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:

1½" 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)*.


* 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 (6 MIL) POLYETHYLENE SHEET ENCASED HELD TOGETHER WITH ADHESIVE TAPE (AWWA C105).
- POTENTIALLY CORROSIVE SOIL CONDITIONS SHALL BE DETERMINED BY THE GEOTECH REPORT.
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 - 3” AND LARGER**
   • FITTINGS SHALL BE EITHER TYTON JOINT, FLANGED, OR MECHANICAL JOINT (DUCTILE IRON AWWA C110 OR AWWA C153).

   **FOR PVC C-900 PIPE - 3” 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

<table>
<thead>
<tr>
<th>METER SIZE</th>
<th>SEE NOTE</th>
<th>BOX SIZE</th>
<th>COOK CONCRETE*</th>
<th>CHRISTY*</th>
<th>BES CONCRETE*</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8&quot; &amp; 3/4&quot;</td>
<td>(a)</td>
<td>10 1/4&quot; x 17 1/4&quot;</td>
<td>B0.75</td>
<td>B9</td>
<td>C9W</td>
</tr>
<tr>
<td>1&quot;</td>
<td>(a)</td>
<td>12&quot; x 20&quot;</td>
<td>B1.0</td>
<td>B12</td>
<td>C12W</td>
</tr>
<tr>
<td>1 1/2&quot;</td>
<td>(a)</td>
<td>13 1/4&quot; x 24&quot;</td>
<td>B1.5</td>
<td>B30</td>
<td>C30</td>
</tr>
<tr>
<td>2&quot;</td>
<td>(a)</td>
<td>17&quot; x 30&quot;</td>
<td>B2.0</td>
<td>B36</td>
<td>C36</td>
</tr>
<tr>
<td>3&quot;</td>
<td>(b)</td>
<td>30&quot; x 48&quot;</td>
<td>B4.0</td>
<td>B48</td>
<td>C48</td>
</tr>
<tr>
<td>4&quot;</td>
<td>(b)</td>
<td>30&quot; x 60&quot;</td>
<td>B5.0</td>
<td>B52</td>
<td>C52</td>
</tr>
<tr>
<td>6&quot;</td>
<td>(b)</td>
<td>48&quot; x 78&quot;</td>
<td>V4.0  6.5</td>
<td>R37P</td>
<td></td>
</tr>
<tr>
<td>8&quot;</td>
<td>(b)</td>
<td>54&quot; x 102&quot;</td>
<td>V4.5  8.5</td>
<td>–</td>
<td></td>
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<tr>
<td>LARGER THAN 8&quot;</td>
<td>(c)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>MULTIPLE METER BANKS</td>
<td>(f)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
</tbody>
</table>

* 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)

<table>
<thead>
<tr>
<th>VALVE BOX SIZE</th>
<th>SEE</th>
<th>COOK CONCRETE*</th>
<th>CHRISTY*</th>
<th>BES CONCRETE*</th>
</tr>
</thead>
<tbody>
<tr>
<td>(MINIMUM)</td>
<td>NOTES</td>
<td>BOX #</td>
<td>BOX #</td>
<td>BOX #</td>
</tr>
<tr>
<td>10” I.D. x 12” HIGH</td>
<td>(a,b)</td>
<td>VB10T</td>
<td>G5</td>
<td>G5</td>
</tr>
</tbody>
</table>

* OR APPROVED EQUAL

9. BLOWOFF BOXES (SEE PAGE 450.00)

<table>
<thead>
<tr>
<th>VALVE BOX SIZE</th>
<th>SEE</th>
<th>COOK CONCRETE*</th>
<th>CHRISTY*</th>
<th>BES CONCRETE*</th>
</tr>
</thead>
<tbody>
<tr>
<td>(MINIMUM)</td>
<td>NOTES</td>
<td>BOX #</td>
<td>BOX #</td>
<td>BOX #</td>
</tr>
<tr>
<td>10” I.D. x 12” HIGH</td>
<td>(a,b)</td>
<td>VB10T</td>
<td>G5</td>
<td>G5</td>
</tr>
</tbody>
</table>

* 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:

<table>
<thead>
<tr>
<th>VALVE SIZE</th>
<th>SEE</th>
<th>BOX SIZE</th>
<th>COOK CONCRETE*</th>
<th>CHRISTY*</th>
<th>BES CONCRETE*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2”, 3”, &amp; 4”</td>
<td>(a,c)</td>
<td>17” x 30”</td>
<td>B2.0</td>
<td>B36</td>
<td>C36</td>
</tr>
<tr>
<td>6” &amp; 8”</td>
<td>(b,c)</td>
<td>30” x 48”</td>
<td>B3.0</td>
<td>B48</td>
<td>C48</td>
</tr>
</tbody>
</table>

* 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).

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>TEST METHOD</th>
<th>SPECIFICATION REQUIREMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORGANIC IMPURITIES</td>
<td>ASTM C-40</td>
<td>SUPERNATANT SHALL NOT BE DARKER THAN PLATE 3 WHEN COMPARED TO STANDARD GARDINAR COLOR SERIES</td>
</tr>
<tr>
<td>SAND EQUIVALENT</td>
<td>ASTM D-2419</td>
<td>EQUAL TO OR GREATER THAN 20</td>
</tr>
<tr>
<td>COMPACTION CHARACTERISTICS</td>
<td>ASTM D-1557</td>
<td>RELATIVE COMPACTION OF 95% OR GREATER</td>
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<tr>
<td>GRAVATION</td>
<td>ASTM C-136 &amp; ASTM C-117</td>
<td>SIEVE</td>
</tr>
<tr>
<td>REU</td>
<td>NO. 4 (4.75mm)</td>
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<tr>
<td></td>
<td>NO. 8 (2.36mm)</td>
<td>90–100</td>
</tr>
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<td>NO. 16 (1.18mm)</td>
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<td>NO. 30 (600um)</td>
<td>65–100</td>
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<td>NO. 100 (150um)</td>
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<tr>
<td></td>
<td>NO. 200</td>
<td>0–15</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>NO. OF 5-G CALCIUM HYPOCHLORITE TABLETS TO OBTAIN 50 PPM (BASED ON TABLETS CONTAINING 65% AVAILABLE CHLORINE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIPE DIAMETER (INCHES)</td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>6</td>
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</tbody>
</table>
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:


2. LEAKAGE FOR DUCTILE IRON PRESSURE PIPE SHALL NOT EXCEED THE ALLOWABLE LEAKAGE AS CALCULATED IN AWWA C600 BY THE FOLLOWING FORMULA:

   \[ L = \frac{SD\sqrt{P}}{133200} \]

   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.

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.
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.
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 STANDARD, 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.
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
TYPICAL BYPASS INSTALLATION
FLANGED 3 INCH AND LARGER WATER METER

<table>
<thead>
<tr>
<th>METER SIZE (INCHES)</th>
<th>BYPASS SIZE (INCHES)</th>
<th>VALVE TYPE</th>
<th>LOCATION (SEE NOTE 2)</th>
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<tbody>
<tr>
<td>3&quot;</td>
<td>2&quot;</td>
<td>BALL</td>
<td>IN METER VAULT</td>
</tr>
<tr>
<td>4&quot;</td>
<td>4&quot;</td>
<td>RWGV</td>
<td>ADJACENT IN VALVE BOX</td>
</tr>
<tr>
<td>6&quot;</td>
<td>4&quot;</td>
<td>RWGV</td>
<td>ADJACENT IN VALVE BOX</td>
</tr>
<tr>
<td>8&quot;</td>
<td>6&quot;</td>
<td>RWGV</td>
<td>ADJACENT IN VALVE BOX</td>
</tr>
<tr>
<td>10&quot;</td>
<td>8&quot;</td>
<td>RWGV</td>
<td>ADJACENT IN VALVE BOX</td>
</tr>
</tbody>
</table>

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.
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.
45° BEND
22–1/2° BEND
11–1/4° BEND
PLAN VIEW

90° BEND
PLAN VIEW

ANCHOR BLOCK
PROFILE VIEW
(TO PREVENT UPLIFT)

3 FT STUB
M.J. CAP
VALVE
TEE, CROSS INSTALLATION SIMILAR
THRUST BLOCK

ANCHOR BLOCK SCHEDULE
MINIMUM VOLUME (CY)

<table>
<thead>
<tr>
<th>PIPE DIA. (IN)</th>
<th>ANCHOR ROD DIA. (IN)</th>
<th>45° BEND</th>
<th>22–1/2° BEND</th>
<th>11–1/4° BEND</th>
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<tbody>
<tr>
<td>4</td>
<td>1/2</td>
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</tr>
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<td>6</td>
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<td>0.9</td>
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<tr>
<td>12</td>
<td>3/4</td>
<td>2.2</td>
<td>1.2</td>
<td>0.7</td>
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</tbody>
</table>

THRUST BLOCK SCHEDULE

<table>
<thead>
<tr>
<th>PIPE DIA. (IN)</th>
<th>REDUCERS, DEAD END TEES, WYES, &amp; VALVES</th>
<th>90° BEND</th>
<th>45° BEND</th>
<th>22–1/2° BEND</th>
<th>11–1/4° BEND</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1.5' x 2'</td>
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<td>1' x 2'</td>
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<td>1' x 1'</td>
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<tr>
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<td>2' x 3'</td>
<td>0.4</td>
<td>2' x 2.5'</td>
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<td>1.5' x 1.5'</td>
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<td>12</td>
<td>4.5' x 4.5'</td>
<td>1.2</td>
<td>3' x 4'</td>
<td>1.2</td>
<td>2' x 2'</td>
</tr>
</tbody>
</table>

NOTES:
1. ALL CONCRETE SHALL BE PER PAGE 100.00.
2. THRU 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.
3. THRU BLOCK SIZES SHOWN IN TABLES ARE BASED ON AN ASSUMED TEST PRESSURE OF 200 PSI AND SOIL BEARING CAPACITY OF 2,000 PSF. THRU BLOCKS SHALL BE ENGINEERED IF THE TEST PRESSURE IS HIGHER OR BEARING CAPACITY IS LOWER THAN THE ASSUMED VALUES.
4. THRU AND ANCHOR BLOCK CONFIGURATIONS OTHER THAN THOSE SHOWN ON THIS PAGE SHALL BE ENGINEERED.
5. ALL THRU BLOCKS FOR PIPES LARGER THAN 12" SHALL BE ENGINEERED.
6. A DOUBLE LAYER OF 6 MIL POLYETHYLENE FILM SHALL BE PLACED BETWEEN CONCRETE AND FITTINGS.
7. CONCRETE SHALL BE KEPT BEHIND THE BELL OF THE FITTING.
8. FITTINGS SHALL NOT BE RENDERED INACCESSIBLE BY THE CONCRETE. CLEARANCE SHALL BE PROVIDED FOR BOLT REMOVAL.

CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION

THRU BLOCKS AND ANCHOR DETAILS
OPERATING NUT EXTENSION DETAIL
REQUIRED WHERE DISTANCE BETWEEN FINISHED GRADE AND TOP OF OPERATING NUT EXCEED 36 INCHES

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 OPERATING 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.
TEMPORARY CONNECTION FROM EXISTING FIRE HYDRANT

5' MAX. CONTRACTORS INSTALLATION

REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLY (SEE NOTES ON SHEET 2)

HYDRANT METER (SEE NOTES ON SHEET 2)

TEMPORARY CONNECTION FROM EXISTING BLOW-OFF

REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLY (SEE NOTES ON SHEET 2)

EXISTING BLOW-OFF

EXISTING WATER MAIN

CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION

MARK DATE REVISION

1 7/13 4/06 REVISED STD NEW STD

CITY ENGINEER

APPROVED BY

TEMPORARY CONNECTION TO NEW WATER MAIN
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.
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.
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.

<table>
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<th>DWG DATE</th>
<th>SCALE</th>
<th>CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION</th>
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<td>4/06</td>
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</table>

FIRE SERVICES
(TYPICAL)
CASE I
CASE II
FIRE SERVICE WITH HYDRANTS ONLY

NOTES:
1. FIRE SERVICE PIPING AND APPURTNANCES 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.

CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION

FIRE SERVICES
(TYPICAL)
CASE II
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.

FIRE SERVICES
(NON-TYPICAL)
CASE III
**NOTES:**

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF REDDING CONSTRUCTION STANDARDS (CCORCS) AND THE STANDARD SPECIFICATIONS (GREENBOOK).

2. FIRE SERVICE PIPING AND APPURTEINANCES 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.

---

**FIRE SERVICES**

(NON-TYPICAL)

1", 1 1/2" and 2"

---

**CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION**

<table>
<thead>
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<th>SCALE</th>
<th>CITY ENGINEER</th>
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**APPROVED BY**
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 SYSTEM 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 AT THE MOST REMOTE LOCATION AS POSSIBLE AS DEEMED BY THE CODE OFFICIAL.
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
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 (COCS) 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.
7. A MIN. OF 12" VERTICAL CLEARANCE SHALL BE PROVIDED BETWEEN THE RELIEF VALVE openings and the finished floor. The following installation heights shall apply.
8. ASSEMBLY SHALL BE LOCATED ON EXTERIOR WALL.

<table>
<thead>
<tr>
<th>SUPPLY MAIN (INCHES)</th>
<th>ASSEMBLY SIZE (INCHES)</th>
<th>DRAIN SIZE (INCHES)</th>
<th>AIR GAP (INCHES)</th>
<th>INSTALL HEIGHT (INCHES)</th>
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<tr>
<td>4&quot;</td>
<td>2&quot;—3&quot;</td>
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<td>6&quot;</td>
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<td>6&quot;</td>
<td>8&quot;</td>
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DWG DATE: 7/05  SCALE: NTS  CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION

1 7/13 4/05 UPDATE NEW STD  MARK DATE REVISION  APPROVED BY  CITY ENGINEER

REDUCED PRESSURE PRINCIPLE (RPP) BACKFLOW ASSEMBLY INTERNAL—ALTERNATE LOCATION
MINIMUM CLEARANCES

PLAN VIEW

- AVOID GROUND ENCLOSURE
  (SEE NOTE 4)
- BYPASS METER (SEE NOTE 9)
- BYPASS VALVE (SEE NOTE 9)
- OPTIONAL FDC LOCATION
- 4" THICK CONC. SLAB
  REQUIRED ON ALL ABOVE
  GROUND EXTERIOR
  INSTALLATIONS

12" MIN
24" MAX.

FLOW

FLOW

- PIPE SUPPORT MAY
  BE REQUIRED

- 90° ELBOW
  (TYP. OF 4)

- DISCHARGE
  PORT (RPP)

- ANCHOR BLOCK
  REQUIRED
  ON 3" SERVICES AND LARGER
  (SEE NOTE 7)

- ANCHOR BRACE (PIPE WITH CAPPED ENDS)
  REQUIRED ON 3" AND LARGER SERVICES
  (SEE NOTE 8).

FOR FIRE SERVICES, APPROVAL GRANTED BY:

ENGINEERING CONSTRUCTION INSPECTOR

BUILDING AND FIRE DEPARTMENT INSPECTOR(S)

ABOVE GROUND INSTALLATION

NOTES:
1. BACKFLOW DEVICES ARE REQUIRED UNDER THE STATE OF CALIFORNIA ADMINISTRATION CODE, TITLE 17, AND SHALL BE INSTALLED IN ACCORDANCE THEREOF.
2. 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.
3. ALL BACKFLOW DEVICES SHALL BE INSPECTED AND TESTED UPON INITIAL INSTALLATION BY A CERTIFIED BACKFLOW TESTER (AWWA OR ABPA).
4. ALL BACKFLOW DEVICES SHALL BE PLACED IN AN APPROVED ENCLOSURE PER PAGE 432.20.
5. 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).
6. ALL ABOVE GROUND PIPING INSTALLATIONS, 3" AND LARGER SHALL BE DUCTILE IRON PIPE WITH FLANGED FITTINGS.
7. ALL THRUST BLOCKS OR ANCHORS TO BE DESIGNED ON AN INDIVIDUAL BASIS PER PAGE 403.00.
8. 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.
9. 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.
**MINIMUM CLEARANCES**

PLAN VIEW

**NOTES:**

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).
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.
CABINET SHALL HAVE OPEN BOTTOM

**BOTTOM MOUNTING FRAME**

**CABINET DIMENSIONS**

<table>
<thead>
<tr>
<th>UNIT</th>
<th>SIZE</th>
<th>L'</th>
<th>W'</th>
<th>H'</th>
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<tr>
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<td>78&quot;</td>
<td>24&quot;</td>
<td>52&quot;</td>
<td></td>
</tr>
<tr>
<td>6&quot;</td>
<td>96&quot;</td>
<td>24&quot;</td>
<td>60&quot;</td>
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<td>108&quot;</td>
<td>30&quot;</td>
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**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.
TOP VIEW

14 GA. STEEL CABINET WITH FULL SWING HINGE (SEE NOTE 3)

HANDLE AND LOCK RING

1/2 'B'

2" MIN. ALL SIDES

3"Ø GRATED OPENINGS

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

CABINET DIMENSIONS

<table>
<thead>
<tr>
<th>DIMENSIONS FOR:</th>
<th>'A'</th>
<th>'B'</th>
<th>'C'</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4&quot; &amp; 1&quot; DEVICES</td>
<td>12 1/2&quot;</td>
<td>25&quot;</td>
<td>25&quot;</td>
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<tr>
<td>1 1/2&quot; &amp; 2&quot; DEVICES</td>
<td>20 1/2&quot;</td>
<td>32&quot;</td>
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* DIMENSIONS MAY VARY TO ACCOMMODATE NON--TYPICAL FIRE SERVICE DEVICE INSTALLATION

BACKFLOW DEVICE ENCLOSURE
3/4" THROUGH 2"
BOTTOM MOUNTING FRAME

DETAIL 'A'

SIDE VIEW

MATERIALS LIST FOR BACKFLOW DEVICE ENCLOSURE

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<thead>
<tr>
<th>ITEM NO.</th>
<th>DESCRIPTION</th>
<th>LENGTH FOR DEVICES:</th>
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<tr>
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<td>1 1/2&quot; &amp; 2&quot;</td>
</tr>
<tr>
<td>①</td>
<td>5/16&quot; COLD ROLL HINGE PIN</td>
<td>25&quot;</td>
<td>32&quot; 1</td>
</tr>
<tr>
<td>②</td>
<td>1/4&quot; PIPE HINGE</td>
<td>25&quot;</td>
<td>32&quot; 1</td>
</tr>
<tr>
<td>③</td>
<td>1/4&quot; x 1 1/2&quot; x 1 1/2&quot; CHAIN LINK</td>
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<td>5&quot; 1</td>
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<tr>
<td>⑤</td>
<td>1/8&quot; x 1&quot; x 1&quot; ANGLE HANDLE</td>
<td>4&quot;</td>
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</tr>
<tr>
<td>⑥</td>
<td>1/4&quot; x 2&quot; FLAT BAR</td>
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<td>⑦</td>
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<td>12 1/2&quot;</td>
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<tr>
<td>⑧</td>
<td>1/8&quot; x 1 1/4&quot; x 1 1/4&quot; ANGLE BRACE</td>
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<td>31 3/4&quot; 1</td>
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<td>1/8&quot; x 1&quot; ALIGNMENT TABS</td>
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</table>

NOTES:
1. 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.
2. 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.
3. CABINET SHALL BE PAINTED WITH OLIVE GREEN POWDER COAT PAINT INSIDE & OUT.
BASE FRAME
5/8" DIA. MOUNTING HOLES (TYP. 6 PLACES)

CABINET SHALL HAVE OPEN BOTTOM

BOTTOM MOUNTING FRAME

LIFTING EYE, 1/2"-13 UMC NUT WELDED IN PLACE (PLUG WITH BOLT AFTER INSTALLATION)

"W"

"L"

LOCKABLE "L" HANDLE

"H"

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.

FDC

GREASABLE HINGES (3 FOR LID)

Greasable hinges
(3 for lid)

TOP VIEW

OPTIONAL FDC w/ 3 SIGNS
(SEE NOTE 2)

TACK WELD 1"x1"x1/8" ANGLE BRACE INSIDE EA. DOOR

LEFT VIEW

FRONT VIEW

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.

CITY OF REDDING • PUBLIC WORKS DEPARTMENT • ENGINEERING DIVISION

BACKFLOW PREVENTION ASSEMBLY ENCLOSURE —"N" PATTERN

3" THROUGH 10"

NEW STD

MARK DATE REVISION

CITY ENGINEER

APPROVED BY

1/0/13

10/11 SCALE: NTS
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.
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.
BOX LOCATION 'A'
IMPROVED STREET AREAS

CASE 1
DEAD END INSTALLATION
EXAMPLE: AT CUL-DE-SAC

CASE 2
ON-LINE INSTALLATION
EXAMPLE: DIP IN ELEVATION OF WATER MAIN

NOTES:
1. ALL MATERIALS SHALL BE PER APPROVED MATERIALS AS LISTED ON PAGE 400.00.
2. FOR 2" THRU 8" MAINS, SIZE PERMANENT BLOWOFF ACCORDING TO CALIFORNIA WATER WORKS STANDARDS, TITLE 22.
3. BLOWOFFS FOR 12" AND LARGER MAINS SHALL BE PER PAGE 2.
4. ALL BLOWOFFS SHALL BE A MIN. OF 2" DIAMETER.
5. BLOWOFF SHALL NOT DISCHARGE TO A DRAIN WITHOUT AN AIR GAP SEPARATION.
6. 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.
7. IN CASE OF A PRESSURE (HOT) TAP, A CORPORATION STOP SHALL BE INSTALLED AT THE WATER MAIN.
8. REDUCING FITTING SHALL BE A D.I. MECHANICAL JOINT CAP WITH 2 INCH TAP.
9. ALL PIPE EXPOSED TO CONCRETE SHALL BE WRAPPED WITH A DOUBLE LAYER OF 6 MIL POLYETHYLENE FILM.

TYPICAL BLOW-OFF INSTALLATION
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.
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" NPT 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 PRACTICALLY 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.
LOCKING TAB (SEE DETAIL 'A')
LOCATED AT 1/3 POINTS

REFLECTIVE SHEETING
(SEE NOTE 9)

20" DIA. (I.D.) ENCLOSURE,
FULLY WELDED. (SEE NOTE 5)

BRASS DISCHARGE PIPING

SLAB, VALVE
AND ENCLOSURE

10 GA. ROLLED MILD STEEL,
20" DIA. (I.D.) ENCLOSURE,
FULLY WELDED. (SEE NOTE 5)

12" MIN.
CLEAR

DISTANCE VARIES
WITH HEIGHT OF
VALVE

CAV VALVE PER
PAGE 451.00

MOUNTING TAB (SEE DETAIL 'B')
LOCATED AT 1/3 POINTS

28" x 28" CONCRETE
SLAB OR SIDEWALK
(SEE NOTE 3)

RISER (BRASS,
COPPER, OR DI)

PVC SLEEVE THROUGH
CONCRETE SLAB
(SEE NOTE 6)

PIPE SUPPORT
(SEE NOTE 7)

14"
14"
12"
4"
4"
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

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.

TYPICAL LOCATION
PLAN VIEW