

CITY OF REDLANDS

MUNICIPAL UTILITIES & ENGINEERING DEPARTMENT



WATER SYSTEMS STANDARD SPECIFICATIONS

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CITY OF REDLANDS
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DEFINITIONS:

The word “City” shall mean the City of Redlands Municipal Utilities & Engineering Department.

The word “Engineer” shall mean the City Engineer acting directly or such individuals acting in his/her behalf as his/her properly authorized agents, assistants, inspectors, and superintendents.

The word “Contractor” shall mean the person, persons, partnership, or corporation duly licensed as such in the State of California to enter into a contract for the performance of the work required.

GENERAL NOTES: WATER

1. NEW DEVELOPMENTS SHALL PROVIDE MODEL ANALYSIS OF DEVELOPMENT IMPACTS ON THE CITY'S WATER SYSTEMS. LATEST WATER MODEL WILL BE PROVIDED BY THE CITY FOR ANALYSIS AND UPDATES. MODEL ANALYSIS SHALL BE ACCEPTED BY THE CITY PRIOR TO PLAN APPROVAL. ANALYSIS SHALL INCLUDE BUT NOT BE LIMITED TO:
 - POTABLE AND NON-POTABLE SYSTEM ANALYSIS
 - GALLONS PER CAPITA PER DAY (GPCD)
 - ANNUAL CONSUMPTION ANALYSIS
 - FIRE FLOW ANALYSIS PER HYDRANT (NFPA 291)
 - HYDRAULIC AND PRESSURE ANALYSIS
2. MATERIAL AND INSTALLATION SHALL CONFORM TO THE CITY OF REDLANDS MUNICIPAL WATER DIVISION STANDARD SPECIFICATION (LATEST REVISION THEREOF).
3. THE APPROXIMATE LOCATIONS OF EXISTING UNDERGROUND UTILITY LINES ARE SHOWN IN THESE PLANS. THE LINES ARE PLOTTED FROM A COMBINATION OF RECORD AND FIELD DATA, AND THE CITY HAS TRIED WITHIN ITS AVAILABLE RESOURCES TO LOCATE ALL SUCH FACILITIES WITH REASONABLE ACCURACY. BY ENTERING INTO A CONTRACT FOR THIS WORK, THE CONTRACTOR AGREES PRIOR TO EXCAVATION TO NOTIFY ALL UTILITY AND IRRIGATION COMPANIES OPERATING IN THE AREA OF THE WORK, AND TO DETERMINE WITH AS MUCH ACCURACY AS IS NEEDED TO PERFORM THIS WORK, THE EXACT LOCATIONS OF ALL UNDERGROUND MAIN OR TRUNKLINE UTILITY FACILITIES.
4. ALL SERVICE CONNECTIONS TO BE MINIMUM 1-INCH COPPER LATERALS.
5. STANDARD WATER MAIN LOCATION IS 7 FEET OFF THE CURB FACE.

6. THIS DRAWING IS SCHEMATIC ONLY, DO NOT SCALE.
7. THE CONTRACTOR SHALL MAKE ALL WATER MAIN CONNECTIONS TO EXISTING WATER MAINS, UNLESS OTHERWISE NOTED.
8. EXISTING UTILITIES ARE SHOWN ON DEVELOPMENT PLAN.
9. HYDRO TEST TO 225 P.S.I. MIN 2 HOUR DURATION AT THE LOWEST POINT IN THE WATER MAIN.
10. VALVES TO BE GATE VALVES MUELLER.
11. CONTRACTOR SHALL USE DOUBLE STRAP SERVICE CLAMPS OR HEAVY DUTY TAPPED COUPLINGS WHEN CONNECTING SERVICE LATERALS.
12. CONTRACTOR SHALL NOTIFY CITY 72 HOURS PRIOR TO SHUTDOWN REQUESTS OF WATER MAINS.
13. INSTALLATION SHALL CONFORM TO MANUFACTURERS SPECIFICATIONS AND LATEST CITY SPECIFICATIONS AND/OR AS DIRECTED BY THE ENGINEER.
14. METER BOXES SHALL BE PER STANDARD SPECIFICATION W-9.
15. PROVIDE A MINIMUM OF 10 FOOT SEPARATION BETWEEN SEWER AND WATER LATERALS WHERE POSSIBLE.
16. BACKFILL COMPACTION AND RE-SURFACING IN EXISTING STREETS SHALL CONFORM TO CITY OF REDLANDS GENERAL PERMIT CONDITIONS AND TRENCH SPECIFICATIONS.
17. ALL VALVES INSTALLED BY THE CONTRACTOR SHALL BE ACCESSIBLE FOR OPERATION WITH COMPLETE VALVE BOX TO GRADE DIRECTLY FOLLOWING CONNECTION TO EXISTING WATER SYSTEM.
18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUATE SIZING OF THRUST BLOCKS BASED ON FIELD CONDITIONS. THE SIZE SHOWN ON THE PLANS IS THE MINIMUM SIZE REQUIRED.
19. SAND BEDDING AND BACKFILL TO A DEPTH OF 12" ABOVE PIPE IS REQUIRED.
20. IF WATER MAINS ARE ABANDONED AS A RESULT OF THIS PROJECT THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RECONNECTION OR REPLACEMENT OF SERVICE LATERALS AS DIRECTED BY THE CITY INSPECTOR. SERVICE LATERALS THAT ARE REPLACED SHALL BE THE SAME SIZE AS EXISTING. ALL CONNECTIONS SHALL HAVE COPORATION STOPS.

21. INTERIOR WATER SYSTEM INCLUDING FIRE HYDRANTS SHALL BE COMPLETE AND ACCEPTED BY THE CITY BEFORE ANY FRAMING PERMITS WILL BE ISSUED. CONTACT CITY FIRE MARSHALL FOR INTERIOR SYSTEM INSPECTIONS.
22. CONTACT THE MUNICIPAL WATER DIVISION 72 HOURS PRIOR TO ANY WATER SYSTEM CONSTRUCTION.
23. WHERE DESIGNATED ON THE PLANS, THE CONTRACTOR SHALL INSTALL "POLY PIGS" AND "POLY PIG" OUTLETS. THE CONTRACTOR SHALL NOTIFY THE CITY 48 HOURS IN ADVANCE TO REQUEST THE CITY TO FLUSH POLY PIGS THROUGH THE MAINS. THE FLUSHING PROCESS SHALL TAKE PLACE PRIOR TO HYDROSTATIC TESTING CHLORINATION AND FINAL FLUSHING OF THE MAIN BY THE CONTRACTOR. FINAL CONNECTIONS SHALL NOT BE MADE PRIOR TO BACTERIA TEST SAMPLES THAT MEET CITY REQUIREMENTS AND AUTHORIZATION FOR TIE-INS BY THE CITY INSPECTOR.
24. COMPLETE A SET OF "AS BUILT" DRAWINGS SHALL BE SUBMITTED TO THE MUNICIPAL UTILITIES DEPARTMENT PRIOR TO FINAL INSPECTION.
25. THE CONTRACTOR SHALL NOT OPERATE ANY EXISTING CITY WATER SYSTEM VALVES.
26. WATER VALVE CANS SHALL BE PER SPEC A-20514 (SLIP CAN TYPE).
27. PRIOR TO THE START OF CONSTRUCTION, CONTRACTOR SHALL SUBMIT MATERIAL SPECIFICATIONS FOR APPROVAL BY THE CITY.

GENERAL NOTES: STANDARD OFF-SITE NON-POTABLE WATER

1. ALL OFF-SITE NON-POTABLE WATER SYSTEMS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE POTABLE WATER SYSTEM.
2. NON-POTABLE WATER PIPE SHALL BE PURPLE PVC C-900 PIPE, EITHER CLASS 150 OR 200, MARKED AS REQUIRED BY CITY STANDARDS TO IDENTIFY IT AS NON-POTABLE WATER. DIP MAY BE USED WITH THE APPROVAL OF THE CITY BUT IT MUST BE BAGGED WITH PURPLE BAGS.
3. ALL 1-INCH AND 2-INCH COPPER SERVICES SHALL BE WRAPPED CONTINUOUSLY WITH PURPLE MARKING TAPE FROM END TO END.
4. THE INSTALLATION OF THE IRRIGATION WATER SYSTEM SHALL CONFORM TO THE REGULATIONS FOR THE CONSTRUCTION OF IRRIGATION WATER SYSTEMS WITHIN THE CITY OF REDLANDS AND THE ACCOMPANYING PLANS AND SPECIFICATIONS.

5. NON-POTABLE WATER PIPING SHALL BE PURPLE PVC.
6. MARKING ON THE PURPLE PVC PIPE SHALL INCLUDE THE FOLLOWING:

“CAUTION: NON-POTABLE WATER - DO NOT DRINK”. NOMINAL PIPE SIZE. PVC-1120. PRESSURE RATING IN POUNDS PER SQUARE INCH AT 73 DEGREES. ASTM DESIGNATIONS SUCH AS 1785, 2241, 2672, 3139. PRINTING SHALL BE PLACED CONTINUOUSLY ON TWO SIDES OF THE PIPE.

7. ALL PRESSURE MAIN LINE PIPING FROM THE NON-POTABLE WATER SYSTEM SHALL BE INSTALLED TO MAINTAIN A MINIMUM OF 10 FEET HORIZONTAL SEPARATION FROM ALL POTABLE WATER PIPING. WHERE NON-POTABLE AND POTABLE WATER PRESSURE MAIN LINE PIPING CROSS, THE NON-POTABLE WATER PIPING SHALL BE INSTALLED BELOW THE POTABLE WATER PIPING IN A CLASS 200 PURPLE-COLORED PVC SLEEVE WHICH EXTENDS A MINIMUM OF 5 FEET ON EITHER SIDE OF THE POTABLE WATER PIPING. PROVIDE A MINIMUM VERTICAL CLEARANCE OF 6 INCHES. CONVENTIONAL (WHITE) PVC PIPE MAY BE USED FOR SLEEVING MATERIAL IF IT IS TAPED WITH 3-INCH-WIDE PURPLE WARNING TAPE WHICH READS “CAUTION, NON-POTABLE WATER - DO NOT DRINK”.

SECTION - I

GENERAL PROVISIONS

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GENERAL PROVISIONS

1. MATERIALS:

Contractors installing water facilities in the City of Redlands service area shall be licensed by the State of California for such work, and must obtain an encroachment permit at the Municipal Utilities & Engineering Department before proceeding with the work. All installations must be in accordance with the following specifications. Any reference to A.W.W.A. or other standards shall be of the latest revisions.

All material to be used on installing any water works facilities in the City of Redlands service area shall be new, and conform to the below named specifications. Any unsatisfactory material rejected by the inspector shall be immediately removed from the site.

- A. Fire Hydrant Assembly shall conform to Spec. No. W-1 or W-2.
- B. Fire Protection Water System shall conform to Spec. No. W-3.
- C. Ductile Iron Pipe shall conform to Spec. No. W-4.
- D. Cement Mortar Lined & Coated Steel Pipe shall conform to Spec. No. W-5.
- E. Fittings – 3” and Larger shall conform to Spec. No. W-6.
- F. Corporation Stops shall conform to Spec. No. W-7.
- G. Angle Meter Stops shall conform to Spec. No. W-8.
- H. Meter Boxes shall conform to Spec. No. W-9.
- I. Valve Cans shall conform to Spec. No. W-10.
- J. Service Saddles and Hot Tap Sleeves shall conform to Spec. No. W-11.
- K. Gate Valves 4” through 12” shall conform to Spec. No. W-12.
- L. Gate Valves Larger than 12” shall conform to Spec. No. W-13.
- M. Gate Valves 3” and Smaller shall conform to Spec. No. W-14.
- N. Butterfly Valves 4” through 20” shall conform to Spec. No. W-15.
- O. Ball Valves ¾” to 2” shall conform to Spec. No. W-16.

2. EXCAVATION:

Trenches shall be excavated to the alignment shown on the plans and to sufficient depth to provide a cover of thirty-two inches (32") for pipe size up to eight inches (8"), and a cover of thirty-four inches (34") to thirty-eight (38") for potable water pipe sizes from ten inches (10") to fourteen inches (14") inclusive, unless otherwise shown on the plans. Cover is to be established from finished grade. Where the placement of pipe is in an area of irregular surface, pipe shall not have more than five feet (5') of cover. The sides of the trench shall be vertical and the bottom flat. The width shall be sufficient for all pipes and for placing backfill material, but shall not be excessive. The maximum width at the ground surface shall not exceed the nominal diameter of the pipe plus two feet (2') unless in the opinion of the Engineer, soil conditions make this impractical. In the event obstructions are encountered that, in the opinion of the Engineer, must be circumvented, deflections up to three feet (3') may be made by gradually deflecting pipe joints. If greater than three foot deflections are required, cast iron fittings must be used.

The trench shall be excavated to a depth of four inches (4") below the grade of the bottom of the pipe, in order to provide clearance for the coupling or bells.

No trenching shall be done under curbs, gutters or cross gutters. This shall be accomplished by boring.

A trench being excavated, shall be backfilled with crushed aggregate base, moistened and thoroughly tamped to achieve 95% relative compaction of the trench is in rock with a diameter two inches (2") or greater then over excavation, or any hard or lumpy material. Such material shall be excavated to provide a clearance of at least six inches from the bottom of the pipe and backfilled with sand or suitable material, moistened and thoroughly tamped.

Adequate timbering, lagging, sheet piling, or other supports shall be provided as necessary, to allow all necessary operations in the trench to be carried on in safety. All such timbering or other supports shall be removed as the trench is backfilled. Adequate barricades, construction signs, lamps and other devices shall be provided to protect persons and property from injury. Where traffic must cross over trenches, suitable bridges shall be provided at street intersections, and driveways. The contractor's methods and procedure shall conform to all applicable laws and regulations.

Excavation and other work adjacent to sewer, pipes, house services, conduits, and other structures and appurtenances, shall be prosecuted so as not to interfere with their safe use.

Should any such facilities be damaged due to the operations of the contractor, he shall immediately notify the owners or proper authorities, and arrange for the immediate repair of the same at his expense. All pipe or structures which might be damaged in connection with the trench excavation shall be uncovered or otherwise accurately located prior to such excavation.

Adequate provisions shall be made for maintaining the flow of sewers, drains, water courses, or ditches crossing the trench and, upon completion of the work, they shall be restored to their original condition.

3. **PIPE RESTRAINTS & THRUST BLOCKS:**

Pipe Restraints shall be provided at all newly installed dead ends and tees and at all elbows over eleven and one-fourth (11¼) degrees in ductile iron pipe. Concrete thrust blocks may be used when approved by the City. At vertical bends, where the thrust is upward, restraints, collars and tie rods, designed to take the full theoretical tension developed under the test pressure, shall be used. Where concrete thrust blocks are used, before the trench is backfilled, all concrete collars and tie rods shall be encased in a minimum of six inches (6") of concrete. Thrust block areas shall be sufficient to provide bearing pressures below the safe limit as shown below. The safe bearing load of the soil is to be determined by the engineer and approved by the City Engineer.

Pipe Restraints shall be used in lieu of concrete thrust blocks where new pipe is being constructed or as directed by the Municipal Utilities & Engineering Department. The length of pipe to be restrained shall be determined as indicated by the manufacturer's specifications and shall be clearly noted on the plans.

Maximum Thrust at Fittings in Pounds

<u>Pipe Size and Class</u>	<u>Tees</u>	<u>90° Bend</u>	<u>45° Bend</u>	<u>22½° Bend</u>
4" – 150	2,775	3,915	2,130	1,080
200	3,700	5,220	2,840	1,440
6" – 150	5,700	8,055	4,365	2,205
200	7,600	10,740	5,820	2,940
8" – 150	9,870	13,950	7,560	3,825
200	13,160	18,600	15,120	5,100
10" – 150	16,125	22,800	12,360	6,255
200	21,500	30,400	16,480	8,340
12" – 150	22,965	32,460	17,580	8,910
200	30,620	43,280	23,440	11,880
14" – 150	31,155	44,040	23,865	12,090
200	41,540	58,720	31,820	16,120
16" – 150	40,320	57,015	30,885	15,645
200	53,760	76,020	41,180	20,860

The safe bearing loads given in the following table are for horizontal thrusts when the depth of over the pipe exceeds two feet (2').

Safe Bearing Loads

<u>Soil</u>	<u>Safe Bearing Load</u> <u>lb. per sq. foot</u>
Muck, peat, etc	0
Soft Clay	500
Sand.....	1000
Sand and Gravel.....	1500
Red Soil – Granular	1500
Sand and gravel cemented with clay.....	2000
Red Soil – Hard, Dry	2000
Shale.....	5000

4. TESTING:

After backfill and compaction, all pipe shall be tested under a pressure of one hundred-fifty (150) pounds, or one and one half (1½) times the working pressure, whichever is greater. The pipe shall be completely filled with water and all air expelled prior to the test. The test pressure shall be maintained for not less than two (2) hours and for as much longer as necessary for proper inspection of the joint. All visible leaks shall be stopped. Maximum allowable leakage shall be defined by the following formula:

$$L = \frac{HND(P)^{1/2}}{C}$$

in which: L = allowable leakage (gallons)
 H = specified test period (hour)
 N = number of rubber – gasketed joints in the pipe tested
 D = diameter of the pipe (inches)
 P = specified test pressures (psig)
 C = 7400

The Contractor shall furnish the metering device to establish leakage rate.

5. BACKFILL:

In all cases, pipe will be installed with sand bedding and a minimum of twelve inches (12") of sand backfill above the pipe. No backfill shall be placed over any fitting thrust-block or valve until it has been inspected and approved by the City Engineer.

Before covering the pipe, it shall be backfilled one third up the pipe diameter with sand and sufficiently rodded and tamped under the pipe, its entire length to provide firm bedding without voids.

If flooding of backfill is permitted by the city Inspector, sand shall be placed to a depth of twelve inches (12") over the pipe and flooded with an excess of water.

When the backfill material has settled and the water has disappeared, but not less than four (4) hours after first layer is placed, the balance of the trench may be backfilled. The material above the first layer shall be compacted by thorough jetting with a nozzle long enough to reach the bottom on the trench, if the material is suitable for settling with water, or by tamping with pneumatic tampers, in layers six inches (6") thick before compaction, or by tamping in twenty-four inch (24") layers with an RPB tamper, Hydrahammer, or equal. Backfill material shall be brought to the proper moisture content for maximum compaction. In paved streets and highways, compaction shall be ninety five percent (95%) of standard compaction in accordance with the procedures of the American Association of State Highway Officials. Backfill materials shall contain no rocks, broken paving, or lumps more than four inches (4") in the largest dimension, nor any trees, brush, or other organic material subject to decay. All backfill within city limits is to conform to specifications of the City Engineer.

6. REPAVING:

Trenches shall be patched with temporary asphaltic material and maintained for thirty (30) days by the contractor. Materials and methods shall be satisfactory to the authorities having jurisdiction. Prior to patching, the edges of the remaining paving shall be properly trimmed and all loose or broken pieces removed. Permanent paving will be done at the expense of the contractor and shall meet the specifications of the City of Redlands Standard Specifications and Detail Drawings for Design and Construction of Public Improvements.

7. FLUSHING AND DISINFECTION:

A. PRELIMINARY FLUSHING

1. All mains and service connections shall be thoroughly flushed prior to disinfection.

2. A flushing valve or blow offs shall be installed at the end of each new main at a site where it has been determined that there is adequate drainage.
3. Flushing valves and blow offs shall be capable of establishing the minimum continuous flushing flow in the main as indicated by Table 1.
4. It shall be noted that flushing is no substitute for preventive measures taken before and during pipe laying.
5. All flushing procedures and operations will be inspected and approved by the City Water Quality Technician.

TABLE 1
MINIMUM WATER MAIN FLUSHING FLOW

Nominal Inside Diameter <u>Inches</u>	Minimum Flushing Flow <u>Gallons Per Min</u>	Minimum Blow off Size <u>Inches</u>
4	100	1
6	220	1½
8	390	2
10	610	2½
12	880	3
14	1200	3½
16	1565	3½
18	1980	4
20" and over as per the City Engineer's Requirement.		

B. DISINFECTION. (And Method of Chlorine Application)

1. Continuous Feed Method.

Water from the existing distribution system or other approved source of supply shall be made to flow at a constant, measured rate into the newly laid pipeline. The water shall receive a dose of chlorine, also fed at a constant rate.

The two rates shall be proportioned so that the chlorine concentration in the water, in the pipe, is maintained at a minimum of 100 mg/L (ppm) available chlorine and no less than 70 mg/L at the end of the 24-hour period. Chlorine application shall not cease until the entire main is filled with the chlorine solution. If water from the existing distribution system is used for the chlorination process great care must be taken to assure

that the treatment water does not flow back into the line supplying the water. The chlorinated water shall be retained in the main for a period of 24 hours, during which time all valves and hydrants in the section treated shall be operated in order to disinfect the appurtenances. The end of the 24-hour period the treated water shall contain no less than 70 mg/L chlorine throughout the length of the main. All chlorine residuals will be determined and approved by the City Water Quality Technician.

C. FINAL FLUSING.

1. After the applicable retention period, the heavily chlorinated water shall be flushed from the main (using the rates shown in Table 1) until the chlorine residual in the water leaving the main is no higher than that in the generally prevailing distribution system. Chlorine residual determination will be made by the City Water Quality Technician.

D. BACTERIOLOGIC TESTS.

1. After final flushing and before the main is placed into the service, a sample or samples will be collected and tested for bacteriologic quality and shall show the absence of coliform organisms. All bacteriologic testing will be performed by the City Water Quality Technician.

2. REPETITION OF PROCEDURE.

If the initial disinfection fails to produce satisfactory samples, or in the case of pressure breaks during hydrostatic testing, complete flushing and disinfection shall be repeated until satisfactory results are obtained. When all procedures are complete and the samples are determined to be satisfactory, the City Water Quality Technician will approve the main being placed into service.

NOTE: Authority cited for main flushing and disinfection: Sections 208 and 4010.1 (h), Health and Safety Code. Reference: Sections 4010.1 (h), 4012, 4013, and 4019, California Health and Safety Code, and Current edition of American Water Works Association "AWWA STANDARD FOR DISINFECTING WATER MAINS" AWWA C601.

8. TAPS FOR CONSTRUCTION PURPOSES:

All taps made in the line for construction purposes, such as for chlorination, testing, etc., shall be closed with brass plugs before backfill.

9. SERVICE CONNECTIONS:

Minimum service connection size shall be one inch (1"). Service connections shall be installed in accordance with the standard drawings attached and made a part of these specifications. Where mains are laid in paved streets, service connections for two inches (2") and smaller size shall be installed, rather than by cutting paving. Laterals shall be placed under curbs and gutters by boring rather than open trenches. A "W" shall be inscribed on the top of the curb adjacent to each meter box. The "W" shall be approximately two inches (2") high and one sixteenth inch (1/16") deep.

No reduction in diameter of lateral such as kinks, flats, crushed, etc., is permitted.

For service laterals, the service trench shall be smooth and regular. The radius of the pipe around bends or upward to the angle meter stops shall not be less than eighteen inches (18").

The pipe shall be placed in the trench with enough slack to provide for thermal expansion or contraction. Slack created by the "coiling" of the pipe is normally sufficient for this purpose. If however, the pipe has been allowed to straighten before it is installed in the trench, six inches (6") per one hundred feet (100') of pipe length, or portion thereof, shall be allowed for thermal movement.

Pipe in bores or casings shall be installed in a manner as to prevent gouging or scraping of the pipe wall. Service connections shall be spaced a minimum of 3-ft. If service is to be abandoned, corporation stop is to be removed and service saddle is to be plugged with a brass plug.

Service connections not in use shall be abandoned. For 2-inch and smaller service laterals corporation stop shall be removed and plugged at the saddle. Under approval of City staff corporation stop can be capped if corporation stop is direct tapped to main or other circumstances that prohibit use of a plug. For 3-inch and larger valve shall be removed. A blind flange shall be fastened to the tee.

10. FIRE HYDRANTS:

Fire hydrants shall be assembled and installed in accordance with the standard drawing attached and made a part of these specifications. Fire hydrant spacing shall conform to Spec. No. W-3.

11. CONNECTIONS TO EXISTING LINES:

All connections to existing mains, either for new mains or hydrant laterals, shall be made at the time and in the manner specified by the Municipal Utilities & Engineering Department. In general, shutting down of existing mains for connections will be permitted only when authorized by the City and with 48 hours notice. Only Municipal Utilities & Engineering Department personnel shall operate existing system valves. Where possible,

connections to existing mains shall be hot tapped with approved tapping sleeves and valves. "Hot tapped" is allowed for 2" or smaller pipe size only. For sizes larger than 2", "Hot tapped" is subject to the approval of the City, on a case-by-case basis. Hot taps may be permitted for construction of up to 50% of the receiving pipe for existing DIP and AC pipes. Hot taps are not allowed on PVC pipe. Hot taps for CML&C steel pipe are subject to City's approval and will be subject to approved per AWWA bung, nozzle or flange welding specifications.

Prior to connection of new water mains, to existing water mains, all compaction tests, hydro-static testing, chlorination, and bacteria tests, shall be completed (and approved by City) and a complete set of as-built drawings submitted to the Municipal Utilities & Engineering Department.

12. CLEAN-UP:

Upon completion of the work, the contractor shall remove from the site, all equipment, unused material, and debris and leave it in a neat and presentable condition. Paved streets shall be thoroughly cleaned.

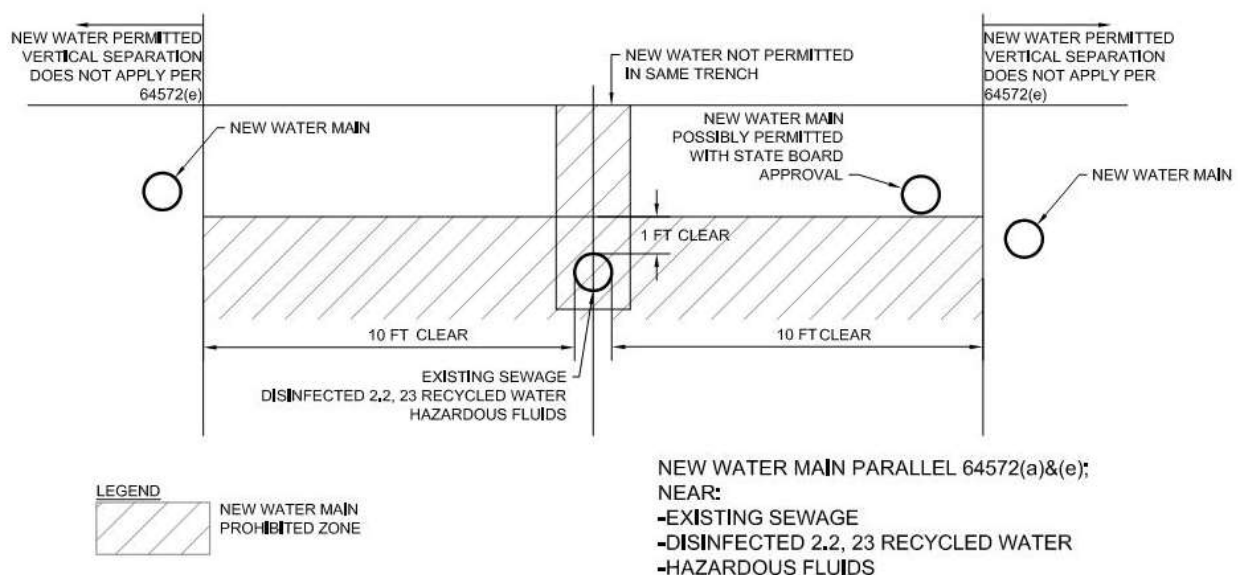
13. WATER & SEWER MAIN SEPARATION:

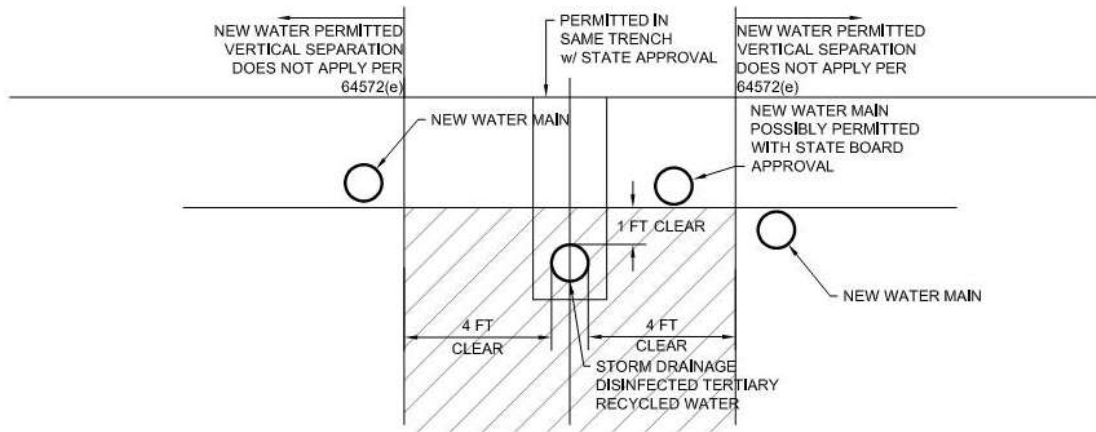
LEGAL

22 CCR § 64572. Water Main Separation.

- (a) New water mains and new supply lines shall not be installed in the same trench as, and shall be at least 10 feet horizontally from and one foot vertically above, any parallel pipeline conveying:
 - (1) Untreated sewage,
 - (2) Primary or secondary treated sewage,
 - (3) Disinfected secondary-2.2 recycled water (defined in section 60301.220),
 - (4) Disinfected secondary-23 recycled water (defined in section 60301.225), and
 - (5) Hazardous fluids such as fuels, industrial wastes, and wastewater sludge.
- (b) New water mains and new supply lines shall be installed at least 4 feet horizontally from, and one foot vertically above, any parallel pipeline conveying:
 - (1) Disinfected tertiary recycled water (defined in section 60301.230), and
 - (2) Storm drainage.
- (c) New supply lines conveying raw water to be treated for drinking purposes shall be installed at least 4 feet horizontally from, and one foot vertically below, any water main.

- (d) If crossing a pipeline conveying a fluid listed in subsection (a) or (b), a new water main shall be constructed no less than 45-degrees to and at least one foot above that pipeline. No connection joints shall be made in the water main within eight horizontal feet of the fluid pipeline.
- (e) The vertical separation specified in subsections (a), (b), and (c) is required only when the horizontal distance between a water main and pipeline is less than ten feet.
- (f) New water mains shall not be installed within 100 horizontal feet of the nearest edge of any sanitary landfill, wastewater disposal pond, or hazardous waste disposal site, or within 25 horizontal feet of the nearest edge of any cesspool, septic tank, sewage leach field, seepage pit, underground hazardous material storage tank, or groundwater recharge project site.
- (g) The minimum separation distances set forth in this section shall be measured from the nearest outside edge of each pipe barrel.
- (h) With State Board approval, newly installed water mains may be exempt from the separation distances in this section, except subsection (f), if the newly installed main is:
 - (1) less than 1320 linear feet,
 - (2) replacing an existing main, installed in the same location, and has a diameter no greater than six inches more than the diameter of the main it is replacing, and
 - (3) installed in a manner that minimizes the potential for contamination, including, but not limited to:
 - (A) sleeving the newly installed main, or
 - (B) utilizing upgraded piping material



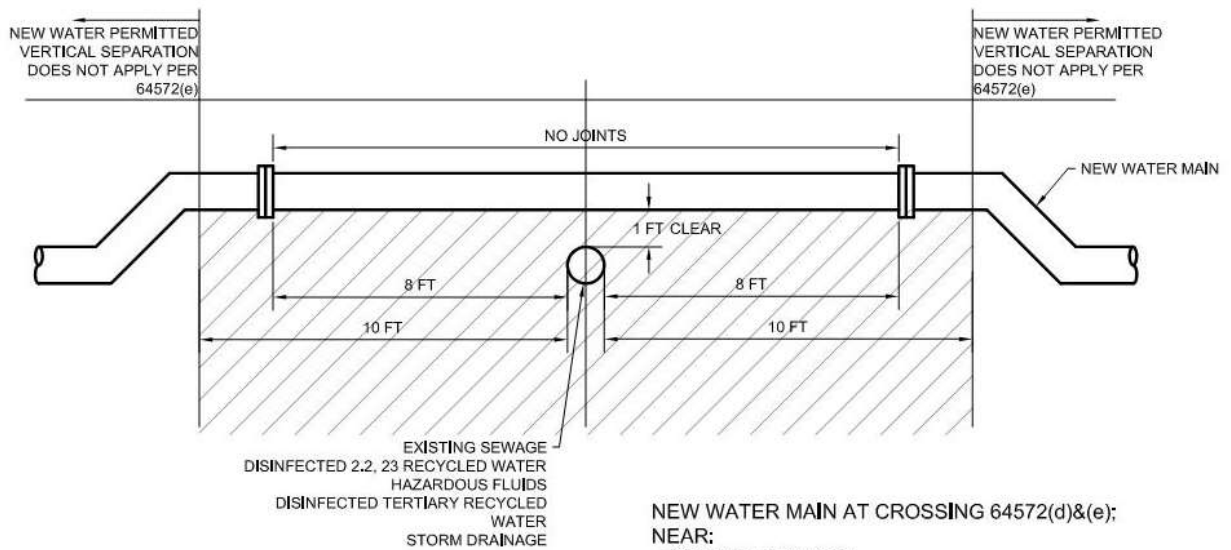


LEGEND



NEW WATER MAIN PROHIBITED ZONE

NEW WATER MAIN PARALLEL 64572(c)&(e);
NEAR:
-STORM DRAINAGE
-DISINFECTED TERTIARY RECYCLED WATER



LEGEND



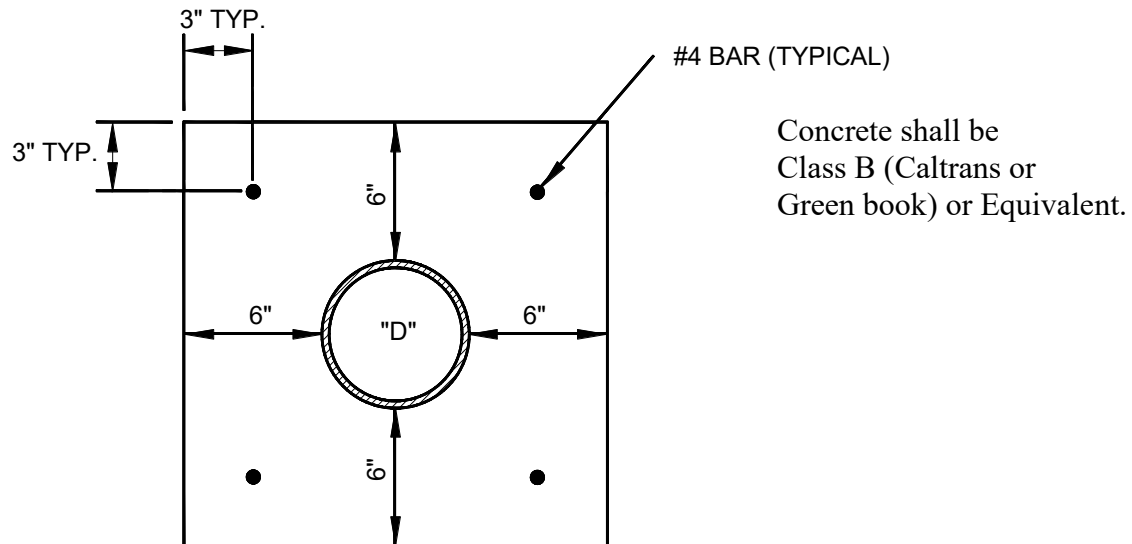
NEW WATER MAIN PROHIBITED ZONE

NEW WATER MAIN AT CROSSING 64572(d)&(e);
NEAR:
-EXISTING SEWAGE
-DISINFECTED 2,2, 23 RECYCLED WATER
-HAZARDOUS FLUIDS
-STORM DRAINAGE
-DISINFECTED TERTIARY RECYCLED WATER

NOTE: The special requirements shall apply to house laterals that cross above a pressure water main but not to house laterals that cross below a pressure water main.

Definitions: Compression Joints are rubber ring or gasket joints.
Mechanical Joints are bolted joints.

Acceptable reinforced concrete encasement is as follows:



14. EXCEPTIONS:

If existing conditions prohibit compliance with § 64572, Water Main Separation, use of alternatives may be approved by City of Redlands. The City may implement and/or approve use of alternatives to Waterworks standards for the separation distances of potable water mains from non-potable fluid carrying pipelines per approved Permit Amendment No. 06-13-24PA-002 attached in Appendix A.

SECTION - II

STANDARD SPECIFICATIONS

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CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
RESIDENTIAL FIRE HYDRANTS

Spec. No. W-1

All standard fire hydrants installed in water systems for the City of Redlands shall be of the "California" or wet-Barrel type with 6" barrel, and one steamer and one 2½" outlet, and shall conform to American Water Works Association Specification C-503 where applicable to the Wet-Barrel style insofar as materials, design, painting, workmanship, testing, inspection, and shipment are concerned, plus the following requirements.

1. Outlets – threaded outlets shall conform to NFPA No. 194A-1956. Steamer outlet thread to be 4" – 4 NH. The 2½" outlet threads to be 2½ - 2½ NH. Outlet capes shall be plastic and attached to hydrant with a chain.
2. Working Parts – head shall be of the type wherein the stem and disc assembly may be removed by the removal of a bolted-on stem nut and packing plates. The outlet nozzle may also be removed through this opening. The outlet nozzle is to be of the long taper type, not the quick operating type. If all parts above the bottom flange are solid bronze, removable stem and disc assembly through packing plate type is not required.
3. Bury – not used, see Standard Drawing A-20510 for riser details.
4. Bolts and Nuts – used in assembling these components shall be galvanized, cadmium plated, or copper base alloy, break-off type.
5. Hydrant Nuts – stem nut and cap nuts shall be pentagon. Dimension from point to flat shall be 1 1/8" nominal.
6. Color – head to be bright yellow enamel over one coat of red primer.

Hydrants shall be James Jones Company No. Triton J4040 or approved equal.

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
COMMERCIAL FIRE HYDRANTS

Spec. No W-2

All standard fire hydrants installed in water systems for the city of Redlands shall be of the "California" or Wet-Barrel type with 6" barrel and one steamer and two 2½" outlets and shall conform to American Water Works Association Specification C-503 where applicable to the Wet-Barrel style insofar as materials, design, painting, workmanship, testing, inspection, and shipment are concerned plus the following requirements:

1. Outlets: - thread outlets shall conform to NFPA No. 194A-1956. Steamer outlet thread to be 4" – 4 NH. The 2½" outlets thread to be 2½" x 2½ NH. Outlet caps shall be plastic and attached to hydrant with a chain.
2. Working Parts – heads shall be of the type wherein the stem and disc assembly may be removed by the removal of a bolted-on stem nut and packing plate. The outlet nozzle may also be removed through this opening. The outlet nozzle is to be of the long taper type, not the quick operating type. If all parts above the bottom flange are solid bronze, removable stem and disc assembly through packing plate type is not required.
3. Bury - not used, see Standard Drawing A-20510 for riser details..
4. Bolts and Nuts – used in assembling these components shall be galvanized, cadmium plated, or copper alloy, break-off type.
5. Hydrant Nuts – stem nut and cap nuts shall be pentagon. Dimension from point to flat shall be 1 1/8" nominal.
6. Color – head to be bright yellow enamel over one coat of red primer.

Hydrants shall be James Jones Company No Triton J4060 or approved equal.

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
**FIRE PROTECTION
WATER SYSTEM**

Spec. No W-3
Page 1 of 2

All fire protection water systems shall conform to the requirements of the 2007 C.F.C 508.3 Table B105.1 and the following:

A. System Standards

1. Residential Areas
 - a. Fire Flow – 1,500 GPM minimum
 - b. Duration – 2 hours
 - c. Hydrant spacing 600 feet
2. Residential Areas (Multiple)
 - a. Fire Flow – 1,500 GPM minimum
 - b. Duration – 3 hours
 - c. Hydrant spacing 300 feet
 - d. Within 150 feet of all building or portions of building.
3. Commercial and Industrial
 - a. Fire Flow – as required by CFC Table B105.1
 - b. Duration – 5 hours
 - c. Hydrant spacing 300 feet
 - d. Within 150 feet of all buildings or portions of buildings.

B. Distribution System

1. The size of the water main and laterals shall be governed by fire flow requirement as determined by the Redlands Fire Department.
2. All water systems shall be designed to permit circulating water flows except where impractical because of cul-de-sac or similar conditions, or the incomplete development of a proposed grid system.

C. Fire Flow

All fire flow requirements are over and above the average daily consumption of water.

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
**FIRE PROTECTION
WATER SYSTEM**

Spec. No W-3
Page 2 of 2

D. Fire Hydrants – All National Standard Threads

1. Residential and Mobile Home Parks

- a. Hydrant: 6 inch with 1-2 ½” 1-4” pumper connection.
- b. Riser: 6 inch
- c. Lateral: 6 inch
- d. Street Valve: 6 inch

2. Commercial, Industrial and Multiple Residential

- a. Hydrant: 6 inch with 2-2½” outlet 1-4” pumper connection.
- b. Riser: 6 inch
- c. Lateral 6 inch (minimum
- d. Street Valve: 6 inch (minimum)

- 3. All hydrants shall be designed to withstand a working pressure of 150 psi and shall be approved by the Fire Department.
- 4. Contractor is responsible for the priming and painting of hydrants.
- 5. A minimum distance of 5 feet shall be maintained between any fire hydrant and utility poles.

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
DUCTILE IRON PIPE

Spec. No. W-4

Pipe shall be cast ductile iron, conforming to AWWA Specification C151 latest revision thereof. Provide pipe in nominal 18 foot or 20 foot laying lengths. Minimum wall thickness for pipe having push-on or mechanical joints , restrained joints, plain ends, or cast flange ends shall be Class 350. Thickness design shall conform to AWWA C151.

Interior of ductile iron pipe and fittings shall be lined with cement-mortar per AWWA C104. Lining thickness shall be the single thickness listed in AWWA C104, Section 4.7. Lining material shall conform to ASTM C 150, Type II.

Gaskets for mechanical, push-on, and restrained joint shall be synthetic rubber in accordance with AWWA C111.

Installation for ductile iron pipe shall conform with AWWA C600 and manufacturers installation guide.

Restrained joints for piping 6 inches and larger shall be American Cast Iron Pipe “Lok-Ring” or “Flex-Ring,” U.S. Pipe “TR-Flex,” or approved equal.

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
CEMENT MORTAR LINED & COATED STEEL WATER PIPE

Spec. No W-5
Page 1 of 4

Materials and workmanship in the manufacture and installation of steel water mains shall conform to the applicable requirements of the following specifications, or the latest revision thereof, which are hereby included and made a part of these specifications:

- (1) American Society of Testing Materials Specification A-134
- (2) American Society of Testing Materials Specification A-139
- (3) American Society of Testing Materials Specification A-211
- (4) American Water Works Association C-201
- (5) American Water Works Association C-202
- (6) American Water Works Association C-205
- (7) American Water Works Association C-208
- (8) Federal Specification SS-P-00385

1. Materials:

a) Steel Pipe: Steel pipe shall be automatic electric fusion welded steel pipe with centrifugally spun cement mortar lining and reinforced cement mortar coated as herein specified. All workmanship and materials shall conform to the provisions of this specification.

b) Quality of Steel: Steel plates or sheets used in the manufacture of the pipe shall conform to the physical properties of A.S.T.M. Specifications A-283, Grade B (for plates), or Specification A-245, Commercial Grade (for sheets), both of latest revision. Minimum yield strength shall be 42,000 psi.

(c) Mortar: The mortar shall consist of one part Portland cement to 3 parts, by weight, of clean sharp sand. Cement used for mortar shall conform to the latest revision of A.S.T.M. Specification C150-49, Type II. Sand shall consist of clean, inert, sharp, durable material of a size so that 100 percent will pass a sieve having clean openings of the size nearest to one-half the specified minimum thickness of the lining. Mortar shall be thoroughly mixed and made workable with a minimum quantity of clear, portable water. All cement mortar shall develop an ultimate compressive strength of 3,000 – 4,000 psi at 28 days

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR

Spec. No W-5
Page 2 of 4

CEMENT MORTAR LINED & COATED STEEL WATER PIPE

as determined by paragraphs 19 and 20 of A.S.T.M. The reinforcement shall be approximately centered in the mortar coating. All reinforcement shall be covered with a minimum thickness of 1/8 inch cement mortar. The steel reinforcement in mortar coating shall consist of helically wound cold-drawn steel wire conforming to A.S.T.M. Designation: A-82, or may consist of a cage of self-furring welded steel wire fabric, of 2 inch by 2 inch, 14 gauge fabric, or 2 inch by 4 inch, 13 gauge fabric conforming to A.S.T.M. Designation: A-185. Helically wound wire shall be not less than 14 gauge, and shall be wound at maximum spacing of 1 1/4 inch on an approximate 1 inch pitch embedded at the approximate center of the cement mortar coating.

2. Fabrications:

a) Ends and Pipe Sections: All joints shall be on the lap welded type joint.

3. Hydrostatic Tests:

$$P = \frac{60,000}{D} \times t$$

Where P = Test Pressure, pound per square inch,
t = minimum thickness of plate course in pipe section tested, in
inches
D = internal diameter of steel pipe, in inches

While under this pressure, the pipe shall be sharply struck at six (6) inch intervals along the weld with a 1 1/2 pound hammer, with blows equivalent to dropping the hammer a distance of two feet (2'). The blows shall be struck in such a manner as to thoroughly jar the weld. Immediately after the hammer test has been completed, the pressure shall be maintained a sufficient length of time to allow for the inspection of the section for tightness. All leaks shall be repeated by chipping to sound metal, hand welding, and the section then re-tested.

4. Pipe Diameter and Thickness:

Pipe diameter shall be new actual inside diameter after lining. Steel shall be minimum thickness of 10 gauge (0.1345 inches).

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
CEMENT MORTAR LINED & COATED STEEL WATER PIPE

Spec. No W-5
Page 3 of 4

5. Cement Mortar Lining:

The thickness of the cement mortar lining will vary in accordance with the pipe diameter and will be as follows:

<u>Net Inside Diameter</u>	<u>Lining Thickness</u>	<u>Coating Thickness</u>
4 inches	3/16"	1/2"
6 inches	3/16"	1/2"
8 inches	1/4"	1/2"
10 inches	1/4"	1/2"
12 inches	5/16"	1/2"
16 inches	3/8"	5/8"
20 inches	1/2"	3/4"
24 inches	1/2"	3/4"
33 inches	1/2"	3/4"
36 inches	1/2"	3/4"

(a) Preparation of Surfaces: Prior to lining, the pipe shall be cleaned of all loose mill scale, moisture, rust, sand, dust, oil, grease and other objectionable matter on both inside and outside.

(b) Application and Treatment: The mortar shall be applied to the interior surface of the pipe by means of equipment specifically designed for the purpose, using a trough or troughs or a retracting feed line or lines in such a manner that uniform distribution throughout the length of pipe is attained. The pipe shall be slowly rotated with its axis in a horizontal position while the mortar is being introduced to assist in uniformity of distribution. Both ends shall be provided with suitable end dams during the spinning operation. These dams shall assist in controlling the thickness of the mortar coating being applied and shall provide a square-finished end for the lining at the bell and spigot ends. After application of the mortar, the rate of rotation of the pipe shall be uniformly increased to a speed that will compact the mortar. This speed shall be maintained until all excess water has been forced to the surface. During the spinning operation surplus water shall be expelled from the pipe by means of a blower or other suitable means. The peripheral speed and the length of spinning time shall be sufficient to obtain a dense, well-compacted lining, with a smooth surface free from all defects.

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
CEMENT MORTAR LINED & COATED STEEL WATER PIPE

Spec. No W-5
Page 4 of 4

Immediately after completion of the above operation, the pipe shall be water cured without being disturbed for at least seven (7) days in a manner that will prevent loss of moisture. This curing time may be reduced to a minimum of four (4) days if an exterior cement mortar coating is to be applied to the pipe.

6. Reinforce Cement – Mortar Coating:

Prior to the application of the cement mortar coating, the pipe shall be cleaned of all foreign material. The cement mortar coating shall be applied by pneumatic placement, extrusion, or by a method producing equivalent results.

7. Deliver:

All pipe sections be handled by such means and in such a manner that no distortion or damage is done to the protection or to the pipe section as a whole. Pipe that is damaged during delivery shall be repaired or replaced at the City's option and at the expense of the manufacturer or contractor.

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
FITTINGS – THREE-INCH & LARGER

Spec. No W-6

Fitting – three-inch and larger, for cast iron pipe shall be cast iron fittings, conforming to American Standard Specifications for AWWA. C110 Ductile Iron Fittings, three-inch (3”) to forty-eight (48”) for 250 psi Water Pressure Plus Water Hammer (A.N.S. Designation: A21.10; AWWA. Designation: C110). All fittings shall be lined with cement mortar in accordance with the American Standard Specifications for Cement Mortar Lining for Cast Iron Pipe and Fittings (A.N.S. Designation: A 21.4 and AWWA Designation: C104) of the American Water Works Association.

Mechanical Joints shall comply with AWWA C153 Ductile Iron Compact Fittings

Flanged joints shall comply with AWWA C110 Ductile Iron and Grey Iron

Materials for all fittings shall be ASTM A536

Rubber gasket shall comply with AWWA C111 Rubber Gasket For DIP

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
CORPORATION STOPS

Spec. No W-7

A. For Metallic Laterals:

Corporation valves shall be manufactured and tested in accordance with ANSI/AWWA C800 Standards. All corporation stops shall be for use with saddles. Corporation stops shall be Jones E-1937SG or approved equal.

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
ANGLE METER STOPS

Spec. No W-8

A. Metallic Laterals

Angle meter stop (AMS) valves shall be of the inverted key type and shall be pack joint connection for copper tubing. One and one-half-inch (1½") and two-inch (2") services to use flanged outlet stops. Angle meter stop valves shall be manufactured and tested in accordance with ANSI/AWWA C800 Standards.

Angle meter stops one-inch (1") shall be Jones E-1963W or approved equal.
Angle meter stops two-inch (2") shall be Jones E-1974W or approved equal.

Mueller Equivalent:

Mueller	B24276N	P24276N	2"
Mueller	B24258N	P24258N	1"

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
METER BOXES

Spec. No W-9

Meter boxes will be manufactured by DFW Plastics, Inc. with the following boxes to be used for each size service:

METER SIZE	DFW PRODUCTS DRAWING NUMBER	
	BOX	LID
1" OR SMALLER	DFW1324C-12-1	DFW1324C-4T DEEP RED NHK-LID
1-1/2" OR 2"	DFW1640C-12-1	DFW1640C-4T DEEP RED NHK-LID

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
VALVE CANS

Spec. No. W-10

Valve cans shall be slip can type, 8" diameter with extension as manufactured by R. K. Industries, 20 GA. Galvanized steel, or approved equal. Cast iron gate cap to be manufactured by SIP Industries, or approved equal, and shall be marked "City of Redlands Water". For detail see drawing A-20514.

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
SERVICE SADDLES

Spec. No. W-11

Saddles shall be bronze body double strap with iron pipe outlets. Service saddles shall be Jones J979 (DIP/AC), Jones J969 (PVC), CML&C welded bung, or approved equal.

HOT TAP SLEEVES

Three (3) inches or larger tapping sleeves, subject to approval, are as follows:

PVC	Not allowed for 3" or larger
AC	Mueller H-619; Clow F-5207
DIP or CI	Mueller H-615; Clow F-5205
CML&C	Welded Nozzle

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
**GATE VALVES FOUR INCHES
THROUGH TWELVE INCHES**

Spec. No. W-12
Page 1 of 2

These specifications cover iron body gate valves of the resilient wedge, non-rising stem type for 175 psi cold water service. Gate valves shall conform to American Water Works Association Specifications C500 with the following specific requirements. All gates shall be flange by ring-title, or flange by flange unless otherwise specified.

1. Wrench Nut – shall be two (2”) inches square cast iron operating nut with a flange at the base upon which is cast an arrow showing the counter-clockwise direction of opening and the word “Open” in distinct letters.
2. Packing – shall be double “O” ring recessed into grooves. “O” ring grooves may be in stem if minor diameter of “O” ring groove is larger than the minor diameter of stem thread. “O” rings shall be given a generous initial lubrication with a high quality non-water soluble grease suitable for water works service (UOBA FL or approved equal).
3. Thrust Washers – shall be provided above and below stem collar, material to be 85-5-5-5 bronze 1/16” minimum thickness.
4. Stem Nut – shall be solid bronze. The threaded length shall be not less than 1 ½ times the outside diameter of the stem.
5. Stem – shall be of non-rising type. The threads shall be Acme type. Stems shall be of such length that the threads on the stem nut are entirely engaged when the valve is in the closed position. The stem on all parts of the valve shall be capable of resisting the stress involved when the following torque requirements are applied to the stem in the closing direction with the valve closed and subjected to the working water pressure without causing permanent deformation of any valve part.

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
GATE VALVES FOUR INCHES
THROUGH TWELVE INCHES

Spec. No. W-12
Page 2 of 2

TORQUE REQUIREMENTS

<u>Valve Size</u>	<u>Working Water Pressure (175 psi)</u>
4 inches	240 foot lbs.
6 inches	330 foot lbs.
8 inches	420 foot lbs.
12 inches	580 foot lbs.

Approved vales are “Mueller No. A-2362 or approved equal”.

6. Wedge – shall be cast iron or bronze. Sealing material shall be Styrene Butadiene Rubber, permanently bonded to the wedge.
7. Body – shall be cast iron. The water-way shall have a smooth bore.
8. Nuts and Bolts – used in assembling gate valve shall be either galvanized cadmium plated or copper base alloy.
9. Identification – All valves conforming to these specifications shall be identified by the manufacturer by the following painted in red on the bonnet, “Redlands Pattern”. This may be abbreviated to conserve space, if necessary.

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
**GATE VALVES LARGER THAN
TWELVE INCHES**

Spec. No. W-13

These specifications cover iron body gate valves of the double disc, parallel seat, non-rising stem type for 175 psi cold water service. Gate valves shall conform to American Water Works Association Specifications C500 with following specific requirements.

1. Design – All valves shall be designed to operate under full-flow discharge conditions, as might occur when a water main breaks. All parts of the valve shall be capable of resisting the stresses involved when the gates are moved from the full open position to the full closed position and back again to the full open position while the valve is under a differential pressure equal to the working pressure of the valve. Valves shall be designed for installation in the horizontal position.
2. Gear Operation – All valves shall be provided with a gear operator designed for a maximum operating torque of 100 foot pounds. In no case shall the gear ratio be less than that specified in AWWA C500.
3. Bypass – All gate valves shall be provided with bypass sized in accordance with AWWA C500. The bypass valve shall be provided with the gate valve and shall meet the requirements of City of Redlands Standard Specification W-12 and W-13, whichever is applicable.
4. Identification – All valves conforming to these specifications shall be identified by the manufacturer by the following painted in red on the bonnet, “Redlands Pattern”. This may be abbreviated to conserve space, if necessary.

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
GATE VALVES – 3” & SMALLER

Spec. No. W-14

These specifications cover iron body gate valves of the double disc, parallel seat, non-rising stem type for 175 psi cold water service. Gate valves shall conform to A.W.W.A. Specifications C500 with the following specific requirements. All gates shall be screwed unless otherwise specified.

1. Wrench Nut – shall be 2” square case iron operating nut with a flange at the base upon which is cast an arrow showing the counter-clockwise direction of opening and the work “Open” in distinct letters.
2. Packing – shall be double “O” ring recessed into grooves. “O” ring may be in stem if minor diameter of “O” ring is larger than the minor diameter of the stem thread. “O” rings shall be given a generous initial lubrication with a high quality non-water soluble grease suitable for water works service (UNOBA F1 or approved equal).
3. Internal Parts – all internal working parts including disc shall be solid bronze.
4. Nuts and Bolts – used in assembling gate valve shall be either galvanized, cadmium plated or copper base alloy.

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
BUTTERFLY VALVES
4" THROUGH 20"

Spec. No. W-15

Rubber seated butterfly valves shall conform to A.W.W.A. Standard C504. End connections shall be either standard #150 flange with galvanized or cadmium plated bolts and nuts, or "ring-title" type.

Valves shall be Mueller Linesal or approved equal.

CITY OF REDLANDS
STANDARD SPECIFICATIONS
FOR
BALL VALVES 3/4" TO 2"

Spec. No. W-16

All service connections shall have a ball valve type shut-off immediately downstream of the meter. All valves shall have a handle type operator and have meter coupling by iron pipe connection for 3/4" and 1" meter sizes.

Valves shall have meter flange by iron pipe connection for 1½" and 2" meter sizes.

Valves shall be Jones E-1908 for 1" and smaller, Jones E-1931F for 1-1/2" and 2".

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SECTION – III

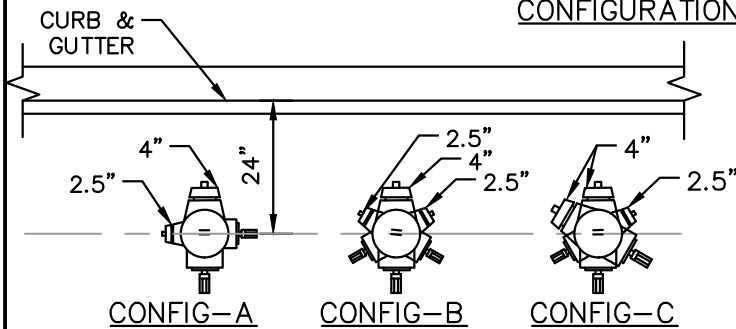
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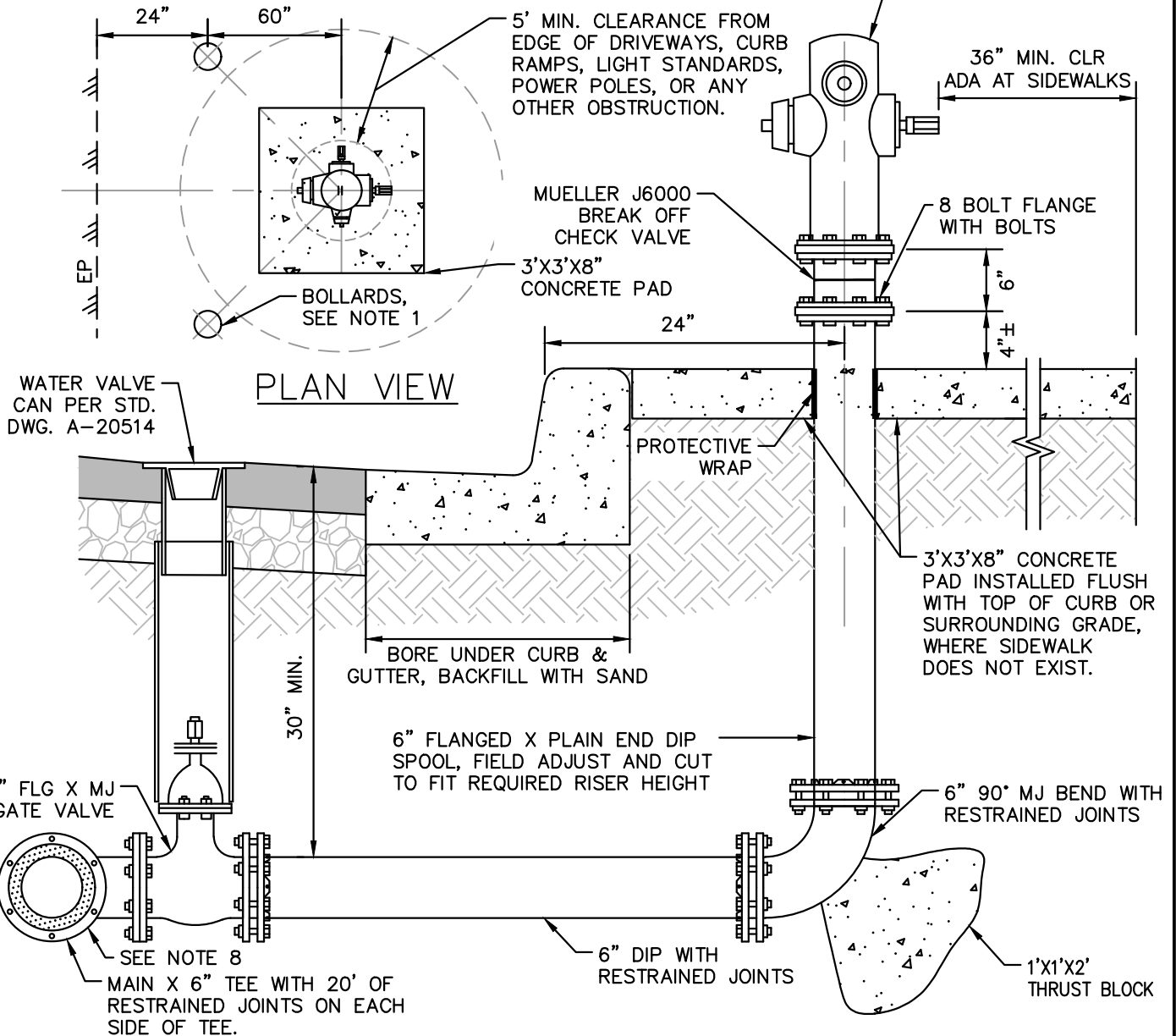
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CONFIGURATION OPTIONS



CONFIGURATION	DESCRIPTION
A-RESIDENTIAL	1-4" OUTLET, 1 - 2.5" OUTLET
B-COMMERCIAL	1-4" OUTLET, 2 - 2.5" OUTLETS
C-COMMERCIAL	2-4" OUTLETS, 1 - 2.5" OUTLET

RESIDENTIAL - JONES TRITON J4040
COMMERCIAL - JONES TRITON J4060



CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

FIRE HYDRANT W/ CHECK VALVE

STD. DWG. NUMBER

A-20510

APPROVED:

[Signature]

DATE: 09/01/2026

Goutam K. Dobey, City Engineer RCE 75646

SHEET 1 OF 2

REV.	BY	DATE

NOTES

1. WHERE NO CURB EXISTS OR WHEN DIRECTED BY CITY INSPECTOR, CONTRACTOR SHALL INSTALL TWO 4" STEEL PIPE (SCH. 40) BARRICADES FILLED WITH CONCRETE. PIPE SHALL BE 30"+/-2" ABOVE FINISHED GRADE UNLESS SHOWN OTHERWISE ON CONSTRUCTION PLANS. PIPE SHALL BE PAINTED YELLOW (FED NO. 13655 OSHA/YELLOW, HIGH VISIBILITY) AND FINISHED WITH A CONCRETE CAP.
2. ALL HYDRANTS SHALL BE INSTALLED 10 FT. MIN. FROM THE END OF CURB RETURN (E.C.R.). ALL FINAL LOCATIONS SHALL BE APPROVED IN THE FIELD PRIOR TO INSTALLATION BY CITY STAFF.
3. VALVE CAN LIDS SHALL BE PAINTED RED BY THE CONTRACTOR.
4. BOLTS ON THE BREAKAWAY SPOOL SHALL BE INSTALLED WITH BOLT HEAD ON BOTTOM AND NUT ON TOP OF UPPER FLANGE OF BREAKAWAY SPOOL. LOWER FLANGE OF SPOOL SHALL HAVE NORMAL BOLTS INSTALLED.
5. HYDRANT SHALL BE PAINTED WITH 1 COAT RUST-OLEUM #1069 PRIMER AND 2 COATS OF EITHER FIRE HYDRANT PERVO #2420, RUST-OLEUM #7644 FEDERAL SAFETY YELLOW.
6. ANY WATER FACILITIES IN CONTACT WITH CONCRETE SHALL REQUIRE A BOND BREAKER.
7. PAINT THE HYDRANT CAPS IN ACCORDANCE WITH NFPA SPECIFICATIONS.
8. FOR HOT TAP CONNECTIONS TO EXISTING LINES, SEE CITY STANDARDS SECTION II, CONNECTIONS TO EXISTING LINES AND SPEC NO. W-11 FOR SERVICE SADDLES AND HOT TAP SLEEVES, IF APPROVED.

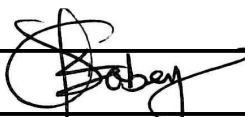
CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

FIRE HYDRANT W/ CHECK VALVE

STD. DWG.
NUMBER

A-20510

APPROVED:

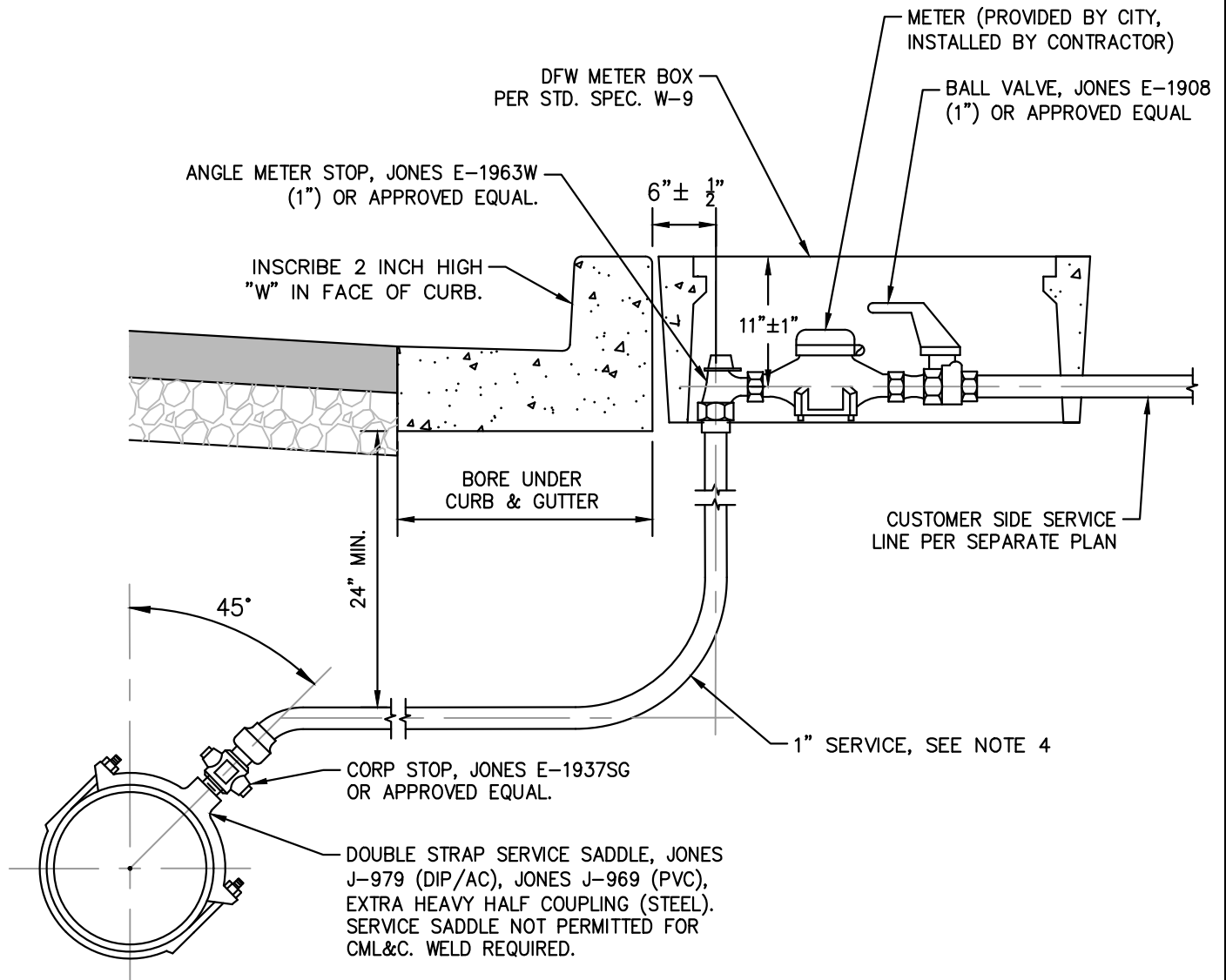


DATE: 09/01/2026

Goutam K. Dobey, City Engineer RCE 75646

SHEET 2 OF 2

REV.	BY	DATE



NOTES

1. METER BOXES AND METERS SHALL BE INSTALLED PERPENDICULAR TO THE CURB, STREET OR TRAVELED WAY.
2. ALL METERS SHALL BE INSTALLED LEVEL AND CENTERED WITHIN THE DROP IN LID OPENING.
3. CONTRACTOR SHALL INSTALL METER BOXES AT THE TIME ANGLE METER STOPS ARE INSTALLED.
4. SERVICE SHALL BE COPPER PIPE TYPE K, SOFT OR APPROVED EQUAL.
5. ALL 1" AND SMALLER METERS SHALL BE SERVED WITH A 1" SERVICE.
6. BUSHINGS SHALL BE INSTALLED BETWEEN ANGLE METER STOP & BALL VALVE TO FIT METER SIZE AS NEEDED.
7. UTILIZE USC APPROVED BACKFLOW PREVENTION ASSEMBLY.
8. PER CCCP 5.0 - BACKFLOW DEVICE IS REQUIRED FOR FIRE PROTECTION.*

* IF 1" LINE SERVICES BOTH DOMESTIC AND FIRE A BACKFLOW DEVICE WILL BE REQUIRED.

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

NEW 1" SERVICE CONNECTION

STD. DWG.
NUMBER

A-20511

APPROVED:

Goutam K. Dobey

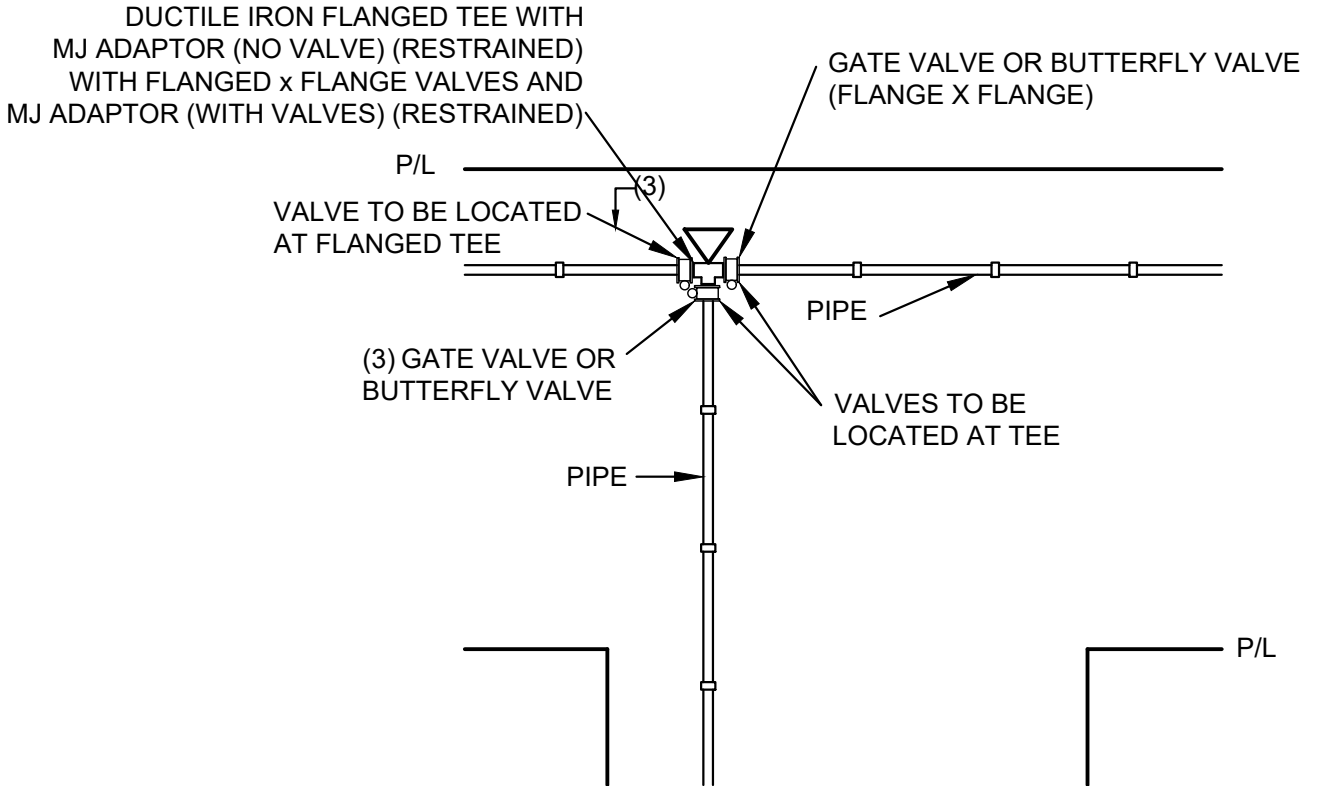
DATE: 09/01/2026

Goutam K. Dobey, City Engineer RCE 75646

SHEET 1 OF 1

REV. BY DATE

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TYPICAL INTERSECTION

NOTES:

- 1) SOIL OUTSIDE OF TRENCH LIMITS AND ADJACENT TO THRUST BLOCK SHALL BE UNDISTURBED OR AT 95% RELATIVE COMPACTION.
- 2) BACKFILL ADJACENT TO THRUST BLOCK SHALL BE PLACED WITH COMPACTION.
- 3) FACE AREA OF THRUST BLOCK SHALL CONFORM TO LIMITS SHOWN IN SPECIFICATIONS. CALCULATED AS A 90° BEND.
- 4) ALL SIDE OPERATORS SHALL BE ON THE SOUTH OR WEST SIDE OF PIPELINE.

EXISTING PIPE CONDITIONS:

DIP - CONNECTIONS SHALL BE FLANGED OR MJ RESTRAINED
OR FLANGE END SPOOL WITH RETRAINED COUPLING

PVC & A.C. - FLANGE END SPOOL WITH FLEX COUPLING

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

VALVE INSTALLATION TYPICAL INTERSECTION

STD. DWG.
NUMBER

A-20512

APPROVED:

Goutam K. Dobby

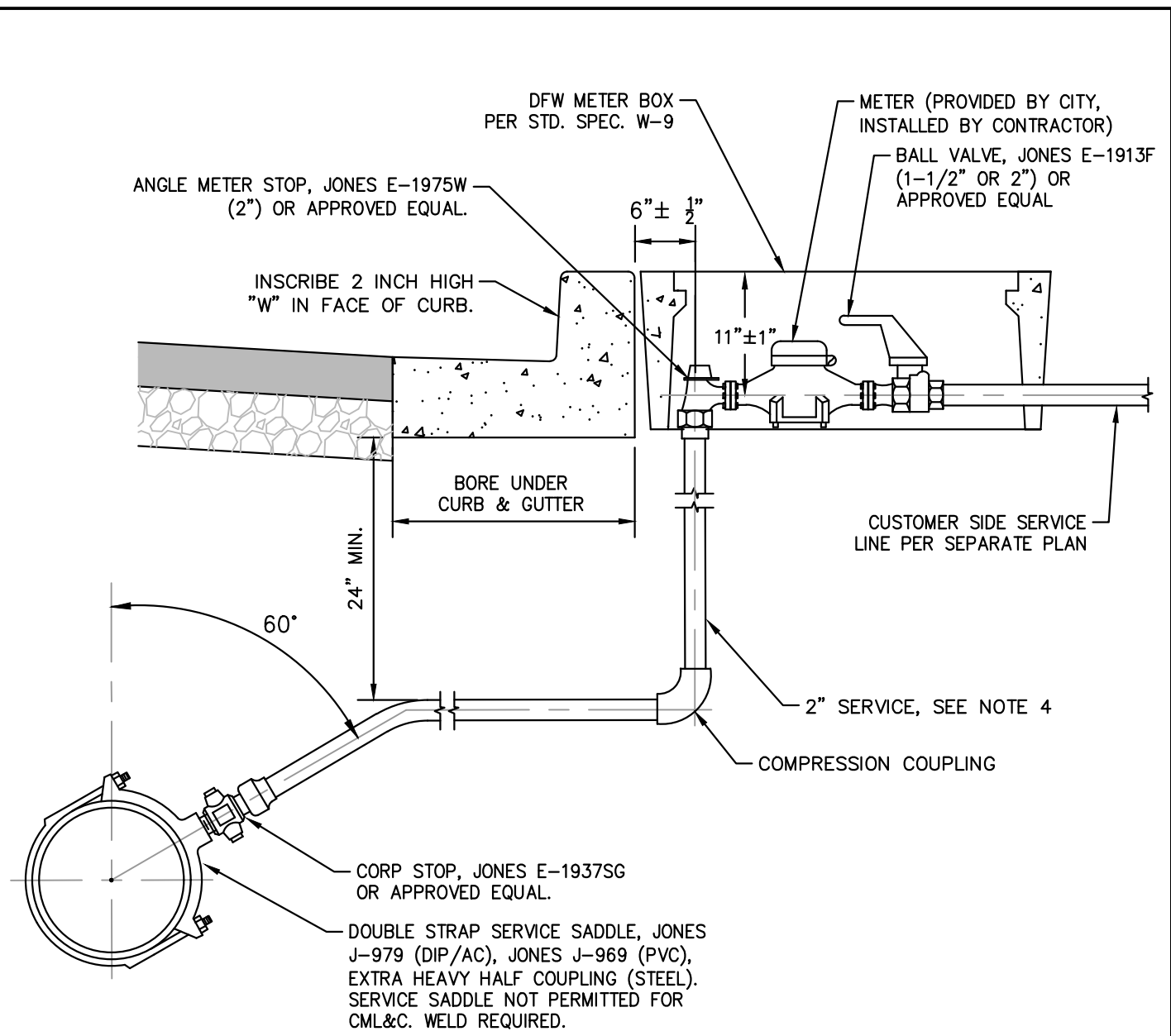
DATE: 01/03/2023

Goutam K. Dobby, City Engineer RCE 75646

SHEET 1 OF 1

REV.	BY	DATE

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NOTES

1. METER BOXES AND METERS SHALL BE INSTALLED PERPENDICULAR TO THE CURB, STREET OR TRAVELED WAY.
2. ALL METERS SHALL BE INSTALLED LEVEL AND CENTERED WITHIN THE DROP IN LID OPENING.
3. CONTRACTOR SHALL INSTALL METER BOXES AT THE TIME ANGLE METER STOPS ARE INSTALLED.
4. SERVICE SHALL BE COPPER PIPE TYPE K, SOFT OR APPROVED EQUAL.
5. ALL 1-1/2" & 2" METERS SHALL BE SERVED WITH A 2" SERVICE.
6. UTILIZE USC APPROVED BACKFLOW PREVENTION ASSEMBLY.
7. PER CCCP 5.0 - BACKFLOW DEVICE IS REQUIRED FOR FIRE PROTECTION.

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

NEW 2" SERVICE CONNECTION

STD. DWG.
NUMBER

A-20513

APPROVED:

Goutam K. Dobey

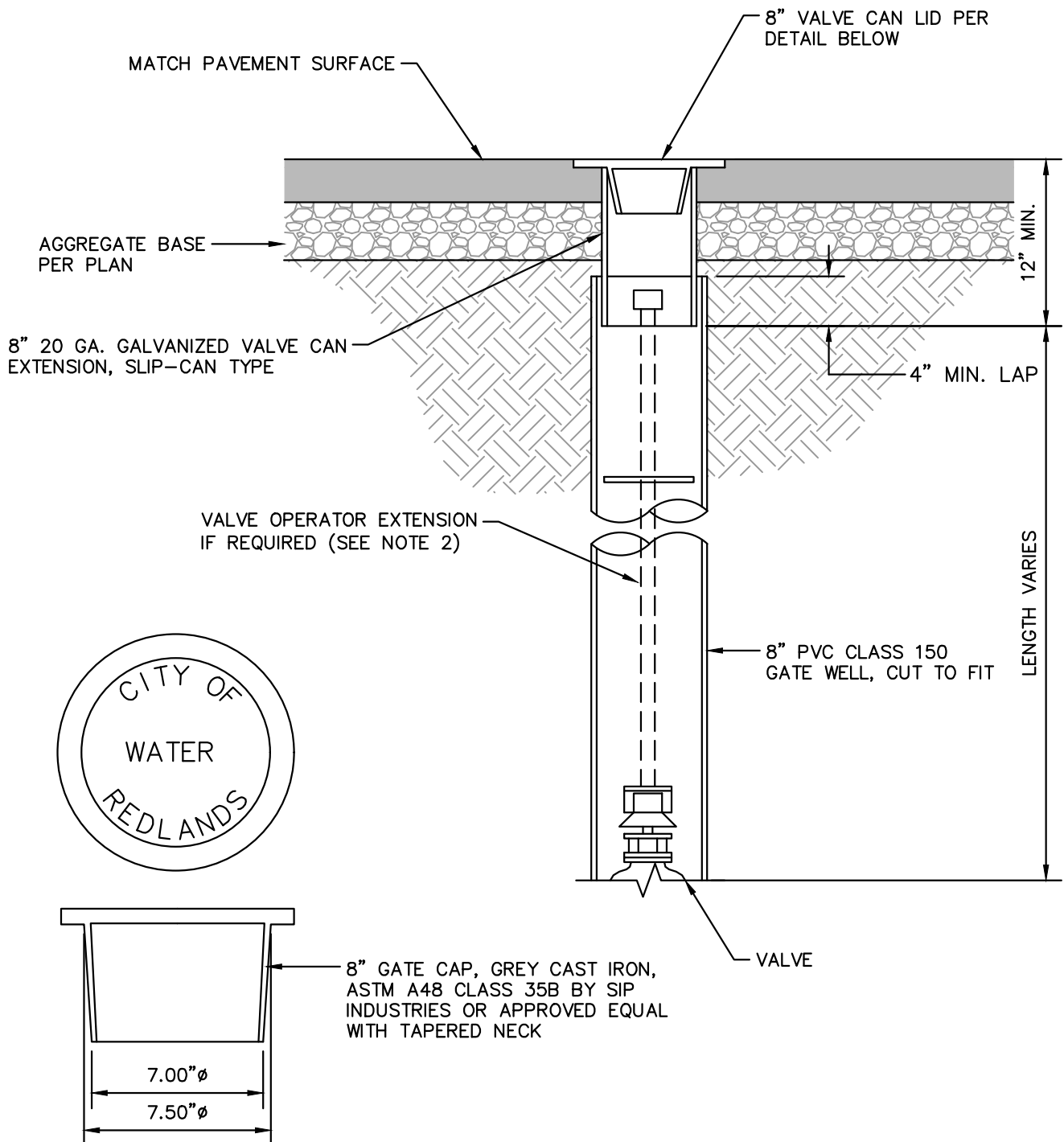
DATE: 09/01/2026

Goutam K. Dobey, City Engineer RCE 75646

SHEET 1 OF 1

REV. BY DATE

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NOTES

1. VALVE CANS SHALL NOT BE LOCATED IN A GUTTER OR CROSS GUTTER.
2. WHERE DEPTH TO VALVE OPERATOR IS GREATER THAN 6 FEET INSTALL AN OPERATOR EXTENSION.
3. ALL MAIN LINE VALVE LIDS SHALL BE PAINTED BLUE BY CONTRACTOR.
4. ALL FIRE HYDRANT VALVE LIDS SHALL BE PAINTED RED BY CONTRACTOR.
5. ALL NON-POTABLE OR RECYCLED WATER LIDS SHALL BE PAINTED PURPLE.

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

WATER VALVE CAN DETAIL

STD. DWG.
NUMBER

A-20514

APPROVED:

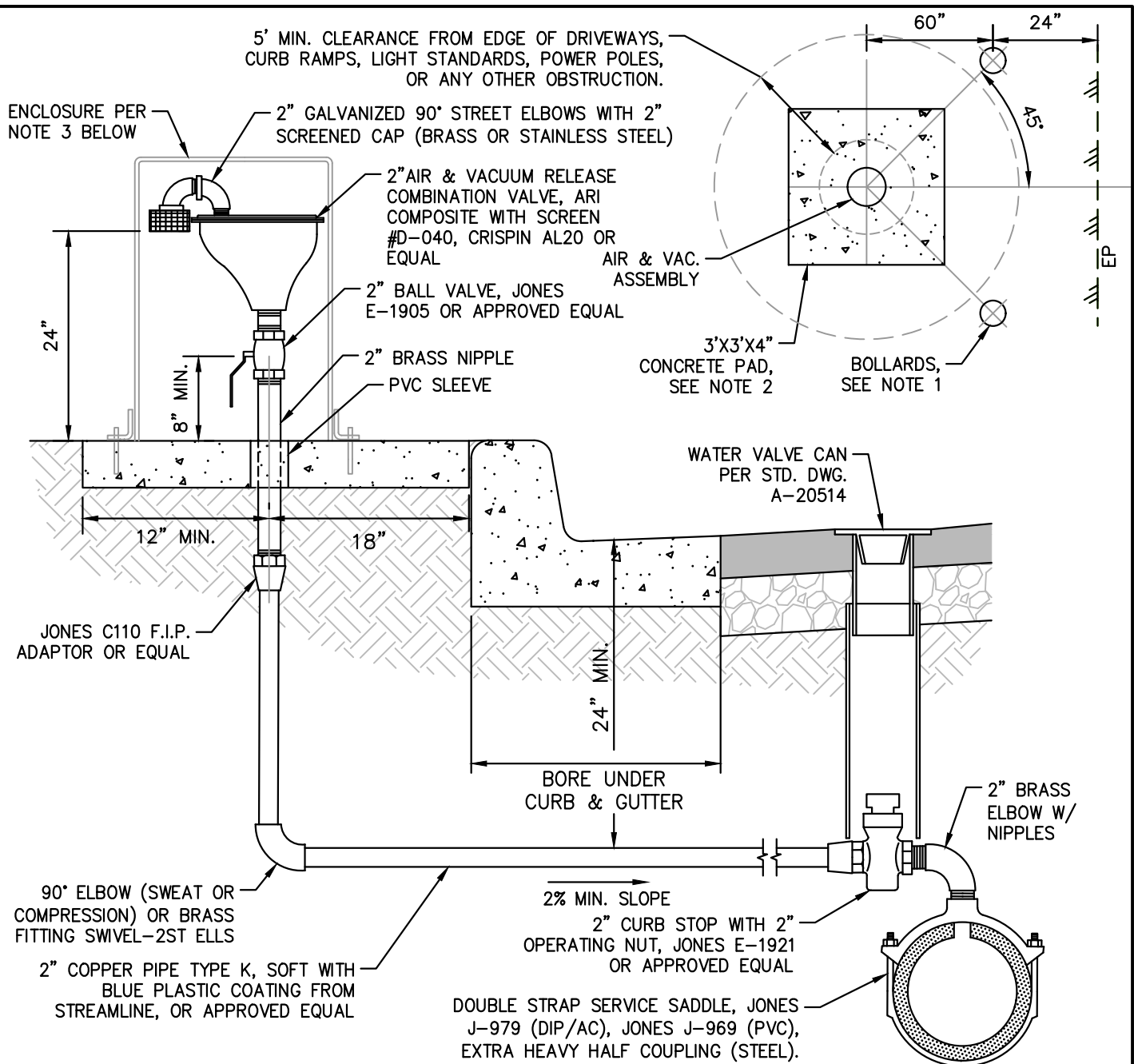
DATE: 09/01/2026

Goutam K. Dobey, City Engineer RCE 75646

SHEET 1 OF 1

REV.	BY	DATE

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NOTES

1. WHERE NO CURB EXISTS OR WHEN DIRECTED BY CITY INSPECTOR, CONTRACTOR SHALL INSTALL TWO 4" STEEL PIPE (SCH. 40) BARRICADES FILLED WITH CONCRETE. PIPE SHALL BE 30" $\pm$ 2" ABOVE FINISHED GRADE UNLESS SHOWN OTHERWISE ON CONSTRUCTION PLANS. PIPE SHALL BE PAINTED YELLOW (FED NO. 13655 OSHA/YELLOW, HIGH VISIBILITY) AND FINISHED WITH A CONCRETE CAP AND REFLECTIVE TAPE.
2. WHEN INSTALLED IN AN AREA WITHOUT SIDEWALK A 3' SQUARE X 4" THICK CONCRETE PAD SHALL BE INSTALLED FLUSH WITH THE TOP OF CURB FOR THE VALVE ASSEMBLY.
3. ENCLOSURE SHALL BE 20" ϕ x 36" POLYETHYLENE, ARMORCAST PART NO. P6002002. INSTALL PER MANUFACTURER RECOMMENDATIONS WITH A MINIMUM (3) 1/2" ϕ CONCRETE ANCHORS AND STAINLESS STEEL FENDER WASHERS. COLOR SHALL BE SANDSTONE FOR ALL POTABLE SERVICES.

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

AIR AND VACUUM VALVE ASSEMBLY

STD. DWG. NUMBER

A-20515

APPROVED:

Goutam K. Dobey

DATE: 01/03/2023

Goutam K. Dobey, City Engineer RCE 75646

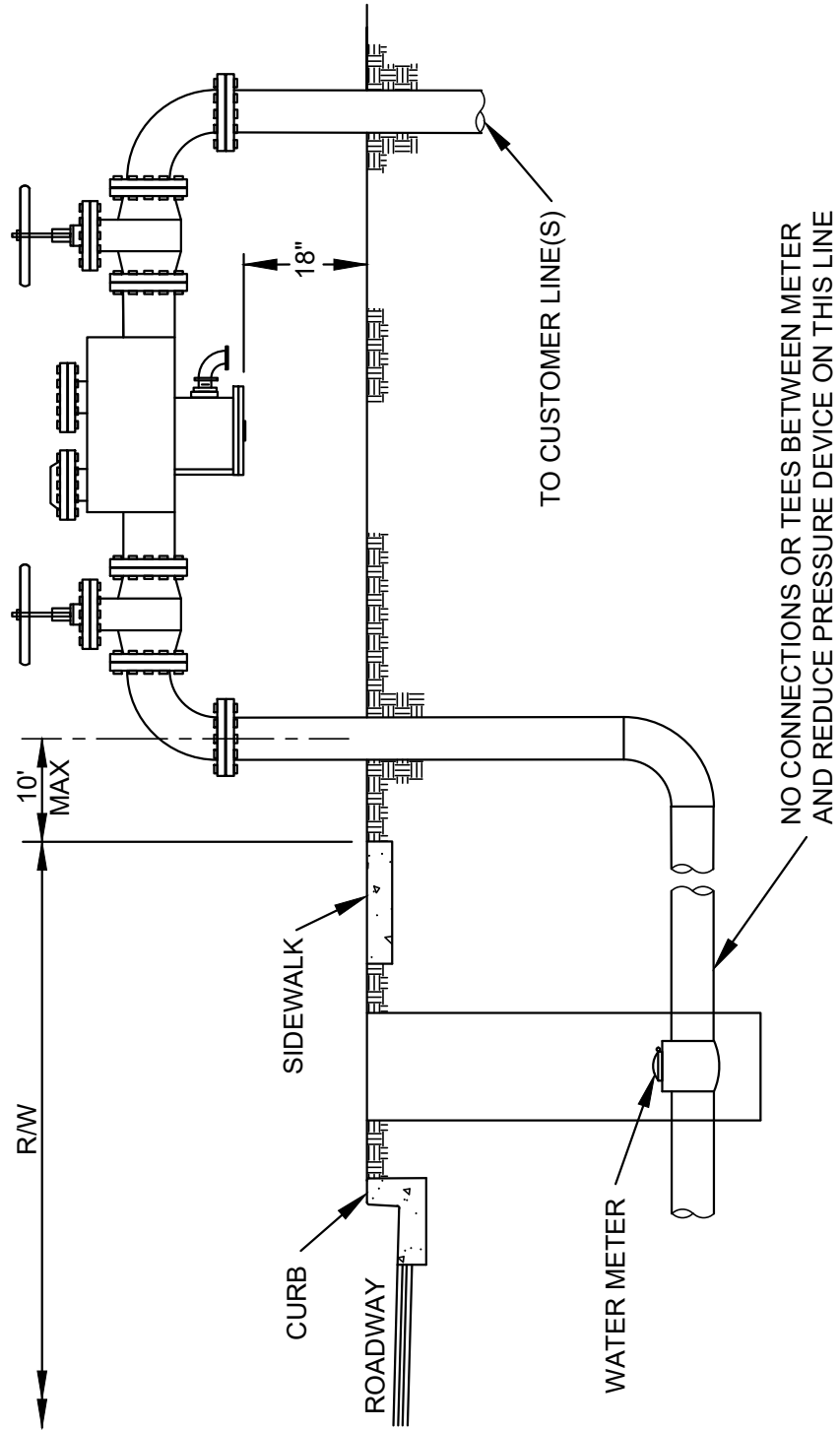
SHEET 1 OF 1

REV.	BY	DATE

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NOTE:

INSTALLATION AND REDUCED PRESSURE
DEVICE SHALL BE A USC APPROVED
BACKFLOW PREVENTION ASSEMBLY



CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

TYPICAL DOMESTIC 3" AND ABOVE REDUCED PRESSURE INSTALLATION

STD. DWG.
NUMBER

A-20516

APPROVED:

DATE: 09/01/2026

Goutam K. Dobey, City Engineer RCE 75646

SHEET 1 OF 1

REV.	BY	DATE

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NOTES:

1. FLANGED GATE VALVE OUTSIDE SCREW AND YOKE (RESILIENT WEDGE OR SEAT)
 USC APPROVED BACKFLOW PREVENTION ASSEMBLY.

2. FLANGED GATE VALVE NON RISING STEM (RESILIENT WEDGE OR SEAT)
 CUT IN TEE OR TAPPING SLEEVE, IF APPROVED, TAPPING SLEEVES SHALL
 BE FULL CIRCLE AND PRE-APPROVED. USE WELDED NOZZLE OR CUT-IN-TEE
 W/ WELDED FLANGES FOR STEEL OR CML&C STEEL SUBJECT TO APPROVAL.
 SEE CITY STANDARDS SECTION II, CONNECTIONS TO EXISTING LINES.

3. FOR A.C. PIPE (MUELLER H-615)
 FOR C.I. OR DIP PIPE (MUELLER H-619)
 3/4" SERVICE COCK VALVE (LOCK TYPE)

4. 3/4" DOUBLE CHECK VALVE
 5/8" BY-PASS METER NEPTUNE PROCODER T-10
 5/8x3/4" THREAD, R900i CUBIC FEET
 DUCTILE IRON PIPE

5. 10' MAX
 R/W

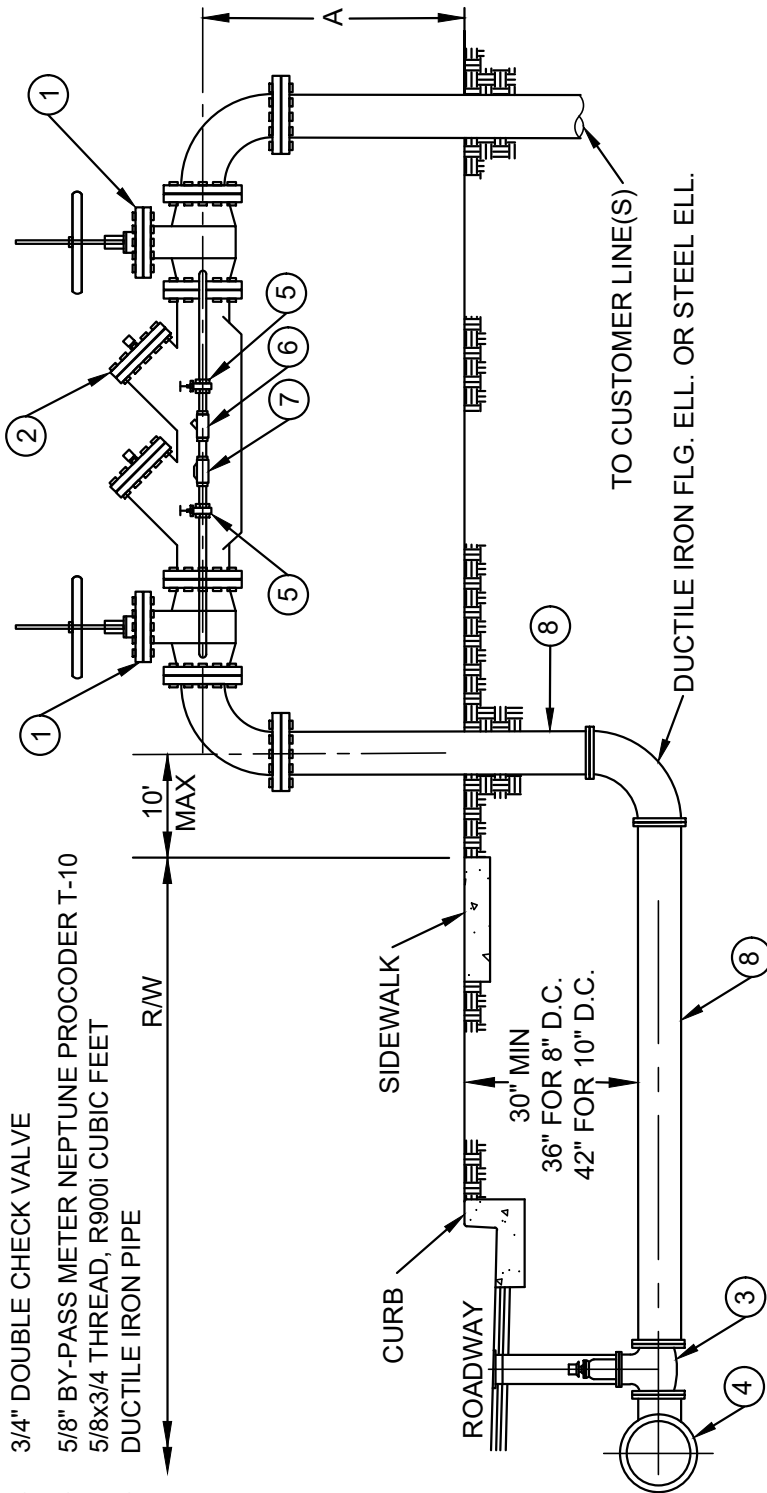
6. SIDEWALK
 30" MIN
 36" FOR 8" D.C.
 42" FOR 10" D.C.

7. CURB
 ROADWAY

8. TO CUSTOMER LINE(S)
 DUCTILE IRON FLG. ELL. OR STEEL ELL.

GENERAL NOTE:

1. ALL BRASS FITTINGS SHALL BE
 PAINTED RED



SIZE	DIM.
3"	18"
4"-12"	24"

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

3"-12" D.C. FIRE SERVICE (ABOVE GROUND)

STD. DWG.
 NUMBER

A-20517

APPROVED:

Goutam K. Dobey

DATE:

09/01/2026

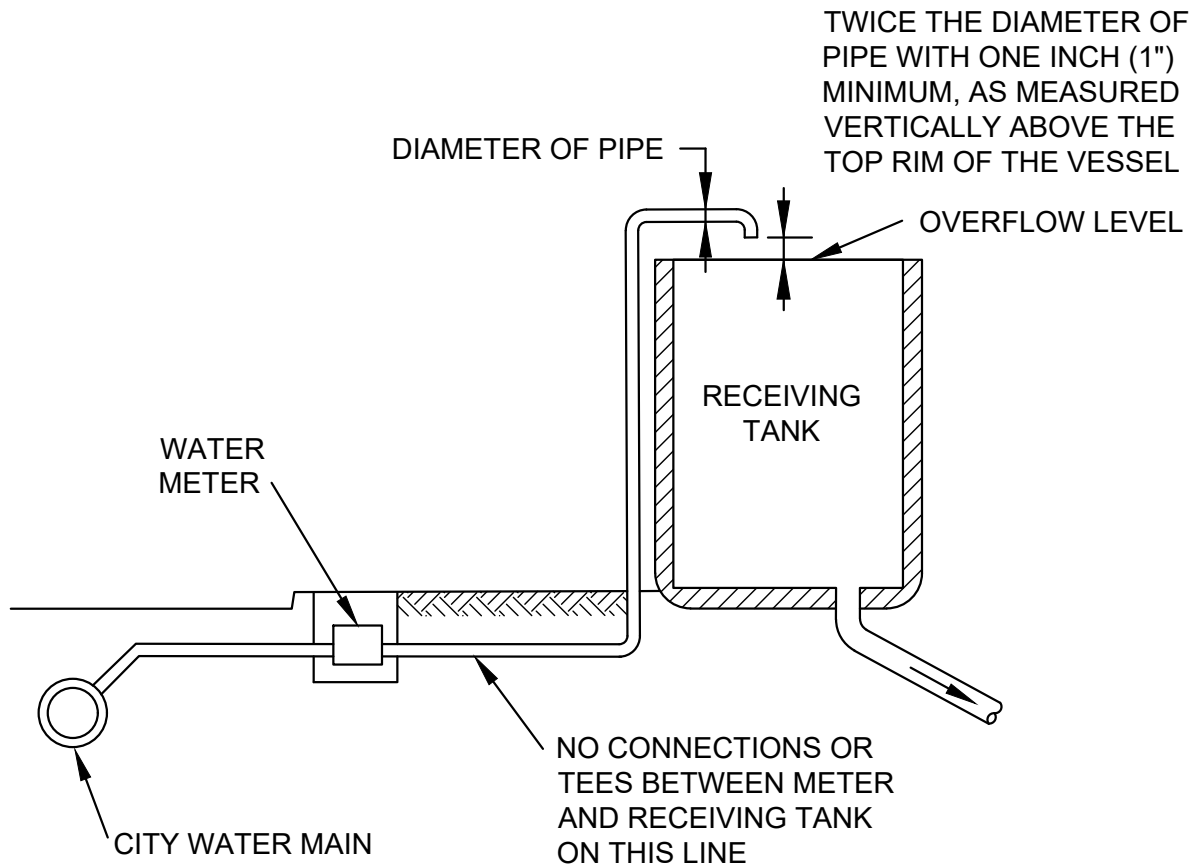
Goutam K. Dobey, City Engineer RCE 75646

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CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

TYPICAL AIR GAP SEPARATION

STD. DWG.
NUMBER

A-20519

APPROVED:

DATE: 01/03/2023

Goutam K. Dobey, City Engineer RCE 75646

SHEET 1 OF 1

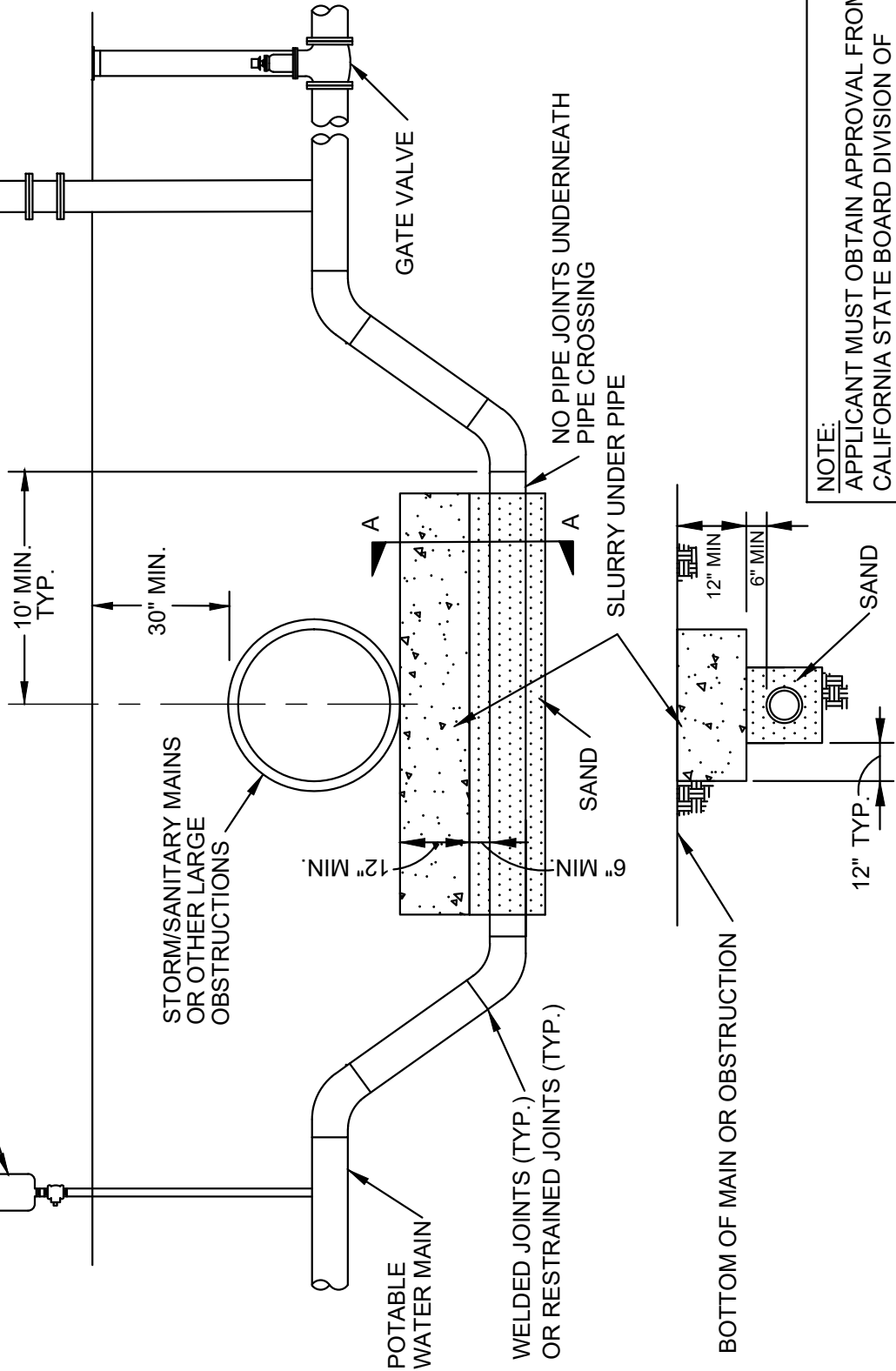
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NOTE: INSTALL AIR VACUUM ASSEMBLY PER STD. DETAIL A-20515 ON LOW SIDE OF DROP SECTION AS REQUIRED BY THE CITY.

HYDRANT PER STD. DETAIL A-20510

APPROXIMATE LOCATION OF AIR/VACUUM ASSEMBLY.
EXACT LOCATION TO BE DETERMINED BY CIVIL ENGINEER.



SECTION A-A

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

DROP SECTION

STD. DWG.
NUMBER

A-20520

APPROVED:

[Signature]

DATE: 01/03/2023

Goutam K. Dobey, City Engineer RCE 75646

SHEET 1 OF 1

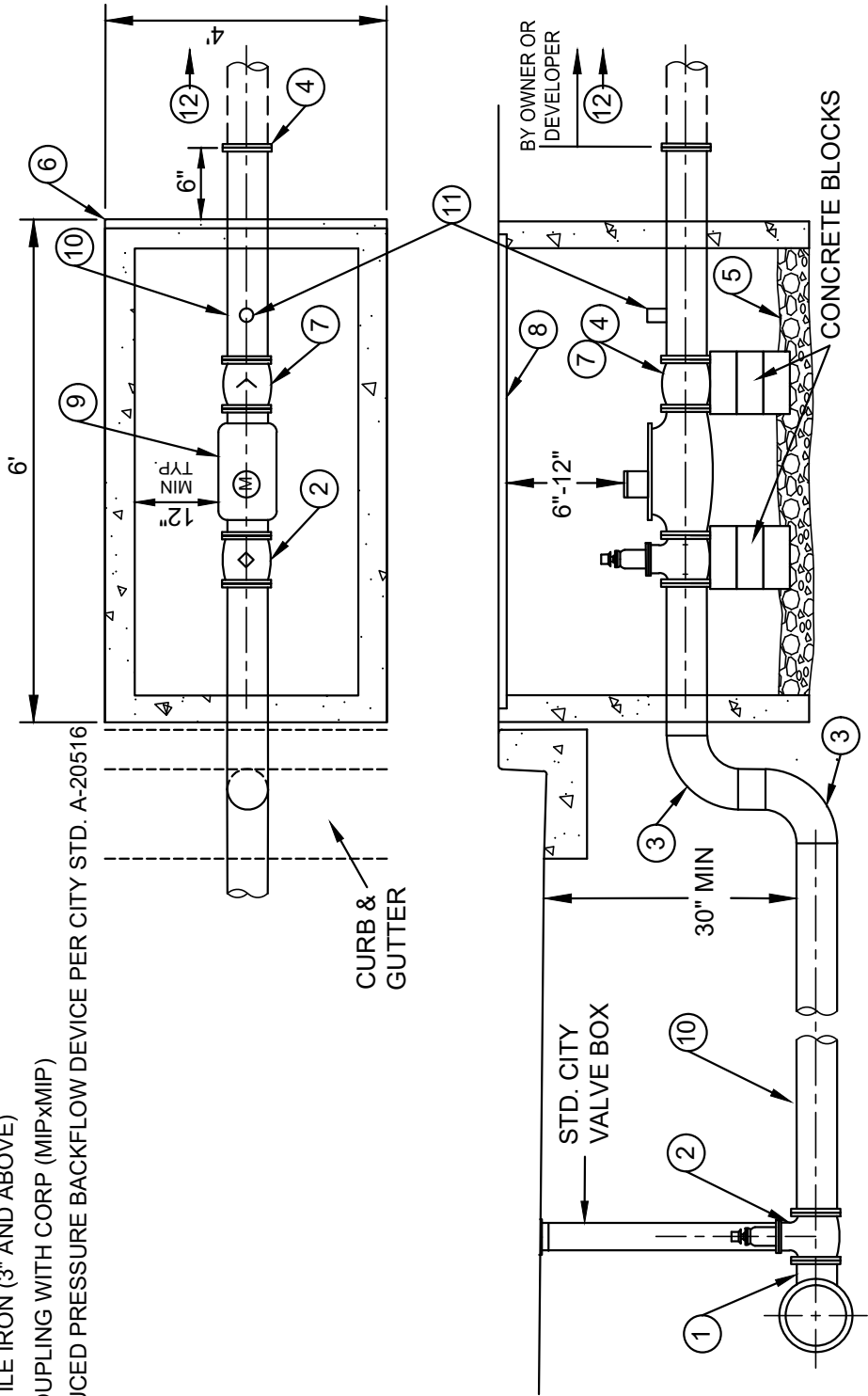
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SERVICE SIZE	ARMORCAST VAULT SIZE	DEPTH
3"	735	32"
4"	735	48"

MATERIAL:

- 1 CUT-IN TEE
- 2 GATE VALVE, FLG. PER SPEC. W-44 (RESILIENT WEDGE)
- 3 RESTRAINED DIP
- 4 NOT USED
- 5 3/4" CRUSHED ROCK
- 6 PRECAST VAULT APPROVE BY CITY (FOR PARKWAY OR SIDEWALK).
- 7 CHECK VALVE, FLG. WITH ADJUSTABLE SPRING, "MUELLER A-2602-02"
- 8 1/4" CHECKER PLATE BOLT DOWN COVER WITH (2) 7-1/2" DIA. ARMORCAST VAULT OR APPROVED EQUAL.
- 9 WATER METER SHALL BE 3" OR 4" IN SIZE. NEPTUNE MACH 10 R900i CUBIC FEET.
- 10 DUCTILE IRON (3" AND ABOVE)
- 11 2" COUPLING WITH CORP (MIPxMIP)
- 12 REDUCED PRESSURE BACKFLOW DEVICE PER CITY STD. A-20516



CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

3" AND ABOVE WATER SERVICE

STD. DWG.
NUMBER

A-20521

APPROVED:

Goutam K. Dobey

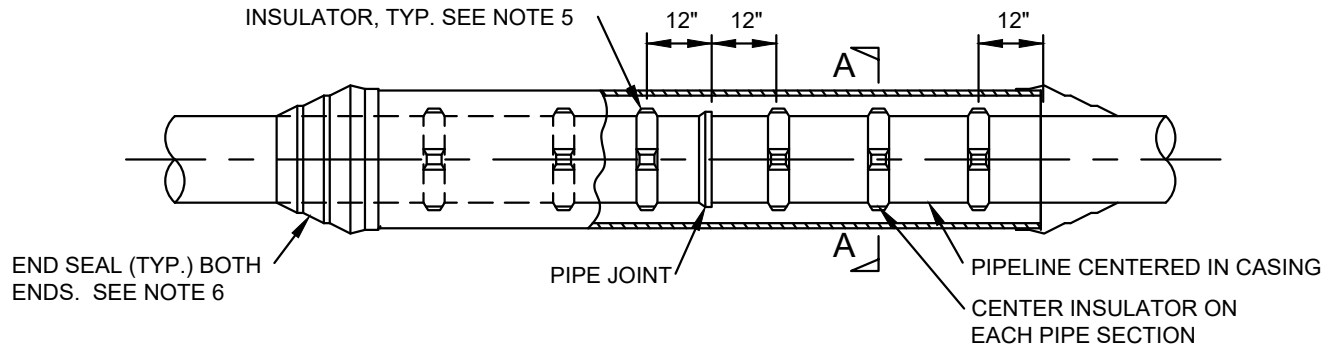
DATE: 09/01/2026

Goutam K. Dobey, City Engineer RCE 75646

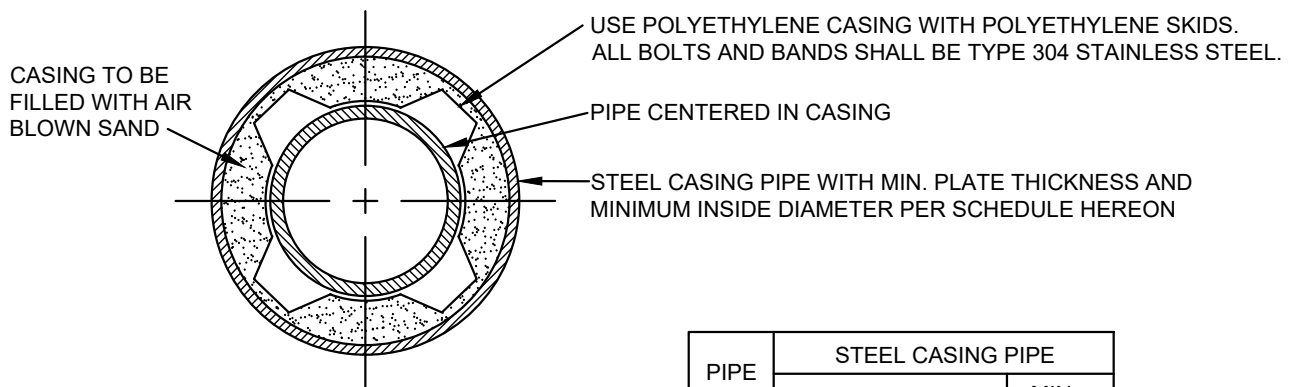
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CASING DETAIL



SECTION A - A

PIPE SIZE (I.D.)	STEEL CASING PIPE		
	MIN. SIZE (I.D.)		MIN. WALL THK.
	DIP & PVC	CML&C	
6"	16"	14"	1/4"
8"	18"	14"	1/4"
10"	21"	18"	5/16"
12"	24"	18"	5/16"

NOTES:

1. ALL STEEL CASING PIPE JOINTS SHALL BE WELDED FULL CIRCUMFERENCE.
2. PERIPHERY OF CASING TO BE PRESSURE GROUTED.
3. CARRIER PIPE SHALL BE AIR TESTED PRIOR TO FILLING WITH BLOWN SAND.
4. UPSTREAM AND DOWNSTREAM ELEVATIONS TO BE VERIFIED PRIOR TO FILLING CASING.
5. SPACING BETWEEN THE CASING INSULATORS SHALL BE PER THE MANUFACTURERS RECOMMENDATIONS EXCEPT THAT THERE SHALL BE AT LEAST 3 CASING INSULATORS PER PIPE SECTION, ONE 12" FROM EACH JOINT AND ONE CENTERED. ADDITIONALLY, ONE INSULATOR SHALL BE INSTALLED 12" FROM EACH END OF THE CASING.
6. BOTH ENDS OF THE CASING BETWEEN THE CASING AND CARRIER PIPE SHALL BE SEALED WATERTIGHT USING AN END SEAL. BANDS SHALL BE TYPE 304 STAINLESS STEEL.
7. DRILL 3/4 INCH HOLE AT THE LOWEST END OF THE CARRIER PIPE TO ALLOW FOR DRAINING OF CONDENSATION.

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

PIPE CASING

STD. DWG.
NUMBER

A-20522

APPROVED:

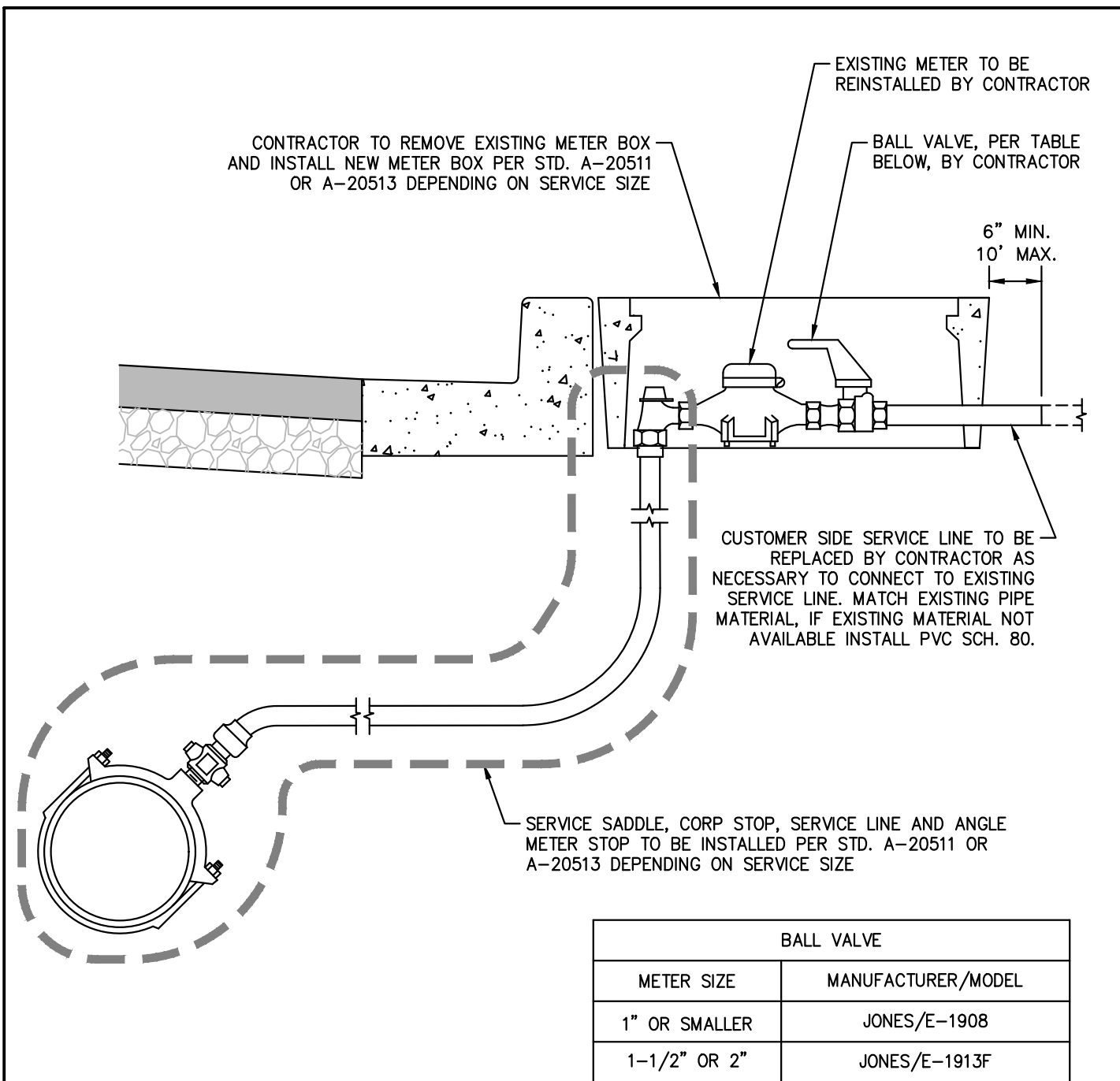
DATE: 01/03/2023

Goutam K. Dobey, City Engineer RCE 75646

SHEET 1 OF 1

REV.	BY	DATE

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NOTES

1. THIS DETAIL APPLIES TO THE ABANDONMENT AND REPLACEMENT OF EXISTING SERVICES AND OUTLINES THE RESPONSIBILITY OF THE EXISTING METER AND NEW BALL VALVE FOLLOWING THE METER TO BE COMPLETED BY THE CONTRACTOR.
2. ALL REQUIREMENTS SHOWN WITHIN STD. A-20511 AND A-20513 FROM THE SERVICE SADDLE UP TO THE ANGLE METER STOP SHALL BE INCLUDED WITHIN THIS STD. DWG.
3. METER BOXES AND METERS SHALL BE INSTALLED PERPENDICULAR TO THE CURB, STREET OR TRAVELED WAY. IF EXISTING METER IS NOT PERPENDICULAR IT SHALL BE ADJUSTED DURING THE NEW BOX AND SERVICE INSTALLATION.
4. EXISTING METER BOX SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR. IF WITHIN A CONCRETE AREA, CONCRETE SHALL BE INSTALLED WITHIN AREA OF REMOVED METER BOX, IF NOT INSTALLED IN SAME LOCATION AS EXISTING.
5. CONTRACTOR TO VERIFY LOCATION AND SIZE OF EXISTING SERVICE AND METER PRIOR TO START OF CONSTRUCTION.

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

REPLACEMENT OF EXISTING SERVICE CONNECTION

STD. DWG.
NUMBER

A-20523

APPROVED:

DATE: 01/03/2023

Goutam K. Dobey, City Engineer RCE 75646

SHEET 1 OF 1

REV.	BY	DATE

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APPENDIX A

BLANKET PERMITTANCE OF THE USE OF ALTERNATIVES TO WATERWORKS
STANDARDS FOR SEPARATION DISTANCES OF WATER MAINS

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State Water Resources Control Board

Division of Drinking Water

February 2, 2024

John R. Harris
Director
Redlands City MUD-Water DIV
P.O. Box 3005
Redlands, CA 92373
jharris@cityofredlands.org

Dear Mr. Harris,

PERMIT AMENDMENT NO. 06-13-24PA-002 TO APPROVE BLANKET PERMITTANCE OF THE USE OF ALTERNATIVES TO WATERWORKS STANDARDS FOR SEPARATION DISTANCES OF WATER MAINS

The State Water Resources Control Board, Division of Drinking Water (Division) is pleased to issue a permit amendment to City of Redlands (City) to allow the use of alternatives to American Waterworks standards for the separation of potable water mains from non-potable fluid carrying pipelines, in accordance with the submitted Standard Operating Procedure.

Attached to this letter is Permit Amendment No. 06-13-24PA-002, which includes specific provisions, appendices, and findings. Findings are detailed in the enclosed engineering report.

Please provide this office with a notice of receipt by March 3, 2024, that certifies the permit amendment was received, reviewed by appropriate managerial staff, and understood to contain legally enforceable conditions for system operation. The Division appreciates your cooperation and patience in the development of this permit amendment.

If you have any questions regarding the information contained in the permit amendment, please contact my staff David Divani at (909) 383-4320, or by email at David.Divani@Waterboards.ca.gov.

E. JOAQUIN ESQUIVEL, CHAIR | ERIC OPPENHEIMER, EXECUTIVE DIRECTOR

464 W. 4th Street, #437, San Bernardino, CA 92401 | www.waterboards.ca.gov

Sincerely,

Wei H. Chang



Digitally signed by Wei H. Chang
Date: 2024.02.02 11:57:32 -08'00'

Wei H. Chang, P.E.
District Engineer
San Bernardino District
Southern California Field Operations Branch

Enclosures:

1. Permit Amendment No. 06-13-24PA-002
2. Supplementary Engineering Report

cc:

1. Goutam K. Dobey, City Engineer, via email at gdobey@cityofredlands.org
2. Paul Mariscal, Water Utility Manager via email at pmariscal@cityofredlands.org

STATE OF CALIFORNIA

**AMENDMENT TO THE
DOMESTIC WATER SUPPLY PERMIT ISSUED TO**

**City of Redlands
CA3610037**

ORIGINAL PERMIT NO. 69-49

DATE OF ISSUE: October 24, 1969

AMENDMENT NO. 06-13-24PA-002

EFFECTIVE DATE: February 2, 2024

WHEREAS:

1. The **City of Redlands** public water system submitted a request letter to the State Water Resources Control Board, Division of Drinking Water (Division) on **March 24, 2023**, for an amendment to the Domestic Water Supply Permit issued to **City of Redlands** on **October 24, 1969**.
2. The purpose of the amendment, is to allow **City of Redlands** to make the following modification to the public water system:

Allow blanket permission of alternatives to Waterworks standards for separation distance of water mains in lieu of waiver process.

3. The **City of Redlands** has submitted all of the supporting information required to evaluate the application.
4. The Division has evaluated the application and the supporting material and has determined that the proposed modifications comply with all applicable State drinking water requirements.

THEREFORE:

The Division hereby approves the application submitted by the **City of Redlands** for a permit amendment. The Domestic Water Supply Permit issued to **City of Redlands** on **October 24, 1969**, is hereby amended as follows:

The City of Redlands may implement alternatives to Waterworks standards for the separation distances of potable water mains from non-potable fluid carrying pipelines as described in the currently approved Standard Operating Procedures (SOP) document.

This permit amendment is subject to the following conditions:

1. The City must comply with all requirements set forth in the California Safe Drinking Water Act, California Health and Safety Code, and any regulations, standards or orders adopted thereunder.
2. This document amends and adds to the domestic water supply permit issued to the City on October 24, 1969. If any provision of this amendment conflicts with those of the original, the provisions of this amendment must be followed.
3. The City must adhere to the water main separation requirements described in California Waterworks Standards (Title 22, California Code of Regulations (T22 CCR), section 64572), in all possible new pipeline installation projects and will implement alternatives only when meeting said requirements is not feasible.
4. Any and all new construction or replacement projects for which alternatives to waterworks standards for main separation are applicable, and for which alternatives will be implemented, must adhere to the construction, approval, and design practices of the approved Standard Operating Procedure (SOP).
5. For all new pipeline installation/replacement projects which do not comply with California Waterworks Standards (T22 CCR, Section 64572) and which are not addressed in the approved SOP, the City must submit an individual Waterworks Standards Main Separation Alternative Waiver Request, as shown in Appendix A of the approved SOP, for the Division's written approval prior to construction.
6. The City must maintain records and "as-built" diagrams of all pipeline installation and/or replacement projects which implement the alternatives described in the SOP.

7. The City must maintain a directory that may be used to readily identify completed projects which implement alternatives, and must submit this directory to the Division annually. An example directory has been included in Appendix B of this permit amendment.
8. "As-built" diagrams must contain all same information as would be included in a Waterworks Standards Main Separation Alternative Request (Appendix A of the approved SOP), which includes but is not limited to the new and old pipeline location, the waterworks standard that is unable to be met, and the additional measures implemented to protect public health.
9. Upon Division's request, the City must provide as-built diagrams for all new pipeline installation/replacement projects which make use of alternatives described in the approved SOP to the Division.
10. Any modifications, alterations, or additions to the approved SOP dated January 23, 2024, must be submitted to the Division for review and written approval prior to implementation.

This amendment must be appended to and shall be considered an integral part of the Domestic Water Supply Permit issued to the City on **October 24, 1969**.

FOR THE STATE WATER RESOURCES CONTROL BOARD

Wei H.
Chang



Digitally signed by Wei
H. Chang
Date: 2024.02.02
11:56:51 -08'00'

Wei H. Chang, P.E.
District Engineer
San Bernardino District
Southern California Field Operations Branch

February 2, 2024
Date

State Water Resources Control Board
Division of Drinking Water

**Supplementary Engineering Report for Consideration of
Permit Amendment No. 06-13-24PA-002**

City of Redlands

System No. CA3610037
San Bernardino County

Prepared by: _____



David Divani
Water Resource Control Engineer
San Bernardino District

Approved by: _____

Wei H. Chang

Digitally signed by Wei H.
Chang
Date: 2024.02.02 11:57:12
08'00'

Wei H. Chang, P.E.
District Engineer
San Bernardino District

February 2, 2024

INTRODUCTION

PURPOSE OF REPORT

The State Water Resources Control Board, Division of Drinking Water (hereinafter “Division”) has received the permit amendment application package submitted by City of Redlands (City) on March 24, 2023. The application package requests that the City be allowed blanket approval to implement alternatives to Waterworks Standards for separation distances of potable water mains required in California Code of Regulations, Title 22 (T22 CCR), Section 64572.

The purpose of this report is to document the Division’s review of the City’s application and supporting documents, and to make recommendations regarding the issuance of the requested permit amendment to City of Redlands.

BACKGROUND INFORMATION

T22 CCR, Section 64572 describes the minimum distances that new potable water mains should be installed at, relative to existing pipelines carrying any of the following non-potable fluids:

- (1) Untreated sewage
- (2) Primary or secondary treated sewage
- (3) Disinfected secondary recycled water (various types)
- (4) Disinfected tertiary recycled water
- (5) Storm water (storm drainage pipelines)
- (6) Hazardous fluids, including fuels, industrial wastes, and wastewater sludge

Regulations exist for new water main pipelines that are installed parallel to, or cross over/under existing ones. Waterworks standards for separation distances between these pipelines are maintained to protect public health. The primary concern that these standards are developed and maintained to address is that of cross contamination. In the event that water mains rupture, crack, or otherwise become susceptible to infiltration of hazardous pathogens or toxic materials, the minimum separation distances ensure that risk of human exposure is minimal.

Under California T22 CCR, Section 64551.100, public water systems may propose the use of an alternative to the requirements of T22 CCR, Chapter 16, regarding California Waterworks standards. The City may implement this alternative if they demonstrate to the State Board that the proposed alternative would provide at least the same level of protection to public health as the standard, and only if written approval is obtained from the State Board prior to construction.

The City is classified as a community water system, and it is one which continues to expand its service area in order to provide water for customers. As expansion continues,

existing structures such as sanitary sewage pipelines and storm drains, structures subject to the Waterworks standard separation requirements, may be encountered. The placement of these existing structures may be vital to their function, making it infeasible for the City to install essential projects that meet separation distance requirements as described in regulations. In such cases, waiver requests may be made to the Division which permits the one-time use of one or multiple alternatives to Waterworks' separation requirements. The City is knowledgeable and capable of utilizing measures that provide equal or greater protection to public health when typical separation distances cannot be met.

The City has requested general, blanket approval to implement alternatives to Waterworks standards for the separation of potable water mains and non-potable fluid carrying pipelines, in accordance with the procedures outlined in the Standard Operating Procedures (SOP), as found in Appendix A of this report. The SOP proposes specific alternative measures and describes scenarios in which alternatives will be used. The latest revised SOP, submitted January 23, 2024, has been reviewed by Division staff, and the measures described therein are believed to adequately provide equal or greater protection to public health.

DESCRIPTION OF SYSTEM

The City operates under the domestic water supply permit No. 69-49 dated October 24, 1969. Issued permit amendments and permit letters are summarized in Table 1.

Table 1: City of Redlands Permit Amendments

Amendment	Date Issued	Purpose
69-49_PA1	01-22-1988	To Operate the Horace Hinckley Water Treatment Plant
69-49_PA2	04-22-1991	Construct And Operate Two GAC Treatment Plants to Remove Organic Chemical
PA 69-49_PA3	09-05-2001	To Operate the Texas Street GAC Facility
PA 69-49-PA4	05-31-2002	To Operate and Maintain as A Potable Municipal Water Source the Existing San Bernardino Ave Well
PA69-49_PA5	08-19-2002	To Operate and Maintain as A Potable Municipal Water Source the Blending of The Water from The Existing Well 10 And Well 13 With the Water from Pressure Zone 1750 In the Highland Reservoir
PA 69-49_PA6	12-05-2002	To Allow the Use of SWP Water and SAR Water as Acceptable Water Sources at the Henry Tate WTP
PA 69-49-PA7	08-04-2003	To Operate North Orange Well 2 as a Potable Municipal Water Source

PA 69-49_PA9	12-04-2003	To Allow Redlands to Use Additional Water Sources by Means of Placing North Orange Well 1 in Service
PA 69-49_PA8	12-04-2003	Allow Redlands to Treat 100 % State Water Project Water Up to A Maximum Capacity Of 8 Million Gallons Per Day at the Henry Tate SWTP
PA69-49_PA_10	08-05-2004	Perchlorate Treatment at Rees Well
PA69-49_PA11	08-19-2004	Blending of Water Produced from Well 38 & Well 39 Per Approved Blending Plan & Church Street Well and Orange St Well Per Approved Blending Plan
05-13-05PA-019	08-05-2005	Upgrades To the Tate Water Treatment Plant and Use of Mill Creek at the Hinckley Water Treatment Plant
05-13-09PA-015	04-10-2009	Revise The Highland Ave Reservoir Blending Operations to Include Blending Perchlorate, Church St Well/ Orange St Well Blending Well 38 & 39 and the Rees Ion Exchange
05-13-10PA-040	08-05-2010	To Convert the Existing Rees Well GAC Facility to Ion Exchange for the Treatment of Perchlorate from Reese Well
05-13-11PA-023	05-16-2011	Add The Refurbished Country Club 1 As an Approved Potable Water Storage Facility
05-13-11PA-039	08-17-2011	Add as an Approved Treatment the Blending of Agate Well 2 with Diluent Water from HWTP for the Reduction of Perchlorate
05-13-13PA-029	07-10-2013	Revised Condition for Permit for Redlands Horace P. Hinckley Water Treatment Plant
05-13-14PA-030	08-11-2014	For Use of Crafton Well to Supply Water to the Distribution System
2017PA-SCHOOLS	01-17-2017	To Establish Requirements for Lead Monitoring and Lead Sample Result Interpretation at Kindergarten To 12 Grade (K-12)
05-13-21PA-004	04-27-2021	To Allow Henry Tate SWTP to Treat 100% Santa Ana River Water and Approval of February 2021 Operations Plan
05-13-23PA-006	05-12-2023	To Remove the Perchlorate Treatment Plant at Rees Well

This permit amendment will allow the City to implement alternatives to standards, as described in the approved SOP, without the Division's additional approval when the water main separation criteria fall into one of the scenarios described in the approved SOP.

The City has a total of 23,872 active service connections and a population of 78,025 as reported in the 2022 annual report. The City owns a total of 51 production wells including 33 active production wells, out of which 21 produce potable water and the other 12 supply

non-potable water for irrigation purposes. The potable wells have a total production capacity of 34 million gallons per day.

In addition, City has two surface water treatment plants, Hinckley and Tate, both which treat surface water from the Santa Ana River, Mill Creek, and State Project Water. The City's distribution system includes six pressure zones and 18 storage tanks. All tanks have been reported as inspected in the last five years and cleanings are maintained.

SOURCES OF INFORMATION

Information for the preparation of this report was obtained from material submitted by the City with the blank waiver approval request letter. Additional information was obtained from records of the State Water Resources Control Board, Division of Drinking Water, San Bernardino District Office. At the time of writing this report, the approved SOP was submitted for division review on January 23, 2024.

Investigation, analyses, and preparation of this report were completed by David Divani, Water Resources Control Engineer with the San Bernardino District. The report was reviewed and approved by Wei H. Chang, P.E., District Engineer of the San Bernardino District.

INVESTIGATION AND FINDINGS

STANDARD OPERATING PROCEDURES

On March 24, 2023, the Division received the first draft of the City's proposed SOP, and the blanket waiver approval request letter. Upon Division review, revisions and clarifications to the SOP were requested to ensure equal or greater protection is provided. On January 23, 2024, the City submitted the final revisions of the revised SOP which is hereby approved as the basis for alternative construction procedures.

The City's SOP discusses the need for waivers from Waterworks standards, regulations outlining those standards, and the authority by which the Division may waive those requirements in order to use alternatives. In addition, it describes the criteria that a new project must meet for alternatives to be approved by City management, and the specific alternative materials, practices, and construction methods which will be used to provide at least equal protection for public health.

The City may implement alternatives to water main separation standards as described in the approved SOP if and only if the necessary pipeline construction project cannot reasonably be built in accordance with the requirements of Title 22, CCR, Section 64572. If the project falls within one of the scenarios described in the approved SOP, the City can implement the alternatives per the SOP without Division's approval. Any projects outside of the scenarios described in the approved SOP will require approval from the

Division using the typical one-time Water Main Separation waiver request form which is enclosed in Appendix A of the approved SOP.

Division staff have reviewed the SOP and found that the alternative measures proposed therein as alternatives to Waterworks separation distance standards will provide equal or greater protection to public health by reducing the risk of cross contamination in potable water mains. The approved SOP, as submitted January 23, 2024, by the City will serve as an adequate basis for the approval, and construction of supply and pipeline projects which cannot meet typical water main separation requirements. Should the City wish to revise the approved SOP, those revisions must be submitted to the Division for approval prior to implementation.

CONCLUSIONS AND RECCOMENDATIONS

The State Water Resources Control Board, Division of Drinking Water finds that the City has proposed adequate measures to be implemented in cases that invoke this permit and that the Standard Operating Procedures document sufficiently addresses all concerns associated with waiving water main separation distance requirements. It is anticipated, based on available information, that the quality of water delivered will meet all applicable State Drinking Water Standards. Issuance of a permit amendment by the Division to the City of Redlands (City) is recommended subject to the following provisions.

1. The City must comply with all requirements set forth in the California Safe Drinking Water Act, California Health and Safety Code, and any regulations, standards or orders adopted thereunder.
2. This document amends and adds to the domestic water supply permit issued to the City on October 24, 1969. If any provision of this amendment conflicts with those of the original, the provisions of this amendment must be followed.
3. The City must adhere to the water main separation requirements described in California Waterworks Standards (Title 22, California Code of Regulations (T22 CCR), section 64572), in all possible new pipeline installation projects and will implement alternatives only when meeting said requirements is not feasible.
4. Any and all new construction or replacement projects for which alternatives to waterworks standards for main separation are applicable, and for which alternatives will be implemented, must adhere to the construction, approval, and design practices of the approved Standard Operating Procedure (SOP).
5. For all new pipeline installation/replacement projects which do not comply with California Waterworks Standards (T22 CCR, Section 64572) and which are not addressed in the approved SOP, the City must submit an individual Waterworks Standards Main Separation Alternative Waiver Request, as shown

in Appendix A of the approved SOP, for the Division's written approval prior to construction.

6. The City must maintain records and "as-built" diagrams of all pipeline installation and/or replacement projects which implement the alternatives described in the SOP.
7. The City must maintain a directory that may be used to readily identify completed projects which implement alternatives, and must submit this directory to the Division annually. An example directory has been included in Appendix B of this permit amendment.
8. "As-built" diagrams must contain all same information as would be included in a Waterworks Standards Main Separation Alternative Request (Appendix A of the approved SOP), which includes but is not limited to the new and old pipeline location, the waterworks standard that is unable to be met, and the additional measures implemented to protect public health.
9. Upon Division's request, the City must provide as-built diagrams for all new pipeline installation/replacement projects which make use of alternatives described in the approved SOP to the Division.
10. Any modifications, alterations, or additions to the approved SOP dated January 23, 2024, must be submitted to the Division for review and written approval prior to implementation.

APPENDIX

Appendix A: Approved Standard Operating Procedure (SOP) for Alternatives to Waterworks Standards

Appendix B: Example for Directory of Alternatives to Waterwork's Standards for Main Separation

CRITERIA FOR ALTERNATIVE WATER MAIN SEPARATION BLANKET WAIVERS

THIS STANDARD OPERATING PROCEDURE (SOP) IS WRITTEN TO SPECIFY REQUIREMENTS AND RECOMMENDATIONS REGARDING THE SEPARATION OF WATER MAINS WITH EXISTING UNDERGROUND UTILITIES IN ORDER TO MINIMIZE THE RISK OF CONTAMINATING DRINKING WATER.

1.0 INTRODUCTION, PURPOSE, OR SCOPE:

THE STATE WATER RESOURCES CONTROL BOARD (STATE BOARD), DIVISION OF DRINKING WATER (DIVISION) HAS RECEIVED SEVERAL WATERWORKS STANDARDS WAIVER REQUESTS FOR WATER MAIN SEPARATIONS FROM THE CITY OF REDLANDS (CITY). THE DIVISION HAS BEEN IN CORRESPONDENCE WITH STAFF AT THE CITY REGARDING CREATION OF AN ALTERNATIVE (BLANKET WAIVERS) IN LIEU OF THE CURRENT WATER MAIN SEPARATION WAIVER PROCESS WHICH IS REQUIRED BY THE WATERWORKS STANDARDS. THIS ALTERNATIVE WILL BE ACCOMPLISHED BY USING A PERMIT AMENDMENT AND SOP. THIS SOP COVERS THE PHYSICAL SEPARATION OF PIPES AND STRUCTURES CONTAINING DRINKING WATER AND THE ALTERNATIVE BLANKET WAIVERS SHALL ONLY BE USED FOR DESIGN AND/OR CONSTRUCTION WHERE THE CONDITIONS DO NOT ALLOW THE CITY TO ACHIEVE THE WATER MAIN SEPARATION CRITERIA IN ACCORDANCE WITH THE WATERWORKS STANDARDS.

2.0 DEFINITIONS

WATER MAIN – ANY PIPELINE, EXCEPT FOR USER SERVICE LINES, WITHIN THE DISTRIBUTION SYSTEM.

SANITARY SEWER MAIN – A GRAVITY SEWER CONVEYING UNTREATED MUNICIPAL WASTEWATER.

SEWER FORCE MAIN – A PRESSURIZED SEWER CONVEYING UNTREATED MUNICIPAL WASTEWATER.

SEWER LATERAL – A SEWER LINE CONNECTION THE BUILDING DRAIN AND THE SANITARY SEWER MAIN.

STORM DRAIN – PIPING AND COLLECTION EQUIPMENT USED FOR COLLECTING AND DISPOSING OF STORM WATER.

COMPRESSION JOINTS – A PUSH-ON JOINT THAT SEALS BY MEANS OF THE COMPRESSION OF A RUBBERING OR GASKET BETWEEN THE PIPE AND A BELL OR COUPLING.

CONTINUOUS SLEEVE – A PROTECTIVE TUBE OF HIGH-DENSITY-POLYETHYLENE (HDPE) PIPE WITH HEAT FUSION JOINTS OR OTHER NON-POTABLE METALLIC CASING JOINTS INTO WHICH A PIPE IS INSERTED.

WRAPPED JOINT – A PIPE WRAP TAPE THAT SEALS SEWER FORCE MAIN AT JOINTS.

3.0 GENERAL

WHEN BURIED WATER MAINS ARE IN CLOSE PROXIMITY TO NON-POTABLE PIPELINES, THE WATER MAINS ARE VULNERABLE TO CONTAMINATION THAT CAN POSE A RISK OF WATERBORNE DISEASE OUTBREAKS. FOR EXAMPLE, SEWERS (SANITARY SEWER MAINS AND SEWAGE FORCE MAINS) FREQUENTLY LEAK AND SATURATE THE SURROUNDING SOIL WITH SEWAGE DUE TO STRUCTURAL FAILURE, IMPROPERLY CONSTRUCTED JOINTS, AND/OR SUBSIDENCE OR UPHEAVAL OF THE SOIL ENCASING THE SEWER. IF A NEARBY WATER MAIN IS DEPRESSURIZED AND NO PRESSURE OR NEGATIVE PRESSURE OCCURS, THAT SITUATION IS A PUBLIC HEALTH HAZARD THAT IS COMPOUNDED IF AN EXISTING SEWER IS BROKEN DURING THE INSTALLATION OR REPAIR OF THE WATER MAIN. FURTHER, FAILURE OF A WATER MAIN IN CLOSE PROXIMITY TO OTHER PIPELINES MAY DISTURB THEIR BEDDING AND CAUSE THEM TO FAIL. IN THE EVENT OF AN EARTHQUAKE OR OTHER DISASTER, SIMULTANEOUS FAILURE OF ALL PIPELINES COULD OCCUR.

THE MOST EFFECTIVE PROTECTION AGAINST THIS TYPE OF DRINKING WATER CONTAMINATION IS ADEQUATE CONSTRUCTION AND SEPARATION OF NON-POTABLE PIPELINES AND WATER MAINS. THE WATERWORKS STANDARDS (CALIFORNIA CODE OF REGULATIONS (CCR), TITLE 22, CHAPTER 16, SECTION 64572) PROVIDE SEPARATION CRITERIA FOR NEW CONSTRUCTION. HOWEVER, WHEN THESE CRITERIA CANNOT BE MET, THE RISK OF CONTAMINATION CAN BE REDUCED BY INCREASING THE STRUCTURAL INTEGRITY OF PIPE MATERIALS AND JOINTS, AND ENSURING MINIMUM SEPARATION REQUIREMENTS ARE MET. THEREFORE, THE FOLLOWING GUIDANCE DETAILS CONSTRUCTION CRITERIA FOR THE INSULATION OF WATER MAINS AND NON-POTABLE PIPELINES TO MINIMIZE THE RISK OF CONTAMINATION OF DRINKING WATER.

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

STANDARD OPERATING PROCEDURE (SOP)

SOP

1 OF 2

APPROVED:

DATE: JAN. 2024

Goutam K. Dobey, City Engineer RCE 75646

REV. BY DATE

4.0 AUTHORITY

THE CALIFORNIA WATERWORKS STANDARDS ESTABLISHED CRITERIA FOR THE SEPARATION OF NEW WATER MAINS FROM NON-POTABLE PIPELINES. THE CITY WILL ENSURE THAT THE DISTANCE ARE MET, WHENEVER FEASIBLE, FOR ALL NEW CONSTRUCTION. THE DIVISION RECOGNIZES THAT CERTAIN CONDITIONS MAY CALL FOR THE INSTALLATION OF PIPELINES WITH LESS SEPARATION DISTANCE THAN WHAT IS REQUIRED BY THE REGULATIONS. IN THESE SITUATIONS, THE CITY PROPOSES AN ALTERNATIVE BLANKET WAIVERS PURSUANT TO CCR, TITLE 22, SECTION 64551.100.

5.0 APPLICABILITY

- A. THE ALTERNATIVE CONSTRUCTION CRITERIA PRESENTED IN THIS DOCUMENT ALSO APPLIES TO SEWER LATERALS OR STORM DRAIN THAT CROSS ABOVE A WATER MAIN, BUT NOT TO THE SEWER LATERALS OR STORM DRAINS THAT CROSS BELOW A WATER MAIN.
- B. IN NO CASE, SHOULD WATER MAINS AND NON-POTABLE PIPELINES CONVEYING SEWAGE OR OTHER LIQUIDS BE INSTALLED IN THE SAME TRENCH.

6.0 POLICY

CCR, TITLE 22, CHAPTER 16 WATERWORKS STANDARDS

- (1) SECTION 64572 WATER MAIN SEPARATION
- (2) SECTION 64551.100 WAIVERS AND ALTERNATIVES

THE CCR, TITLE 22, CHAPTER 16, WATERWORKS STANDARDS, SECTION 64572 WATER MAIN SEPARATION, AND SECTION 64551.100 WAIVERS AND ALTERNATIVES IS OUTLINED IN APPENDIX A.

7.0 ALTERNATIVE CONSTRUCTION CRITERIA

WHEN NEW WATER MAINS AND NEW SANITARY SEWER MAINS ARE BEING INSTALLED IN EXISTING DEVELOPMENT AREAS, LOCAL CONDITIONS (E.G., AVAILABLE SPACE, LIMITED SLOPE, EXISTING STRUCTURES) MAY CREATE A SITUATION IN WHICH THERE IS NO ALTERNATIVE BUT TO INSTALL WATER MAINS AT A DISTANCE LESS THAN BASIC REQUIREMENTS SPECIFIED ABOVE. IN SUCH CASES, THE DIVISION MAY APPROVE ALTERNATIVE CONSTRUCTION CRITERIA.

ANY APPLICATION THAT PROPOSED TO USE THE ALTERNATIVE CONSTRUCTION CRITERIA SHALL DEMONSTRATE TO THE DIVISION HOW IT WILL INSTITUTE ADDITIONAL MITIGATION MEASURES TO ENSURE THAT THE PROPOSED ALTERNATIVE WOULD NOT RESULT IN AN INCREASED RISK TO THE PUBLIC HEALTH. A COPY OF THE STATE WATER RESOURCES CONTROL BOARD, DIVISION OF DRINKING WATER, EXAMPLES FOR WATERWORKS STANDARDS MAIN SEPARATION ALTERNATIVES APPLICATION IS OUTLINED IN APPENDIX A.

APPROPRIATE ALTERNATIVES CONDITION CRITERIA FOR TYPICAL SCENARIO(S) THE CITY EXPERIENCES IN WHICH THE BASIC REQUIREMENTS FOR WATER MAIN SEPARATION CANNOT BE MET SHALL BE DEMONSTRATED TO THE DIVISION. A COPY OF THE DIVISION OF DRINKING WATER (DDW) APPROVED WATERWORKS STANDARDS MAIN SEPARATION ALTERNATIVES (BLANKET WAIVERS) FOR THE USE OF THE CITY IS OUTLINED IN APPENDIX A.

8.0 CITY DDW BLANKET WAIVERS TRACKING

FOR EACH INSTANCE THAT THE WATER MAIN IS NOT MEETING SEPARATION STANDARDS, THE REQUEST FOR AN ALTERNATIVE BLANKET WAIVERS SHALL BE TRACKED. THE CITY SHALL MAINTAIN A RECORD AVAILABLE FOR REVIEW BY THE DDW. CITY RECORD DRAWINGS TO BE KEPT AS A PERMANENT RECORD.

9.0 REFERENCES

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD (2017, APRIL 10). CALIFORNIA REGULATIONS RELATED TO DRINKING WATER.

[HTTPS://WWW.WATERBOARDS.CA.GOV/DRINKING_WATER/CERTLIC/DRINKINGWATER/DOCUMENTS/LAWBOOK/DWREGULATIONS-2017-04-10.PDF](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/lawbook/dwregulations-2017-04-10.pdf)

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

STANDARD OPERATING PROCEDURE (SOP)

SOP

APPROVED:

DATE: JAN. 2024

2 OF 2

REV. BY DATE

Goutam K. Dobey, City Engineer RCE 75646

APPENDIX "A"

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

- I. California Code of Regulation Title 22, Chapter 16 "Waterworks Standards"
 - 1. Section 64572 Water Main Separation
 - 2. Section 64551.100 Waivers and Alternatives
- II. State Water Resources Control Board, Division of Drinking Water: Examples Request for Alternative Water Main Installation
- III. Division of Drinking Water Approved Alternative Installation "Blanket Waivers" for use in the City of Redlands

I. California Code of Regulation Title 22, Chapter 16

"Waterworks Standards"

1. Section 64572 Water Main Separation

- (a) New water mains and new supply lines shall not be installed in the same trench as, and shall be at least 10 feet horizontally from and one foot vertically above, any parallel pipeline conveying:
 - (1) Untreated sewage,
 - (2) Primary or secondary treated sewage,
 - (3) Disinfected secondary-2.2 recycled water (defined in section 60301.220),
 - (4) Disinfected secondary-23 recycled water (defined in section 60301.225), and
 - (5) Hazardous fluids such as fuels, industrial wastes, and wastewater sludge.
- (b) New water mains and new supply lines shall be installed at least 4 feet horizontally from, and one foot vertically above, any parallel pipeline conveying:
 - (1) Disinfected tertiary recycled water (defined in section 60301.230), and
 - (2) Storm drainage.
- (c) New supply lines conveying raw water to be treated for drinking purposes shall be installed at least 4 feet horizontally from, and one foot vertically below, any water main.
- (d) If crossing a pipeline conveying a fluid listed in subsection (a) or (b), a new water main shall be constructed no less than 45-degrees to and at least one foot above that pipeline. No connection joints shall be made in the water main within eight horizontal feet of the fluid pipeline.
- (e) The vertical separation specified in subsections (a), (b), and (c) is required only when the horizontal distance between a water main and pipeline is less than ten feet.
- (f) New water mains shall not be installed within 100 horizontal feet of the nearest edge of any sanitary landfill, wastewater disposal pond, or hazardous waste disposal site, or within 25 horizontal feet of the nearest edge of any cesspool, septic tank, sewage leach field, seepage pit, underground hazardous material storage tank, or groundwater recharge project site.
- (g) The minimum separation distances set forth in this section shall be measured from the nearest outside edge of each pipe barrel.
- (h) With State Board approval, newly installed water mains may be exempt from the separation distances in this section, except subsection (f), if the newly installed main is:
 - (1) less than 1320 linear feet,
 - (2) replacing an existing main, installed in the same location, and has a diameter no greater than six inches more than the diameter of the main it is replacing, and
 - (3) installed in a manner that minimizes the potential for contamination, including, but not limited to:
 - (A) sleeving the newly installed main, or
 - (B) utilizing upgraded piping material.

2. Section 64551.100 Waivers and Alternatives

- (a) A water system that proposes to use an alternative to a requirement in this chapter shall:
 - (1) Demonstrate to the State Board that the proposed alternative would provide at least the same level of protection to public health; and
 - (1) Obtain written approval from the State Board prior to implementation of the alternative.

II. State Water Resources Control Board, Division of Drinking Water: Examples
Request for Alternative Water Main Installation

STATE WATER RESOURCES CONTROL BOARD
Division of Drinking Water
Waterworks Standards Main Separation Alternative
Request Checklist

Water System Name/Number: [Click here to enter text.](#)

Name of Applicant: [Click here to enter text.](#)

Phone Number and Email Address: [Click here to enter text.](#)

Project Name and Location: [Click here to enter text.](#)

Attach Plans or field drawings to show the standard installation and the proposed installation for which the alternative is being requested. (e.g. vertical profile and horizontal alignment, specifications, and other exhibits, as possible)

The Waterworks Standards in the California Code of Regulations (CCR) Title 22, Chapter 16, Section 64572 provide separation criteria for new construction. When buried water mains are in close proximity to non-potable pipelines, the water mains are vulnerable to contamination that can pose a risk of waterborne disease outbreaks.

Per CCR Title 22, Chapter 16, Section 64551.100, a water system that proposes to use an alternative to a requirement in Chapter 16 shall: 1) demonstrate to the State Board that the proposed alternative would provide at least the same level of protection to public health; and 2) obtain written approval from the State Board prior to implementation of the alternative. Requests for alternatives to the Waterworks Standards must consist of information outlined in at least four of the attachments below. Information contained in Attachments A, B and E will be required for all alternative requests. Information contained in Attachments C and/or D will also be needed depending on your particular situation. Please review all the attachments and submit the information for your specific project. The information must be submitted to your local Division of Drinking Water District Office for review and approval prior to construction.

Attachment A represents the standard pipe material and construction that would be used if the standard separation criteria can be met by the utility.

Attachment B represents information on the current pipe in the ground that is being crossed by a new pipeline or being paralleled by a new pipeline.

Attachments C and D represent information on the new pipeline being installed. Attachment C is for parallel construction and Attachment D is for crossings.

Attachment E is certification language that is needed to consider the Waterworks Standard alternative application.

Please Note: The information may be submitted using this checklist or another format, but all relevant information must be provided to the Division of Drinking Water District Office for consideration. If multiple crossings or parallel pipelines in multiple locations are part of the application, please indicate in the comments field of the applicable attachment or submittal. Alternatively, the applicant can provide an attachment or separate submittal for each location.

Attachment A (All Cases)

Water System's Standard Pipe Material and Construction Details

Attach the water system's standard pipe specification and construction details to this as Exhibit 1 and describe below.

Liquid Conveyed By New Pipeline:

- ☐ Domestic Water ☐ Raw Water ☐ Recycled Water
☐ Sewer ☐ Force Sewer ☐ Storm Drain
☐ Other (describe) [Click here to enter text.](#)

Nominal Size: [Click here to enter text.](#) inches

Operating Pressure: [Click here to enter text.](#) psi or ☐ Gravity flow/atmospheric

Pipe Material: ☐ Ductile Iron ☐ Cast Iron ☐ Welded Steel
☐ HDPE ☐ PVC ☐ Concrete ☐ Clay
☐ Other describe [Click here to enter text.](#)

AWWA Material Designation Code: [Click here to enter text.](#)

Pressure Class/Thickness/Coating [Click here to enter text.](#)

Joint Type Construction: ☐ Push On ☐ Restrained ☐ Welded Joints ☐ Fused
☐ Other describe [Click here to enter text.](#)

Depth of Cover: [Click here to enter text.](#)

Comments:

[Click here to enter text.](#)

Attachment B (All Cases)

Existing Pipeline Material – Paralleling or Crossing the Proposed Pipe

List the condition of the existing pipeline being paralleled or crossed.

Liquid Conveyed By Existing Pipeline:

- ☐ Domestic Water ☐ Raw Water ☐ Recycled Water
☐ Sewer ☐ Force Sewer ☐ Storm Drain
☐ Other (describe) [Click here to enter text.](#)

Nominal Size: [Click here to enter text.](#) inches

Operating Pressure: [Click here to enter text.](#) psi or ☐ Gravity flow/atmospheric

Pipe Material: ☐ Ductile Iron ☐ Cast Iron ☐ Welded Steel
☐ HDPE ☐ PVC ☐ Concrete ☐ Clay
☐ Other (describe) [Click here to enter text.](#)

AWWA Material Designation Code: [Click here to enter text.](#)

Pressure Class/Thickness/Coating [Click here to enter text.](#)

Joint Type Construction: ☐ Push On ☐ Restrained ☐ Welded Joints ☐ Fused
☐ Other (describe) [Click here to enter text.](#)

Length of Project: [Click here to enter text.](#)

Age/Condition: [Click here to enter text.](#)

Depth of Cover: [Click here to enter text.](#)

Separation from proposed pipeline

Note: all distances are measured from the outside walls of both pipelines.

Vertical: [Click here to enter text.](#)

Horizontal: [Click here to enter text.](#)

Have there been many repairs on the existing pipeline in this area? ☐ Yes ☐ No

If yes, explain: [Click here to enter text.](#)

COMMENTS:

[Click here to enter text.](#)

Attachment C

Proposed Parallel Pipeline Material and Construction Information

Where the Waterworks Standards cannot be met, it is the responsibility of the water system proposing an alternative to demonstrate that its proposed construction will have at least the “same level of protection to public health” as the minimum separation distances prescribed in the regulations.

Intended Use of New Pipeline: ☐ Distribution ☐ Transmission ☐ Storage
☐ Other (describe) [Click here to enter text.](#)

Liquid Conveyed:

☐ Domestic Water ☐ Raw Water ☐ Recycled Water
☐ Sewer ☐ Force Sewer ☐ Storm Drain
☐ Other (describe) [Click here to enter text.](#)

Nominal Size: [Click here to enter text.](#) inches Flow rate: [Click here to enter text.](#) gpm
Operating Pressure: [Click here to enter text.](#) psi or ☐ Gravity flow/atmospheric

Pipe Material: ☐ Ductile Iron ☐ Cast Iron ☐ Welded Steel
☐ HDPE ☐ PVC ☐ Concrete ☐ Clay
☐ Other describe [Click here to enter text.](#)

AWWA Material Designation Code: [Click here to enter text.](#)

Pressure Class/Thickness/Coating [Click here to enter text.](#)

Joint Type Construction: ☐ Push On ☐ Restrained ☐ Welded Joints ☐ Fused
☐ Other describe [Click here to enter text.](#)

Length of Project: [Click here to enter text.](#)

Depth of Cover: [Click here to enter text.](#)

Separation From Existing Non- Potable Pipeline

Note: all distances are measured from the outside walls of both pipelines.

Vertical: [Click here to enter text.](#)

Horizontal: [Click here to enter text.](#)

Is this a temporary installation? ☐ Yes ☐ No

If yes, how long will it be in place? [Click here to enter text.](#)

Can the new pipeline be installed in accordance with the Waterworks Standards? If not explain below:

[Click here to enter text.](#)

Proposed additional protective measures (*material construction methods, operational considerations, etc.*):

Attachment C

[Click here to enter text.](#)

Attach additional exhibits as necessary

Attachment D

Proposed Pipeline Crossing Material and Construction Information

Where the Waterworks Standards cannot be met, it is the responsibility of the water system proposing an alternative to demonstrate that its proposed construction will have at least the “same level of protection to public health” as the minimum separation distances prescribed in the regulations.

Intended Use of New Pipeline: ☐ Distribution ☐ Transmission ☐ Storage
☐ Other (describe) [Click here to enter text.](#)

Liquid Conveyed:

☐ Domestic Water ☐ Raw Water ☐ Recycled Water
☐ Sewer ☐ Force Sewer ☐ Storm Drain
☐ Other (describe) [Click here to enter text.](#)

Nominal Size: [Click here to enter text.](#) inches
Operating Pressure: [Click here to enter text.](#) psi or ☐ Gravity flow/atmospheric

Pipe Material: ☐ Ductile Iron ☐ Cast Iron ☐ Welded Steel
☐ HDPE ☐ PVC ☐ Concrete ☐ Clay
☐ Other describe [Click here to enter text.](#)

AWWA Material Designation Code: [Click here to enter text.](#)

Pressure Class/Thickness/Coating [Click here to enter text.](#)

Joint Type Construction: ☐ Push On ☐ Restrained ☐ Welded Joints ☐ Fused
☐ Other describe [Click here to enter text.](#)

Length of Project: [Click here to enter text.](#)

Depth of Cover: [Click here to enter text.](#)

Number of Crossings: [Click here to enter text.](#)

Angle of Crossings: [Click here to enter text.](#)

Description of crossing pipelines:
[Click here to enter text.](#)

Attachment D

Can the new pipeline be installed in accordance with the Waterworks Standards? If not explain below:

[Click here to enter text.](#)

Proposed additional protective measures (*material construction methods, operational considerations, etc.*):

[Click here to enter text.](#)

Attach additional exhibits as necessary

Attachment E Certification

CERTIFYING SIGNATURE:

For consultants, contractors, and developers: attach written concurrence from the governing water system and pipeline owners stating that the selected project alternative is the preferred alternative.

Attached concurrence?: ☐ YES ☐ NO ☐ N/A

I certify that the forgoing information is true and correct to the best of my ability, and that I believe this alternative would provide at least the same level of protection to public health as the minimum separation distances prescribed in the California Waterworks Standards (CCR, Title 22, Section 64572)..

Signature

Name and Title [Click here to enter text.](#)

Date [Click here to enter a date.](#)

LIST OF MATERIALS

STANDARD MATERIALS

Water

DIP (Ductile Iron Pipe) CL150

Push-on Joints

CML&C Steel Pipe (10 ga)

3" and larger fittings
250 psi AWWA C110 C104

Sewer

Vitrified Clay Pipe (VCP)
Extra Strength SSPWC

SDR35 PVC (Polyvinyl Chloride) pipe

Storm Drain

Non-continuous RCP
(Reinforced Concrete Pipe) D-1500

UPGRADED MATERIALS

Water

DIP (Ductile Iron Pipe) CL350

Restrained Joints

CML&C Steel Pipe (10 ga)

3" and larger fittings
250 psi AWWA C110 C104

Sewer

Vitrified Clay Pipe (VCP)
High Strength SSPWC

SDR27 PVC (Polyvinyl Chloride) pipe

Storm Drain

Continuous HDPE
(High Density Polyethylene) Pipe

Reinforced Concrete beam with RCP
(Reinforced Concrete Pipe) D-1500

LIST OF CONSTRUCTION METHODS

STANDARD CONSTRUCTION METHODS

Water

Thrust blocks at directional changes

Push-on joints

No reinforced concrete blanket protection of existing water main when SD is built under water main.

Sewer

VCP Push on compression Joints

Storm Drain (SD)

No protection of existing SD at new Water main at crossing.

UPGRADED CONSTRUCTION METHODS

Water

Restrained Joints at directional changes

Restrained Joints at crossings

Reinforced concrete blanket protection of existing water main when SD is built under water main.

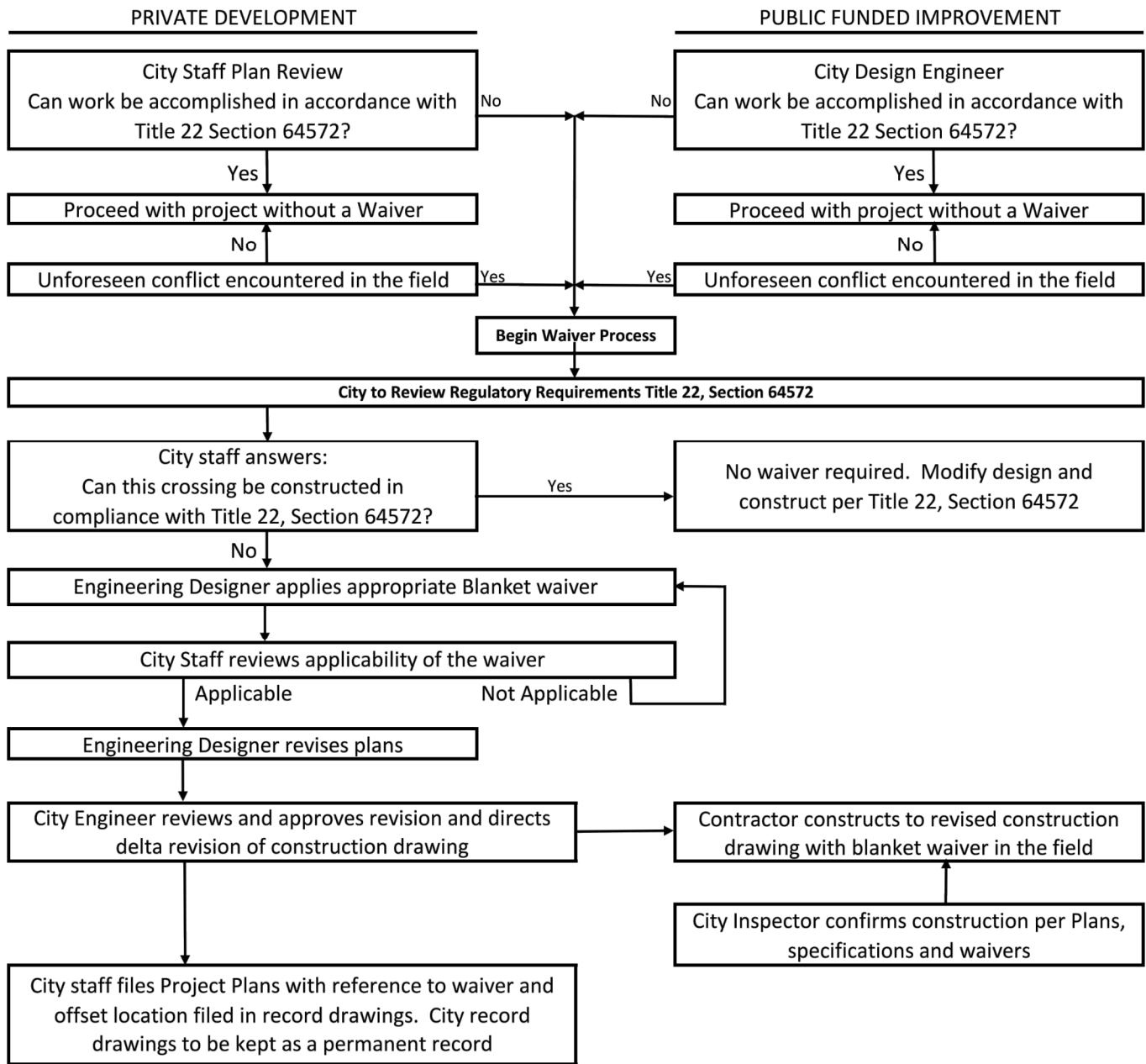
Sewer

PVC solvent weld pipe

Storm Drain

Reinforced concrete blanket protection of existing RCP at new watermain at crossing under SD.

FLOW CHART FOR WAIVER



Definitions

City Staff – Plan review Engineer under the supervision of the City Engineer

City Design Engineer – City Staff Engineer or Consultant who prepares City’s capital improvement project plans.

Engineering Designer – Private consultant or City Staff Engineer.

Permanent records – include final record drawings, encroachment permit, and inspection records.

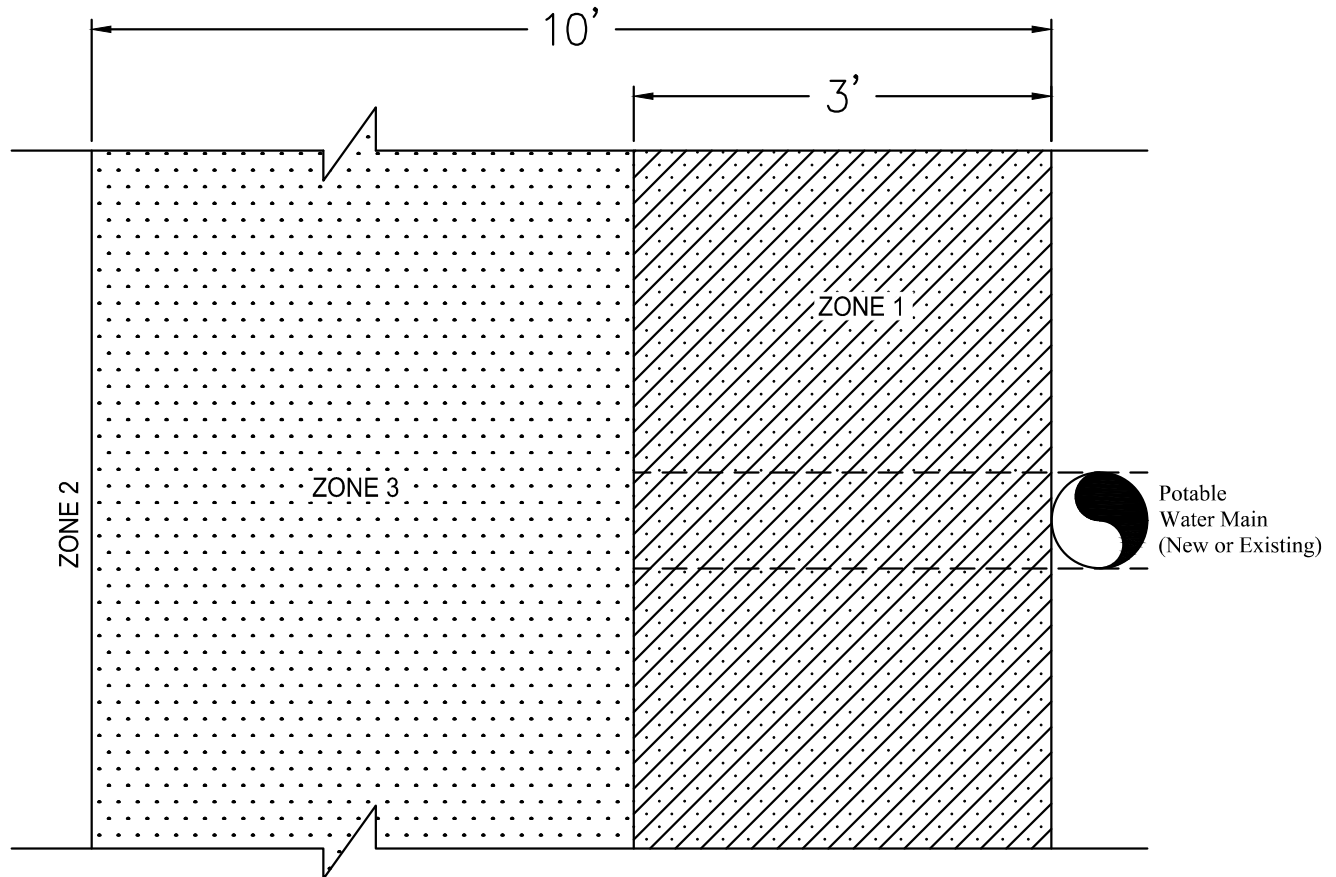
Record Drawings – Project plans kept in mylar and digital format. These include original plans plus any delta revisions if applicable. These are permanent records.

III. Division of Drinking Water Approved Alternative Installation "Blanket Waivers' for use in the City of Redlands

Note: Design and/or installations per one or more of the approved Blanket Waivers attached to this appendix may only be used when the standard Water Main Separations per Section 64572 of the Waterworks Standards cannot be met. Section 64572 of the California Waterworks Standards can be found in the California Code of Regulations (CCR), Title 22, under Chapter 16, current language is herein. Minimum separations shown on individual Blanket Waivers are to be adhered to, but when practical and field conditions allow, greater separations between water mains and non-potable pipelines shall be utilized.

List of Blanket Waivers:

1. New Sanitary Sewer Installation Parallel to Water Main
2. New Storm Drain or Recycled Water Installation Parallel to Water Main
3. New Water Main Installation Parallel to Sanitary Sewer Pipe
4. New Water Main Installation Parallel to Storm Drain Line
5. New Sanitary Sewer Line Over or Under New or Existing Water Main
6. New Water Main Crossing Over or Under Sanitary Sewer Pipe
7. New Storm Drain Line Over or Under New or Existing Water Main
8. New Water Main Crossing Over or Under Existing Storm Drain Pipe
9. Non Typical Installation - Sewer Lateral Over Water Main
10. Water Main Lowering
11. Water Main Over Structure
12. Separation Details for Sewer Force Main Conditions



New Sanitary Sewer Alternate Installation Zones

- ZONE 1: PROHIBITED ZONE, NO INSTALLATION ALLOWED. SPECIAL APPROVAL REQUIRED BY STATE WATER BOARD AND CITY.
- ZONE 2: NO SPECIAL REQUIREMENTS FOR INSTALLATION.
- ZONE 3: SANITARY SEWER LINES ALLOWED PER THE FOLLOWING UPGRADED MATERIAL REQUIREMENTS: SANITARY SEWER PIPE SHALL BE BELL AND SPIGOT; ASTM 3034 COMPLIANT SDR27 PVC. MATERIAL USES SHALL ALSO COMPLY WITH ALL APPLICABLE CITY STANDARD.

NOTES:

1. THIS BLANKET WAIVER SHALL ONLY BE USED UPON APPROVAL BY THE CITY, AND WHERE CONDITIONS DO NOT ALLOW FOR THE MINIMUM 1-FT VERTICAL SEPARATION AS SPECIFIED IN THE CALIFORNIA WATERWORKS STANDARDS, ARTICLE 4, SECTION 64572 "WATER MAIN SEPARATION". SEE THE CITY OF REDLANDS WATER SYSTEMS STANDARDS SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. DIMENSIONS SHOWN ARE MINIMUMS, PIPES SHALL BE INSTALLED WITH AS MUCH SEPARATION AS FIELD CONDITIONS ALLOW.
3. ALL FITTINGS AND/OR CONNECTIONS TO PIPES SHALL COMPLY WITH CITY DESIGN AND CONSTRUCTION STANDARDS AND THIS ALTERNATE CONSTRUCTION BLANKET WAIVER.
4. 1,320 FEET MAXIMUM FOR ZONE 3.
- *5. WHEN A SEWER FORCE MAIN MUST CROSS A WATER MAIN, THE CROSSING SHOULD BE AS CLOSE AS PRACTICAL TO THE PERPENDICULAR AND NO LESS THAN 45°. THE SEWER FORCE MAIN SHOULD BE AT LEAST ONE FOOT BELOW THE WATER MAIN AND HAVE NO JOINTS WITHIN EIGHT FEET FROM EITHER SIDE OF THE WATER MAIN PER 64572(D).
- *6. WHEN A NEW SEWER FORCE MAIN CROSSES AN EXISTING WATER MAIN, AND A ONE-FOOT VERTICAL SEPARATION CANNOT BE PROVIDED, ALL PORTIONS OF THE SEWER FORCE MAIN WITHIN EIGHT FEET (HORIZONTALLY) OF THE OUTSIDE WALLS OF THE WATER MAIN SHOULD BE ENCLOSED IN A CONTINUOUS SLEEVE. IN THESE CASES, A MINIMUM VERTICAL SEPARATION DISTANCE OF 6 INCHES MUST BE MAINTAINED BETWEEN THE OUTSIDE EDGE OF THE BOTTOM OF THE WATER MAIN AND THE TOP OF THE CONTINUOUS SLEEVE (SEE DETAIL 12). PIPE CASING PER STD. A-20522.
- * APPLIED TO SEWER FORCE MAIN CONDITIONS ONLY.

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

NEW SANITARY SEWER INSTALLATION PARALLEL TO WATER MAIN

BLANKET
WAIVER

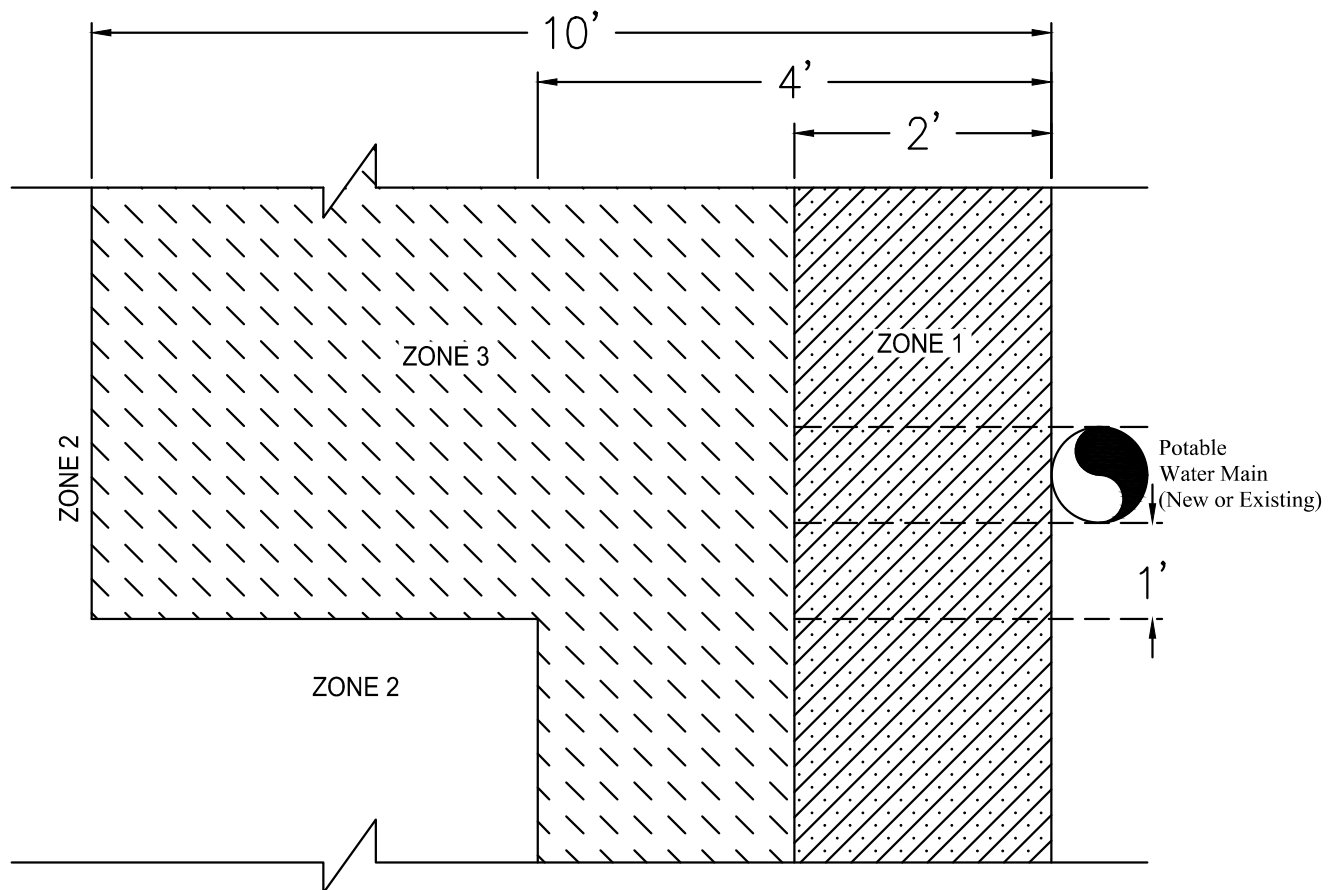
APPROVED:

DATE: DEC. 2023

1

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Goutam K. Dobey, City Engineer RCE 75646



New Storm Drain Alternate Installation Zones

ZONE 1: PROHIBITED ZONE, NO INSTALLATION ALLOWED.

ZONE 2: NO SPECIAL REQUIREMENTS FOR INSTALLATION.

ZONE 3: STORM DRAIN LINES ALLOWED PER THE FOLLOWING UPGRADED MATERIAL REQUIREMENTS: PIPE SHALL BE BELL AND SPIGOT; CLASS III, IV OR V REINFORCED CONCRETE (RCP). ALL JOINTS SHALL BE WELDED OR RETAINED JOINTS. RCP CLASS SHALL BE DETERMINED BY CITY FOR EACH SPECIFIC INSTALLATION. TERTIARY RECYCLED WATER OR NON-POTABLE WATER LINES ALLOWED CLASS 350 RESTRAINED DUCTILE IRON PIPE (DIP).

NOTES:

1. THIS BLANKET WAIVER SHALL ONLY BE USED UPON APPROVAL BY THE CITY, AND WHERE CONDITIONS DO NOT ALLOW FOR THE MINIMUM 1-FT VERTICAL SEPARATION AS SPECIFIED IN THE CALIFORNIA WATERWORKS STANDARDS, ARTICLE 4, SECTION 64572 "WATER MAIN SEPARATION". SEE THE CITY OF REDLANDS WATER SYSTEMS STANDARDS SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. DIMENSIONS SHOWN ARE MINIMUMS, PIPES SHALL BE INSTALLED WITH AS MUCH SEPARATION AS FIELD CONDITIONS ALLOW.
3. ALL FITTINGS AND/OR CONNECTIONS TO PIPES SHALL COMPLY WITH CITY DESIGN AND CONSTRUCTION STANDARDS AND THIS ALTERNATE CONSTRUCTION BLANKET WAIVER.
4. 1,320 FEET MAXIMUM FOR ZONE 3.

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

NEW STORM DRAIN OR RECYCLED WATER INSTALLATION PARALLEL TO WATER MAIN

BLANKET
WAIVER

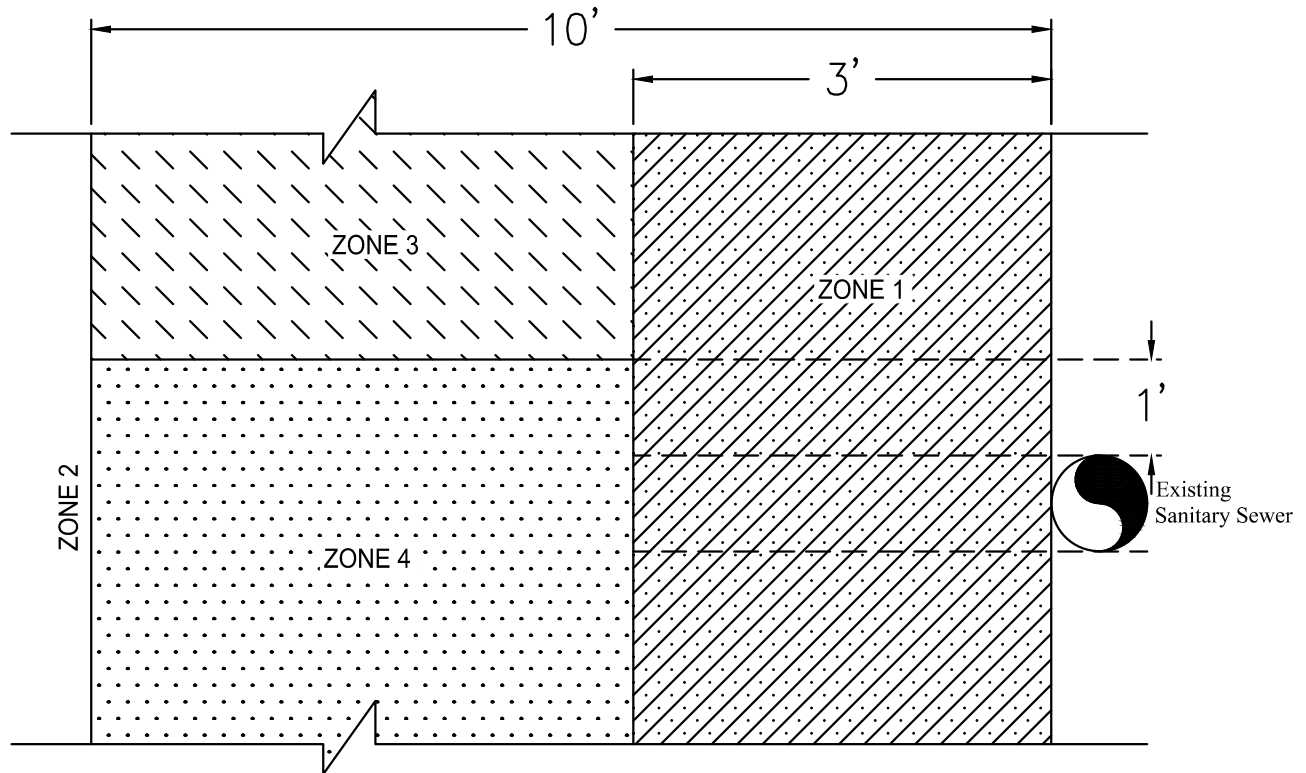
APPROVED:

DATE: DEC. 2023

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Goutam K. Dobey, City Engineer RCE 75646



New Potable Water Main Alternate Installation Zones

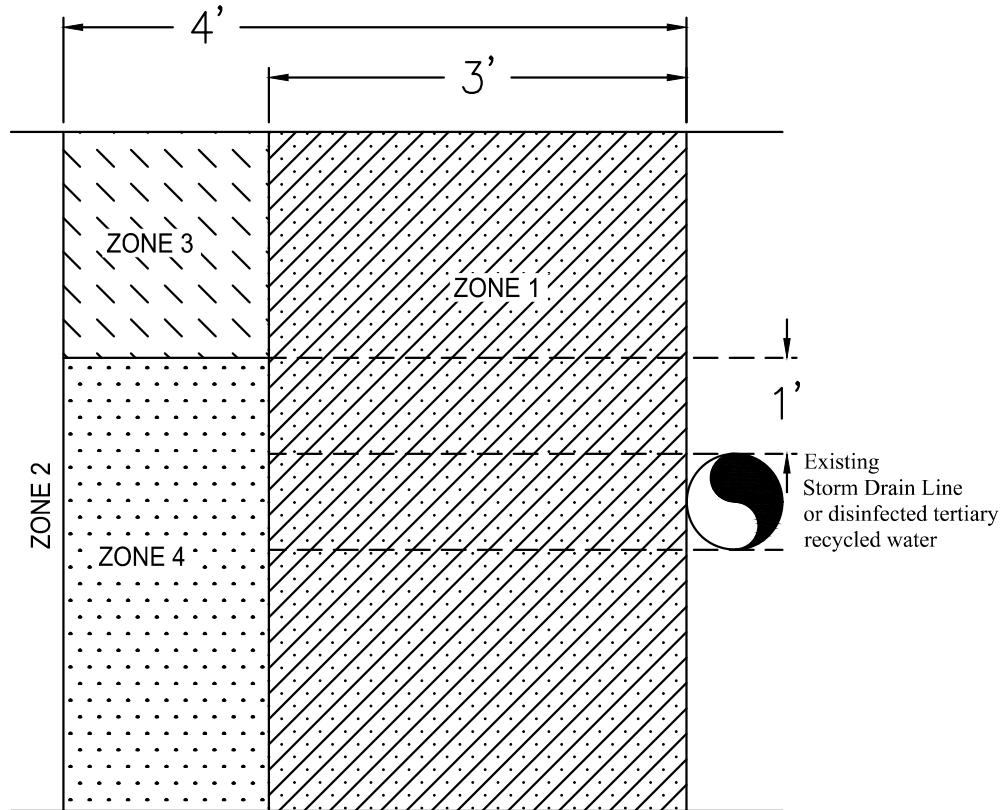
- ZONE 1: PROHIBITED ZONE, NO INSTALLATION ALLOWED.
- ZONE 2: NO SPECIAL REQUIREMENTS FOR INSTALLATION.
- ZONE 3: NEW WATER MAIN ONLY ALLOWED FOR EXISTING STORM DRAIN OR DISINFECTED TERTIARY RECYCLED WATER. NEW WATER MAIN SHALL BE INSTALLED PER CITY STANDARDS.
- ZONE 4: NEW WATER MAIN SHALL BE INSTALLED WITH UPGRADED MATERIALS: CLASS 350 DUCTILE IRON PIPE (DIP) WITH RESTRAINED JOINTS; CML&C WELDED STEEL PIPE, OR WITH SPECIAL APPROVAL BY THE CITY, HIGH DENSITY POLYETHYLENE PIPE WITH FUSION WELDED JOINTS.

NOTES:

- ONLY TO BE USED UPON APPROVED BY THE CITY, AND WHERE CONDITIONS DO NOT ALLOW FOR THE MINIMUM 1-FT VERTICAL SEPARATION AS SPECIFIED IN THE CALIFORNIA WATERWORKS STANDARDS, ARTICLE 4, SECTION 64572 "WATER MAIN SEPARATION". SEE THE CITY OF REDLANDS WATER SYSTEMS STANDARDS SPECIFICATIONS FOR ADDITIONAL INFORMATION.
 - DIMENSIONS SHOWN ARE MINIMUMS, PIPES SHALL BE INSTALLED WITH AS MUCH SEPARATION AS FIELD CONDITIONS ALLOW.
 - ALL FITTINGS AND/OR CONNECTIONS TO WATER MAIN SHALL BE WATERTIGHT RUBBER GASKETED TYPE WITH A MINIMUM PRESSURE RATING OF 250PSI, AND SHALL OTHERWISE COMPLY WITH CITY DESIGN AND CONSTRUCTION STANDARDS AND THIS ALTERNATE CONSTRUCTION BLANKET WAIVER.
 - WHEN A SEWER FORCE MAIN MUST CROSS A WATER MAIN, THE CROSSING SHOULD BE AS CLOSE AS PRACTICAL TO THE PERPENDICULAR AND NO LESS THAN 45°. THE SEWER FORCE MAIN SHOULD BE AT LEAST ONE FOOT BELOW THE WATER MAIN AND HAVE NO JOINTS WITHIN EIGHT FEET FROM EITHER SIDE OF THE WATER MAIN PER 64572(D).
 - WHEN A NEW SEWER FORCE MAIN CROSSES AN EXISTING WATER MAIN, AND A ONE-FOOT VERTICAL SEPARATION CANNOT BE PROVIDED, ALL PORTIONS OF THE SEWER FORCE MAIN WITHIN EIGHT FEET (HORIZONTALLY) OF THE OUTSIDE WALLS OF THE WATER MAIN SHOULD BE ENCLOSED IN A CONTINUOUS SLEEVE. IN THESE CASES, A MINIMUM VERTICAL SEPARATION DISTANCE OF 6 INCHES MUST BE MAINTAINED BETWEEN THE OUTSIDE EDGE OF THE BOTTOM OF THE WATER MAIN AND THE TOP OF THE CONTINUOUS SLEEVE (SEE DETAIL 12). PIPE CASING PER STD. A-20522.
- * APPLIED TO SEWER FORCE MAIN CONDITIONS ONLY.

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

			NEW WATER MAIN INSTALLATION PARALLEL TO SANITARY SEWER LINE		BLANKET WAIVER 3
			APPROVED: 		
			DATE: <u>DEC. 2023</u>		
REV.	BY	DATE	Goutam K. Dobey, City Engineer RCE 75646		



New Potable Water Main Alternate Installation Zones

- ZONE 1: PROHIBITED ZONE, NO INSTALLATION ALLOWED.
- ZONE 2: NO SPECIAL REQUIREMENTS FOR INSTALLATION.
- ZONE 3: NEW WATER MAIN ONLY ALLOWED FOR EXISTING STORM DRAIN OR DISINFECTED TERTIARY RECYCLED WATER. NEW WATER MAIN SHALL BE INSTALLED PER CITY STANDARDS.
- ZONE 4: NEW WATER MAIN SHALL BE INSTALLED WITH UPGRADED MATERIALS: CLASS 350 DUCTILE IRON PIPE (DIP) WITH RESTRAINED JOINTS; CML&C WELDED STEEL PIPE, OR WITH SPECIAL APPROVAL BY THE CITY, HIGH DENSITY POLYETHYLENE PIPE WITH FUSION WELDED JOINTS.

NOTES:

- ONLY TO BE USED UPON APPROVED BY THE CITY, AND WHERE CONDITIONS DO NOT ALLOW FOR THE MINIMUM 1-FT VERTICAL SEPARATION AS SPECIFIED IN THE CALIFORNIA WATERWORKS STANDARDS, ARTICLE 4, SECTION 64572 "WATER MAIN SEPARATION". SEE THE CITY OF REDLANDS WATER SYSTEMS STANDARDS SPECIFICATIONS FOR ADDITIONAL INFORMATION.
- DIMENSIONS SHOWN ARE MINIMUMS, PIPES SHALL BE INSTALLED WITH AS MUCH SEPARATION AS FIELD CONDITIONS ALLOW.
- ALL FITTINGS AND/OR CONNECTIONS TO WATER MAIN SHALL BE WATERTIGHT RUBBER GASKETED TYPE WITH A MINIMUM PRESSURE RATING OF 250PSI, AND SHALL OTHERWISE COMPLY WITH CITY DESIGN AND CONSTRUCTION STANDARDS AND THIS ALTERNATE CONSTRUCTION BLANKET WAIVER.

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

NEW WATER MAIN INSTALLATION PARALLEL TO STORM DRAIN LINE

BLANKET
WAIVER

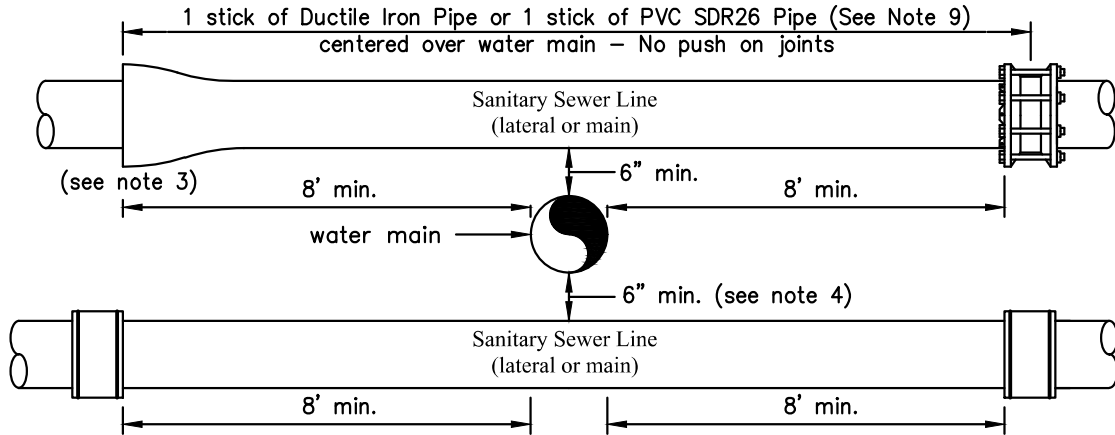
APPROVED:

DATE: DEC. 2023

4

Goutam K. Dobey, City Engineer RCE 75646

REV. BY DATE



New Sanitary Sewer Line Over or Under New or Existing Water Main

NOTES:

1. THIS BLANKET WAIVER SHALL ONLY BE USED UPON APPROVAL BY THE CITY, AND WHERE CONDITIONS DO NOT ALLOW FOR THE MINIMUM 1-FT VERTICAL SEPARATION AS SPECIFIED IN THE CALIFORNIA WATERWORKS STANDARDS, ARTICLE 4, SECTION 64572 "WATER MAIN SEPARATION". SEE THE CITY OF REDLANDS WATER SYSTEMS STANDARDS SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. THIS ALTERNATE INSTALLATION APPLIES ONLY TO WATER MAINS LESS THAN 24" DIAMETER. ALL CROSSINGS OF 24" DIAMETER AND LARGER WATER MAINS MUST BE APPROVED BY THE STATE WATER BOARD AND THE CITY.
3. DO NOT REMOVE BELL. WHERE REQUIRED FOR CONNECTION TO ADJACENT PIPING, ADD ADDITIONAL (2' MIN.) SECTION OF PIPE AND CONNECT WITH APPROVED COUPLING OR SOLVENT WELD.
4. WHERE THE SANITARY SEWER LINE CROSSES BELOW THE WATER AND THERE IS 1' OR MORE VERTICAL CLEARANCE NO SPECIAL INSTALLATION IS REQUIRED.
5. ALL BELL & SPIGOT, DRESSER TYPE COUPLING OR TRANSITION ADAPTER JOINTS SHALL HAVE WATERTIGHT RUBBER GASKETED SEALS. MATERIAL SUBMITTAL REQUIRED.
6. NO JOINTS PERMITTED WITHIN 8' ON EITHER SIDE OF THE CROSSING PIPE.
7. STATE WATER BOARD APPROVAL REQUIRED FOR ANY CROSSING OF LESS THAN 6".
8. SOLVENT WELD PVC CONNECTION PERMITTED FROM 8' TO 10' ON EITHER SIDE OF THE PIPE CROSSING.
- *9. WHEN A SEWER FORCE MAIN MUST CROSS A WATER MAIN, THE CROSSING SHOULD BE AS CLOSE AS PRACTICAL TO THE PERPENDICULAR AND NO LESS THAN 45°. THE SEWER FORCE MAIN SHOULD BE AT LEAST ONE FOOT BELOW THE WATER MAIN AND HAVE NO JOINTS WITHIN EIGHT FEET FROM EITHER SIDE OF THE WATER MAIN PER 64572(D).
- *10. WHEN A NEW SEWER FORCE MAIN CROSSES AN EXISTING WATER MAIN, AND A ONE-FOOT VERTICAL SEPARATION CANNOT BE PROVIDED, ALL PORTIONS OF THE SEWER FORCE MAIN WITHIN EIGHT FEET (HORIZONTALLY) OF THE OUTSIDE WALLS OF THE WATER MAIN SHOULD BE ENCLOSED IN A CONTINUOUS SLEEVE. IN THESE CASES, A MINIMUM VERTICAL SEPARATION DISTANCE OF 6 INCHES MUST BE MAINTAINED BETWEEN THE OUTSIDE EDGE OF THE BOTTOM OF THE WATER MAIN AND THE TOP OF THE CONTINUOUS SLEEVE (SEE DETAIL 12). PIPE CASING PER STD. A-20522.
- * APPLIED TO SEWER FORCE MAIN CONDITIONS ONLY.

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

NEW SANITARY SEWER LINE OVER OR UNDER NEW OR EXISTING WATER MAIN

BLANKET
WAIVER

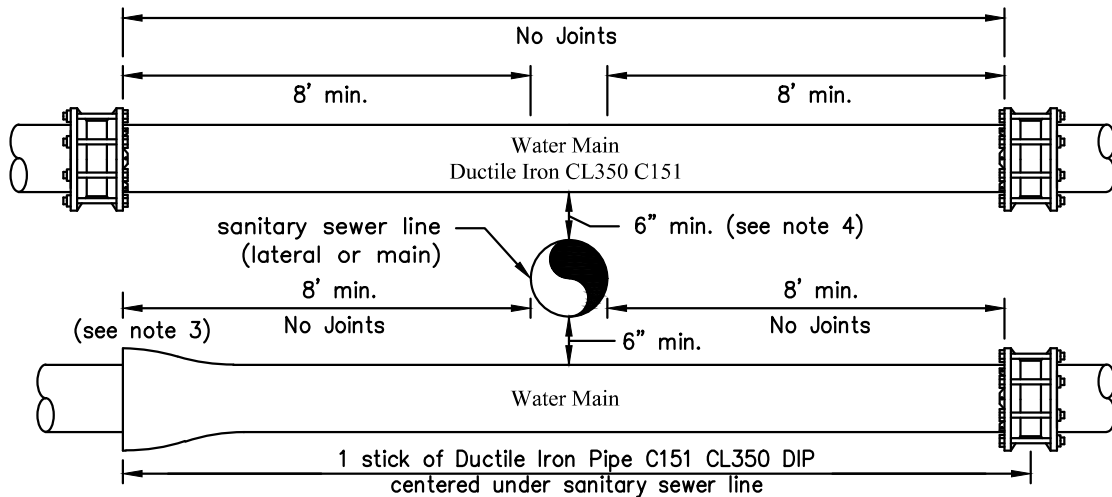
APPROVED:

DATE: DEC. 2023

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Goutam K. Dobey, City Engineer RCE 75646

REV. BY DATE



New Water Main Over or Under Existing Sanitary Sewer Line

NOTES:

1. THIS BLANKET WAIVER SHALL ONLY BE USED UPON APPROVAL BY THE CITY, AND WHERE CONDITIONS DO NOT ALLOW FOR THE MINIMUM 1-FT VERTICAL SEPARATION AS SPECIFIED IN THE CALIFORNIA WATERWORKS STANDARDS, ARTICLE 4, SECTION 64572 "WATER MAIN SEPARATION". SEE THE CITY OF REDLANDS WATER SYSTEMS STANDARDS SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. THIS ALTERNATE INSTALLATION APPLIES ONLY TO WATER MAINS LESS THAN 24" DIAMETER. ALL CROSSINGS OF 24" DIAMETER AND LARGER WATER MAINS MUST BE APPROVED BY THE STATE WATER BOARD AND THE CITY.
3. DO NOT REMOVE BELL. WHERE REQUIRED FOR CONNECTION TO ADJACENT PIPING, ADD ADDITIONAL (2' MIN.) SECTION OF PIPE AND CONNECT WITH APPROVED COUPLING OR SOLVENT WELD.
4. WHERE THE SANITARY SEWER LINE CROSSES BELOW THE WATER AND THERE IS 1' OR MORE VERTICAL CLEARANCE NO SPECIAL INSTALLATION IS REQUIRED.
5. ALL BELL & SPIGOT, DRESSER TYPE COUPLING OR TRANSITION ADAPTER JOINTS SHALL HAVE WATERTIGHT RUBBER GASKETED SEALS. MATERIAL SUBMITTAL REQUIRED.
6. NO JOINTS PERMITTED WITHIN 8' ON EITHER SIDE OF THE CROSSING PIPE.
7. STATE WATER BOARD APPROVAL REQUIRED FOR ANY CROSSING OF LESS THAN 6".
8. SOLVENT WELD PVC CONNECTION PERMITTED FROM 8' TO 10' ON EITHER SIDE OF THE PIPE CROSSING.
- *9. WHEN A SEWER FORCE MAIN MUST CROSS A WATER MAIN, THE CROSSING SHOULD BE AS CLOSE AS PRACTICAL TO THE PERPENDICULAR AND NO LESS THAN 45°. THE SEWER FORCE MAIN SHOULD BE AT LEAST ONE FOOT BELOW THE WATER MAIN AND HAVE NO JOINTS WITHIN EIGHT FEET FROM EITHER SIDE OF THE WATER MAIN PER 64572(D).
- *10. WHEN A NEW SEWER FORCE MAIN CROSSES AN EXISTING WATER MAIN, AND A ONE-FOOT VERTICAL SEPARATION CANNOT BE PROVIDED, ALL PORTIONS OF THE SEWER FORCE MAIN WITHIN EIGHT FEET (HORIZONTALLY) OF THE OUTSIDE WALLS OF THE WATER MAIN SHOULD BE ENCLOSED IN A CONTINUOUS SLEEVE. IN THESE CASES, A MINIMUM VERTICAL SEPARATION DISTANCE OF 6 INCHES MUST BE MAINTAINED BETWEEN THE OUTSIDE EDGE OF THE BOTTOM OF THE WATER MAIN AND THE TOP OF THE CONTINUOUS SLEEVE (SEE DETAIL 12). PIPE CASING PER STD. A-20522.
- * APPLIED TO SEWER FORCE MAIN CONDITIONS ONLY.

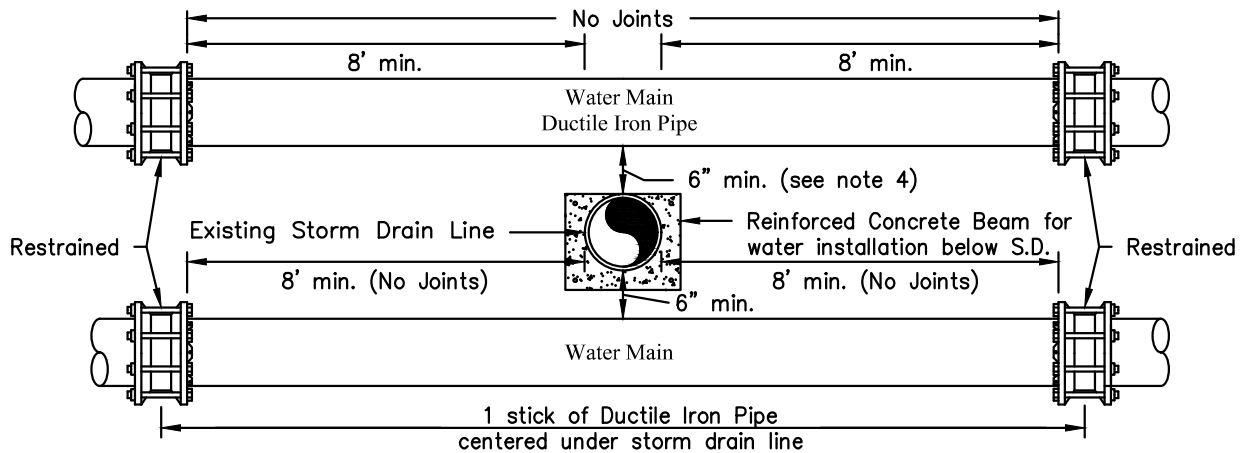
CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

			NEW WATER MAIN OVER OR UNDER EXISTING SANITARY SEWER LINE	BLANKET WAIVER
REV. BY DATE			APPROVED:	DATE: DEC. 2023
Goutam K. Dobey, City Engineer RCE 75646			6	



1. THIS BLANKET WAIVER SHALL ONLY BE USED UPON APPROVAL BY THE CITY, WHERE CONDITIONS DO NOT ALLOW FOR THE MINIMUM 1-FT ABOVE WATER MAIN VERTICAL SEPARATION AS SPECIFIED IN THE CALIFORNIA WATERWORKS STANDARDS, ARTICLE 4, SECTION 64572 "WATER MAIN SEPARATION". SEE THE CITY OF REDLANDS WATER SYSTEMS STANDARDS SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. THIS ALTERNATE INSTALLATION APPLIES ONLY TO WATER MAINS LESS THAN 24" DIAMETER. ALL CROSSINGS OF 24" DIAMETER AND LARGER WATER MAINS MUST BE APPROVED BY THE STATE WATER BOARD AND THE CITY.
3. TRANSITION FROM OTHER MATERIAL TO HDPE MAY BE REQUIRED TO MEET JOINT SEPARATION AS SHOWN.
4. WHERE THE STORM DRAIN LINE CROSSES BELOW THE WATER AND THERE IS 1' OR MORE VERTICAL CLEARANCE NO SPECIAL INSTALLATION IS REQUIRED.
5. STATE WATER BOARD APPROVAL REQUIRED FOR ANY CROSSING OF LESS THAN 6".
6. ALL BELL & SPIGOT, DRESSER TYPE COUPLING OR TRANSITION JOINTS SHALL HAVE WATERTIGHT RUBBER GASKETED SEALS. MATERIAL SUBMITTAL REQUIRED.
7. WHERE, DUE TO FIELD CONDITIONS, NEW STORM DRAIN PIPE IS REQUIRED TO BE REINFORCED CONCRETE PIPE (RCP) AND MUST BE INSTALLED OVER THE WATER MAIN, STORM DRAIN RCP PIPE SHALL BE CENTERED OVER WATER MAIN AND ANY JOINTS WITHIN LIMITS SPECIFIED ABOVE A REINFORCED CONCRETE BEAM SHALL BE BUILT, OR SLEEVED TO BEYOND THE LIMITS SPECIFIED. METHOD USED SHALL BE DIRECTED BY A CITY.

			NEW STORM DRAIN LINE OVER OR UNDER NEW OR EXISTING WATER MAIN				BLANKET WAIVER 7	
			APPROVED: 					DATE: <u>DEC. 2023</u>
REV.	BY	DATE	Goutam K. Dobey, City Engineer RCE 75646					



New Water Main Over or Under Existing Storm Drain Line

NOTES:

1. THIS BLANKET WAIVER SHALL ONLY BE USED UPON APPROVAL BY THE CITY, WHERE CONDITIONS DO NOT ALLOW FOR THE MINIMUM 1-FT ABOVE WATER MAIN VERTICAL SEPARATION AS SPECIFIED IN THE CALIFORNIA WATERWORKS STANDARDS, ARTICLE 4, SECTION 64572 "WATER MAIN SEPARATION". SEE THE CITY OF REDLANDS WATER SYSTEMS STANDARDS SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. THIS ALTERNATE INSTALLATION APPLIES ONLY TO WATER MAINS LESS THAN 24" DIAMETER. ALL CROSSINGS OF 24" DIAMETER AND LARGER WATER MAINS MUST BE APPROVED BY THE STATE WATER BOARD AND THE CITY.
3. TRANSITION FROM OTHER MATERIAL TO HDPE MAY BE REQUIRED TO MEET JOINT SEPARATION AS SHOWN.
4. WHERE THE STORM DRAIN LINE CROSSES BELOW THE WATER AND THERE IS 1' OR MORE VERTICAL CLEARANCE NO SPECIAL INSTALLATION IS REQUIRED.
5. STATE WATER BOARD APPROVAL REQUIRED FOR ANY CROSSING OF LESS THAN 6".
6. ALL BELL & SPIGOT, DRESSER TYPE COUPLING OR TRANSITION JOINTS SHALL HAVE WATERTIGHT RUBBER GASKETED SEALS. MATERIAL SUBMITTAL REQUIRED.
7. WHERE, DUE TO FIELD CONDITIONS, NEW STORM DRAIN PIPE IS REQUIRED TO BE REINFORCED CONCRETE PIPE (RCP) AND MUST BE INSTALLED OVER THE WATER MAIN, STORM DRAIN RCP PIPE SHALL BE CENTERED OVER WATER MAIN AND ANY JOINTS WITHIN LIMITS SPECIFIED ABOVE A REINFORCED CONCRETE BEAM SHALL BE BUILT, OR SLEEVED TO BEYOND THE LIMITS SPECIFIED. METHOD USED SHALL BE DIRECTED BY A CITY.

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

NEW WATER MAIN OVER OR UNDER EXISTING STORM DRAIN LINE

BLANKET
WAIVER

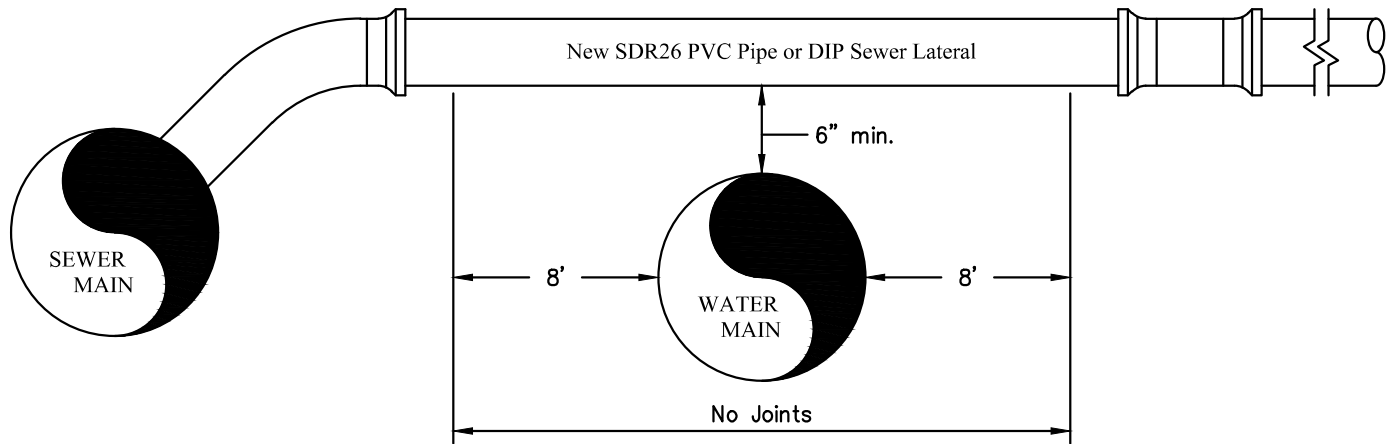
APPROVED: _____

DATE: DEC. 2023

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REV. BY DATE

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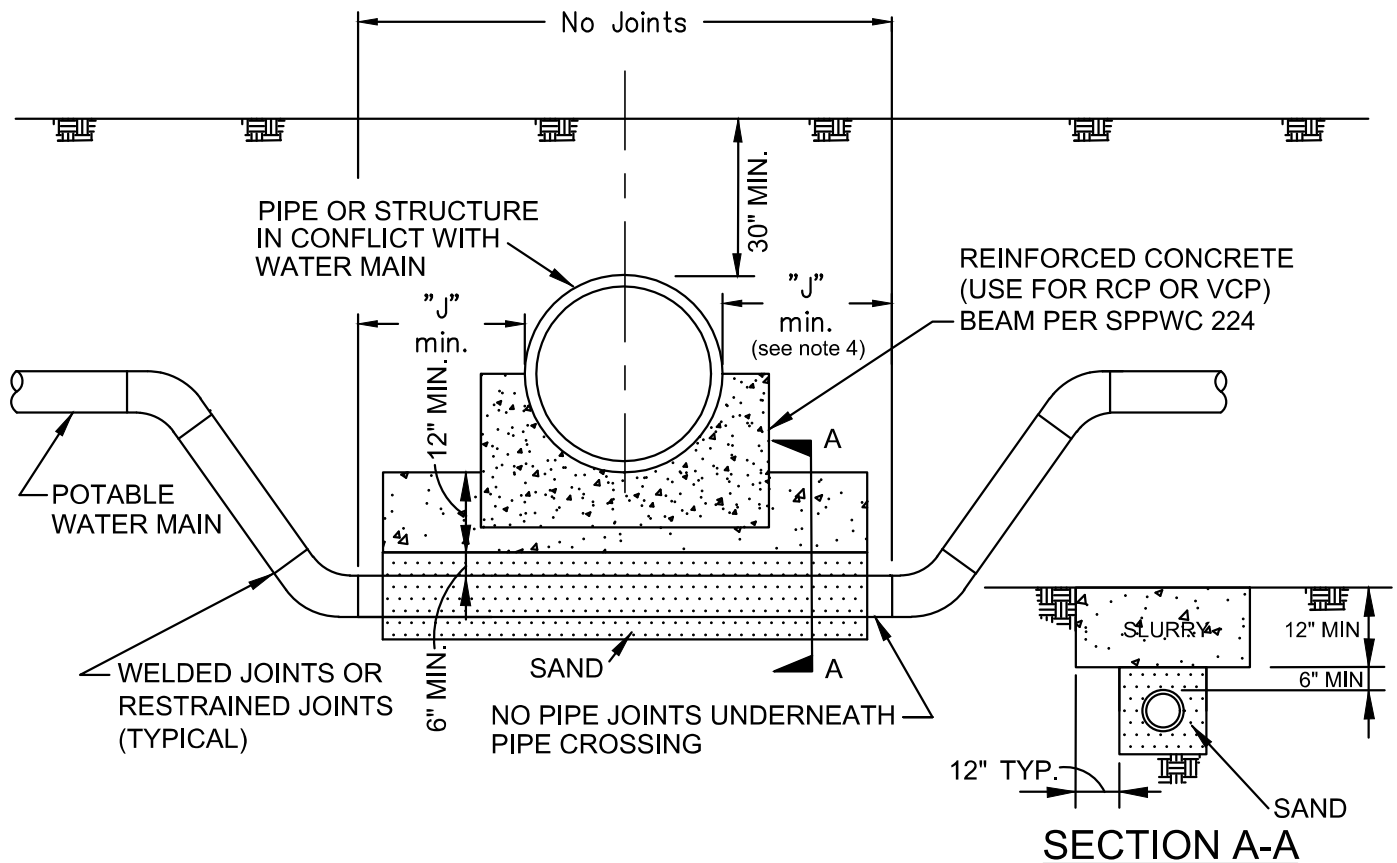
NON TYPICAL INSTALLATION
SEWER LATERAL OVER WATER MAIN

NOTES:

1. THIS BLANKET WAIVER SHALL ONLY BE USED UPON APPROVAL BY THE CITY, AND WHERE CONDITIONS DO NOT ALLOW FOR THE MINIMUM 1-FT VERTICAL SEPARATION ABOVE WATER MAIN AS SPECIFIED IN THE CALIFORNIA WATERWORKS STANDARDS, ARTICLE 4, SECTION 64572 "WATER MAIN SEPARATION". SEE THE CITY OF REDLANDS WATER SYSTEMS STANDARDS SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. DIP = DUCTILE IRON PIPE
PVC = POLYVINYL CHLORIDE
- *3. WHEN A SEWER FORCE MAIN MUST CROSS A WATER MAIN, THE CROSSING SHOULD BE AS CLOSE AS PRACTICAL TO THE PERPENDICULAR AND NO LESS THAN 45°. THE SEWER FORCE MAIN SHOULD BE AT LEAST ONE FOOT BELOW THE WATER MAIN AND HAVE NO JOINTS WITHIN EIGHT FEET FROM EITHER SIDE OF THE WATER MAIN PER 64572(D).
- *4. WHEN A NEW SEWER FORCE MAIN CROSSES AN EXISTING WATER MAIN, AND A ONE-FOOT VERTICAL SEPARATION CANNOT BE PROVIDED, ALL PORTIONS OF THE SEWER FORCE MAIN WITHIN EIGHT FEET (HORIZONTALLY) OF THE OUTSIDE WALLS OF THE WATER MAIN SHOULD BE ENCLOSED IN A CONTINUOUS SLEEVE. IN THESE CASES, A MINIMUM VERTICAL SEPARATION DISTANCE OF 6 INCHES MUST BE MAINTAINED BETWEEN THE OUTSIDE EDGE OF THE BOTTOM OF THE WATER MAIN AND THE TOP OF THE CONTINUOUS SLEEVE (SEE DETAIL 12). PIPE CASING PER STD. A-20522.
- * APPLIED TO SEWER FORCE MAIN CONDITIONS ONLY.

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

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REV.	BY	DATE															



NOTES:

1. THIS BLANKET WAIVER SHALL ONLY BE USED UPON APPROVAL OF CITY WHERE CONDITIONS DO NOT ALLOW THE WATER MAIN TO CROSS "OVER" A PIPE OR STRUCTURE. THIS INSTALLATION SHALL ALSO ONLY BE INSTALLED WHERE FIELD CONDITIONS DO NOT ALLOW FOR PROPER 1-FT SEPARATIONS ABOVE WATER MAIN AS SPECIFIED IN ARTICLE 4, SECTION 64572 "WATER MAIN SEPARATIONS" OF THE CALIFORNIA WATERWORKS STANDARDS. SEE THE CITY OF REDLANDS WATER SYSTEMS STANDARDS SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. THIS INSTALLATION APPLIES ONLY TO WATER MAINS LESS THAN 24" DIAMETER. ALL WATER MAIN INSTALLATION OF 24" DIAMETER AND LARGER MUST BE APPROVED BY THE STATE WATER BOARD AND THE CITY ON A CASE BY CASE BASIS.
3. WHERE WATER MAIN LOWERING IS PART OF A LARGER INSTALLATION, AND WHEN OTHERWISE PRACTICAL, THE NEW SYSTEM SHALL BE DESIGNED AS A "RESTRAINED JOINT SYSTEM", AND PER CITY STANDARDS. SEE THE CITY OF REDLANDS WATER SYSTEMS STANDARDS SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS ON RESTRAINED JOINT SYSTEMS.
4. MINIMUM "J" DISTANCES SHOWN ARE; 4' FOR STORM DRAIN OR DISINFECTED TERTIARY RECYCLED WATER; 8' FOR SANITARY SEWER PIPES AND SEWER FORCE MAIN. SEE CITY OF REDLANDS WATER SYSTEMS STANDARDS SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
5. ALL PIPE AND FITTINGS TO CREATE DROP SHALL BE DUCTILE IRON OR CML&C STEEL (WELDED), AND ALL BEND FITTINGS SHALL BE EITHER 45 DEGREE OR 22-1/2 DEGREE RESTRAINED MECHANICAL JOINT, OR WELDED CML&C STEEL OR ROPED UNDER WITHOUT FITTINGS.
6. WHEN CONNECTING TO AN EXISTING MAIN, CONNECTIONS TO CAST IRON, DUCTILE IRON OR PVC PIPE SHALL BE MADE WITH MECHANICAL JOINT SOLID SLEEVES WITH RESTRAINING GLANDS. APPROVED "WIDE RANGE" COUPLINGS SHALL BE USED WHEN CONNECTING TO OVERSIZED CAST IRON OR ASBESTOS CEMENT PIPE. WHEN NOT CONNECTING TO AN EXISTING MAIN COUPLINGS ARE NOT REQUIRED.
- *7. WHEN A SEWER FORCE MAIN MUST CROSS A WATER MAIN, THE CROSSING SHOULD BE AS CLOSE AS PRACTICAL TO THE PERPENDICULAR AND NO LESS THAN 45°. THE SEWER FORCE MAIN SHOULD BE AT LEAST ONE FOOT BELOW THE WATER MAIN AND HAVE NO JOINTS WITHIN EIGHT FEET FROM EITHER SIDE OF THE WATER MAIN PER 64572(D).
- *8. WHEN A NEW SEWER FORCE MAIN CROSSES AN EXISTING WATER MAIN, AND A ONE-FOOT VERTICAL SEPARATION CANNOT BE PROVIDED, ALL PORTIONS OF THE SEWER FORCE MAIN WITHIN EIGHT FEET (HORIZONTALLY) OF THE OUTSIDE WALLS OF THE WATER MAIN SHOULD BE ENCLOSED IN A CONTINUOUS SLEEVE. IN THESE CASES, A MINIMUM VERTICAL SEPARATION DISTANCE OF 6 INCHES MUST BE MAINTAINED BETWEEN THE OUTSIDE EDGE OF THE BOTTOM OF THE WATER MAIN AND THE TOP OF THE CONTINUOUS SLEEVE (SEE DETAIL 12). PIPE CASING PER STD. A-20522.
- * APPLIED TO SEWER FORCE MAIN CONDITIONS ONLY.

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

WATER MAIN LOWERING

BLANKET
WAIVER

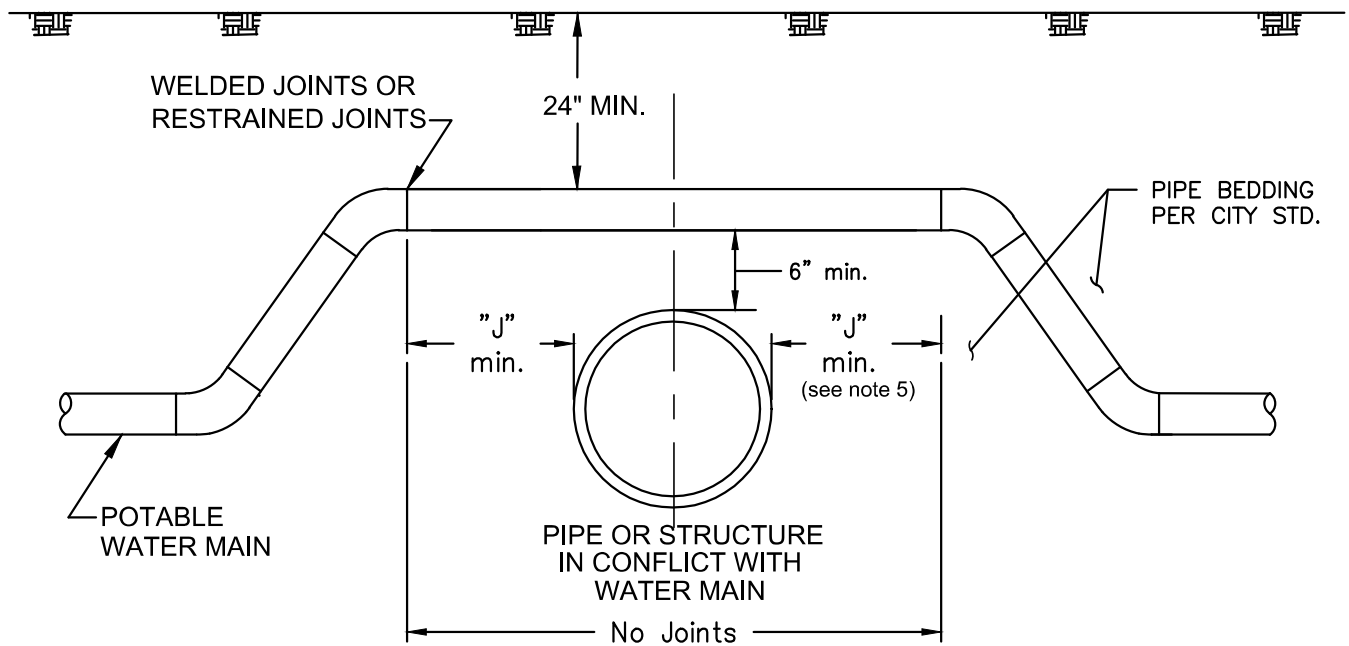
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Goutam K. Dobey, City Engineer RCE 75646

REV.	BY	DATE



NOTES:

1. THIS BLANKET WAIVER SHALL ONLY BE USED UPON APPROVAL OF THE CITY WHERE FIELD CONDITIONS DO NOT ALLOW FOR THE 1-FT STANDARD SEPARATION ABOVE WATER MAIN REQUIREMENTS AS SPECIFIED IN ARTICLE 4, SECTION 64572 "WATER MAIN SEPARATIONS" OF THE CALIFORNIA WATERWORKS STANDARDS. SEE THE CITY OF REDLANDS WATER SYSTEMS STANDARDS SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. WATER MAIN OVER STRUCTURE MAY ONLY BE INSTALLED WHEN SPECIFICALLY APPROVED ON A CASE BY CASE BASIS BY THE CITY. WHERE PRACTICAL WATER MAIN ALIGNMENT SHALL BE RAISED BY DEFLECTING, (ROPING) WITHOUT EXCEEDING MANUFACTURER'S TOLERANCES. WHERE INSTALLATION IS ROPED, SPACING REQUIREMENTS SHOWN STILL APPLY.
3. THIS INSTALLATION APPLIES ONLY TO WATER MAINS LESS THAN 24" DIAMETER. ALL WATER MAIN INSTALLATION OF 24" DIAMETER AND LARGER MUST BE APPROVED BY THE STATE WATER BOARD AND THE CITY ON A CASE BY CASE BASIS.
4. WHERE WATER MAIN OVER-STRUCTURE IS PART OF A LARGER INSTALLATION, AND WHEN OTHERWISE PRACTICAL, THE NEW SYSTEM SHALL BE DESIGNED AS A "RESTRAINED JOINT SYSTEM", AND PER CITY STANDARDS. SEE THE CITY OF REDLANDS WATER SYSTEMS STANDARDS SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS ON RESTRAINED JOINT SYSTEMS.
5. MINIMUM "J" DISTANCES SHOWN ARE; 8' FOR SANITARY SEWER LINES UP TO 18" DIAMETER, 4' FOR ANY SIZE STORM DRAIN LINE, AND 4' FOR OTHER PIPE OR STRUCTURE THAT IS NOT CONVEYING NON-POTABLE FLUID; 4' FOR TERTIARY RECYCLED WATER; 8' FOR SANITARY SEWER FORCE MAIN, DISINFECTED 2.2, 23 RECYCLED WATER, OR HAZARDOUS FLUIDS. SEE THE CITY OF REDLANDS WATER SYSTEMS STANDARDS SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
6. ALL PIPE AND FITTINGS TO CREATE OFFSET SHALL BE DUCTILE IRON OR CML&C, AND ALL BEND FITTINGS SHALL BE EITHER 45 DEGREE OR 22-1/2 DEGREE RESTRAINED MECHANICAL JOINT TYPE OR ROPED OVER WITH RESTRAINED JOINTS OR CML&C STEEL (WELDED).
7. WHEN CONNECTING TO AN EXISTING MAIN, CONNECTIONS TO CAST IRON, DUCTILE IRON OR PVC PIPE SHALL BE MADE WITH MECHANICAL JOINT SOLID SLEEVES WITH RESTRAINING GLANDS. APPROVED "WIDE RANGE" COUPLINGS SHALL BE USED WHEN CONNECTING TO OVERSIZED CAST IRON OR ASBESTOS CEMENT PIPE. WHEN NOT CONNECTING TO AN EXISTING MAIN COUPLINGS ARE NOT REQUIRED.
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CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

WATER MAIN OVER STRUCTURE

BLANKET
WAIVER

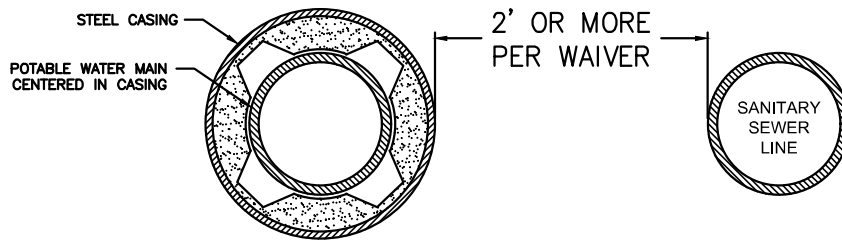
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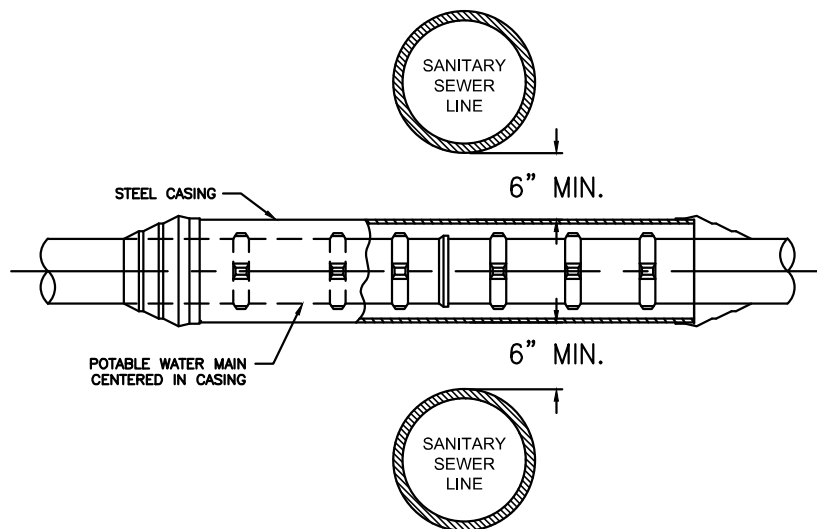
DATE: DEC. 2023

Goutam K. Dobey, City Engineer RCE 75646

REV. BY DATE



**PARALLEL CONDITIONS
SEPARATION MEASUREMENTS**



**CROSSING CONDITIONS
SEPARATION MEASUREMENTS (OVER/UNDER)**

NOTES:

- *1. WHEN A SEWER FORCE MAIN MUST CROSS A WATER MAIN, THE CROSSING SHOULD BE AS CLOSE AS PRACTICAL TO THE PERPENDICULAR AND NO LESS THAN 45°. THE SEWER FORCE MAIN SHOULD BE AT LEAST ONE FOOT BELOW THE WATER MAIN AND HAVE NO JOINTS WITHIN EIGHT FEET FROM EITHER SIDE OF THE WATER MAIN PER 64572(D).
- *2. WHEN A NEW SEWER FORCE MAIN CROSSES AN EXISTING WATER MAIN, AND A ONE-FOOT VERTICAL SEPARATION CANNOT BE PROVIDED, ALL PORTIONS OF THE SEWER FORCE MAIN WITHIN EIGHT FEET (HORIZONTALLY) OF THE OUTSIDE WALLS OF THE WATER MAIN SHOULD BE ENCLOSED IN A CONTINUOUS SLEEVE. IN THESE CASES, A MINIMUM VERTICAL SEPARATION DISTANCE OF 6 INCHES MUST BE MAINTAINED BETWEEN THE OUTSIDE EDGE OF THE BOTTOM OF THE WATER MAIN AND THE TOP OF THE CONTINUOUS SLEEVE (SEE DETAIL 12). PIPE CASING PER STD. A-20522.
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CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

**SEWER FORCE MAIN CONDITIONS
PARALLEL OR CROSSING MEASUREMENTS**

DETAIL

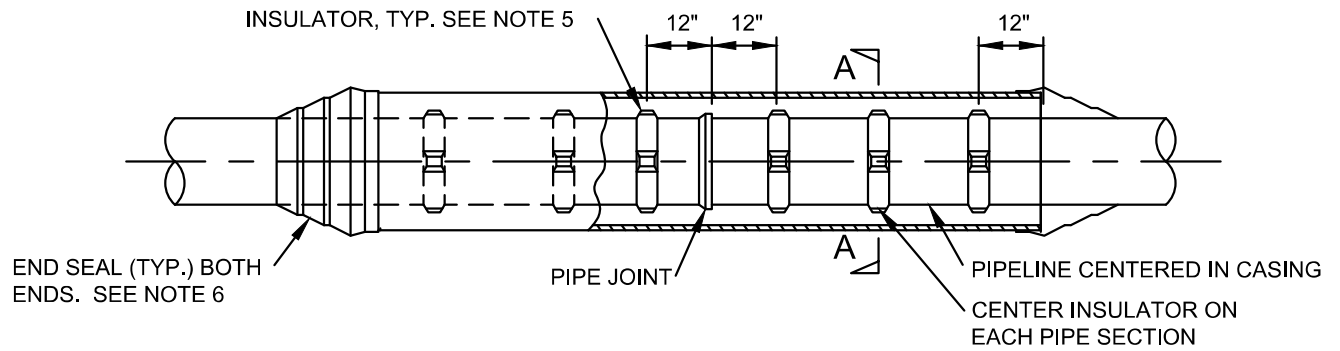
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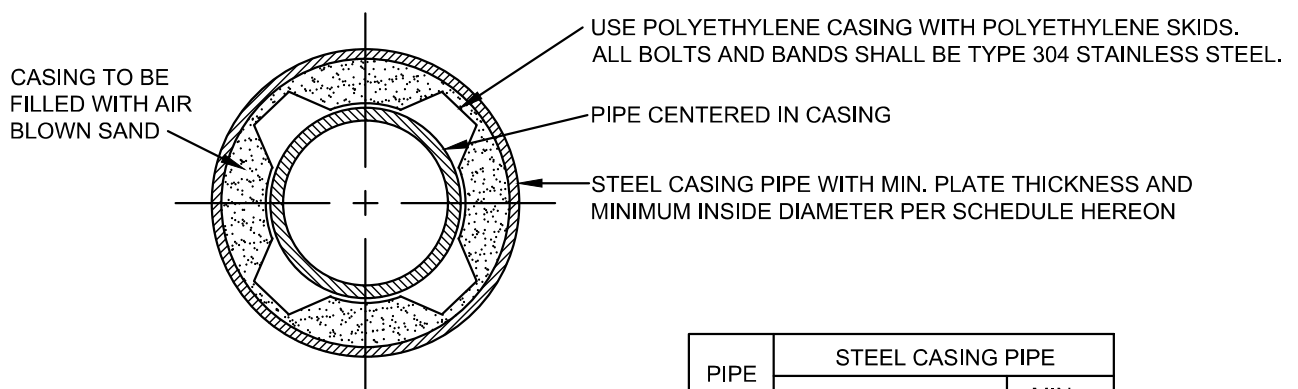
DATE: DEC. 2023

Goutam K. Dobey, City Engineer RCE 75646

REV.	BY	DATE



CASING DETAIL



SECTION A - A

PIPE SIZE (I.D.)	STEEL CASING PIPE		
	MIN. SIZE (I.D.)		MIN. WALL THK.
	DIP & PVC	CML&C	
6"	16"	14"	1/4"
8"	18"	14"	1/4"
10"	21"	18"	5/16"
12"	24"	18"	5/16"

NOTES:

1. ALL STEEL CASING PIPE JOINTS SHALL BE WELDED FULL CIRCUMFERENCE.
2. PERIPHERY OF CASING TO BE PRESSURE GROUTED.
3. CARRIER PIPE SHALL BE AIR TESTED PRIOR TO FILLING WITH BLOWN SAND.
4. UPSTREAM AND DOWNSTREAM ELEVATIONS TO BE VERIFIED PRIOR TO FILLING CASING.
5. SPACING BETWEEN THE CASING INSULATORS SHALL BE PER THE MANUFACTURERS RECOMMENDATIONS EXCEPT THAT THERE SHALL BE AT LEAST 3 CASING INSULATORS PER PIPE SECTION, ONE 12" FROM EACH JOINT AND ONE CENTERED. ADDITIONALLY, ONE INSULATOR SHALL BE INSTALLED 12" FROM EACH END OF THE CASING.
6. BOTH ENDS OF THE CASING BETWEEN THE CASING AND CARRIER PIPE SHALL BE SEALED WATERTIGHT USING AN END SEAL. BANDS SHALL BE TYPE 304 STAINLESS STEEL.
7. DRILL 3/4 INCH HOLE AT THE LOWEST END OF THE CARRIER PIPE TO ALLOW FOR DRAINING OF CONDENSATION.

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

PIPE CASING

STD. DWG.
NUMBER

A-20522

APPROVED:

DATE: 01/03/2023

Goutam K. Dobe, City Engineer RCE 75646

SHEET 1 OF 1

REV. BY DATE

APPENDIX "B"

**EXAMPLE FOR DIRECTORY OF ALTERNATIVES TO
WATERWORK'S STANDARDS FOR MAIN SEPARATION**

[illegible][illegible]

[illegible]

