

WATER DISTRIBUTION SYSTEM CONSTRUCTION STANDARD SPECIFICATIONS

SECTION 132 WATER DISTRIBUTION SYSTEM CONSTRUCTION

132-1.01 Description

All water distribution system components and related items for new construction and rehabilitation projects shall be constructed in accordance with all applicable City Standards, the latest version of the Standard Specifications as they apply, and any modifications herein. Any proposed deviations must first be approved in writing by the Director of Santa Rosa Water.

The Contractor shall provide a full size set of water distribution system “record plans” for their project to the City within 7 calendar days from the final connection to the City’s water distribution system. All deviations from the improvement plans shall be recorded on the plans in red ink.

Permanent paving shall not take place until all underground work is finished, except as otherwise noted, and the Engineer has given written notice of acceptance to the Contractor.

The pipe manufacturer shall legibly mark pipe materials. Name and/or trademark of manufacturer, nominal pipe size and manufacturing standard reference number shall be printed on the pipe.

132-1.01A Materials

The Contractor shall use a single manufacturer for each of the following types of items supplied for their project unless otherwise approved by the Engineer;

- Pipe
- Fittings
- Valves
- Meter Boxes (per sizes)

Connections to cast iron (CI), polyvinyl chloride (PVC), or ductile iron (DI) pipe shall be made with mechanical joint solid sleeves. When connecting to asbestos cement (AC) and/or “over-sized” cast iron pipe, “wide range” style couplings from Ford, Smith-Blair, Romac or an approved equivalent shall be used. Submittals are required for all couplings.

The City reserves the right to reject any material that may be supplied for use, whether on the “Engineer’s List of Approved Items” or not. If the City obtains information indicating that a listed item is not performing satisfactorily or is found to be defective, that item will be rejected and the Contractor shall submit a replacement for review at no additional cost to the City.

All materials used shall be lead free per California Health & Safety code, Section 116875.

132-1.01B Material Submittals

The Contractor shall submit to the Engineer, in writing, a list of all materials proposed to be used on their project, and any supporting documentation and/or samples required by the Water Department.

For material listed on the "Engineer's List of Approved Items" the Engineer shall be provided with the name of the manufacturer and model/part number for all material proposed for this project, unless that item has been replaced as shown on the Plans or in other contract documents.

For any material not listed on the "Engineer's List of Approved Items" the Contractor shall provide to the Engineer, the name of the manufacturer and model/part number along with supporting documentation and/or samples that will allow the Engineer to make an informed decision on acceptance or rejection of the material.

The Contractor shall submit the installation location for any proposed use of flange fittings. Use of flanged fittings other than those already specified herein must be approved by the Director of Santa Rosa Water.

132-1.02 Pipe

Unless otherwise approved by the Director of Santa Rosa Water, water distribution pipe shall be either Ductile Iron Pipe (DIP) or Polyvinyl Chloride (PVC) all in accordance with the following:

- A. Ductile Iron Pipe (DIP) shall be cement lined, new pipe conforming to AWWA Standard C151, pressure class 350. The pipe shall be furnished with either Bell and spigot end, "Tyton Joints" or Mechanical Joints unless otherwise approved by Santa Rosa Water.

All Ductile Iron pipe buried underground shall be encased with 8 mil (minimum) polyethylene film in tube form. Polyethylene material and installation procedure for the encasement shall conform to AWWA C105 or most recent issue.

- B.B. Polyvinyl Chloride (PVC) Pipe, 4" through 12", shall be new pipe, with a minimum pressure class (PC) rating of PC235, DR18 conforming to the requirements of AWWA C900 "Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4" through 12" for Water Transmission and Distribution. 16" Polyvinyl Chloride (PVC) pipe, shall be new pipe, with a minimum pressure class (PC) rating of PC165, DR25 conforming to the requirements of AWWA C905 "Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14" through 48".

An affidavit shall be provided that all delivered materials comply with the requirements of AWWA C900 and these specifications.

Water distribution pipes of different sizes and/or materials than those specified above shall only be used when first approved by the Director of Santa Rosa Water.

Any pipe that is delivered to the job site that, in the opinion of the Engineer, shows signs of contamination, damage and/or defect, may result in the rejection of any pipe that was delivered to the supplier on the same shipment.

Tracer wire shall be laid on the top of and along the entire length of all water pipe and HDPE tubing and shall be extended to the surface at all valve locations, blow-offs and meter boxes sufficiently for locator equipment to be attached. Tracer wire shall be 12 AWG solid copper wire with a blue type UF 60 mil insulation that is designed for use in the detection of underground utilities. Except where otherwise noted on individual City Standards, fasten the wire to the top of the pipe so as not to be displaced during backfilling operations, (one method of accomplishing this is to affix the wire to the top of the pipe with duct tape at approximately 10 feet intervals). Where splicing is required only watertight connectors shall be used, and shall be either Copperhead Snakebite, 3M DBR, or an approved equivalent.

132-1.03 Copper Water Service Tubing

All copper water service tubing shall be factory coated “blue” with a polyethylene coating that has a minimum coating thickness of 0.025”. The copper tubing shall conform with the latest AWWA Standards as described in AWWA C800 of the latest revision, and with ASTM B88. Type K soft temper tubing shall be used for 1" services, and Type K hard temper tubing for 1-1/2" and 2" services.

Tubing shall be continuously marked at a minimum with; manufacturer, size, specification information and manufacturing codes.

132-1.03A High Density Polyethylene (HDPE) Water Service Tubing

All HDPE water service tubing shall be blue copper tubing size (CTS) SDR9 tubing, and shall conform to both AWWA C901 and ASTM D2737, and shall be either PE3608 - 200psi tubing or PE4710 - 250psi tubing.

Tubing shall be continuously marked at a minimum with; manufacturer, size, specification information and manufacturing codes.

If soil contamination is suspected during construction the Contractor shall notify the Engineer prior to the installation of HDPE material. Use of HDPE material within or adjacent to areas of known contaminated soils is strictly prohibited.

132-1.04 Fittings

All fittings 3" through 16" shall be new ductile iron fittings conforming to AWWA C110, or new ductile iron compact fittings conforming to AWWA C153 of the latest revision and shall be compatible with the type and pressure class of pipe used.

Unless otherwise approved herein or by the Director of Santa Rosa Water all fittings shall be mechanical joint type.

Flanged fittings shall only be used on above ground installations or on tees or crosses when attached to a flange (FL) x mechanical joint (MJ) valve or approved fitting, or as otherwise approved by the Director of Santa Rosa Water.

All non-stainless-steel bolts, nuts and threads shall be coated with bitumastic paint or Permatex spray-on heavy duty rubberized under-coating or an approved equivalent. All nuts shall be fully tightened and surfaces to be coated dried prior to application. The use of an anti-galling agent is required on all stainless-steel bolts.

132-1.04A Restrained Joints and Fittings

In general, and unless otherwise specified or allowed by the Director of Santa Rosa Water, all new water distribution system installations of 4" and larger shall be a "Restrained Joint System" where, in lieu of, or in addition to concrete thrust blocks and/or harnesses, approved mechanical restraint devices are used to restrain the system. The Project Design Engineer shall show joint restraint, at a minimum, on all tees, crosses and on all joints required to make a bend in the alignment of the water system. This is to include all joints on either side of a bend to a calculated distance with the calculation including, at a minimum, a safety factor of 2 to 1, size of pipe(s), angle of bend(s), depth of cover, type of compaction, and test pressures as specified herein.

All water distribution system installations that are 12" or larger and are in an area where the static system pressure is 90psi or greater shall comply with the above requirements and shall include concrete thrust blocks and/or harnesses in their design and construction per applicable City Standards.

Restrained joint fittings shall be mechanical joint type ductile iron in accordance with the applicable requirements of /AWWA C111 and AWWA C153 of latest revision and shall be compatible with the type and pressure class of pipe used. Mechanical restraint devices of 4" through 16" shall have a minimum working pressure of 350 psi.

Ductile iron pipe locking gaskets such as "Field Lok 350 Gaskets manufactured by U.S. Pipe", or an approved equivalent, may be approved by Santa Rosa Water for use on specific installations. Requests and submittals for use shall be accompanied by supporting documentation. Information provided shall include, at a minimum, specifications of product, manufacturer's installation instructions, and compatibility acceptance from the pipe manufacturer.

132-1.04B Cut-in Tee or Cross

Contractor shall install a new tee or cross on an existing main, with or without valve(s), by "cut-in" at the location(s) shown on the Plans per City Standards 854 and 877. In general, and to mitigate the necessity for prolonged shutdown times, the "cut-in assembly" shall be assembled as much as possible prior to shutting down the City's distribution system. Connection to the existing mains shall be by approved couplings as noted herein unless otherwise approved by the Director of Santa Rosa Water.

132-1.05 Gate Valves

Gate valves shall have ductile iron bodies and bonnets and resilient seated gates, and shall conform to AWWA Standard C509 and/or AWWA Standard C515 of the latest revisions. All gate valves, unless otherwise specified, shall be non-rising stem (NRS) type with O-ring stem seals. Gate valves installed above grade or in vaults shall be equipped with an approved hand wheel. Outside screw and yoke (OS&Y) rising stem type gate valves shall only be installed where specified or approved by the Water Department. All gate valves shall open in the counter clockwise direction. Where elevations on buried installations will not allow a minimum of six inches of cover over the valve nut, the Contractor shall submit for approval, by the Water Department, the installation of a horizontally installed gate valve with manufacturer installed bevel gearing. Bonnet direction of horizontally installed gate valves must be approved by the City and shall be recorded on the record plans.

The working pressure rating of gate valves shall meet or exceed the pressure rating of the pipe specified on the plans. Gate valve bolts and nuts shall be stainless-steel, and joint connection bolts and nuts shall be 304 stainless-steel or coated as specified herein.

Gate valves shall be Mechanical Joint type unless otherwise specified herein or approved by the Engineer.

New gate valves shown to be installed by “cut-in” on an existing main shall be done by removing a section of the existing main and installing the required gate valve, pipe and couplers as specified in the City Standards. Sections of pipe used shall be at least 18 inches in length.

When any part of the new water system is pressurized, all affected gate valves shall be at grade and accessible to City personnel at all times. Valves that require “valve stem risers” shall not be considered accessible unless the riser is in place and operational.

132-1.06 Butterfly Valves

Butterfly valves shall only be installed where approved by the Director of Santa Rosa Water.

Butterfly valves shall be flanged or mechanical joint type only and shall conform to AWWA C504 of latest revision and shall be of the rubber seat type. Valve discs shall rotate 90 degrees from the full open position to the tight shut position. The valve seat shall provide a tight shutoff at a pressure differential of 150 psi upstream and 0 psi downstream in either direction. The valve operator shall be the traveling nut type. Valve shall open with a counter-clockwise rotation of the operating nut.

132-1.07 Valve Boxes, Vaults and Pits

Each gate valve shall be covered by a precast 8" valve box set flush with street surface with cast iron ring and cover marked "WATER".

When a color coated box cover is called for, the coating shall be TIGER Series 49 Polyester TGIC, or an approved equivalent, in the color specified by the Water Department. Finish shall be a rough

texture matte. Cover shall be prepared per manufacturer's recommendations prior to coating. Film thickness shall be 2.5 to 3.5 mils.

Valve box riser pipe shall be installed centered over and plumb with the valve nut prior to final paving. If riser pipe needs to be lowered for paving it shall be cut by hand perpendicular to the axis of the pipe and free of jagged edges. If sections need to be added after paving it shall be done per Standard 877. The riser pipe shall extend into the bottom of the valve box a minimum of 2 inches and the upper section shall be no shorter than 1-foot in length.

If valve stem risers are required they shall be installed and checked for operation prior to paving.

All meter boxes, vaults and pits shall be bedded on 3" minimum thick, 3/4" drain rock, or other approved clean material with minimum sand equivalent percent of 20, uncontaminated by native soil, against compacted or undisturbed base. The gravel bed shall extend to a 4" minimum beyond all sides of the meter box. Box shall be set flush with top of curb, sidewalk or ground, whichever is applicable. Addresses shall be clearly marked on top side lip of meter box with a permanent marking pen.

Meter boxes and vaults shall be set so that the reading lids are aligned over the meter registers as closely as possible.

132-1.08 Locating and Adjusting Water Valve Boxes

After a street has been paved, mark the location of all water valve boxes in white paint before the close of that work day. If multiple paving lifts are required, remark box locations after each lift.

Within 48 hours of paving, adjust all water valve boxes up to grade.

If an existing valve box riser pipe is found to be asbestos cement, the entire pipe shall be removed and new riser pipe installed per Standard 877. See Section 132-1.10 Asbestos Cement Pipe herein for additional requirements.

132-1.09 Fire hydrants and Lateral Assembly

Unless stationing is specifically called out, fire hydrant locations, as shown on the plans, are approximate and shall be field located with the Engineer's approval.

Fire hydrant and lateral assemblies that are installed on an existing water main by "cut-in" requires that the disinfection and bacteria test sampling shall take place prior to hydrostatic testing. The Contractor shall request, and the Engineer shall provide the proper procedures for this operation.

No bends are allowed in fire hydrant laterals without approval of the Director of Santa Rosa Water.

Fire hydrants serving one and two family residential use have one 2-1/2 inch outlet and one 4-1/2 inch outlet. Fire hydrants serving commercial and multi-family residential uses have one 2-1/2 inch outlet and two 4-1/2 inch outlets.

Paint all hydrants in accordance with City Standard 857.

Before a public fire hydrant may be placed in service, a high velocity flushing of the hydrant lateral shall be witnessed and approved by Santa Rosa Water Department personnel.

All concrete which is to be removed from sidewalk areas for fire hydrant removal or installation shall be removed to the nearest transverse score mark across the full width of sidewalk and replaced as specified per applicable City Standards and Specifications.

132-1.10 Asbestos Cement Pipe

The installation of asbestos cement pipe is prohibited.

Cutting of Asbestos Cement Pipe (ACP) shall be done utilizing a Pipe Cutter (snapper), of the proper type and size for the intended use. A ratcheting hand snapper shall only be used on ACP sizes of 6 inch and smaller. The “snapper”, and all appurtenances shall have been inspected by the Contractor to ensure that it is in good working order prior to use.

If field conditions require an alternative method for cutting the ACP, the alternative method shall comply with all laws and requirements as specified by OSHA, the Contractor’s State Licensing Board, and any other governing body for this type of work.

In all cases, cutting, handling and disposal shall be done per the above stated governing bodies. Cut pipe shall be properly enclosed as soon as possible after removed from the trench.

132-1.11 Excavation, Backfill, and Resurfacing

All trenching, backfill and resurfacing required for installation of water distribution system facilities shall be in accordance with all applicable City Standards, specifically Standard 215, or as modified on the plans, and approved by the City of Santa Rosa Materials Engineer.

If existing utility crossings or other potential conflicts are shown on the plans or specified in other contract documents, the Contractor shall pot hole said areas prior to the start of pipe laying. If conflicts are discovered during this investigation the Engineer shall be notified immediately.

An **air gap** shall be in use at all times when dewatering to the sanitary sewer system. It is the Contractor’s responsibility to ensure that water system components are laid and bedded on sound, stable material. All existing material that has been disturbed shall be removed from the trench prior to installation of new material. The Contractor shall promptly notify the Engineer of any field conditions that may affect alignment and/or grade.

All stumps and large roots encountered during trenching operations shall be removed to the satisfaction of the Engineer.

Where excavations occur within the drip line of any tree, the Contractor shall hand dig to protect tree roots. If necessary for installations, roots one inch in diameter or smaller may be cut neat by hand tool. Unless otherwise specified, cutting roots larger than one inch in diameter shall only be done with City approval.

The trench shall be opened sufficiently ahead of the pipe laying operations to reveal obstructions. Trench crossings shall be provided as necessary to accommodate public travel and to provide convenient access to adjacent properties. Flow shall be maintained in any sanitary sewers, storm drains, water lines, or water courses encountered in trenching.

When the public works involved will exceed an estimated \$25,000 for the excavation of any trench or trenches five feet or more in depth, the Contractor shall, except for subdivisions, submit to the City Engineer for acceptance in advance of job excavation, a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trench or trenches. If such plan varies from the shoring system standards established by the construction safety orders, the plan shall be prepared by a registered civil or structural engineer. A permit to do the above described work must be obtained from the State of California, Division of Industrial Safety. Proof of such permit shall be submitted to the Engineer prior to starting the trench work.

Unless otherwise specified, excess material from excavation shall become the property of the Contractor and shall be disposed of to the satisfaction of the Engineer. If the work is in existing City streets the excess material shall be removed from the site daily unless it has been preapproved for reuse.

Prior to disposal of any materials or operation of any equipment on sites provided by the Contractor for disposal of excess trench excavation owned by him, the Contractor shall submit to the Engineer written authorization for such disposal of materials and entry permission signed by the owners of the disposal site and the required permits.

All excavations shall be able to accommodate any typical compaction and testing equipment and personnel used to backfill the trench. If, in the opinion of the Engineer, typical methods cannot be used, the Engineer may require the use of a pneumatic Pogo Stick/Powder Puff type compactor at no additional cost to the City.

All lateral services constructed under curb, gutter and driveway culverts shall be accomplished by use of a trenchless method approved by the Engineer, unless otherwise specified. Boring under sidewalks and/or concrete filled planter strips will not be allowed. Boreholes shall be only large enough to allow for the size of pipe to be installed. If the Contractor's operations disturb the supporting soil, the Engineer may require the removal and replacement of any undermined sidewalk, curb, gutter or culvert; and/or the use of CDF backfill at the Contractor's expense. The limits of curb and gutter replacement and any required doweling will be at the discretion of the Engineer.

Blasting shall not be permitted unless first approved of, in writing, by the Building Department and the Director of Santa Rosa Water.

Controlled density fill (CDF) shall be placed at the locations shown on the plans and where cover is less than 3 feet unless otherwise specified herein, on the plans, or approved by the Director of Santa Rosa Water. CDF shall conform to City Standard 215, and a material submittal is required for approval. All excavations in a traveled way with CDF backfill shall be plated or otherwise safely covered to allow for safe passage during curing.

Trenching operations shall be conducted in such a manner that will not disturb existing facilities. The Contractor shall incur all costs associated with repairs needed, in the opinion of and to the satisfaction of the Engineer, by any such damage due to their operations.

Unless otherwise approved by the Engineer, all excavated material shall be removed from the job site each day.

Five days prior to cutting into any traffic detector loop the Contractor shall notify and coordinate with the Engineer.

132-1.11A Trench Bracing and Shoring – Water

All bracing and shoring shall conform to Section 7-1.02K(6) of the Standard Specifications, the Division of Industrial Safety Construction Safety Orders which are currently in use, and any additional requirements specified by the Engineer.

Trench sheeting or boxes shall be withdrawn in such a manner as to prevent caving at the walls of excavations or damage to piping or other structures. Sheeting shall be completely removed from the trench and no backfill shall be installed against the sheeting before it is removed. Trenching operations shall be conducted in such a manner that will not disturb existing utilities.

The Contractor shall take all necessary measures to protect workers, adjacent areas, and structures, and all other facilities from the hazards of the trenching operations.

132-1.12 Laying and Handling Pipe Materials

All pipe stockpiled on the job shall be stored with the ends covered to prevent the entrance of foreign matter. The Engineer may reject stockpiled pipe with exposed ends.

Proper implements, tools, and facilities satisfactory to the Engineer shall be provided and used by the Contractor for safe, convenient, and workmanlike prosecution of the work.

Prior to start of pipe laying, the Contractor shall expose the ends of the existing mains to determine individual lines and grades. New mains shall begin approximately 8 feet from and on the same line and grade as the existing main unless otherwise shown or approved. New mains shall be installed at minimum standard cover conforming to the requirements of the City Water Distributions System Design Standards, or as shown on the Plans. Where, in the opinion of the Engineer, new mains cannot start on the same lines and grades and the existing main, restrained fittings shall be used to make grade and/or alignment transitions for tie-ins to existing mains. This does not eliminate the requirement for thrust blocking unless specifically specified elsewhere.

All pipe fittings and valves shall be carefully lowered into the trench in such a manner as to prevent damage to pipe coatings. Under no circumstances shall pipe or accessories be dropped or dumped into the trench. Before lowering and while suspended, the pipe shall be inspected for defects and the cast iron pipe rung with a light hammer to detect cracks. Any defective, damaged, or unsound pipe shall be rejected and sound material furnished. Cutting of pipe for inserting valves, fittings, or closure pieces shall be done in a neat and workmanlike manner without damage to pipe. All pipe stockpiled on the job shall be stored with the ends covered to prevent the entrance of foreign matter.

Installation of all pipe joints shall be per manufacturer's recommendations and installation instructions, and all PVC bell and spigot joints, up to and including 8 inches, shall be assembled using the bar and block method. At any time and at no additional cost to the City the Engineer may require the use of a device to prevent "over-insertion" such as a Mega-Stop Series 5000 from EBAA Iron, or an approved equivalent. All joints that are, in the opinion of the Engineer, over-inserted, shall be pulled back to the proper insertion point or removed and replaced at the Engineer's discretion. Any adjacent joint that may have been disturbed due to the over-insertion shall be allowed to be inspected by the Engineer and if required shall be pulled back or removed and replaced.

Whenever it is necessary either in vertical or horizontal plane, to avoid obstructions or when long radius curves are permitted, the amount of deflection shall not exceed the maximum recommended by the pipe manufacturer or that required for satisfactory jointing.

Each length of pipe shall be free of any visible evidence of contamination, dirt, and foreign material before it is lowered into its position in the trench, and it shall be kept clean by approved means during and after laying. Whenever pipe laying is not in progress, the open ends of installed pipe shall be closed watertight by mechanical plug, cap or other means approved by the Engineer to prevent the entrance of foreign material or small animals. Trench water shall not be permitted to enter the pipe.

Existing utilities shall be supported in place with service maintained during construction.

If proper separation between water mains and non-potable pipelines, per the latest guidelines from the California State Water Resources Control Board cannot be maintained, the Contractor shall inform the Engineer immediately to get direction, unless direction has been already provided in the contract documents. See Appendix "A" of the City of Santa Rosa Water Distribution System Design Standards for additional information and direction.

Proposed water main elevations may need to be adjusted in the field to allow for the required separation between non-potable pipelines and other facilities. If water system components are proposed to be installed prior to sanitary sewer or storm drain components, the Contractor shall investigate for the possibility of conflicts or inadequate separation of facilities. The Contractor shall perform this investigation prior to water system installation and provide all relevant information in writing to the Engineer immediately upon discovery of any conflict.

132-1.13 Laying P.V.C. Pipe

Individual pieces of pipe, valves, and fittings shall be joined by placing the rubber rings on the machined ends of the pipe and pulling the couplings, valves, or fittings in accordance with the manufacturer's recommendations. The rings shall be checked to be sure they are in the proper position after the coupling is in place. Care shall be taken to insure proper seating of the rings, and adapters shall be utilized for connections as required by the manufacturer.

Where ground water occurs, pumping shall continue until back filling has progressed to a sufficient height to prevent flotation of the pipe. Water shall be disposed of in such a manner as to cause no property damage or not be a hazard to public health

132-1.14 Laying of Ductile Iron Pipe

Ductile iron pipe, and their appurtenances, shall be as specified in and installed per AWWA C600 of latest revision, in accordance with the manufacturer's recommendations and any modifications herein.

132-1.14A Water Main Lowering/Over-Structure

Attention is directed to Sections 132-1.04 and 132-1.04A of these Construction Specifications.

Where shown on the Plans or as directed by the Engineer to lower or raise the alignment of the water main or 3" or larger service lateral using fittings, the alignment change shall be done in accordance with Section VI. "B" of the City of Santa Rosa Water Distribution System Design Standards and these Construction Specifications.

If the Contractor elects to install a partial or full water main lowering to make a grade transition in place of roping the pipe if roping is shown on the plans, they shall first receive written approval from the Engineer. The lowering shall be installed per City Standards and shall include restrained joints beyond the lowering to a calculated distance as directed by the Engineer.

The flame cutting of pipe by means of oxyacetylene torch shall not be allowed.

132-1.15 Service Laterals

Service laterals other than those shown or noted on the plans shall not be installed prior to obtaining approval from the Director of Santa Rosa Water. Service laterals encountered in construction that will not be used shall be abandoned.

132-1.15A Water Services

The Contractor shall install new water service laterals per applicable City Standards at the locations shown on the Plans.

If a new water service lateral is replacing an existing lateral, the work shall include abandoning the old service lateral pipe or tubing, removal of curb stop valve(s), removal and disposal of old

meter boxes, and removal, disposal and replacement of any existing sidewalk, curb and gutter as needed.

Typically, replacement service laterals shall be designed and constructed per all other City requirements and as close as practical to the existing laterals they are replacing, unless the existing is in a driveway. If the existing service lateral is in a driveway the replacement lateral shall be designed and constructed out of the driveway and where practical. Exact locations shall be determined in the field and approved by the Engineer. New service laterals shall be installed with a minimum horizontal clearance of 5 feet from sewer laterals.

HDPE and type "K" soft temper copper water services shall be one continuous length (no splices), from the water distribution main to the water meter. For water service laterals of other material types, the Contractor shall minimize joints as much as possible.

Water service connections to existing building service lines of 3/4" or 1" in size shall be made with type "K" hard or soft temper copper or schedule 80 PVC tubing, and shall match the size of the existing service line.

Water Service connections to existing building service lines of 1-1/2" to 3" in size shall be made with type "K" hard temper copper tubing and shall match the size of the existing service line.

When connecting to any service line under 4" that has a backflow prevention device, threaded brass or type "K" hard temper copper tubing shall be used unless otherwise shown on individual Standards. If the existing pipe between the meter and backflow device is found to be plastic, the Contractor shall inform the Engineer, and replace the existing pipe with threaded brass or type "K" hard temper copper.

When an existing service line is found to be galvanized iron, an approved dielectric fitting shall be required. The use of PVC material as dielectric protection is not acceptable.

Except as required to comply with City Standards, bends and/or fittings shall not be installed under sidewalk or concrete planter strips.

Connections to existing water service lines shall be made behind sidewalk or at the back of P.U.E.,

Submittals are required on all material used for service tie-ins.

When connecting to a 5/8" x 3/4" water meter the street side curb stop shall be a 1" x 3/4" angle meter ball valve (submittal required), and the meter box shall be per Standard 863.

After the new water system is connected to the existing City water distribution system the Contractor shall purge the new service of air and sediment prior to new meter installation or the transferring of the existing water meter.

Prior to transferring an existing water meter, the Contractor shall notify the affected customer before shutting down their service. The Contractor shall coordinate this work to provide minimum customer out-of-service time and inconvenience. All existing water meter transfers and service tie-

ins shall be witnessed by the field Inspector, and it is the Contractor's responsibility to coordinate this inspection.

The Contractor shall shut off any available property side valve on the existing service prior to cutting into the line and after the meter transfer, but prior to activating the new service, the Contractor shall notify the customer that the water is coming back on, then open the property side valve and flush the new service for a minimum of 5 minutes and until the water is clear and free of all air and foreign matter.

The existing building service line to be connected to may be metal or plastic and may not be the same size as the new service. The Contractor shall provide couplings, adapters and fittings as necessary to complete the connection to the new water service line.

Where a new service is connected to existing backflow device the Contractor shall provide documentation that the backflow device has been certified after installation. Certifications shall be completed by a certified tester off the "*City of Santa Rosa Approved List of Backflow Testers*". All necessary paperwork shall be completed by the Tester and one copy given to the property owner and one to the City's Water Quality Section within 72 hours after connection.

Where new service laterals of 2" in diameter and smaller are connected to existing water mains, a minimum distance of 18" shall be maintained between taps, whether new or existing. For hot taps larger than 2" the Contractor shall request spacing requirements from the Engineer, which will be determined based on size and material.

Individual hot taps may be requested a minimum of 2 working days in advance, if the request is for multiple hot taps to be done on the same day the request shall be made a minimum of 5 working days in advance. The Water Department will attempt to facilitate hot taps within these timeframes; however, extenuating circumstances may result in response times in excess of those mentioned above.

132-1.15B HDPE Water Services

High Density Polyethylene (HDPE) services shall be installed per applicable City Standard and as specified on the Plans.

132-1.15C Copper Water Services

Unless otherwise specified herein or in other contract documents, water service lateral installations of sizes 2" and smaller shall be HDPE.

If directed to install a copper water service it shall be installed per Section 132-1.03 of these specifications, the applicable City Standard, and any modification herein and/or on the Plans. All brass material and sections of copper tubing where the polyethylene coating is removed shall be wrapped with an approved waterproof pipe wrap to a minimum of 4" beyond any exposed brass or copper. All cut ends of copper tubing shall be deburred prior to installation.

132-1.15D Backflow Device Installation

The Contractor shall install new backflow prevention devices at the locations shown on the Plans or as directed by the Engineer. Backflow prevention devices shall be installed per applicable City Standards unless otherwise directed by the Engineer. The Contractor shall purge the water service at the meter of air and sediment, prior to installation. The Contractor shall coordinate this work to provide minimum out-of-service time to existing customers.

All piping downstream of the backflow device shall be of the same material called for between the meter and backflow device unless otherwise specified.

Unions, as required, shall be brass.

After installation, the backflow prevention device shall be certified. Certifications shall be completed by a certified tester off the City of Santa Rosa "*Approved List of Backflow Contractors*", which upon request will be provided by the Engineer. All necessary paperwork shall be completed by the Tester and one copy given to the property owner and one to the Engineer within 72 hours after connection to the existing building service line.

Submittals shall be required for all backflow devices and related materials.

132-1.16 Thrust Blocking

Unless other arrangements are made that are acceptable to the Engineer, the Contractor shall coordinate notification, and allow for visual inspection by the City, of all concrete thrust blocking.

Regardless of restrained joint requirements specified elsewhere or actual installation, concrete thrust blocks shall be installed behind all tees, when connecting to any existing line larger than 2" in diameter, and where restrained joints cannot be used or alone are deemed insufficient by the Design and/or City Engineer.

Concrete thrust blocks and/or harnesses shall also be installed per applicable City Standard, and in addition to restrained joints, where the water main is 12" in diameter or larger and the static water pressure in the distribution system is 90 psi or greater.

Permanent concrete thrust blocks and/or harnesses restraints shall be installed at least 24 hours prior to reactivation of the water system when reactivation is required immediately after completion of any operation where a water system shut down is needed and temporary blocking is not feasible. If a joint restraint system can be installed to alleviate the need for concrete thrust blocks and protects the existing and new water systems, it shall be used in place of this requirement.

Wherever concrete thrust blocking is deemed necessary, by the City or the Contractor, it shall be installed per City Standards unless otherwise specified on the plans.

132-1.17 Abandon or Removal of Water Distribution System Components

Water mains and service laterals larger than 1-1/2" shown on the plans to be abandoned shall be abandoned per City Standard 507. If the end of the pipe to be abandoned is connected in any way to an active main and allowed to stay in place with the approval from the Director of Santa Rosa Water, the abandonment shall consist of a watertight cap or plug and proper restraint, and the location shall be recorded on the plans.

Existing water system components shall be removed where shown on the Plans, or to facilitate the progress of work. The Contractor must first receive written approval from the Director of Santa Rosa Water prior to removing any component, fully or in part, that is active during construction, and the removed material shall be replaced to the satisfaction of the Water Department.

Prior to abandoning an existing main that will be replaced with a new main, all water services shall be transferred to the new and active main.

Leaded joints encountered on water mains that are to stay active within the limits of excavations shall be removed by the Contractor as directed by the Engineer. The Contractor shall remove the joints by cutting out the section of pipe containing the exposed joint and installing ductile iron pipe and approved couplers. The removed joint shall be handled, and disposed of according to the Contractor's State Licensing Law and all other applicable laws and regulations.

For all abandoned water services, up to and including 2", or 4" if connection is by hot tap, on mains that are to remain active, remove the valve and saddle and install a stainless-steel full circle clamp on the main under City inspection.

All abandoned service laterals 6" and larger on water mains that are to remain active, shall be done as noted on the plans, and as specified in the Water Distribution System Design Standards.

Tees or crosses shown to be removed on water mains that will remain in service, shall have the tee or cross, any related valves and thrust blocking removed, and the main shall be repaired with ductile iron pipe and approved couplers.

Barrels of existing fire hydrants to be removed shall be carefully separated from risers and buried by the Contractor, and the bury, if left in the ground, shall be capped or plugged in an acceptable manner. The hydrant only shall be delivered to the City's Water Department Field Operations site located at 35 Stony Point Road, unless the Contractor has obtained specific written approval by the Water Department to otherwise dispose of the materials.

Remove all valve boxes and risers on abandoned mains and backfill and resurface per City Standards. If any portion of a gate valve that is to be abandoned is in the structural section of the street, the valve must be fully removed and the pipe ends abandoned per Standard 507. Any valves not in the structural section of the street may be abandoned in place in the fully closed position.

All system components located behind curb and gutter, or edge of pavement where there is no curb or gutter, on laterals to be abandoned shall be fully removed to a minimum of 1' below grade, unless otherwise directed or approved by the Engineer. All voids shall be backfilled per City Standards and surfaced in an acceptable manner to match the surrounding area. Any sidewalk that

must be replaced shall be done to the nearest transverse score mark on both sides and the full sidewalk width.

After a new water service lateral is installed on an existing main and the meter is transferred, the old service lateral shall be abandoned as specified herein.

Any abandonment that requires a system shutdown, such as removing an old water service from an active main, shall be done under inspection by authorized City personnel.

132-1.18 Hydrostatic Test

Prior to being allowed to connect to the City of Santa Rosa's water distribution system, except where otherwise specified, all newly constructed water mains, and their appurtenances, shall be hydrostatically tested in accordance with AWWA C600, and any modifications herein.

4" and larger water service laterals, including fire lines, that are installed on an existing water main by cut-in or hot tap requires that the disinfection and bacteria test sampling shall take place prior to hydrostatic testing. The Contractor shall request, and the Engineer shall provide the proper procedures for this operation.

Methods and equipment used for hydrostatic testing shall be submitted to the Engineer for approval.

The Contractor, at their option, may test the system at any time during construction. However, the final test, which will be witnessed by the City for acceptance, shall take only place after the system is fully constructed and trenches backfilled and compacted, but prior to final paving.

Each valved section of the system, or combined sections, as approved by the Engineer, shall be hydrostatically tested to a pressure of not less than 150psi measured at the highest point along the section to be tested. Where the static pressure in the City's distribution system to be connected to is greater than 100psi, the test pressure shall be 1.5 times the static pressure of the City's distribution system.

If complying with the above requirements it appears that the specified test pressure may exceed the new system's designed thrust restraint, valving or joint pressures at the lowest elevation, the Contractor shall request direction from the Director of Santa Rosa Water.

Except where otherwise specified or approved by the Director of Santa Rosa Water, pressure testing against closed gate valves shall not take place. Where testing against a closed gate valve is approved, the valves supplied by the Contractor shall be rated to exceed the specified test pressure. Any damage to gate valves shall be the responsibility of the Contractor and must be corrected to the satisfaction of the Director of Santa Rosa Water, including up to full replacement.

Each section of the new system shall be slowly filled with water, and all air expelled through an opening(s) located at the highest point(s) of the system. If necessary, tap the main at point(s) of the highest elevation(s) and install corporation stops to assist in expelling during filling of the

system. Unless the taps are located where combination air and vacuum valves have been designed into the system, the penetrations shall be sealed with stainless-steel full circle clamps once all air is expelled. All caps, plugs, fittings and any other appurtenance shall be properly braced prior to pressurizing the system.

When testing ductile iron pipe, it is advisable to allow some time for the lining to absorb water prior to the hydrostatic test.

After all air is expelled, the specified test pressure shall be applied by means of an approved pump connected to the new system in a manner approved of by the Engineer. The pump, connection fittings, and all other necessary apparatus except for the pressure gauge and measuring devices shall be furnished by the Contractor. The City of Santa Rosa will furnish the pressure gauge and measuring devices for the test. The Contractor shall construct all openings into the new system required for filling and expelling air, and shall furnish all necessary assistance for conducting the tests. Before applying the test pressure, all air shall be expelled from the pipe.

The gauge(s) used to measure pressure for the test shall be a liquid filled gauge with increments no greater than 5psi.

The duration of each pressure test shall be 2 hours, and the test pressure shall not vary by more than ± 5 psi. The pressure shall be maintained within this tolerance by adding makeup water through the approved test pump into the system. The makeup water shall be accurately measured in gallons by a meter or by pumping from an approved vessel of known volume, and shall not exceed the applicable testing allowance as specified in Table 1.

Table 1
Hydrostatic testing makeup water allowance per 100ft of pipeline*

Gallons per hour

Avg. Test Pressure <i>psi</i>	Nominal Pipe Diameter									
	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
150	0.033	0.050	0.066	0.083	0.099	0.116	0.132	0.149	0.166	0.199
175	0.036	0.054	0.072	0.089	0.107	0.125	0.143	0.161	0.179	0.215
200	0.038	0.057	0.076	0.096	0.115	0.134	0.153	0.172	0.191	0.229
225	0.041	0.061	0.081	0.101	0.122	0.142	0.162	0.182	0.203	0.243
250	0.043	0.064	0.085	0.107	0.128	0.150	0.171	0.192	0.214	0.256
275	0.045	0.067	0.090	0.112	0.134	0.157	0.179	0.202	0.224	0.269
300	0.047	0.070	0.094	0.117	0.140	0.164	0.187	0.211	0.234	0.281

*If sections of various diameter piping are to be tested at the same, the testing allowance shall be the sum of the testing allowances for each size.

Leakage is defined as the quantity of water to be supplied into the newly constructed water system, or any valved section thereof, necessary to maintain the specified test pressure.

If at any time during the pressure and leakage testing the specified test pressure can be maintained ± 3 psi for a consecutive 30 minutes without adding makeup water, the test can be discontinued and the system considered as passing. Should any test of combined or individual sections of the new system show leakage greater than the specified limit, the Contractor shall, at their own expense, locate the cause and repair the defect until the leakage is within the specified allowance.

Regardless of test results, the Contractor shall repair any leaks detected.

132-1.19 Cleaning, Flushing and Disinfection of the New Water System

Cleaning, flushing and disinfection of new water system components purposed to be connected to the City of Santa Rosa's Water Distribution System shall conform to AWWA C651, all applicable City Standards, and any modifications herein and/or on the plans. To ensure the sanitary integrity of the new water system the Contractor shall practice proper sanitary technics during storage, handling and construction of the new water system.

Unless otherwise approved by the Director of Santa Rosa Water cleaning and flushing of all mainline pipes shall be accomplished by propelling the swab down the pipeline to an exit point per Section 132-with an approved source of potable water. After removal of the swab(s) a unidirectional flush of the new system shall continue until the water is completely clear.

During the installation of new water line(s), the Contractor shall insert an appropriately sized flexible polyurethane foam sweeping or cleaning style swab, with a density of 2 pounds per cubic

foot, complete with polyurethane drive seal, into the beginning or ending segment of each pipe run. The swab shall stay in place until utilized for cleaning operations as specified.

Where tees or crosses are installed as part of the new system, swabs shall be placed where practical so both the run and branch segments are able to be swabbed. If determined by the Engineer that sanitary techniques were practiced during construction, the Engineer may, at their discretion, allow segments of new pipe 80 linear feet or less to be cleaned by line flushing only. The City will not be responsible for extra time for locating lost swabs.

All temporary blow-offs installed for the purpose of removing foam swabs required for water main cleaning shall be constructed similar to Standard 862 with a "same size as main" elbow and vertical stand pipe to prevent trench and disspelled water from flowing back into the main. After the swab is removed the end of the pipe shall be sealed watertight and all parts restrained to allow for testing. All temporary material shall be removed during operations to connect to the City's distribution system.

After swabbing, as specified above, is complete, any segment that may have been allowed to be omitted by the Engineer, and every lateral, shall be flushed until clean and free of air and debris.

Water used for flushing shall be considered contaminated after exiting the new system and shall not be allowed to reenter the system. If, in the opinion of the Engineer, the new system becomes contaminated the Contractor shall be required to re-disinfect the system, all or in part, at no additional cost to the City.

Except as otherwise specified or permitted by the Director of Santa Rosa Water, disinfection of the new system shall only take place after all lines have been cleaned and flushed, and each required hydrostatic test has been accepted by the Engineer.

All laterals, 2" and larger, including fire lines, installed on an existing main shall be disinfected and bacteriological test samples taken as specified herein.

All 1" and 1-1/2" service laterals components installed on an existing main shall be thoroughly swabbed with a 1 percent liquid chlorine solution during construction.

All laterals shall be thoroughly flushed just prior to being put into service.

Methods, material and equipment used for disinfection of the water system shall be submitted to the Engineer for approval.

Sodium hypochlorite (liquid chlorine) of 10%, 12.5% or 15% shall be utilized for disinfection operations and shall be applied as stated herein. The use of household bleach is not permitted for disinfection at any time.

The point of application of the disinfectant shall be through a permanent or temporary blow-off, or through a new fire hydrant installed as part of the new system. If none of the aforementioned components are available or practical for use, the Contractor may use a corporation stop of an

approved size, if approved by the Engineer. Adequate venting must be allowed, and both filling and venting port elevations shall be a minimum of 6 inches higher than all components to be disinfected.

Water from the City's existing distribution system shall be used to fill the new mains at a slow controlled rate of flow during the application of the disinfectant; this rate of flow shall not exceed the limits of any openings used to expel water and/or air, including installed air release valves. Precautions shall be taken to prevent back pressure causing a reversal of flow into the City's water distribution system. In the process of disinfecting, all valves and other appurtenances on the new water system shall be operated in such a way to allow the disinfectant solution to be fully distributed to all components of the new water system.

The rate of disinfectant feed shall be in such proportion to the rate of water entering the pipe that the disinfectant dose applied shall be between 100ppm and 200ppm. The disinfectant solution shall be retained in the pipe for a period of at least 24 hours but no longer than 72 hours. After 24 hours, disinfectant levels shall not be less than 50% of the initial dosage, as recorded by the Inspector. If the disinfectant level is less than 50% of the initial dosage, the system shall be flushed and the above disinfection procedures repeated. When disinfectant levels are acceptable after the retention period, the chlorinated water shall then be discharged as specified in Section 132-1.20 "Discharge of Chlorinated Water", and all new mains and laterals shall be given a final flush and then filled with water from the City's distribution system.

While the final flush of the new system is taking place the Engineer, or their representative, will take a chlorine residual reading from the City's distribution system and note it. If the reading is higher than 0.5 ppm, the new system shall be flushed until residual readings taken at all locations, as determined by the Engineer, are between the residual noted from the City's distribution system and 1 ppm, but no higher. If the residual taken from the City's distribution system is less than 0.05 ppm, the new water system shall be flushed until all locations are between 0.5 ppm and 1 ppm.

After the disinfectant is flushed from the new water system and all residual readings are as specified, an initial set, consisting of two bacteria test samples per location, shall be taken where specified by the Engineer per one of the following methods;

Method A:

Take a first set of sample tests just after flushing is complete, and the second after a minimum of 16 hours, but not more than 72 hours after flushing.

Method B:

After flushing is complete let the system sit a minimum of 16 hours without any use, then collect both sets of sample tests from the same locations 15 minutes apart while allowing the sample port to maintain a slight flow in between samples.

The method used shall be determined by the Engineer at the time of sampling.

All residual readings and bacteria test samples specified herein shall be taken by the Engineer, or their designee, and witnessed by the Contractor.

The Engineer must receive written test results showing that all samples from both sets taken are negative for contamination prior to scheduling connection(s) to the City's water distribution system.

If bacteria test results indicate contamination the new water system shall be flushed and sampling shall take place again as specified above. If any results from the additional sampling still show indication of contamination the new system shall be disinfected and flushed again prior to any additional bacteria test sampling taking place.

Unless otherwise approved by The City of Santa Rosa Water Quality Supervisor, the initial two sets of bacteria tests will be considered valid for up to 14 calendar days after the second set has been taken. All other sets taken will be valid for up to 10 calendar days. If more time passes than those specified before connecting to the City's distribution system, additional passing bacteria test samples will be required before connections are approved.

Costs for the collection and analysis of the initial sets of bacteria test samples will be paid for by the City. Samples shall be taken at a minimum; on each blow-off of the new water system and on at least one water service between each two blow-offs. The exact location and quantity of the samples will be determined in the field by the Engineer. There shall not be more than 1200 feet between sample points. Samples taken from fire hydrants, new or existing, shall be avoided where possible, if samples must be taken from a fire hydrant the hydrant shall first receive a high-volume flush to clean the interior.

The City will pay labor and analytical fees for collecting and analyzing up to two additional sets of bacteria test samples. If additional testing is required, costs shall be borne by the Contractor.

If deemed necessary by the Director of Santa Rosa Water, due to unsanitary or other construction practices, as determined by the Engineer, the Contractor may be required to do additional sampling with satisfactory results prior to connecting to the City's distribution system.

132-1.20 DISCHARGE OF CHLORINATED WATER

Chlorinated water used to disinfect newly constructed water systems is the property of the Contractor and its disposal is the responsibility of the Contractor. Chlorinated water used to disinfect the new mains shall be disposed of in accordance with AWWA C655, all laws and regulations, and any modifications herein or specified on other contract documents.

Discharge to the storm drain system or a waterway is not permitted without a permit from the North Coast Regional Water Quality Control Board.

Discharges may be allowed to be disposed of into the sanitary sewer system, but must first meet the following requirements:

- A. The City of Santa Rosa Subregional Reclamation Facility shall be notified by the Engineer in coordination with the Contractor, prior to the discharge being disposed of in the sanitary

sewer system. The payment of any fees required shall be the responsibility of the Contractor.

B. The pH of the water must be between 6.0 and 9.5.

C. The Contractor shall maintain an approved “**air gap**” from the discharge conduit to the receiving sewer facility.

132-1.21 Water Main Connection Work

Upon completion of construction and testing of new water mains, service laterals and other appurtenances, tie-in connection(s) can be made by the Contractor under inspection by authorized City personnel.

The Contractor shall make a schedule request, to the Engineer, for any work which requires a City water distribution system shutdown, including, but not limited to, connection to the City's distribution system or a service hot tap. Connections to the City's distribution system will not be scheduled until the Engineer has received documentation of all required passing bacteria tests. The Contractor shall submit a separate written request to the Engineer to schedule each individual shutdown required to facilitate a tie-in connection or any other work where a shutdown may be necessary. The Contractor shall submit written shut down requests at least 2 working days, and 3 working days in advance for residential and commercial shutdowns respectively. The Santa Rosa Water Department will attempt to facilitate shutdowns within these timeframes; however, extenuating circumstances may result in response times in excess of those mentioned above. Under such conditions, no claims related to work delays shall be considered. All shutdowns and valve turning operations shall be performed by authorized City personnel only. Authorized City personnel must be present during any operation requiring a shutdown unless otherwise approved by the Director of Santa Rosa Water and provided to the Contractor in writing. Connections to the City's distribution system shall not be performed without prior authorization by the Engineer. Individual hot taps may be requested a minimum of 2 working days in advance, if the request is for multiple hot taps to be done on the same day the request shall be made a minimum of 5 working days in advance. The City will attempt to facilitate hot taps within these timeframes; however, extenuating circumstances may result in response times in excess of those mentioned herein. Under such conditions, no claims related to hot tap delays will be considered. Hot tap scheduling shall also be subject to the limitations of Section 6-4.01B, “Water Utility Notification”, of these Special Provisions.

4” and larger hot taps or any size cut-in shall not be allowed within 4’ of a joint unless first receiving written approval from the Director of Santa Rosa Water. 4” and larger hot taps that are within 4’ of a joint shall be replaced with a cut-in tee.

Any existing joint that is not specified to be replace and is disturbed by the Contractor's operations may be require by the Director of Santa Rosa Water to be removed and replaced with approved pipe and couplings under City inspection, and at no additional cost.

Excavations for individual tie-in connections and hot taps shall be completed as much as possible without causing damage to new or existing facilities and plated a minimum of 1 working day in

advance of the scheduled work. If this requirement is not met, the scheduled work will be cancelled. All connection materials shall be on site for inspection at the tie-in location the morning of the scheduled work.

Contractors who fail to keep field appointments shall be billed for City personnel and equipment time used, and the contractor shall bear the costs incurred by the City for notification of its customers for the subsequent appointment.

Interruption of service to commercial customers shall, as much as practical, be coordinated with the customer's needs. After notification by the Contractor for such a need, the City will contact commercial customers for service interruption needs and will inform the Contractor accordingly.

City crews work a 9/80 schedule; this schedule may prohibit shutdowns on alternating Fridays.

Contractors requiring work of any kind by City forces shall request such services a minimum of 48 hours in advance of the time such services are desired. Work requests, which will involve City forces for more than 8 hours or an extensive number of City supplied parts, shall be requested a minimum of 7 calendar days in advance.

If it is necessary to terminate service to any customer, the contractor shall make the request for such work an additional 72-hours (three additional working days for a total of five working days advance notice) in advance of the time such services are desired to allow the customers affected to have a minimum 72-hour notice.

When installing a cut-in-tee or cross that is larger than the existing pipe, the new assembly shall be installed at the depth appropriate to the size of the "cut-in" tee or cross, and shall include all fittings, pipe and couplers required to make the change in grade and connections unless otherwise directed by the Engineer. Depth shall also be sufficient to allow any valve(s) that may be part of the assembly to remain below the subgrade of the street.

When a connection is required to an existing water pipe, the contractor shall provide all excavation, shoring, backfill and trench resurfacing per City Standard 215.

All joints of a tie-in connection to the City's distribution system shall be mechanically restrained.

Where the connection is to be a "hot tap", the contractor shall provide and install the tapping valve and sleeve, and any other hardware required and City forces shall make the tap at the developer's expense, unless it is part of a Capital Improvement Project, in which case the hot tap shall be paid for accordingly.

Full circle tapping saddles shall be used when hot tapping 10" and Larger PVC pipe with a static pressure of 85psi or higher

Where a "cut-in" tee or cross and valve(s) assembly is required to be installed, the contractor shall provide and install the entire assembly (including valves), and any other hardware necessary under

City inspection, and shall provide all other work and materials necessary to complete the installation to City Standards.

During the work, the Contractor shall exercise all necessary precautions to prevent the entrance of trench water or any other foreign material into the water main and appurtenances and shall conduct all operations in accordance with the most stringent sanitation practices. The interior of all appurtenances being installed, as well as the exterior of the pipe that will come into contact with the distribution water, shall be thoroughly swabbed with a 1 percent liquid chlorine solution prior to installation.

When connecting to an existing water main the Contractor shall install temporary and permanent thrust blocking, as necessary, for restraint and to allow for reenergizing of the water main immediately after all plumbing is complete.

When installing new components by “cut-in” to an existing PVC or ductile iron main, all new joints shall be mechanically restrained.

Pipe and fittings furnished for tie-ins shall be no smaller than the existing water main to which each tie-in is made.

132-1.22 Construction Water

All water required for the performance of work shall be legally obtained and furnished by the Contractor.

Prior to obtaining water from the City’s water system the Contractor shall obtain a Water Use Permit and rent a hydrant or bridge meter, this can be done at 35 Stony Point Rd, Water Department’s Utilities Field Operations front counter, Ph# 707-543-4200. The Contractor is responsible for any deposits required, permits and moving fees, and the cost of all water used. Deposits shall be refunded upon removal of the meter by City forces, less any charges for water used. Any damage to the meter may result in forfeiture of all or part of the deposit.

Unmetered connections are not permitted to the City of Santa Rosa water system, including connections that bypass meters for testing onsite plumbing, or for obtaining construction water. When a subdivision water main has been accepted and tied-in the individual curb stops will be locked off with cable ties/or locks. Cutting off or tampering with the cable ties/ or locks will constitute a straight tie-in connection. Such connections shall be severed by the Water Department and will result in penalties including payment of fines and estimated water usage fees.

Construction water shall be obtained from the City water system only at the point(s) designated by the Engineer.

Contractors are prohibited from operating gate valves or fire hydrants on the City system.

Use of water obtained from unmetered fire hydrants or other facilities is a violation of City ordinance and State law. Use of construction water from sources other than the City Water System

must be approved by Engineer.

Citations and fines will be levied for violation of these and other utility regulations and deductions will be made from progress payments if necessary.

Construction water for the work under this contract will **not** be furnished by the City.

At no time shall water trucks or any other unapproved vessel be used in the application of loading water mains unless first approved of by the City's Water Quality Section.