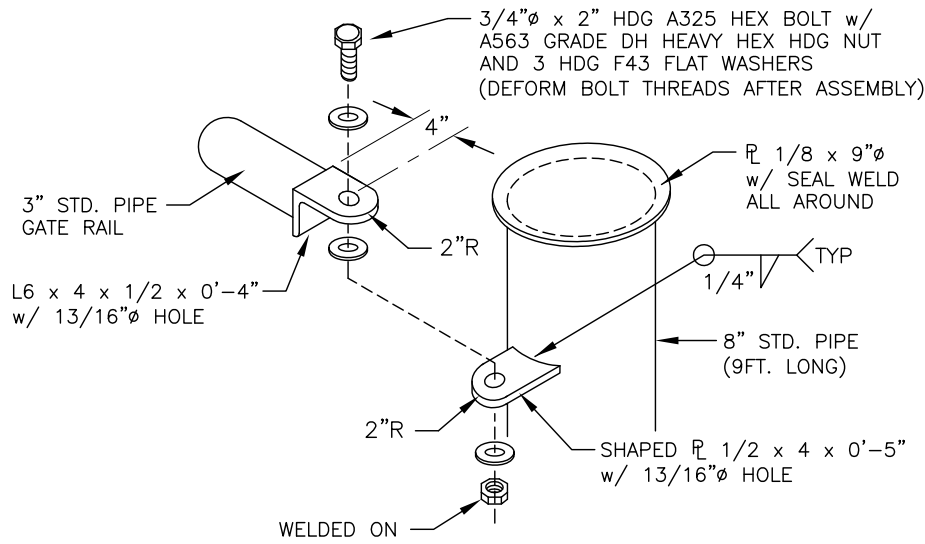
7/13  
1/98

ADA UPDATE  
NUM. CHG

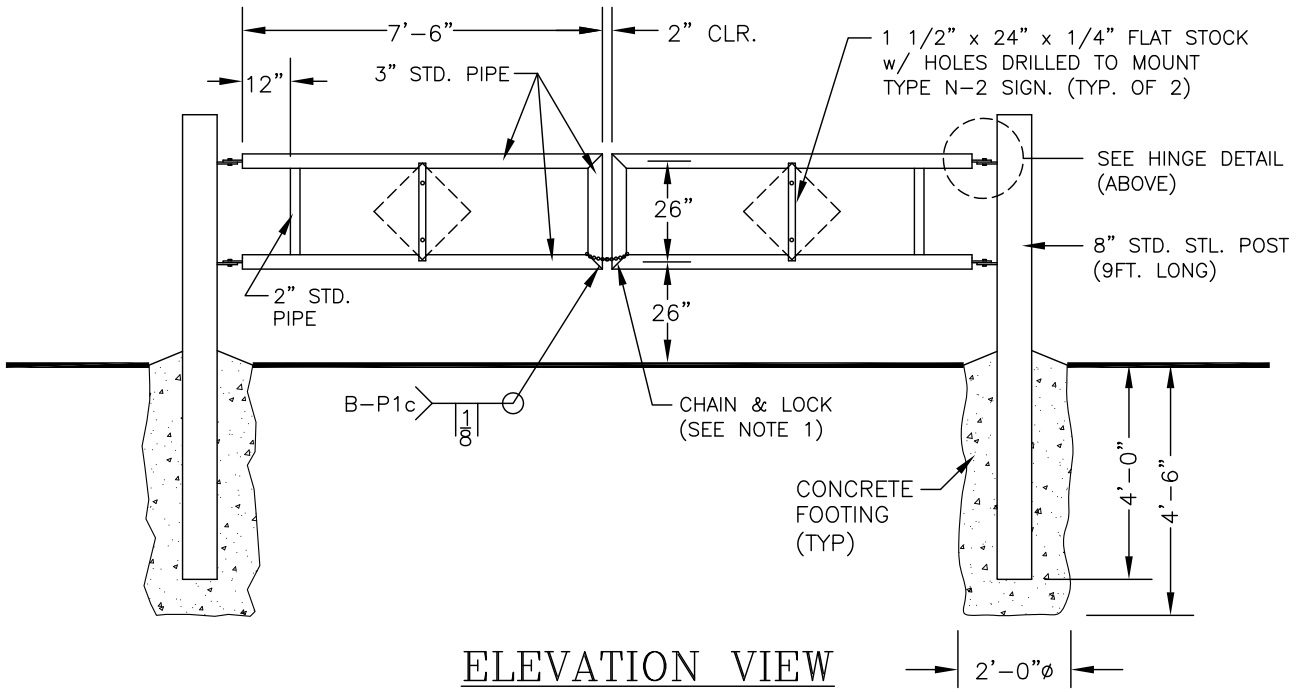
MARK

DATE

REVISION



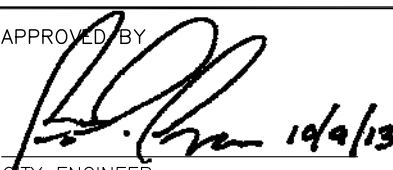
**HINGE DETAIL**

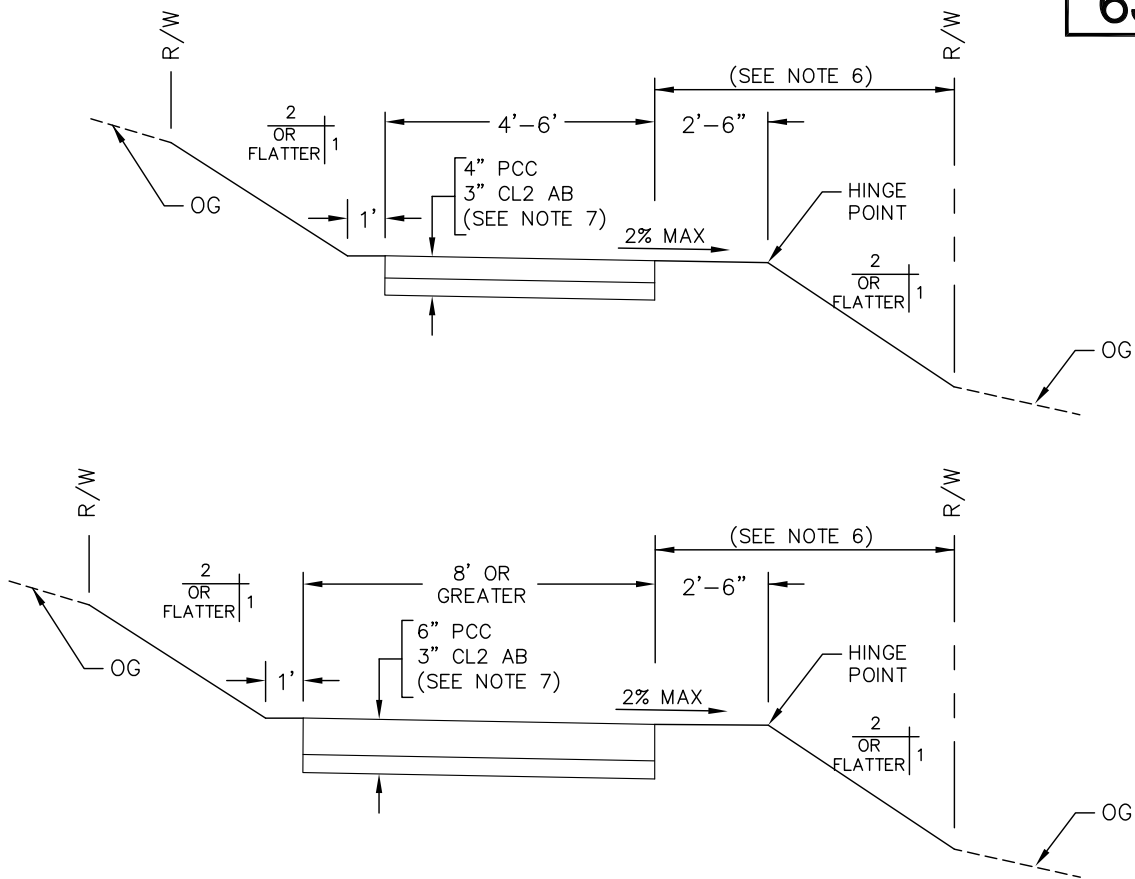


**ELEVATION VIEW**

**NOTES:**

1. INSTALL 3/8" HARDENED CHAIN, WELD ONE END TO GATE RAIL AND SECURE FREE END WITH CITY PROVIDED LOCK.
2. CONTRACTOR SHALL PREPARE AND PAINT ALL SURFACES WHITE PER SECTION 210-1.5 (PAGES B3 & B4) OF THE MODIFICATIONS TO THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (GREENBOOK).
3. HDG = HOT-DIPPED GALVANIZED
4. CONCRETE FOR FOOTINGS SHALL COMPLY WITH CLASS 500-C-2500 PER SECTION 201 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (GREENBOOK)

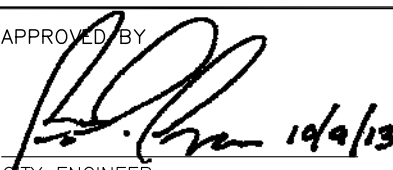
DWG DATE: 1/98		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
2	10/13	UPDATE	APPROVED BY  10/9/13 CITY ENGINEER	<b>ACCESS CONTROL GATE</b>
1	4/06	ADD WELD		
MARK	DATE	REVISION		

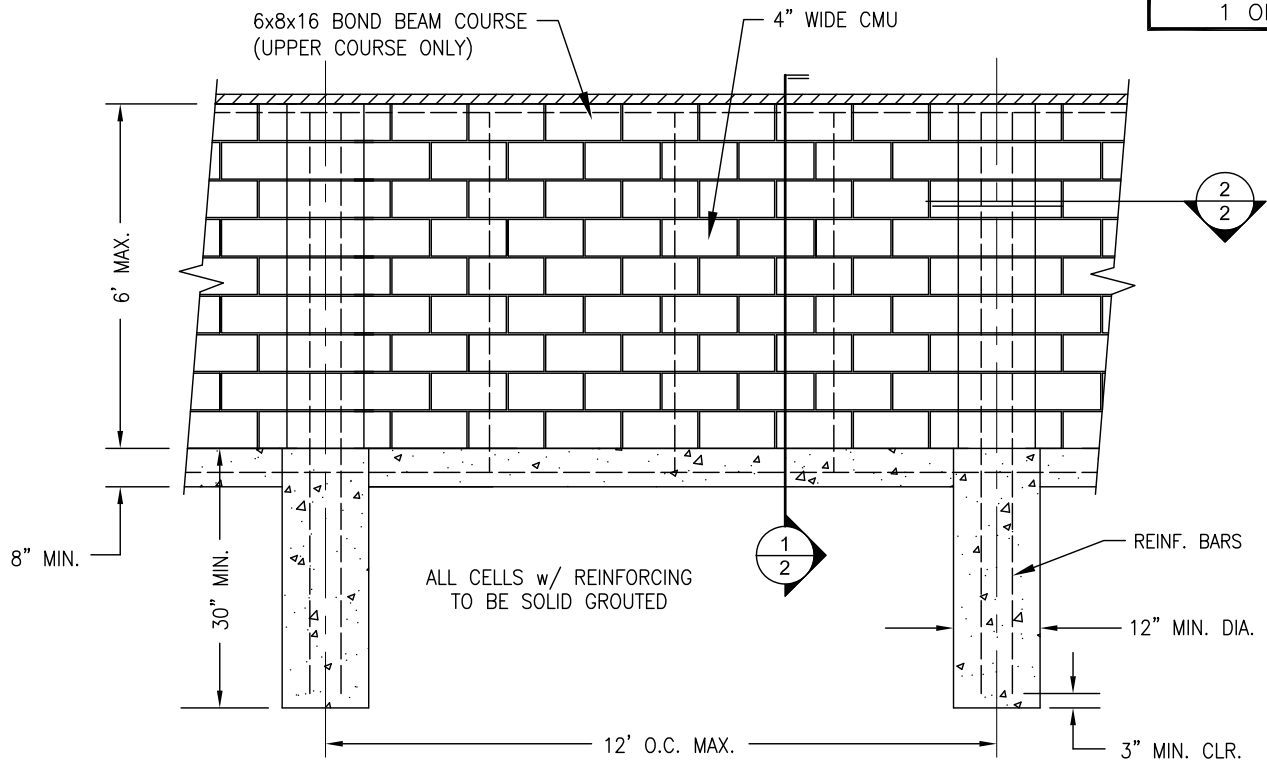


PROFILE GRADE	RESTING INTERVAL SPACING
>5%	NO RESTING INTERVAL REQ'D
5% - 8.33%	200'
8.33% - 10%	30'
10% - 12.5%	10'
PROFILE GRADE SHALL NOT EXCEED 12.5%, NO MORE THAN 30% OF THE TRAIL LENGTH MAY EXCEED A PROFILE GRADE OF 8.33%.	

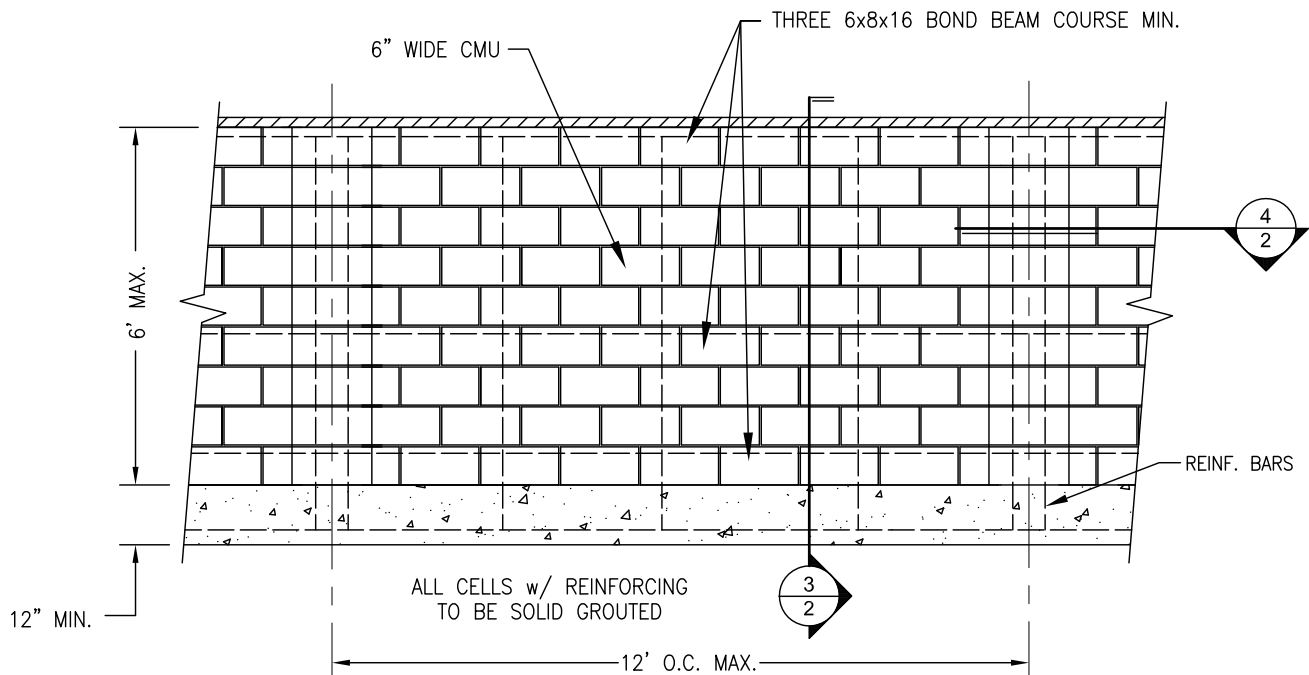
**NOTES:**

- ALL WORK AND MATERIALS SHALL CONFORM TO THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" (GREENBOOK).
- MATERIALS SHALL BE PER PAGE 100.00.
- ALL BROOM FINISHING SHALL BE PERPENDICULAR TO THE ALIGNMENT.
- 1/2-INCH PRE-MOLDED JOINT FILLER SHALL BE LEFT INSTALLED IN EXPANSION JOINTS AT EACH 'BC' AND 'EC' AND SHALL BE HELD FIRMLY IN PLACE PRIOR TO PLACING CONCRETE (SEE PAGE 126.00).
- CONTROL JOINTS SHALL BE TWO (2) INCHES DEEP AND AT INTERVALS NOT TO EXCEED 16 FT. OC.
- A FOUR (4) FOOT HIGH, VINYL COATED CHAIN LINK FENCE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS IN AREAS WHERE THE DISTANCE FROM THE EDGE OF CONCRETE TO THE HINGE POINT IS LESS THAN 2 1/2 FEET AND IN AREAS WHERE THE SIDE SLOPE IS STEEPER THAN 2:1. IN AREAS WHERE A FENCE IS REQUIRED, THE FENCE SHALL BE CONSTRUCTED BETWEEN THE EDGE OF PATH AND THE HINGE POINT.
- ALTERNATE ASPHALT CONCRETE/AGGREGATE BASE STRUCTURAL SECTIONS MAY BE CONSTRUCTED WHEN APPROVED BY THE CITY ENGINEER. SEE PAGE 111.00 "TYPICAL STREET CROSS SECTIONS" FOR ASPHALT CONCRETE/AGGREGATE BASE DETAILS.
- PASSING SPACE AT LEAST 8 FEET WIDE AND 8 FEET LONG SHALL BE PROVIDED AT LEAST EVERY 1000' WHERE TRAIL WIDTH IS LESS THAN FIVE (5) FEET.
- SIGNS SHALL BE INSTALLED AT DESIGNATED TRAIL HEADS INDICATING THE LENGTH OF THE TRAIL SEGMENT.
- RESTING LOCATIONS SHALL BE PROVIDED ALONG THE TRAIL PER THE "RESTING INTERVAL SPACING" CHART ABOVE. EACH RESTING LOCATION SHALL BE NO LESS THAN FIVE (5) FEET IN LENGTH.

DWG DATE: 2/03		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
1	7/13	UPDATE	APPROVED BY  10/9/13 CITY ENGINEER	
MARK	DATE	REVISION		
			<b>PAVED PATH</b>	

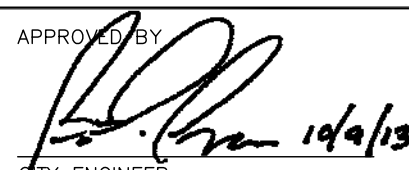


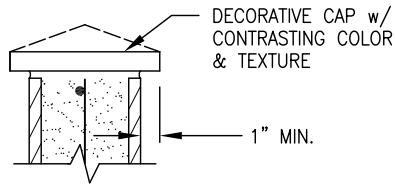
PIER FOUNDATION OPTION



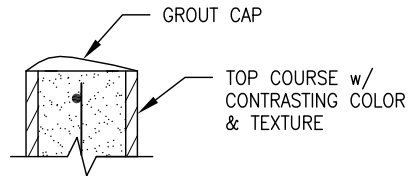
CONTINUOUS FOOTING OPTION

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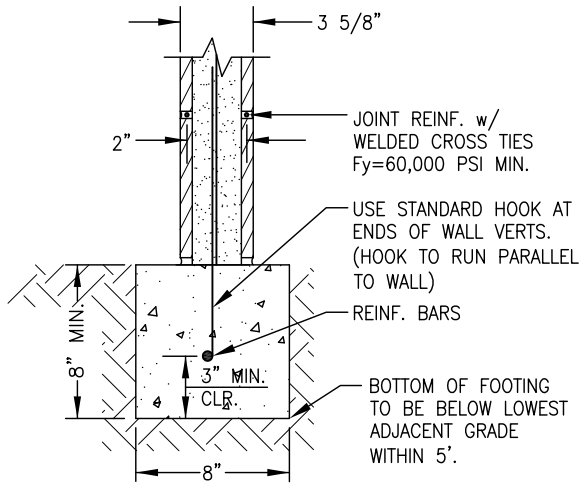
DWG DATE: 4/06		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
4	10/13	REVISED STD	APPROVED BY  10/9/13 CITY ENGINEER	RIGHT-OF-WAY FENCE DETAILS
3	4/06	NEW STD		
MARK	DATE	REVISION		



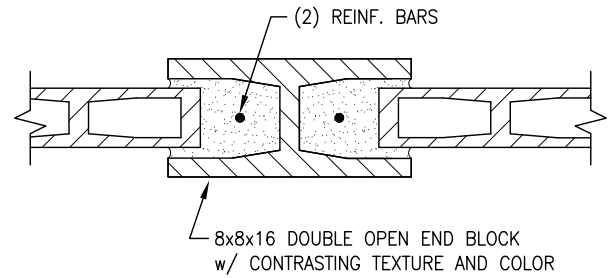
CAP OPTION #1



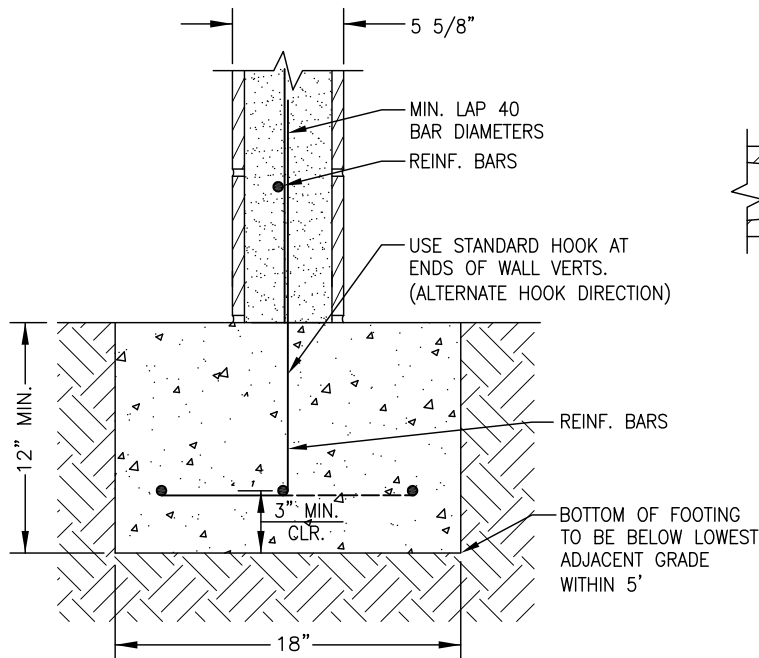
CAP OPTION #2



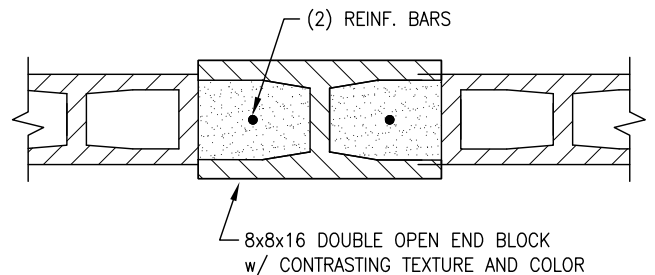
1 PIER FOOTING DETAIL



2 PILASTER DETAIL



3 CONTINUOUS FOOTING DETAIL



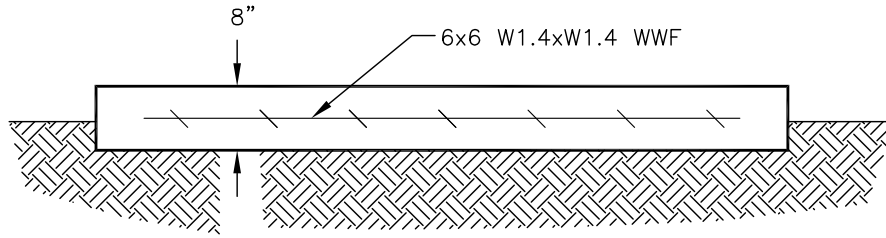
4 PILASTER DETAIL

SPECIFICATIONS:

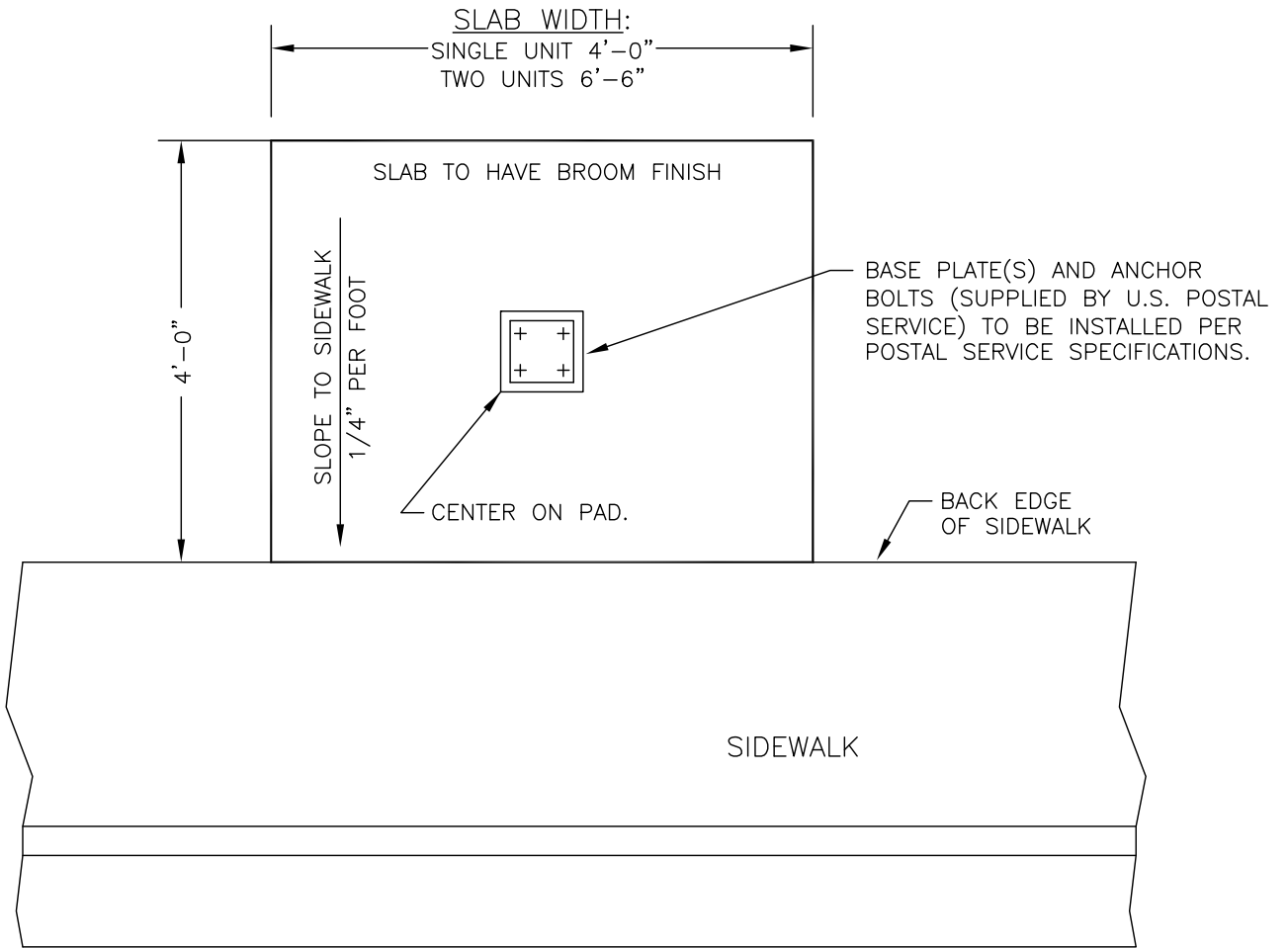
1. CONCRETE: CLASS 500-C-2500 (GREENBOOK)
2. REBAR: ASTM A615 GRADE 40 (OR GRADE 60)
3. CMU BLOCK: ASTM C90 - f'm=1900 PSI
4. GROUT: f'c=2000 PSI
  - a. FINE GROUT PER ASTM C476 SHALL BE USED AT ALL 4" CMU
  - b. COURSE GROUT PER ASTM C476 SHALL BE USED AT ALL 6" AND LARGER CMU
5. MORTAR: TYPE S
  - 1 PART CEMENT
  - 1/4 TO 1/2 PART LIME
  - 2 1/4 TO 3 PARTS SAND
6. LAP REBAR SPLICES 40 BAR DIAMETERS MIN.

NOTES:

1. WALL AESTHETICS SHALL BE APPROVED BY THE PLANNING DEPARTMENT.
2. STRUCTURAL CALCULATIONS AND CONSTRUCTION DETAILS (SIGNED AND STAMPED BY A CALIFORNIA LICENSED CIVIL OR STRUCTURAL ENGINEER) SHALL BE PROVIDED TO AND APPROVED BY THE BUILDING DEPARTMENT FOR ALL RIGHT-OF-WAY FENCE DESIGNS PRIOR TO CONSTRUCTION.

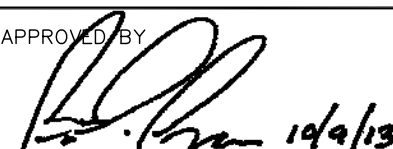


SECTION

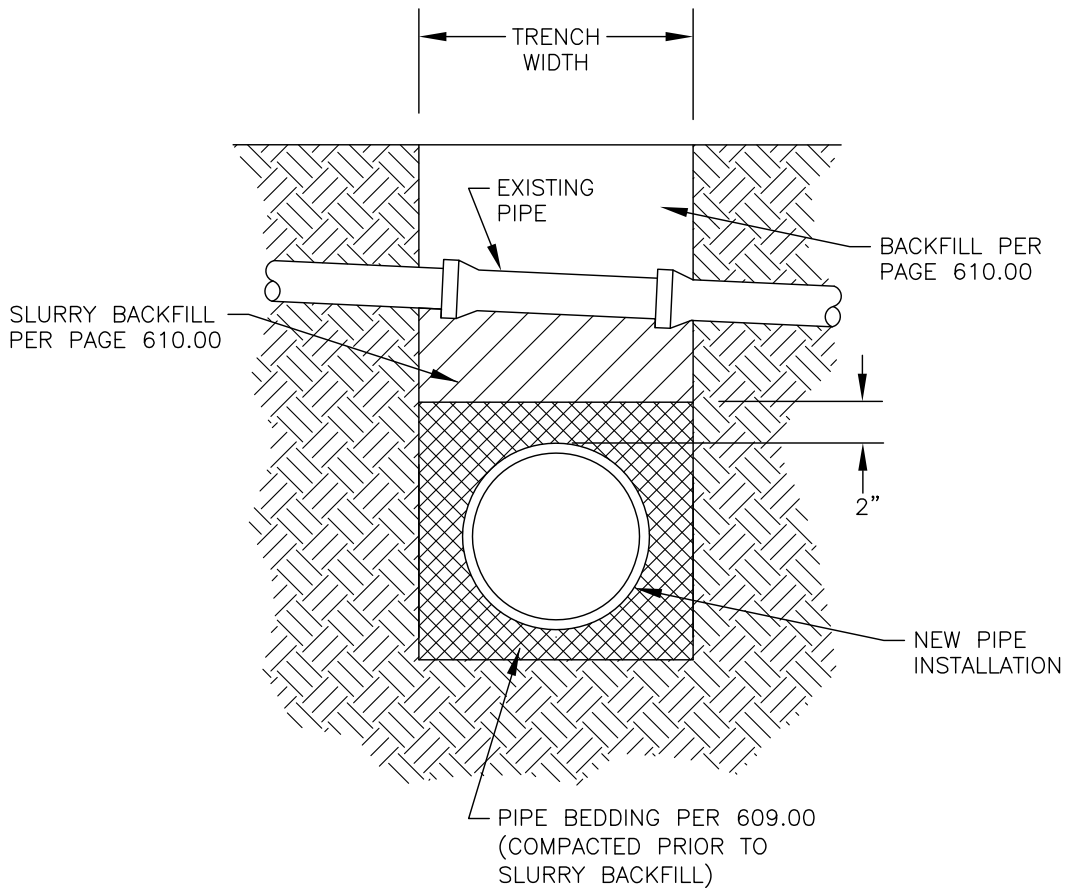
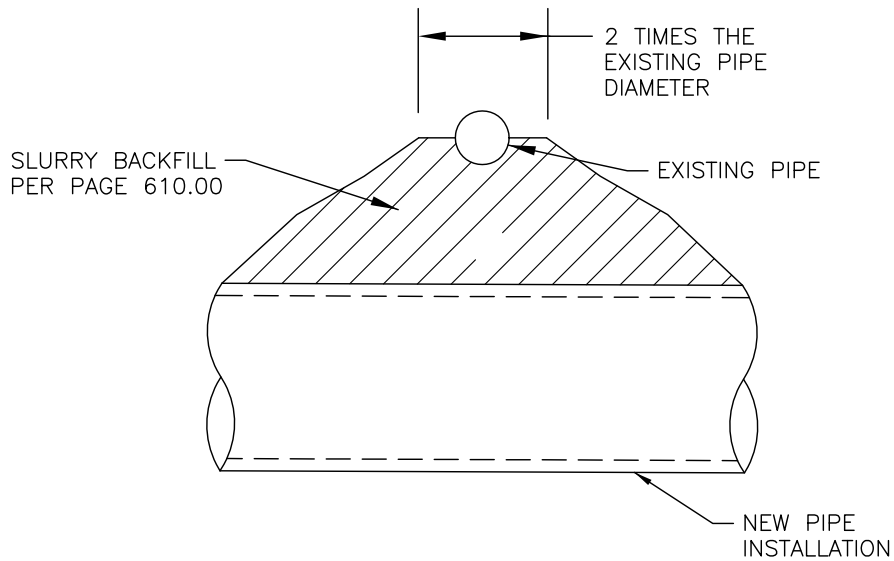


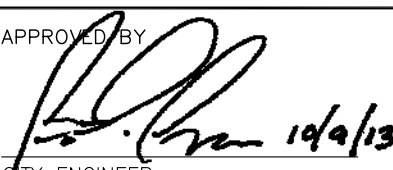
PLAN VIEW

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DWG DATE: 4/91		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
3	7/13	UPDATE	APPROVED BY  10/9/13 CITY ENGINEER	
2	2/03	SLAB THICK.		
MARK	DATE	REVISION	<p align="center"><b>POSTAL PAD</b></p> NDCBU "CLUSTER BOX" CONCRETE PAD WITHOUT J-BOLTS	





DWG DATE: 2/03		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
5	7/13	UPDATE STD	APPROVED BY  10/9/13 CITY ENGINEER	<b>PIPE SUPPORT ACROSS TRENCHES</b>
4	2/03	REVISED STD		
MARK	DATE	REVISION		

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

- A. THE CONSTRUCTION OF NEW MAIN LINES FOR THE CONVEYANCE OF POTABLE WATER AND NON-POTABLE MATERIAL SHALL CONFORM TO CALIFORNIA TITLE 22 CODE OF REGULATIONS, DIVISION 4 – ENVIRONMENTAL HEALTH, CHAPTER 16 – CALIFORNIA WATERWORKS STANDARDS, ARTICLE 4 – MATERIALS AND INSTALLATION OF WATER MAINS AND APPURTENANCES, §64572 – WATER MAIN SEPARATION. SAID REGULATION AND APPROVED CASES EXCEPTIONS ARE DETAILED HEREIN.
- B. FOR THE PURPOSE OF THIS STANDARD, NON-POTABLE MATERIAL SHALL INCLUDE: UNTREATED SEWAGE, PRIMARY OR SECONDARY TREATED SEWAGE, RECYCLED WATER, AND HAZARDOUS FLUIDS SUCH AS FUELS, INDUSTRIAL WASTES, ETC.
- C. IN NO CASE, SHOULD WATER MAINS AND NON-POTABLE PIPELINES CONVEYING SEWAGE OR OTHER LIQUIDS BE INSTALLED IN THE SAME TRENCH.
- D. INSTALLATION OF WATER MAINS OR NON-POTABLE PIPELINES 24-INCHES IN DIAMETER OR LARGER SHALL BE REVIEWED AND APPROVED IN WRITING BY THE CALIFORNIA DEPARTMENT OF PUBLIC HEALTH ON A CASE-BY-CASE BASIS PRIOR TO CONSTRUCTION.
- E. THE CONSTRUCTION CRITERIA PRESENTED IN THIS STANDARD SHALL APPLY TO HOUSE LATERALS THAT CROSS ABOVE A WATER MAIN, BUT NOT TO THOSE HOUSE LATERALS THAT CROSS BELOW A WATER MAIN.

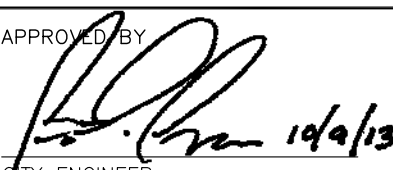
**STANDARD MAIN SEPARATION**

- A. NEW WATER MAINS SHALL BE AT LEAST TEN (10) FEET HORIZONTALLY FROM, AND ONE (1) FOOT VERTICALLY ABOVE, ANY PARALLEL NON-POTABLE PIPELINE.
- B. NEW WATER MAINS SHALL BE INSTALLED AT LEAST FOUR (4) FEET HORIZONTALLY FROM, AND ONE (1) FOOT VERTICALLY ABOVE, ANY PARALLEL STORM DRAIN.
- C. NEW RAW WATER SUPPLY LINES SHALL BE INSTALLED AT LEAST FOUR (4) FEET HORIZONTALLY FROM, AND ONE (1) FOOT VERTICALLY BELOW, ANY PARALLEL WATER MAIN.
- D. IF CROSSING A NON-POTABLE PIPELINE, A NEW WATER MAIN SHALL BE CONSTRUCTED NO LESS THAN 45-DEGREES TO AND AT LEAST ONE (1) FOOT ABOVE THAT PIPELINE. NO CONNECTION JOINTS SHALL BE MADE IN THE WATER MAIN WITHIN EIGHT HORIZONTAL FEET OF THE NON-POTABLE PIPELINE.
- E. THE VERTICAL SEPARATION SPECIFIED IN (A), (B), AND (C) IS REQUIRED ONLY WHEN THE HORIZONTAL DISTANCE BETWEEN A WATER MAIN AND NON-POTABLE PIPELINE IS LESS THAN TEN (10) FEET.
- F. THE MINIMUM SEPARATION DISTANCES ABOVE SHALL BE MEASURED FROM THE NEAREST OUTSIDE EDGE OF EACH PIPE BARREL.

**ALTERNATE CRITERIA FOR MAIN SEPARATION**

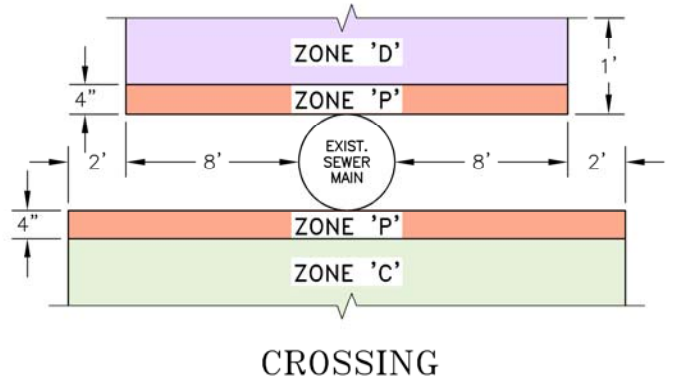
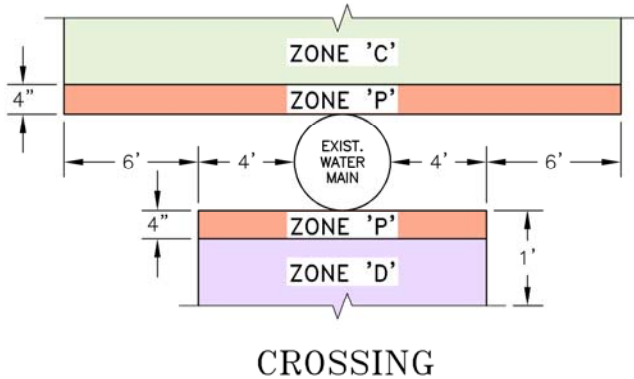
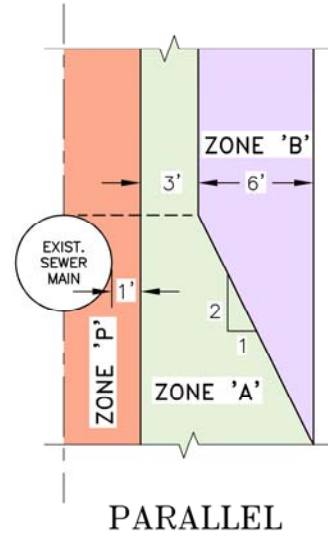
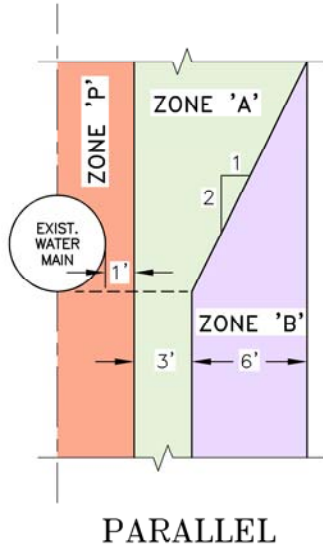
- A. WHEN NEW WATER MAINS OR NON-POTABLE PIPELINES CANNOT BE CONSTRUCTED IN ACCORDANCE WITH THE ABOVE STANDARD DUE TO LIMITING EXISTING CONDITIONS, THE APPROPRIATE ALTERNATE CONSTRUCTION CRITERIA DESCRIBED IN THE CASES BELOW SHALL APPLY EITHER ONE OR BOTH OF THE SYSTEMS.
  - CASE 1: A NEW NON-POTABLE PIPELINE AND A NEW OR EXISTING WATER MAIN.
  - CASE 2: A NEW WATER MAIN AND AN EXISTING NON-POTABLE PIPELINE.

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DWG DATE: 5/12		SCALE: NTS	CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION	
			APPROVED BY	<b>SEPARATION          REQUIREMENTS          FOR WATER MAINS &amp;          NON-POTABLE PIPELINES</b>
		NEW STD		
MARK	DATE	REVISION	CITY ENGINEER	

**CASE 1**  
NEW NON-POTABLE PIPELINE

**CASE 2**  
NEW WATER MAIN



**DESCRIPTION OF SPECIAL CONDITIONS BY ZONE**

ZONE	CASE 1: NEW NON-POTABLE MAIN	CASE 2: NEW WATER MAIN
P	NEW CONSTRUCTION IS PROHIBITED WITHIN THIS AREA	NEW CONSTRUCTION IS PROHIBITED WITHIN THIS AREA
A	NEW CONSTRUCTION WITHIN THIS AREA SHALL HAVE PRIOR WRITTEN APPROVAL FROM BOTH CDPH AND CITY OF REDDING PUBLIC WORKS	NEW CONSTRUCTION WITHIN THIS AREA SHALL HAVE PRIOR WRITTEN APPROVAL FROM BOTH CDPH AND CITY OF REDDING PUBLIC WORKS
B	NEW CONSTRUCTION WITHIN THIS AREA SHALL BE DIP WITH COMPRESSION JOINTS OR PVC WITH RUBBER RING JOINTS (ASTM D3034)	NEW CONSTRUCTION WITHIN THIS AREA SHALL BE DIP WITH COMPRESSION JOINTS OR PVC WITH RUBBER RING JOINTS (ASTM D3034)
C	NEW CONSTRUCTION SHALL BE DIP, CLASS 200 PVC, OR HDPE (C906-99) AND HAVE NO JOINTS WITHIN TEN (10) FEET FROM EITHER SIDE OF WATER MAIN	NEW CONSTRUCTION SHALL BE DIP, CLASS 200 PVC, OR HDPE (C906-99) AND HAVE NO JOINTS WITHIN TEN (10) FEET FROM EITHER SIDE OF WATER MAIN
D	NEW CONSTRUCTION SHALL BE DIP, CLASS 200 PVC, OR HDPE (C906-99) AND HAVE NO JOINTS WITHIN FOUR (4) FEET FROM EITHER SIDE OF WATER MAIN	NEW CONSTRUCTION SHALL BE DIP, CLASS 200 PVC, OR HDPE (C906-99) AND HAVE NO JOINTS WITHIN FOUR (4) FEET FROM EITHER SIDE OF WATER MAIN