CITY OF SANTA ROSA

WATER STANDARDS

Adopted by the Santa Rosa City Council
Resolution No. 25372
September 10, 2002
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WATER SYSTEM DESIGN STANDARDS

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WATER SYSTEM DESIGN STANDARDS

I. PURPOSE

To provide guidelines for the design of water utilities projects and thereby reduce the time required for processing the plans. These guidelines do not include, but may reference, additional conditions which may be promulgated by all other pertinent ordinances, codes, and official policy set forth by the Utilities Department or other departments of the City of Santa Rosa or other government agencies. These guidelines establish minimum acceptable design criteria. More stringent requirements may be imposed by the Director of Utilities based on specific project conditions.

Portions of these standards apply to fire systems, both public and private, and are intended as general reference to aid in the design of the public water system. Final designs are subject to approval of the Fire Department.

It is the responsibility of the design engineer to initiate written requests to the Director of Utilities for approval of any design concepts that differ from these criteria, verify additional requirements imposed, perform any necessary calculations or studies, and resolve specific design problems with the appropriate agency, department or division.

II. REQUIREMENTS FOR IMPROVEMENT PLANS AND SUBDIVISION MAPS

A. Provide a detailed utility plan showing onsite and offsite public and private water and fire protection systems, including mains, services, hydrants, and all other required appurtenances, and their connections to existing City-maintained water facilities. Show the location, type, and diameter of public and private water mains. Reference any existing fire hydrants within 300' of the project boundary. Show any wells existing or to be abandoned. When a separate irrigation service is necessary, an irrigation plan is required per section X-O of these standards. (See section XI-B for submittal of plans for private fire systems.)

B. Annotate the local agency information sheet of the Subdivision Map with any information that is needed to notify property owners of requirements for connection to the City water system. These include, but are not limited to:
   1. payment of fees prior to issuance of Building Permits,
   2. lots requiring pressure regulating valves or booster pumps,
   3. backflow protection,
   4. public water access requirements, such as gates or access roads.
   The appropriate information may be obtained from Utilities Engineering.

C. Miscellaneous specific items required on improvement plans are indicated throughout
these Standards.

D. Before combustible materials may be delivered, stored or constructed on site, fire flow and access must be provided and approved by the Fire Department per current City Fire Code. In addition, public and/or private fire hydrants must be installed, flushed, tested, and operational. This information must be included on all improvement plans. Provide any necessary calculations with the submittal of improvement plans or with the Tentative Map submittal to demonstrate adequate fire flows are available.

III. WATER MAINS - GENERAL

A. Public water mains may not be designed outside the street right-of-way without Director of Utilities approval.

B. In general, publicly maintained water systems will be designed only where they serve multiple ownership lots and where appropriate access for maintenance can be provided.

C. Water mains installed at a slope of 15% or greater will be designed with restrained joints. The Design Engineer must provide adequate drainage measures to protect the trench from erosion.

D. Water mains installed outside of any roadway, called “cross-country mains,” must be Ductile Iron Pipe and will have suitable access. In general, cross-country mains must be isolated with valves in the public right-of-way and must be identified with blue locating posts (Carsonite 492 CW-112 or approved equal) at approximate 500' intervals, at any angle point, and at the entrance to an easement. Stakes should have vandal-proof metal bottoms. Access requirements as established in Section XIV of the Sewer System Design Standards may be imposed on a project based on site conditions.

E. For system reliability, to minimize pipe size, and to minimize the number of people affected by a system shutdown, either for domestic or fire protection purposes, no more than 100 residential units may be served by a single-feed water system, providing it is hydraulically adequate. Where more than 100 units are to be served, a dual-feed (or “looping”) public water system must be designed to provide a secondary source of water to the project. Onsite private fire requirements, such as dual fire services and looping mains, will be determined by the Fire Department for residential and nonresidential developments.

F. For purposes of leak detection and maintenance access, no reinforced concrete may be designed over publicly maintained water facilities. Unreinforced concrete will be allowed under special circumstances such as crosswalks.
G. Extent of water main improvements will be as follows:

1. Any offsite water main improvements needed to serve the project must be shown on the improvement plans, including upgrades to existing mains that may be required as a result of a flow analysis or modeling effort.

2a. In general, water mains must be designed at least across one-half of the property frontage or to the last service connection, whichever is greater; or

2b. Where the project is required to provide new street improvements over the water main alignment and the water main will serve properties beyond the project limits, the water main must be designed to cross the full property frontage or to the limits of the street improvements, whichever is greater.

H. Streets with both water and sewer mains must be at least 20 feet wide, face-of-curb to face-of-curb. Streets with only a water or sewer main must be at least 16 feet wide. No water or sewer mains may be installed in alleys.

IV. MATERIALS

A. Service laterals will be copper, Polyvinyl Chloride (PVC), or Ductile Iron Pipe (DIP) per applicable City Standards.

B. 8" and 12" public water mains and 4"-12" private fire mains will be Polyvinyl Chloride (PVC) Pressure Class 150, DR18 per AWWA Standard C900, minimum or Ductile Iron Pipe Pressure Class 350 per AWWA Standard C151 minimum. Where the normal mainline static pressure exceeds 100 psi, Ductile Iron Pipe or PVC Pressure Class 200, DR14 must be used.

C. 16" diameter water mains will be Polyvinyl Chloride (PVC) per AWWA Standard C905, DR25 with a pressure rating of 165 psi or Ductile Iron Pipe per AWWA Standard C151, or as shown on plans and specifications. Where the normal mainline static pressure exceeds 100 psi, AWWA Standard C905, DR18 with a pressure rating of 235 psi or Ductile Iron Pipe must be used.

D. 20" diameter and larger water mains will be concrete cylinder pipe, wrapped steel pipe, or Ductile Iron Pipe.

E. Asbestos cement pipe will not be allowed under any circumstances.
V. CONNECTION TO AN EXISTING PUBLIC WATER MAIN

A. Indicate a "hot tap" for connection of service laterals 2" in diameter and smaller.

B. Indicate connection of pipes 4" - 12" in diameter with a hot tap or a cut-in tee in conformance with the provisions of the Water System Construction Standard Specifications Section 99-1.20. Hot taps will be allowed only when no main line valves are required.

C. Design a cut-in tee if additional valves are required on the existing main. If the new main/lateral is larger than the existing main, the tee and main/lateral valve will be the size of the existing main unless it is hydraulically necessary to increase the tee and valve to the size of the new main/lateral.

D. Tie-ins to the existing City water system must be inspected by a Utilities Dept. representative and the improvement plans must be so annotated.

E. Size-on-size taps are allowed up to 8" in accordance with the approved standards. 12" size-on-size taps are allowed only under emergency situations and with the specific approval of the Director of Utilities.

F. In most major streets, or where the street surface is less than five years old, installation methods other than open cutting may be required. The Encroachment Officer or the City Engineer as appropriate will determine the requirements based on the condition of the existing street.

VI. ALIGNMENT

A. Horizontal

1. Alignment will be in accordance with the provisions of Standard 871.

2. The minimum allowable radius of curvature for an 8" water main is 250 feet and for a 12" water main is 350 feet. In situations such as streets that have smaller radius curves, the water system will be designed in straight segments parallel to the sewer or storm drain system so that future locating is simplified.

3. Conform to the State of California Department of Health Services "Criteria for the Separation of Water Main and Sanitary Sewers" (See Appendix "A").

4. The minimum horizontal separation from storm drains, monuments, gas,
electrical, and telephone lines will be 4 feet clear except at crossings.

5. The minimum clear horizontal separation from a metallic pipeline with an induced current or from an anode field will be 5 feet. Where the new water main will be in proximity to an anode field, special design will be required for approval by the Director of Utilities.

6. All public water mains must be designed a minimum 5 feet from all structures, such as manholes or drop inlets. Provide a minimum of 3 feet from the lip of gutter for service connections and repairs. Water mains will be designed a minimum of 5 feet from the edge of easements.

7. All water main trenches that are parallel to and deeper than the footing of any adjacent structure must be designed at least forty-five (45) degrees from the footing as required in the Uniform Plumbing Code. Any exceptions must be approved in writing by the Director of Utilities and the Director of Building and Code Compliance. (See City Std. 517)

8. Where dual water mains are designed, a minimum 5 feet clear horizontal separation will be maintained.

9. In general, water main crossings over or under other underground facilities will be designed as close as 90° to that facility as possible. Crossings of less than 45° will only be approved when no other design is possible.

B. Vertical

1. Generally provide a minimum of 6" of vertical separation from storm drains or other underground utilities such as telephone, cable tv, gas, or electric conduit. When the minimum cannot be maintained, plans will indicate installation of felt expansion material, styrofoam, or equivalent between facilities. Other measures, such as the use of concrete encasement, controlled density backfill, or ductile iron pipe may be submitted for approval of the Director of Utilities. The absolute minimum separation between water and other underground facilities, except sewer mains will be 0.1'.

2. Conform to the State of California Department of Health Services "Criteria for the Separation of Water Main and Sanitary Sewers" (See Appendix “A”).

3. Where dual water mains are designed, a minimum 1' clear vertical separation will be maintained.
VII. MAIN SIZING CRITERIA

A. Allowable nominal sizes for public water mains are 8", 12", and 16". Mains larger than 16" must have specific approval of the Director of Utilities.

B. Public water mains must be sized to meet minimum Fire Code requirements in addition to domestic and irrigation demands. Private fire protection mains must be sized to meet minimum Fire Code requirements (see Section XII-L for fire flow requirements).

C. The minimum new public main size is 8 inches. New public mains serving commercial, industrial and/or multi-family residential developments greater than two units, must be a minimum of 12 inches. Existing mains that will serve such proposed uses must be upgraded as needed to meet the current Fire Code.

D. Analysis and design of water systems will be based upon the criteria listed in the City's Water System Master Plan where applicable. The Director of Utilities may require increased pipe size for overall system benefit. When the project is required to provide larger water mains than needed for the development, the applicant may apply to Utilities engineering for oversize reimbursement.

E. Maximum flow velocity for new public or private water mains is 10 feet per second, to be calculated by applying the demands from Section VII-B above.

VIII. MAIN / LATERAL COVER

A. Cover is the distance from the top of the pipe to final finished grade measured directly over the pipe.

B. Typically, the minimum standard depths of cover for public water mains and private fire protection mains are:

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>4&quot;</th>
<th>6&quot;</th>
<th>8&quot;</th>
<th>10&quot;</th>
<th>12&quot;</th>
<th>16&quot; or Larger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cover (in.)</td>
<td>36&quot;</td>
<td>36&quot;</td>
<td>36&quot;</td>
<td>40&quot;</td>
<td>44&quot;</td>
<td>48&quot;</td>
</tr>
</tbody>
</table>

C. Where minimum cover is less than standard or greater than 8', special permission from the Director of Utilities is required. Show mains with nonstandard cover in a profile on the Improvement Plans or Encroachment Permit applications. Where cover is less than the standard, Pressure Class 350 Ductile Iron Pipe is required.

D. Where standard cover cannot be maintained, such as at the crossing of a water main
with a sewer main or any other utility line, either an undercrossing or overcrossing will be chosen based upon the evaluation by the Developer's Engineer. Evaluation will include the need for higher class pipe, use of controlled density backfill as pipe encasement, ability to meet California Criteria for Separation of Water Mains and Sanitary Sewers and the resulting need for air/vacuum release valves. This evaluation will be submitted to the Director of Utilities for review.

E. The minimum cover for service laterals will be as shown on the appropriate City Standard Plan. Where service laterals have conflicts with other facilities, a detail or profile must be shown on the plans, or the plans must be sufficiently annotated to give clear direction for the installation.

F. When designing a cut-in tee for a service or main connection that is larger than the existing main, the new assembly must be shown at a depth sufficient to allow the valves to remain below the street subgrade, which may necessitate lowering the existing main.

IX. VALVING

A. Valving at intersections will be in accordance with the provisions of Standard 871. A minimum of three (3) mainline valves are required for "T" intersections and four (4) valves are required for cross intersections. A valve may not be required on any leg of a tee or cross intersection if another valve is within 250 feet, except as needed to isolate fire hydrants.

B. All hydrants must be on separately valved sections of the public main, including fire lines serving private hydrants.

C. Any water main which does not have a fire hydrant or lateral connection will have valves designed at approximately 1,000 foot intervals or as required by the Director of Utilities.

D. Water main valves must be designed outside of concrete areas wherever possible to facilitate repairs.

X. SERVICE LATERALS AND METERS FOR DOMESTIC AND IRRIG. SERVICE

A. Developments will be provided City domestic and/or irrigation water service via water meters located at the frontage of a public street.

B. The City may allow meters to be located on private street frontages and/or within public utility/water easements if the City Utilities Dept. evaluation concludes that it
is reasonable under the circumstances. However, meters must be readily accessible.

C. Design meter boxes out of traveled ways and a minimum of 10' from street trees whenever possible.

D. Base any required hydraulic calculations for the water meter and service lateral sizes on criteria from AWWA Manual M22 and submit to the Director of Utilities for approval.

E. The maximum velocity in domestic, irrigation, fire line, or combination water service laterals from the main to the meter is 15 feet per second.

F. Maintain a minimum 5' horizontal separation between water and sewer laterals.

G. Meter manifolds other than those shown in various City Standard Plans will be detailed on the plans and approved by the Utilities Department, Engineering Division.

H. Residential (single units)

1. Each lot must be separately metered.

2. A standard 1" dual water service lateral is preferred when practical to serve two single-family residential lots, providing each lot is less than ¼ acre. Otherwise, provide an individual 3/4" service lateral for a 5/8" meter for each lot.

3. Provide a 1" service lateral with a 5/8" meter for any lot greater than ½ acre.

I. Residential with second unit (as defined in the City Zoning Code Section 20-03.111 Article 6), two SFD’s on one lot, and Duplexes.

1. Each unit must be served by separate meters.

2. If a new second unit is constructed and the total water flow for both units exceeds the capacity and allowable velocity of an existing 3/4" service lateral, based on the criteria established in AWWA Manual M22, the service lateral must be upsized to a 1". Otherwise, the existing lateral may be utilized.

3. If the primary unit and the second unit are to be constructed at the same time, design a 1" service lateral for the site.

4. The appropriate service lateral must be shown on the Public Improvement Plans and/or Encroachment Permit submitted for approval.
J. Multi-Family Residential (3 or more units)

1. For triplexes or lots with three PUD's, condominiums, or townhomes, individual meters are required for each unit.

2. For multi-family developments of 4-99 units, whether rental units or separate ownership units, design for an appropriately sized single master meter, a master meter for each building cluster, or individual meters for each unit.

3. For complexes of 100 units or more, metering will be designed as in (2) above, except that at least two metered connections are required if the project is to be master-metered.

4. See Section X-O for irrigation meter requirements for any landscaped or common areas.

5. All meters must be within public right-of-way or easements and multiple meters will be clustered where possible.

K. Mobile Home Parks

1. Mobile home parks that have rental spaces may have a master meter (two master meters if more than 100 spaces) or each unit may have an individual meter. Parks with individually-owned lots must have individual meters. When master meters are used, the mobile home park owner may sub-meter to the tenants at their own expense, providing they comply with P.U.C. Requirements.

2. Individual meters must be clustered and located within the public right-of-way or easement.

3. See Section X-O for common area irrigation meter requirements.

L. Mixed residential and commercial uses must have separate meters.

M. Commercial

1. See Section X-O below for irrigation requirements.

2. A minimum 1" domestic service lateral is required for commercial use.
3. Critical uses such as hospitals, jails, elderly care facilities, and others as determined by the Director of Utilities, require at least two separate water services for domestic use that must be connected to separately valved sections of the public water main.

N. Combination Services for Private Fire Service with Domestic and/or Irrigation Service

1. Only 6", 8" and 12" combination service laterals are allowed.

2. The combination service lateral must equal or exceed the size of the required fire line and must be hydraulically sized to provide adequately combined domestic, irrigation, and fire flows without exceeding allowable velocity of 15 feet per second.

3. A minimum 8" combination service lateral is required for lots with unknown commercial, multi-family, industrial and shopping centers uses where onsite hydrants are not likely to be required for development.

4. A minimum 12" combination service lateral is required for lots with unknown commercial, multi-family, industrial or shopping center uses where onsite hydrants are likely to be required for development.

O. Irrigation

1. Provide separate irrigation meters for landscaped areas of all commercial uses.

2. Provide separate irrigation meters for common areas of all condominium, townhome, PUD, apartment complexes, and mobile home parks.

3. Provide reduced pressure backflow devices for all irrigation services. Backflow devices must be specified on the irrigation plan and must conform to City Standard 876 and current USC Approved List of Devices.

4. Sizing of irrigation meters will be determined by the Utilities Department after reviewing the landscape plans. Irrigation meter size will be determined by the maximum flow required at the meter and will be based on AWWA criteria for meter sizing. Water demand purchased will be based on the estimated gallons required to maintain the planned landscape in a healthy condition for our climate. Along with landscape and irrigation plans, the applicant must submit the planned square footage of planted areas and categories of plants to be used as selected from the following:
High water use plants: turf, annuals, and container plants;

b. Moderate water use plants: ornamental trees, shrubs ground covers, and perennials primarily irrigated by sprinklers. (Note that there may be some use of drip or bubblers in this category but not a predominance.)

c. Low water use plants: drought tolerant plants recognized as having a plant factor of 0.3 or less and irrigated primarily through drip emitters.

XI. PUBLIC IMPROVEMENTS FOR PRIVATE FIRE SYSTEMS

A. The Utilities Department is responsible for mapping private fire systems, including hydrants, for the Fire Department and for assuring properly sized services. Design plans showing private fire systems must be submitted to the appropriate Fire and/or Building jurisdiction for approval and: 1) may be included with the Public Improvement Plans for the project; or 2) copies of the approved plans may be submitted to Utilities Engineering prior to requesting a meter set and activating the fire system.

B. Generally, the lateral size must be designed the same size or larger than the size required for the fire sprinkler system and/or the private hydrant system. Caution - onsite fire system design may necessitate changes to pre-approved public improvements. The hydraulic calculations for laterals serving private fire systems will be based on the required fire flow or the fire sprinkler demand, whichever is greater, combined with the peak domestic flow.

C. All private fire systems that only serve onsite hydrants require above-ground single detector check valves in accordance with Standard 888. Where above-ground installations are not reasonable due to site constraints, design for single detector check valves in vaults per Standard 879.

D. Double-check detector backflow assemblies are required for:

1. all connections serving commercial fire sprinkler systems; or

2. any property with multiple fire service connections; or

3. any fire line connections to properties with auxiliary water supply.
E. Reduced-pressure detectors are required for:

1. any fire suppression system using chemical additives such as antifreeze or fire suppressants; or

2. any building where an extreme hazard exists, as determined by the Utilities Department Water Quality Division.

F. For one- and two-family residential fire sprinkler systems:

1. Where a multipurpose system circulates water for fire sprinklers and domestic supply, no backflow device is required.

2. Where the fire system does not circulate water with the domestic supply, double-check backflow assemblies are required to protect the public water supply by either of the two methods shown on City Standard 875 and must be located in the public right-of-way or the P.U.E. adjacent to the right-of-way.

3. Where a fire sprinkler system is to be installed in a one- or two-family dwelling, design the service lateral from the street main to the water meter and the water meter to be 1" minimum. Larger size laterals and meters may be permitted where hydraulic calculations indicate the need.

G. The location of any Fire Department connection must be approved by the Fire Department.

H. Critical uses such as hospitals, jails, elderly care facilities, and others as determined by the Director of Utilities and/or the Fire Marshal, require at least two fire line service connections to separately valved sections of the public water main, so that service can be maintained in the event of a main line or service lateral shutdown.

XII. FIRE HYDRANTS

A. Generally, fire hydrants required onsite to serve one lot will be private.

B. Generally, fire hydrants required onsite to serve two or more lots will be public.

C. Design of hydrant locations must meet the Fire Code requirements and be approved by the Fire Department for logistics and by the Utilities Department for maintainability.

D. Each hydrant must be on a separately valved main line section.
E. Whenever possible, locate hydrants near street intersections.

F. If it is not possible to locate near an intersection, locate the hydrant near a property line or where it will minimize interference with property use.

G. Locate hydrants a minimum of 10' from roll down of driveways for commercial or multi-family sites and 5' from residential driveways.

H. On streets with raised medians or with four or more travel lanes, design hydrants on alternate sides of the street per current City Fire Code. Each side of the street will be considered independently relative to hydrant placement per subsections XII-J and XII-K below.

I. Residential property with one or two dwelling units - Typical locations

   1. Design hydrants with a maximum of 500' spacing, or as approved by the Fire Department. Design hydrants at a maximum spacing of 300' in High Fire Severity Zones.

   2. Generally, design hydrants at intersections and then evenly distribute hydrants throughout the project.

   3. No one or two family dwellings may be more than 250' from the nearest hydrant or more than 150' in High Fire Severity Zones.

   4. Specify "residential" hydrants per City Std. 857 on the plans.

J. Commercial, Industrial, and Multi-family (3 or more units) - Typical locations

   1. Generally, design hydrants at intersections or driveway entrances and then evenly distribute hydrants throughout the project.

   2. No portion of the exterior wall of the facility or building may be more than 150' from the nearest hydrant as measured by an approved route around the building per the City Fire Code.

   3. Specify "commercial" hydrants per City Std. 857 on the plans.

L. Minimum fire flow required at all hydrants:

   1. Fire flow as specified in the following subsections is defined as the amount of
water supply available in the water main nearest the flowing hydrant with 30 psi residual pressure, 10 psi of that residual pressure being required to overcome losses in a typical hydrant and lateral assembly at the required flow.

2. Single and two family residential uses require 1,500 gallons per minute flow, except as in subsection L-4 of this section below.

3. The required fire flows for schools, commercial, industrial, and multi-family residential (3 or more units) uses will be based on the City Fire Code. The water system will be designed so that 1,500 gpm is available from the hydraulically most demanding hydrant and the remaining flow required is available at the next most demanding hydrant(s), up to a maximum of 1,500 gpm per hydrant.

4. The minimum required fire flow in High Fire Severity Zones is 2,500 gpm for all occupancies, including one and two family residential dwellings. System design will accommodate flow apportionment as in subsection L-3 above.

5. Fire flow requirements are under the jurisdiction of the Fire Department. The guidelines given above are general. Actual flow requirements must be verified with the Fire Department prior to submittal of plans. Calculations may be required by the Fire Department to verify the adequacy of the proposed design. Mitigation measures may be required by the Fire Department if the minimum fire flow requirements cannot be met for a specific project.

XIII. BACKFLOW DEVICES (EXCEPT FOR FIRE LINES)

A. Backflow devices are required to be designed in accordance with State of California Title 17 and current City of Santa Rosa Code, Section 14-16, Backflow Regulations.

B. All backflow devices must be listed on the latest revision of the approved, USC Foundation for Cross-Connection Control and Hydraulic Research list.

C. Design backflow assemblies as near as possible to the water meter as shown on Standards 874, 875 and 876.

D. Backflow preventors will be designed in accordance with Appendix "B." For uses not listed contact Utilities Engineering or Water Quality.
XIV. PRESSURE

A. To obtain water system data for these calculations, contact Utilities Engineering. A fee will be imposed if flow testing is required.

B. Mainline

1. The minimum allowable static pressure in the system is 20 psi. The maximum allowable static pressure in the system is 120 psi.

2. The maximum allowable pressure in a high-level zone is calculated by assuming the reservoir full. In the Aqueduct zone or other reduced pressure zones, calculate the pressure by using the high setting of the pressure regulating valve at the nearest aqueduct connection or system regulator.

3. The minimum allowable pressure in a high level zone is calculated by assuming the reservoir drawn down 10' from the high water level. In the Aqueduct zone or other reduced-pressure zones, use the low setting of the pressure regulating valve at the nearest aqueduct connection or system regulator.

C. Domestic service

1. The minimum allowable pressure is 20 psi measured at the meter. If pressure measured at any faucet is less than 35 psi, a pressure booster system is required.

2. The maximum allowable pressure at a meter is 120 psi. If service pressure measured at any faucet exceeds 80 psi, a private pressure regulating device is required.

XV. SPECIALTY VALVES AND WATER SAMPLING STATIONS

A. Specific locations will be reviewed for each project by Utilities Engineering.

B. Air release and vacuum relief valves are required at substantial high points in the system such as over a hilltop or at the upper end of a dead end main.

C. Design pressure reducing valves to maintain overall system balance and to maintain service pressure levels within the parameters established within these system design standards.

D. Typically surge or pressure relief valves are to be designed near the low points of any
high level pressure zone where discharge may be directed to an approved disposal system.

E. Water sampling stations are required to provide representative sampling within each pressure zone. At a minimum, one water sample station is required in each pressure zone, at each reservoir and at pump stations.

XVI. SPECIAL CONDITIONS FOR DELINEATED FAULT ZONES

A. Fault zones must be identified on improvement plans.

B. Ductile iron pipe must be indicated on the improvement plans in delineated fault zones and extend to 100' outside each side of the delineated fault boundaries.

C. Pumper connections or fire hydrants will be designed approximately 50' outside each side of the delineated fault zone. Gate valves must be designed between the fault zone and the fire hydrant/pumper connection.

D. Mechanical joint double-ball Flexextend assemblies with 8” expansion/contraction capability, as manufactured by EBAA Iron, Inc. of Eastland, Texas, or approved alternative, must be designed adjacent to each side of the fault zone.

XVII. EASEMENTS

A. An easement must be provided over any public water system when it is installed outside a public right-of-way.

B. The easement must be a minimum of 15' wide if it only contains a water main or 20' wide if it contains another facility, such as sewer, storm drain, or other utility. The easement will be dedicated as a "public water easement" if it contains water only. It will be dedicated as a "public utilities easement" if it contains other facilities as well.

C. Easements must be configured to encompass all publicly maintained appurtenances, such as water service laterals, meters and fire hydrants and will be generally centered over the facility. Separate access easements may be required depending on site conditions. When water mains are to be installed along a property line the easement will be wholly contained on one parcel.

D. All property restrictions placed as a result of dedication of easements will be so noted on the Subdivision Map, or on the Easement Deed if the easement is not dedicated as part of a subdivision. Required notes are:
1. No structures may encroach on, above or below the surface of the ground in any public water easement. This includes footing of foundations or eaves from the roof of any adjacent structure, pools, ponds or outbuildings on slabs or foundations. Decks, sheds, or other structures which may be easily removed for maintenance of the water system may be allowed at the discretion of the Director of Utilities.

2. No trees may be planted in a public water easement without first obtaining approval of the Director of Utilities. Trees may be allowed to the extent that damage to the water system does not occur from root intrusion and adequate access can be provided for maintenance and repair vehicles.

XVIII. ABANDONMENT OF WATER MAINS AND SERVICES

A. Any existing water mains and service laterals that will not be used must be abandoned and must be shown on the Improvement Plans with appropriate notation.

B. For all abandoned water services up to and including 2", annotate to remove the valve and saddle and install a full circle clamp on main under Utilities Department inspection.

C. For flanged or mechanical joint tees, annotate the Improvement Plans to remove the valve and install a blind flange or mechanical joint plug under Utilities Department inspection.

D. For push-on tees, the tee, valve and concrete thrust block must be removed and the main repaired with approved pipe and suitable couplings, and so noted on the Improvement Plans.

E. Valve boxes for abandoned valves must be removed and so noted on the Improvement Plans.

F. Abandoned mains, valves and risers located within any street structural section or within any new trench must be shown on the Improvement Plans to be removed.

G. Show all 12" diameter and larger water mains to be abandoned within the public right-of-way as removed or broken every 50' and filled with sand slurry.

H. Where a fire hydrant is to be abandoned, note that the hydrant barrel, break off riser, and check valve are to be removed, the bury is to be capped or plugged, and the lateral abandoned at main as stated above. Abandonments of fire hydrants must be approved by the Fire Department.
Appendix "A"

CRITERIA FOR THE SEPARATION
OF WATER MAINS AND SANITARY SEWERS
Criteria for the Separation of Water Mains and Sanitary Sewers
Revised April 5, 1983

A. PUBLIC HEALTH CONSIDERATIONS

Waterborne disease outbreaks attributed to the entry of sewage-contaminated groundwater into the distribution systems of public water supplies continue to be a problem in the United States. A community with its buried water mains in close proximity to sanitary sewers is vulnerable to waterborne disease outbreaks.

Sanitary sewers frequently leak and saturate the surrounding soil with sewage. This is caused primarily by structural failure of the sewer line, improperly constructed joints, and subsidence or upheaval of the soil encasing the conduit. A serious public health hazard exists when the water mains are depressurized and no pressure or negative pressures occur. The hazard is further compounded when, in the course of installing or repairing a water main, existing sewer lines are broken. Sewage spills into the excavation and, hence, enters into the water main itself. Additionally, if a water main fails in close proximity to a sewer line, the resultant failure may disturb the bedding of the sewer line and cause it to fail. In the event of an earthquake or manmade disaster, simultaneous failure of both conduits often occurs.

The water supplier is responsible for the quality of the water delivered to consumers and must take all practical steps to minimize the hazard of sewage contamination to the public water supply. Protection of the quality of the water in the public water system is best achieved by the barrier provided by the physical separation of the water mains and sewer lines.

This document sets forth the construction criteria for the installation of water mains and sewer lines to prevent contamination of the public water supplies from nearby sanitary sewers.

B. BASIC SEPARATION STANDARDS

The "California Waterworks Standards" sets forth the minimum separation requirements for water mains and sewer lines. These standards, contained in Section 64630, Title 22, California Code of Regulations, specify:
(c) (1) Parallel Construction: The horizontal distance between pressure water mains and sewer lines shall be at least 10 feet.

(2) Perpendicular Construction (Crossing): Pressure water mains shall be at least one foot above sanitary sewer lines where these lines must cross.

(d) Separation distances specified in (e) shall be measured from the nearest edges of the facilities.

(e) (2) Common Trench: Water mains and sewer lines must not be installed in the same trench.

When water mains and sanitary sewers are not adequately separated, the potential for contamination of the water supply increases. Therefore, when adequate physical separation cannot be attained an increase in the factor of safety should be provided by increasing the structural integrity of both the pipe materials and joints.

C. EXCEPTIONS TO BASIC SEPARATION STANDARDS

Local conditions, such as available space, limited slope, existing structures, etc., may create a situation where there is no alternative but to install water mains or sewer lines at a distance less than that required by the Basic Separation Standards. In such cases, alternative construction criteria as specified in Section E should be followed, subject to the special provisions in Section D.

Water mains and sewers of 24 inches diameter or greater may create special hazards because of the large volumes of flow. Therefore, installations of water mains and sewer lines 24 inches diameter or larger should be reviewed and approved by the health agency prior to construction.

D. SPECIAL PROVISIONS

1. The Basic Separation Standards are applicable under normal conditions for sewage collection lines and water distribution mains. More stringent requirements may be necessary if conditions, such as, high groundwater exist.

2. Sewer lines shall not be installed within 25 feet horizontally of a low head (5 psi or less pressure) water main.

3. New water mains and sewers shall be pressure tested where the conduits are located ten feet apart or less.
4. In the installation of water mains or sewer lines, measures should be taken to
prevent or minimize disturbances of the existing line. Disturbance of the supporting
base of this line could eventually result in failure of this existing pipeline.

5. Special consideration shall be given to the selection of pipe materials if corrosive
conditions are likely to exist. These conditions may be due to soil type and/or the
nature of the fluid conveyed in the conduit, such as a septic sewage which produces
corrosive hydrogen sulfide.

6. Sewer Force Mains

   a. Sewer force mains shall not be installed within ten feet (horizontally) of a
      water main.

   b. When a sewer force main must cross a water line, the crossing should be as
      close as practical to the perpendicular. The sewer force main should be at
      least one foot below the water line.

   c. When a new sewer force main crosses under an existing water main, all
      portions of the sewer force main within ten feet (horizontally) of the water
      main shall be enclosed in a continuous sleeve.

   d. When a new water main crosses over an existing sewer force main, the
      water main shall be constructed or pipe materials with a minimum rated
      working pressure of 200 psi or equivalent pressure rating.

E. ALTERNATE CRITERIA FOR CONSTRUCTION

The construction criteria for sewer lines or water mains where the Basic Separation Standards
cannot be attained are shown in Figures 1 and 2. There are two situations encountered:

Case 1--New sewer line--new or existing water main.

Case 2--New water main--existing sewer line.

For case 1, the alternate construction criteria apply to the sewer line.

For Case 2, the alternate construction criteria may apply to either or both the water main
and sewer line.
The construction criteria should apply to the house laterals that cross above a pressure water main but not to those house laterals that cross below a pressure water main.

**Case 1: New Sewer Being Installed (Figures 1 and 2)**

**Zone**

**Special Construction Required for Sewer**

A

Sewer lines parallel to water mains shall not be permitted in this zone without approval from the responsible health agency and water supplier.

B

A sewer line placed parallel to a water line shall be constructed of:

1. Extra strength vitrified clay pipe with compression joints.
2. Class 4000, Type II, asbestos-cement pipe with rubber gasket joints.
3. Plastic sewer pipe with rubber ring joints (per ASTM D3034) or equivalent.
4. Cast or ductile iron pipe with compression joints.
5. Reinforced concrete pressure pipe with compression joints (per AWWA C302-74).

C

A sewer line crossing over a water main shall be constructed of:

1. Ductile iron pipe with hot dip bituminous coating and mechanical joints.
2. A continuous section of Class 200 (DR 14 per AWWA C900) plastic pipe or equivalent, centered over the pipe being crossed.
3. A continuous section of reinforced concrete pressure pipe (per AWWA C302-74) centered over the pipe being crossed.
4. Any sewer pipe within a continuous sleeve.

D

A sewer line crossing under a water main shall be constructed of:

1. A continuous section of ductile iron pipe with hot dip bituminous coating.
2. A continuous section of Class 200 QR 14 per AWWA C900) plastic pipe or equivalent, centered on the pipe being crossed.
3. A continuous section of reinforced concrete pressure pipe (per AWWA C302-74) centered on the pipe being crossed.

4. Any sewer pipe within a continuous sleeve.

5. Any sewer pipe separated by a ten-foot by ten-foot, four-inch thick reinforced concrete slab.

Case 2: New Water Mains Being Installed  (Figures 1 and 2)

<table>
<thead>
<tr>
<th>Zone</th>
<th>Special Construction Required for Water Mains</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>No water mains parallel to sewers shall be constructed without approval from the health agency.</td>
</tr>
<tr>
<td>B</td>
<td>If the sewer paralleling the water main does not meet the Case 1, Zone B, requirements, the water main shall be constructed of:</td>
</tr>
<tr>
<td></td>
<td>1. Ductile iron pipe with hot dip bituminous coating.</td>
</tr>
<tr>
<td></td>
<td>2. Dipped and wrapped one-fourth-inch-thick welded steel pipe.</td>
</tr>
<tr>
<td></td>
<td>3. Class 200, Type II, asbestos-cement pressure pipe.</td>
</tr>
<tr>
<td></td>
<td>4. Class 200 pressure rated plastic water pipe QR 14 per AWWA C900) or equivalent.</td>
</tr>
<tr>
<td></td>
<td>5. Reinforced concrete pressure pipe, steel cylinder type, per AWWA (C300-74 or C301-79 or C303-70).</td>
</tr>
<tr>
<td>C</td>
<td>If the sewer crossing over the water main does not meet the Case 1, Zone C, requirements, the water main shall have no joints in Zone C and be constructed of:</td>
</tr>
<tr>
<td></td>
<td>1. Ductile iron pipe with hot dip bituminous coating.</td>
</tr>
<tr>
<td></td>
<td>2. Dipped and wrapped one-fourth-inch-thick welded steel pipe.</td>
</tr>
<tr>
<td></td>
<td>3. Class 200 pressure rated plastic water pipe (DR 14 per AWWA C900) or equivalent.</td>
</tr>
<tr>
<td></td>
<td>4. Reinforced concrete pressure pipe, steel cylinder type, per AWWA (C300-74 or C301-79 or C303-70).</td>
</tr>
</tbody>
</table>
If the sewer crossing under the water main does not meet the requirements for Zone D, Case 1, the water main shall have no joints within four feet from either side of the sewer and shall be constructed of:

1. Ductile iron pipe with hot dip bituminous coating.
2. Dipped and wrapped one-fourth-inch-Thick welded steel pipe.
3. Class 200 pressure rated plastic water pipe (DR 14 per AWWA C900) or equivalent.
4. Reinforced concrete pressure pipe, steel cylinder type, per AWWA (C300-74 or C302-79 or C303-70).
NOTES AND DEFINITIONS:

1. Health Agency -- The Department of Health Services. For those water systems supplying fewer than 200 service connections, the local health officer shall act for the Department of Health Services if it has been delegated authority to conduct the small water system regulatory program.

2. Water Supplier -- "Person operating a public water system" or "supplier of water" means any person who owns or operates a public water system.

3. Low Head Water Main -- Any water main which has a pressure of five psi or less at any time at any point in the main.

4. Dimensions are from outside of water main to outside of sewer line or manhole.

5. Compression Joint -- A push-on joint that seals by means of the compression of a rubber ring or gasket between the pipe and a bell or coupling.


7. Rated working water pressure or pressure class -- A pipe classification system based upon internal working pressure of the fluid in the pipe, type of pipe material, and the thickness of the pipe wall.

8. Fused Joint -- The jointing of sections of pipe using thermal or chemical bonding processes.

9. Sleeve -- A protective tube of steel with a wall thickness of not less than one-fourth inch into which a pipe is inserted.

10. Ground Water -- Subsurface water found in the saturation zone.

11. House Lateral -- A sewer connecting the building drain and the main sewer line.
Note: Zones identical on either side of center lines.
Zone "P" is a prohibited zone, Section 64630 (e) (2) California Administrative Code, Title 22

Figure 1 - PARALLEL CONSTRUCTION
Figure 2 — CROSSINGS
Appendix "B"

BACKFLOW DEVICE REQUIREMENTS
FOR SPECIFIC TYPES OF USE
## BACKFLOW DEVICE REQUIREMENTS

<table>
<thead>
<tr>
<th>APPLICATION</th>
<th>TYPE OF DEVICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Sales, Painting, Repair, Radiator work</td>
<td>RP</td>
</tr>
<tr>
<td>Auxiliary Water Supply (Contaminated Wells, etc.)</td>
<td>RP</td>
</tr>
<tr>
<td>Auxiliary Water Supply</td>
<td>DC</td>
</tr>
<tr>
<td>Auxiliary Water Supply (with 2 or more City Water Connections to Site)</td>
<td>DC/RP</td>
</tr>
<tr>
<td>Barber Shops</td>
<td>RP</td>
</tr>
<tr>
<td>Blood Banks</td>
<td>RP</td>
</tr>
<tr>
<td>Boiler Systems (any)</td>
<td>RP</td>
</tr>
<tr>
<td>Buildings with Booster Systems</td>
<td>DC</td>
</tr>
<tr>
<td>Buildings with 3 or more Stories or with fixtures 30 feet above the service</td>
<td>RP</td>
</tr>
<tr>
<td>Buildings with Sewage Ejectors</td>
<td>AG/RP</td>
</tr>
<tr>
<td>Buildings with Storage Tanks</td>
<td>DC/RP</td>
</tr>
<tr>
<td>Homes with Sewage Lift Stations</td>
<td>RP</td>
</tr>
<tr>
<td>Car Wash</td>
<td>AG/RP</td>
</tr>
<tr>
<td>Cement, concrete, Sand &amp; Gravel Plants</td>
<td>RP</td>
</tr>
<tr>
<td>Chemical Storage or Processing Facilities</td>
<td>AG/RP</td>
</tr>
<tr>
<td>Dairy or Cold Storage</td>
<td>RP</td>
</tr>
<tr>
<td>Film Processing</td>
<td>RP</td>
</tr>
<tr>
<td>Fire Systems - Business/Residential (sprinklers with or without hydrants)</td>
<td>DC w/Det.Ck.</td>
</tr>
<tr>
<td>Fire Systems - w/Sprinkler in Hazardous Locations</td>
<td>AG/RP</td>
</tr>
<tr>
<td>Gas Stations</td>
<td>RP</td>
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<tr>
<td>Gray Water System</td>
<td>RP</td>
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<tr>
<td>Heating &amp; Air Conditioning (Using Water)</td>
<td>RP</td>
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<tr>
<td>Hospital or Medical Facility (any) Convalescent or Long Term Care</td>
<td>RP</td>
</tr>
<tr>
<td>Irrigation Systems</td>
<td>RP</td>
</tr>
<tr>
<td>Activity</td>
<td>Pressure Type</td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Irrigation System w/ Chemical Feed</td>
<td>RP</td>
</tr>
<tr>
<td>Laboratories (Commercial or Research)</td>
<td>AG/RP</td>
</tr>
<tr>
<td>Laundry or Dry Cleaner</td>
<td>RP</td>
</tr>
<tr>
<td>Manufacturing or Processing (with Toxic Chemicals)</td>
<td>AG/RP</td>
</tr>
<tr>
<td>Medical or Dental Facility (any)</td>
<td>RP</td>
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<tr>
<td>Mobile Home Park</td>
<td>DC</td>
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<tr>
<td>Ornamental Pools, Ponds or Fountains</td>
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<tr>
<td>Painting Auto Shops</td>
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<tr>
<td>Printing Shops</td>
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<tr>
<td>Radiator Shops (all)</td>
<td>RP</td>
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<tr>
<td>Radioactive Materials</td>
<td>AG/RP</td>
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<tr>
<td>Restaurant</td>
<td>RP/DC</td>
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<tr>
<td>Restricted or Classified Facilities</td>
<td>AG/RP</td>
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<td>Schools</td>
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<tr>
<td>Sewage or Storm Drain Facilities</td>
<td>AG</td>
</tr>
<tr>
<td>Spray Rigs (all types)</td>
<td>AG</td>
</tr>
<tr>
<td>Steam Cleaning Equipment (any type)</td>
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<td>Steam Generation</td>
<td>AG/RP</td>
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<tr>
<td>Swimming Pools (Public and Commercial)</td>
<td>RP</td>
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<tr>
<td>Tank Trucks or Chemical Spray Rigs</td>
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</tr>
<tr>
<td>Veterinary Clinics</td>
<td>RP</td>
</tr>
<tr>
<td>Warehousing &amp; Storage</td>
<td>DC/RP</td>
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**Notes:**
- AG = Air Gap
- DC = Double Check
- RP = Reduced Pressure
- DC w/Det. Ck. = w/Detector Check
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<th>Std. #</th>
<th>Title</th>
<th>Approved</th>
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<tr>
<td>851</td>
<td>Harness Installation For Flange Fittings</td>
<td>Sept. 2002</td>
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<td>Harness Installation</td>
<td>June 2009</td>
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<td>853</td>
<td>Concrete Anchor Blocks For Vertical Bends</td>
<td>Sept. 2002</td>
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<td>854</td>
<td>Concrete Thrust Blocks For Horizontal Bends</td>
<td>Sept. 2002</td>
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<td>855</td>
<td>Water Main Lowering</td>
<td>June 2009</td>
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<td>Water Main Over Structure</td>
<td>June 2009</td>
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<td>857</td>
<td>Fire Hydrant and Lateral / Fire Hydrant Location, 2 Sheets</td>
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<td>858</td>
<td>Pumper Connection</td>
<td>June 2009</td>
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<td>859</td>
<td>Temporary Blow-Off and/or Metered Connection</td>
<td>June 2009</td>
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<tr>
<td>860</td>
<td>Temporary Metered Connection When Fire Flow is Required</td>
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<td>861</td>
<td>Blow-Off With Harness</td>
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<td>Full Size Blow-Off</td>
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<td>3/4&quot; &amp; 1&quot; Water Service Lateral</td>
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<td>863-A</td>
<td>1&quot; High Density Polyethylene Water Service Lateral for 1&quot; Meter</td>
<td>June 2009</td>
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<td>863-B</td>
<td>1 1/2&quot; Copper Water service Lateral for 1&quot; Meter</td>
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<td>863-C</td>
<td>1 1/8&quot; High Density Polyethylene Water Service Lateral for 1&quot; Meter</td>
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<td>1&quot; Dual Water Service Lateral</td>
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<td>2&quot; Water Service Lateral For 2&quot; or 1 1/2&quot; Meter</td>
<td>June 2009</td>
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<tr>
<td>865-A</td>
<td>2&quot; High Density Polyethylene Water Service Lateral for 2&quot; or 1 1/2&quot; Meter</td>
<td>June 2009</td>
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<td>866</td>
<td>4&quot; Water Service Lateral For 3&quot; Meter</td>
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<td>4&quot; Water Service Lateral For 4&quot; Meter</td>
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<td>6&quot; Water Service Lateral For 6&quot; Meter</td>
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<td>Combination Water Service Stub</td>
<td>June 2009</td>
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<td>Combination Water Service / 4&quot; DI Multi-Service Manifold, 2 Sheets</td>
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<td>871</td>
<td>Alignment of Water Mains &amp; Placement of Mainline Valves</td>
<td>Sept. 2002</td>
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<td>872</td>
<td>Dirt Stop &amp; Water Main Encasement</td>
<td>June 2009</td>
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<td>874</td>
<td>Above Ground Double-Check Valve Backflow Device</td>
<td>June 2009</td>
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<td>875</td>
<td>Below Ground Double-Check Valve Backflow Device</td>
<td>June 2009</td>
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<td>876</td>
<td>Reduced-Pressure Backflow Device</td>
<td>June 2009</td>
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<td>877</td>
<td>Gate Valve</td>
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<td>Butterfly Valve And Tapping Valve</td>
<td>June 2009</td>
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<td>879</td>
<td>Single Check Detector In Vault - 3 Sheets</td>
<td>Sept. 2002</td>
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<td>880</td>
<td>Double Check Detector Fire Line Backflow Assembly</td>
<td>June 2009</td>
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<td>881</td>
<td>Pressure Reducing Valves</td>
<td>June 2009</td>
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<td>882</td>
<td>Surge Anticipator Valve or Pressure Relief Valve</td>
<td>June 2009</td>
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<td>883</td>
<td>Air &amp; Vacuum / Air Release Valve</td>
<td>Sept. 2002</td>
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<td>Water Meter for Private Non-residential Systems</td>
<td>Sept. 2002</td>
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<td>Water Meter for Private Process and Evaporative Water Lines</td>
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<td>886</td>
<td>Water Sampling Station</td>
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<td>887</td>
<td>4&quot; Ductile Iron Multi-Service Manifold</td>
<td>June 2009</td>
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<td>888</td>
<td>Above Ground Single Detector Check Assembly</td>
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<tr>
<td>889</td>
<td>Water Service Anode</td>
<td>Sept. 2002</td>
</tr>
</tbody>
</table>
**ELEVATION**

- Flange adapter
- Underground socket pipe clamp
- Pipe bedding
- 3" Clear
- Bearing area against undisturbed ground (See table below)

**PLAN**

- Flange x push-on valve
- Flange x mech. joint valve
- Mech. joint plug-tapped for blow-off
- Concrete thrust block (See table below)

**MINIMUM DIMENSIONS**

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>TIE RODS</th>
<th>HARNESS BLOCK*</th>
<th>THRUST BLOCK**</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>5/8&quot;</td>
<td>4 Sq. Ft.</td>
<td>2' 4 Sq. Ft.</td>
</tr>
<tr>
<td>8&quot;</td>
<td>3/4&quot;</td>
<td>7 Sq. Ft.</td>
<td>3' 7 Sq. Ft.</td>
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<tr>
<td>12&quot;</td>
<td>1-1/8&quot;</td>
<td>15 Sq. Ft.</td>
<td>3' 15 Sq. Ft.</td>
</tr>
</tbody>
</table>

**CITY OF SANTA ROSA**

HARNESS INSTALLATION for FLANGE FITTINGS

- Bearing area below grade of pipe against undisturbed ground.
- Bearing area against undisturbed ground.

Concrete shall extend at least to the undisturbed earth at both sides of trench.
HARNESS FOR VALVE WITH PLUG

Concrete shall extend at least to the undisturbed earth at both sides of trench

TYPICAL HARNESS

**MINIMUM DIMENSIONS**

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>TIE RODS</th>
<th>ANGLE IRON</th>
<th>* HARNESS BLOCK</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>5/8</td>
<td>3&quot;x3&quot;x1/4&quot;</td>
<td>4 Sq. Ft.</td>
<td>.2'</td>
</tr>
<tr>
<td>8&quot;</td>
<td>3/4&quot;</td>
<td>1/2&quot;x3&quot;x1/4&quot;</td>
<td>7 Sq. Ft.</td>
<td>.3'</td>
</tr>
<tr>
<td>12&quot;</td>
<td>1 1/8&quot;</td>
<td>4&quot;x3&quot;x1/2&quot;</td>
<td>15 Sq. Ft.</td>
<td>.3'</td>
</tr>
<tr>
<td>OVER 12&quot;</td>
<td>BY THE DESIGN ENGINEER</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Bearing area below grade of pipe against undisturbed ground
Detail of anchor block
Shown below

SECTION "A-A"

TYPICAL CONCRETE ANCHOR BLOCK FOR VERTICAL BEND

ELEVATION

TYPICAL CONCRETE ANCHOR BLOCK FOR COMBINATION

HORIZONTAL – VERTICAL BEND

NOTES:
1. Concrete anchor blocks shall be installed by the Contractor to withstand a thrust produced by the test pressure plus 50 p.s.i. Minimum dimensions for anchor bolts and clamps are listed in table below.
2. Use mechanical restrained joints at all fittings.

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>ANCHOR BOLTS</th>
<th>STEEL CLAMPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>5/8&quot;</td>
<td>3&quot; X 1/4&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>3/4&quot;</td>
<td>3-1/4&quot;x1/4&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>1-1/8&quot;</td>
<td>4&quot; X 1/2&quot;</td>
</tr>
</tbody>
</table>

For pipes greater than 12", design Engineer must submit calcs. To size anchor bolts & clamps.
NOTES:

1. Safe bearing load of soil for horizontal thrust shall not be exceeded.
2. Concrete blocking, cost-in-place, to extend from bells of fittings to undisturbed soil and entire bearing area must be against undisturbed soil.
3. In using the Thrust Blocking Table below, assume 2000 P.S.F. bearing capacity unless otherwise shown on the plans. The Design Engineer shall specify thrust blocking requirements for all other soil bearing conditions.
4. For plugged leg(s) of tee or cross use harness type blocking as shown on STD. 852 and concrete blocking indicated in table below.

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>SOIL BEARING CAPACITY (PSF)</th>
<th>TEES &amp; DEAD ENDS</th>
<th>90° BENDS</th>
<th>45° BENDS</th>
<th>22-1/2° BENDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>1000</td>
<td>4</td>
<td>6</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>8&quot;</td>
<td>1000</td>
<td>7</td>
<td>10</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>12&quot;</td>
<td>1000</td>
<td>16</td>
<td>22</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>8</td>
<td>11</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

* MULTIPLY NO. IN TABLE BY TEST PRESSURE & DIVIDE BY 100

For pipes greater than 12", Design Engineer must submit calculations to size concrete thrust blocks.
NOTES:

1. All pipe and fittings shall be ductile iron & shall be wrapped in polyethylene – per City of Santa Rosa Std. Construction Specifications.

2. Only mechanical joint fittings with restrained joints may be used.

3. All bends shall be 45° or 22-1/2° fittings.

4. If all new mains are being constructed, couplings are not required.

5. If installing a drop into an existing main, connections to cast iron, ductile iron or PVC pipe shall be made with mechanical joint solid sleeves. Flexible couplings shall be used when connecting to asbestos cement pipe.
NOTES:

1. All pipe and fittings shall be ductile iron & shall be wrapped in polyethylene per City of Santa Rosa Std. Construction Specifications.
2. Only mechanical joint fittings with restrained joints may be used.
3. All bends shall be 45° or 22-1/2° fittings. No 90° bends allowed.
4. If all new mains are being constructed, couplings are not required.
5. If installing a drop into an existing main, connections to cast iron, ductile iron or PVC pipe shall be made with mechanical joint solid sleeves. Flexible couplings shall be used when connecting to asbestos cement pipe.
6. To be used only at the direct approval of the Director of Utilities.
NOTES:

1. Residential fire hydrants have one 2-1/2" & one 4-1/2" outlets. Commercial fire hydrants have one 2-1/2" & two 4-1/2" outlets.

2. Paint fire hydrant in accordance with AWWA Standard Specification C503. (See Engineer's Approved List)
   The finished paint color shall be white.
   All damaged paint surfaces shall be corrected by touch up prior to acceptance.

3. Restrained joints are required for all new construction from gate valve to hydrant bury. Thrust blocks are only required where existing services are being modified and restrained joints are not used.

4. Blue reflective pavement markers should be placed 6 inches from the centerline stripe, or approximate center of the pavement where there is no centerline stripe, on the side nearest the fire hydrant.

5. If hydrant lateral length exceeds 50 feet, contact Utilities Engineering.
NOTES:

1. Where no sidewalk exists, or where hydrant is installed in planter strip, a 4" thick 4' x 4' concrete pad shall be installed.

2. Hydrants to be a minimum of 10 feet from driveway approach in commercial or multi-family developments and a minimum of 5 feet from driveway approach in one or two family developments.
APPROVED HYDRANTS
(See Engineer's Approved List)

The middle of the break-off riser shall be set at finished grade ±1". Flange bolts shall be set above finished grade to enable bolt and nut removal. Trim tracer wire 2" above finished grade at hydrant.

Break-off riser
(See Engineer's approved list)

Concrete sidewalk/Pad
(See Note 1 below)

Concrete block to be poured from 2" above bottom flange to 2" below top flange and shall extend to undisturbed ground as shown.

Hydrant break-off check valve
(See Engineer's Approved List)

Use flange spacers or extensions (may have break-off grooves) to adjust hydrant height.

(See Note 2)

Install pier block or pour a concrete pad if thrust block is not installed.

SECTION "A-A"

5' Min.

20' MINIMUM

Low Profile Fire Hydrant and lateral. (See Above)

Isolation valve

Low pressure Water main

Standard Fire hydrant and lateral per Std. 857

High pressure Water main

NOTES

1. Where no sidewalk exists, or where hydrant is installed in planter strip, a 4" thick 4' x 4' concrete pad shall be installed around the base of the hydrant.

2. Restrained joints are required for all new construction from gate valve to hydrant bury. Thrust blocks are only required where existing services are being modified and restrained joints are not used.

3. Install min. of 10' from commercial or multi-family driveways and 5' from one or two family driveways.

4. Paint fire hydrant in accordance with AWWA Standard Specification C503. (See Engineer's Approved List)
   The finished paint color shall be white.
   All damaged paint surfaces shall be corrected by touch up prior to acceptance.

CITY OF SANTA ROSA

PUMPER CONNECTION

SCALE: NONE  DATE: June 2009

OWN: TBM RR

OKLAHOMA

APPROVED

FILE NO. STD.-858
8' to 10' for permanent connection by contractor under City Utility Dept. Inspection.

Temporary meter & double check valve installed by City Forces at the Contractor’s expense.

Temporary connection between check valve assembly and blowoff to be made by the Contractor where temporary metered connection is required.

Install plug if metered connection is not required.

Existing main and blow-off assembly

(See Note 7)

Finished Grade

New main (See Note 1)

Pipe and fittings to be threaded galvanized iron.

Temporary wood blocking sufficient to hold test pressure.

ELEVATION

NOTES:

1. End of new main to be on same line and grade as existing where feasible.

2. Wood blocking to be used for thrust produced by test pressure plus 50 P.S.I.

3. Safe bearing load of soil for horizontal thrust shall not be exceeded.

4. See Std. 861 for blowoff size chart. ("Blowoff" is pipe and fittings, up to and including valve.)

5. The Contractor shall make the final tie-in under the inspection of a City Utilities Dept. representative. Inspection fees must be paid prior to scheduling tie-in.

6. Should the blowoff on the existing main be located out of the traveled way as indicated on Std. 861, the temporary blowoff piping shall be extended out of the traveled way and the risers, meter, and check valve will be installed out of the traveled way.

7. Clearance to be 12" min. above finished grade or 6" above the inundation level, whichever is higher.

8. This installation is not acceptable when combustible material is stored on site or construction above grade begins. (See Standard 860 when fire flow is required).
NOTES:

1. This assembly shall be installed when combustible materials will be stored or constructed on-site prior to acceptance of the on-site water main by the City. Fire flow & access must be satisfactory to the City Fire Department.

2. The Contractor shall furnish the 6" meter currently certified by an approved testing facility. The double check valve will be tested and certified on-site by the Utilities Department prior to activating the system. The contractor is responsible for any fees and charges incurred.

3. The Contractor shall make final tie-in under the inspection of a City Utilities Department representative. Inspection fees must be paid prior to scheduling tie-in.

4. Meters to be gallon reading type only.

5. Clearance to be 12" min. above finished grade or 6" above the inundation level, whichever is higher.

6. Fire lines shall be flushed per City Standard Specifications and adequate fire flow provided prior to combustible materials being stored or construction beginning on site.
ELEVATION

1. For 6" & 8" mains, M.J. plugs or caps with dilly lugs or start bolts and 2" center tap may be used in lieu of angle iron. Install angle iron off-center to accommodate center tap.

2. Blow-off shall not be installed within the traveled way. If main ends within street area, blow-off to be extended to area outside of traveled way and installed as shown above.

PLAN

Concrete shall extend at least to the undisturbed earth at both sides of trench.

MINIMUM DIMENSIONS

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>TIE RODS</th>
<th>ANGLE IRON</th>
<th>BEARING AREA</th>
<th>A</th>
<th>SIZE B.O.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>5/8&quot;</td>
<td>3&quot;x3&quot;x1/4&quot;</td>
<td>4 Sq. Ft.</td>
<td>2'</td>
<td>2&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>3/4&quot;</td>
<td>3 1/2&quot;x3&quot;x1/4&quot;</td>
<td>7 Sq. Ft.</td>
<td>3'</td>
<td>2&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>1-1/8&quot;</td>
<td>4&quot;x3&quot;x1/2&quot;</td>
<td>15 Sq. Ft.</td>
<td>3&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>OVER 12&quot;</td>
<td>BY THE DESIGN ENGINEER</td>
<td>3&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* (see note 1)
NOTES

1. Restrained joints are required for all new construction from gate valve to 90° bend. Thrust blocks are only required where existing services are being modified and restrained joints are not used.

2. Blowoff piping to be the same size as the main.

CITY OF SANTA ROSA

FULL SIZE BLOW-OFF
NOTES

1. Service lateral bedding material to be compacted to minimum 90% relative compaction prior to installation of copper service tubing.
2. Unless otherwise specified on the plans, provide for 5/8" x 3/4" meter installation for residential uses and 1" meter installation for commercial uses.
3. Unless otherwise specified on the plans, install 3/4" service tubing for residential uses and 1" service tubing for commercial uses. For unknown commercial uses, install 2" service per standard 865.
4. Contractor to install sch. 80 PVC spacer with threads on both ends. Drill 1/2" holes Ø 2" O.C. through pipe after testing service lateral.
5. Meter box must be set flush with top of curb or sidewalk, if applicable.
6. Prior to meter set, address to be clearly marked on topside lip of meter box with permanent felt marker.
7. For 5/8" x 3/4" meter installation on a 1" water service lateral, use a reducing adapter.
8. Traffic loading box & lid to be installed in all driveways or locations where vehicular traffic may occur, and where specified on plans.
9. At a minimum, extend building service line to 12" beyond back of meter box and cap. Where sidewalk is being installed by the public improvements contractor, extend building service line to 12" beyond back of sidewalk and cap. If permanent meter set is requested prior to completion of property side plumbing, a minimum of 10' of the building service line must be installed with a hose bib on a riser above finished grade.

METER SETTING ASSEMBLY PARTS LIST

| METER SIZE | VALVES | SPACER BAR
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8&quot; x 3/4&quot;</td>
<td>(See Engineer’s approved list)</td>
<td>1&quot; x 7-3/4&quot; Sch. 80 PVC Pipe</td>
</tr>
<tr>
<td>1&quot;</td>
<td>(See Engineer’s approved list)</td>
<td>1-1/4&quot; x 11&quot; Sch. 80 PVC Pipe</td>
</tr>
</tbody>
</table>

METER BOXES AND COVERS
(See Engineer’s approved list)

AMPROVED TAPPING SERVICE SADDLES
(See Engineer’s approved list)
NOTES

1. Unless otherwise specified on the plans, provide for 5/8" x 3/4" meter installation for residential uses and 1" meter installation for commercial uses.

2. Unless otherwise specified on the plans, install 1" service tubing for residential and commercial uses. For unknown commercial uses, install 2" service per standard 865.

3. Contractor to install sch. 80 PVC spacer with threads on both ends. Drill 1/2" @ holes @ 2" O.C. through pipe after testing service lateral.

4. Meter box must be set flush with top of curb or sidewalk, if applicable.

5. Prior to meter seat, address to be clearly marked on topside lip of meter box with permanent felt marker.

6. Traffic loading box & lid to be installed in all driveways or locations where vehicular traffic may occur, and where specified on plans.

7. At a minimum, extend building service line to 12" beyond back of meter box and cap. Where sidewalk is being installed by the public improvements contractor, extend building service line to 12" beyond back of sidewalk and cap. If permanent meter set is requested prior to completion of property side plumbing, a minimum of 10' of the building service line must be installed with a hose bib on a riser above finished grade. Domestic supply line to building shall meet building department requirements.

8. If connecting to a backflow device use Type "K" hard temper copper or threaded brass between the meter and backflow device. If existing line to be connected is galvanized use dielectric protection.

METER SETTING ASSEMBLY PARTS LIST

<table>
<thead>
<tr>
<th>METER SIZE</th>
<th>VALVES</th>
<th>SPACER BAR (SEE NOTE 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8&quot; x 3/4&quot;</td>
<td>1&quot;x3/4&quot; Angle meter ball valve  (See Engineer’s approved list)</td>
<td>1&quot; x 7.75 – 3/4&quot; Sch. 80 PVC Pipe</td>
</tr>
<tr>
<td>1&quot;</td>
<td>1&quot;x1&quot; Angle meter ball valve  (See Engineer’s approved list)</td>
<td>1 1/4&quot; x 1&quot; Sch. 80 PVC Pipe</td>
</tr>
</tbody>
</table>

METER BOXES AND COVERS

(See Engineer’s approved list)

APPROVED TAPPING SERVICE SADDLES

(See Engineer’s approved list)
NOTES:

1. Unless otherwise specified on the plans, provide for a 1" meter installation.

2. If more than one length of tubing is required, compression couplings shall be used. No compression fittings are allowed under the curb and gutter.

3. Contractor is to install a schedule 80 PVC spacer with threads on both ends. Drill 1/2" dia holes @ 2" O.C. through pipe after testing the service lateral.

4. The meter box must be set flush with the top of curb or sidewalk, if applicable.

5. Prior to the meter set, the address is to be clearly marked on the topside lip of the meter box with permanent felt marker.

6. Traffic loading box and lid are to be installed in all driveways or locations where vehicular traffic may occur, or where specified on the plans.

7. At a minimum, extend building service line to 12" beyond the back of meter and cap. Where the sidewalk is being installed by the public improvements contractor, extend the building service line to 12" beyond the back of sidewalk and cap. If a permanent meter set is requested prior to completion of the property side plumbing, a minimum of 10' of building service line must be installed with a hose bib on a riser above finished grade.

8. If connecting to a backflow device use Type "K" hard tempered copper or threaded brass between the meter and backflow device. If existing line to be connected is galvanized, provide dielectric protection.
METER BOXES and COVERS
(See Engineer's approved list for applicable meter size)

If the meter box has "cut outs" install redwood or pressure treated blocks to prevent dirt intrusion.

Angle Meter Ball Valve
(See Engineer's approved list)

Spacer Bar
1 1/2" 11" Sch. 80 PVC
(See note 7)

Drain Rock
3" min. thickness

Building service line
(See Notes 5 and 6)

Type "K" hard temper copper or threaded brass

90° ell

Compression x MIP Reducer
1 1/2" x 1"

Install #12 size tracer wire. Wrap once around the corporation stop, and extend a 2' coil into meter box. Do not wrap around the pipe.

NOTES

1. Service lateral bedding material to be compacted to minimum 90% relative compaction prior to installation of Polyethylene service tubing.

2. Unless otherwise specified on the plans, provide for 1" meter installation.

3. Meter box must be set flush with top of curb or sidewalk, if applicable. The address shall be clearly marked on top of meter box with a permanent felt marker prior to requesting meter set.

4. Traffic loading box & lid to be installed in all driveways or locations where vehicular traffic may occur, and where specified on plans.

5. At a minimum, extend building service line to 12" beyond back of meter box and cap. Where sidewalk is being installed by the public improvements contractor, extend building service line to 12" beyond back of sidewalk and cap. If permanent meter set is requested prior to completion of property side plumbing, a minimum of 10' of the building service line must be installed with a hose bib on a riser above finished grade. Domestic supply line to building shall meet building department requirements.

6. If connecting to a backflow device use Type "K" hard temper copper or threaded brass pipe between the meter and the backflow device. If existing line to be connected to is galvanized, provide dielectric protection.

7. Contractor must install a Sch. 80 PVC spacer bar, without washers and threaded at each end. Drill 1/2" dia. holes through the spacer bar at 2" O.C. City forces will remove spacer bar and install meter.
1. Meter box to be installed so that reading lid is centered over the meter registers.
2. In traffic loading areas, install two individual meter boxes and replace U-branch with field-made manifold.
3. Contractor to install sch. 80 PVC pipe with threads on both ends. Drill 1/2" holes @ 2" O.C. through pipe after testing service lateral.
4. Meter box knockouts will not be allowed.
5. Prior to meter set, address to be clearly marked on topside lip of meter box over each service with permanent felt marker.
6. At a minimum, extend building service lines to 12" beyond back of meter box and cap. Where sidewalk is being installed by the public improvements contractor, extend building service line to 12" beyond back of sidewalk and cap. If permanent meter set is requested prior to completion of property side plumbing, a minimum of 10' of the building service line must be installed with a hose bib on a riser above finished grade.
NOTES:

1. Spacer shall be sch. 80 PVC pipe with 2" flanges threaded on both ends. Drill 1/2" holes @ 2" O.C. through spacer after testing. Spacer bar assembly length is to outside of flanges. Opening between valve flanges shall be 1/4" longer than spacer bar assembly to accommodate gaskets. City forces will remove spacer bar and install meter.

2. Meter box must be set so that cover is flush with top of curb or sidewalk, if applicable.

3. If more than one length of tubing is required, compression coupling shall be used. No compression fittings allowed under curb and gutter.

4. Prior to meter set, address shall be clearly marked on top of meter box with permanent marker.

5. At a minimum, extend building service line to 12" beyond back of meter box and cap. Where sidewalk is being installed by the public improvements contractor, extend building service line to 12" beyond back of sidewalk and cap. If permanent meter set is requested prior to completion of property side plumbing, a minimum of 10' of the building service line must be installed with a hose bib on a riser above finished grade.

6. Traffic loading box & lid to be installed in all driveways or locations where vehicular traffic may occur and where specified on the plans.

7. If connecting to a backflow device use Type "K" hard tempered copper or threaded brass pipe between meter and backflow device. If existing line to be connected is galvanized, provide dielectric protection.
NOTES:

1. Spacer shall be sch. 80 PVC pipe with 2" flanges threaded on both ends. Drill 1/2" holes @ 2" O.C. through spacer after testing. Spacer bar assembly length is to outside of flanges. Opening between valve flanges shall be 1/4" longer than spacer bar assembly to accommodate gaskets. City forces will remove spacer bar and install meter.

2. Meter box must be set so that cover is flush with top of curb or sidewalk, if applicable.

3. If more than one length of tubing is required, compression coupling shall be used. No compression fittings allowed under curb and gutter.

4. Prior to meter set, address shall be clearly marked on top of meter box with permanent marker.

5. At a minimum, extend building service line to 12" beyond back of meter box and cap. Where sidewalk is being installed by the public improvements contractor, extend building service line to 12" beyond back of sidewalk and cap. If permanent meter set is requested prior to completion of property side plumbing, a minimum of 10' of the building service line must be installed with a hose bib on a riser above finished grade.

6. Traffic loading box & Lid to be installed in all driveways or locations where vehicular traffic may occur and where specified on the plans.

7. If connecting to a backflow device use Type "K" hard tempered copper or threaded brass pipe between meter and backflow device. If existing line to be connected is galvanized, provide dielectric protection.
NOTES:

1. Spacer shall be schedule 40 PVC pipe with 1/2" holes @ 2" O.C. drilled through pipe. City Forces to remove spacer bar & install 3" water meter.

2. Boxes located in traffic loading areas must be set so the steel cover is flush with finished surface.

3. Prior to meter set, address shall be clearly marked on top of meter box with permanent marker.

4. Box pipe knockouts to be grouted sufficiently to prevent intrusion of dirt. Pipe openings in box to be neatly cut - do not use hammer.

5. Restrained joints are required for all new construction from gate valve to 90° ell. Thrust blocks are only required where existing services are being modified and restrained joints are not used.

<table>
<thead>
<tr>
<th>NO.</th>
<th>ITEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3&quot; Plate Strainer by City Forces</td>
</tr>
<tr>
<td>2</td>
<td>4&quot; x 90 Flange x MJ</td>
</tr>
<tr>
<td>3</td>
<td>4&quot; Flanged x PE spool - length as required</td>
</tr>
<tr>
<td>4</td>
<td>4&quot; x 3&quot; Companion flange</td>
</tr>
<tr>
<td>5</td>
<td>3&quot; Brass close nipple</td>
</tr>
<tr>
<td>6</td>
<td>3&quot; x Companion flange</td>
</tr>
<tr>
<td>7</td>
<td>3&quot; x 24 3/8&quot; Schl. 40 PVC pipe (See note 1)</td>
</tr>
<tr>
<td>8</td>
<td>3&quot; Schedule 80 PVC flange</td>
</tr>
<tr>
<td>9</td>
<td>3&quot; Flanged coupling adapter</td>
</tr>
<tr>
<td>10</td>
<td>3&quot; D.I.P. - length as req'd.</td>
</tr>
<tr>
<td>11</td>
<td>AWWA Resilient wedge gate valve (M.J.)</td>
</tr>
<tr>
<td>12</td>
<td>3&quot; Meter by City Forces</td>
</tr>
</tbody>
</table>

APPROVED METER BOXES, EXTENSIONS AND COVERS
(See Engineer's approved list)

APPROVED TAPPING SLEEVES
(See Engineer's approved list)
NOTES:
1. Spacer shall be schedule 40 PVC pipe with 1/2" holes @ 2" O.C. drilled through pipe. City Forces to remove spacer bar & install 4" water meter.
2. Boxes located in traffic loading areas must be set so the steel cover is flush with finished surface.
3. Prior to meter set, address shall be clearly marked on top of meter box with permanent marker.
4. Box pipe knockouts to be grouted sufficiently to prevent intrusion of dirt. Pipe openings in box to be neatly cut – do not use hammer.
5. Restrained joints are required for all new construction from gate valve to 90° ell. Thrust blocks are only required where existing services are being modified and restrained joints are not used.

<table>
<thead>
<tr>
<th>NO.</th>
<th>ITEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4&quot; Plate Strainer by City Forces</td>
</tr>
<tr>
<td>2</td>
<td>4&quot; x 90 Flange x MJ</td>
</tr>
<tr>
<td>3</td>
<td>4&quot; P.E. spool-length as required</td>
</tr>
<tr>
<td>4</td>
<td>4&quot; x 29 3/8&quot; Schl. 40 PVC pipe (See note 1)</td>
</tr>
<tr>
<td>5</td>
<td>Meter by City Forces</td>
</tr>
<tr>
<td>6</td>
<td>4&quot; Schedule 80 PVC flange</td>
</tr>
<tr>
<td>7</td>
<td>4&quot; Flanged coupling adapter</td>
</tr>
<tr>
<td>8</td>
<td>4&quot; AWWA resilient wedge gate valve (M.J.)</td>
</tr>
</tbody>
</table>

APPROVED METER BOXES, EXTENSIONS AND COVERS
(See Engineer’s approved list)

APPROVED TAPPING SLEEVES
(See Engineer’s approved list)
NOTES:

1. Contractor to install Schl. 40 PVC pipe spacer with 1/2" Ø Holes @ 2" O.C. drilled through pipe. City Forces to remove spacer bar & install 6" water meter.

2. Boxes located in traffic areas must be set so the steel cover is flush with the finished surface.

3. Prior to meter set, address to be clearly marked on top of meter box with permanent marker.

4. Box pipe knockouts to be grouted sufficiently to prevent intrusion of dirt. Pipe openings in box to be neatly cut – do not use hammer.

5. Restrained joints are required for all new construction from gate valve to 90° ell. Thrust blocks are only required where existing services are being modified and restrained joints are not used.

<table>
<thead>
<tr>
<th>NO.</th>
<th>ITEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6&quot; Plate Strainer by City Forces</td>
</tr>
<tr>
<td>2</td>
<td>6&quot; x 90° Flange x MJ</td>
</tr>
<tr>
<td>3</td>
<td>6&quot; FL x P.E. spool – length as required</td>
</tr>
<tr>
<td>4</td>
<td>6&quot; Schedule 80 PVC flange</td>
</tr>
<tr>
<td>5</td>
<td>6&quot; x 33 3/8&quot; Sch. 40 PVC pipe – See note 1</td>
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<tr>
<td>6</td>
<td>6&quot; Turbine meter by City Forces</td>
</tr>
<tr>
<td>7</td>
<td>6&quot; Flanged coupling adapter</td>
</tr>
<tr>
<td>8</td>
<td>6&quot; AWWA resilient wedge gate valve</td>
</tr>
</tbody>
</table>

APPROVED METER BOXES, EXTENSIONS AND COVERS
(See Engineer's approved list)

APPROVED TAPPING SLEEVES
(See Engineer's approved list)
NOTES:

1. This standard applies to commercial and multi-residential developments where domestic, irrigation, or fire protection requirements are not established at the time of application.

2. Utilities Dept. approval must be obtained prior to installation.

3. Where a hydrant is required, install an 8" x 6" cross or 12" x 6" cross as appropriate. Where a hydrant is not required, install manifold connection per the appropriate service lateral standard.

4. Use a slotted break-off riser as necessary to enable proper orientation of the fire hydrant outlets.

5. Restrained joints are required from gate valve to blowoff for all new construction.
NOTES:

1. This standard applies to commercial and multi-residential developments where domestic, irrigation, or fire protection requirements are established at the time of application.

2. When referring to this standard, specify meter and detector check sizes and appropriate standard plans.

3. When field conditions preclude the installation of meters at or near the curb line, submit detailed plans of the proposed installation for Utilities Dept. approval. All meter installations must be within public right-of-way.

4. Where a hydrant is required, install an 8" x 6" cross or 12" x 6" cross as appropriate. Where a hydrant is not required, install manifold connection per the appropriate service lateral Standard.

5. Use a slotted break-off riser as necessary to enable proper orientation of the fire hydrant outlets.

6. Restrained joints are required for all new construction from the gate valve at the main to the detector check valve.
NOTES

1. Water mains shall be located parallel to street centerlines unless conflicts with other underground facilities cannot be avoided.

2. Non-standard alignments shall be approved by the Utilities Dept. prior to installation. Mainline valves, except hydrant valves and tapping valves, shall be on face of curb extended where feasible.

3. Install mains with constant alignment whenever possible, minimum 3' from the lip of gutter and minimum 4' from centerline monuments.

CITY OF SANTA ROSA
ALIGNMENT OF WATER MAINS AND PLACEMENT OF MAIN VALVES

SCALE: NONE  DATE: Sept. 2002

Dwn: GC  CHK: RED
APPROVED  FILE NO.
STD.-871
**TYPICAL DIRT STOP DETAIL**

**NO SCALE**

Alternately, install casing and seal.

**NOTES**
1. Install skids per manufacturer's specifications.
2. See Engineer's approved list for approved skids.
3. Where conductor casing is existing R.C.P., banded redwood skids may be installed in lieu of polyethylene skids with Utilities Dept. approval.

**TYPICAL PIPE JOINT AND INSULATOR**

**NO SCALE**

**APPROVED PIPES:**
Ductile iron pipe w/restrained joints, TR flex or Field Lok restrained joint Ductile Iron pipe, Certainteed Yellowline Certa-Lok PVC pipe

**MINIMUM SIZE CASING REQUIRED**
For all approved pipe types

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>6&quot;</th>
<th>8&quot;</th>
<th>12&quot;</th>
<th>14&quot;</th>
<th>16&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casing Size (Inside Ø)</td>
<td>16&quot;</td>
<td>18&quot;</td>
<td>24&quot;</td>
<td>24&quot;</td>
<td>30&quot;</td>
</tr>
<tr>
<td>Casing Wall Thickness</td>
<td>.375&quot;</td>
<td>.375&quot;</td>
<td>.375&quot;</td>
<td>.375&quot;</td>
<td>.500&quot;</td>
</tr>
</tbody>
</table>

**SECTION "A-A"**

**NO SCALE**

5/16" Cadmium plated bolts

5/16" Cadmium plated bolts
NOTES:

1. Double check valve assemblies shall be installed adjacent to and on the property side of sidewalk where applicable. Where no sidewalk exists, the double check valve assemblies shall be installed as close as possible to the water meter location. Any conflicts shall be resolved by the City Utilities Dept.

2. Approved double check valves shall be as shown on "List Of Approved Backflow Prevention Devices" (Latest Revision) by the University of Southern California Foundation For Cross Connection Control & Hydraulic Research.

3. All double check valve assemblies shall be provided with a minimum of four (4) test cocks.

4. Double check valve assemblies shall be required for any use where an intermediate hazard exists. To be installed on all services to properties with wells, and other domestic services as determined by the City Utilities Dept.

5. The piping from the meter to the double check valve assembly and the double check valve assembly itself must be the same size as the meter unless otherwise approved by the Utilities Dept.

6. This Std. will be used for all commercial installations requiring a double check valve type backflow preventer.

7. If above ground installation is not feasible install per Std. 875 after approval by the City Utilities Dept.

8. Any cover or screening for the backflow prevention assembly must be approved by the Utilities Dept. prior to installation.

9. Valves 2" & less shall be ball valves, 3" & greater shall be resilient seat gate valves.
1. This Standard applies to residential connections with auxiliary water supplies onsite or where residential fire sprinkler systems are installed. Where residential fire sprinkler systems are designed to circulate water with the domestic systems, no backflow device is required.

2. Double check valve assemblies shall be installed adjacent to and on the property side of sidewalk where applicable. Where no sidewalk exists, the double check valve assemblies shall be installed as close as possible to the water meter location. Any conflicts shall be resolved by the City Utilities Dept.

3. Approved double check valves shall be as shown on "List Of Approved Backflow Prevention Devices" (latest revision) by the University of Southern California Foundation For Cross-Connection Control & Hydraulic Research.

4. Piping, valves, nipples, etc. shall be threaded brass or type "K" hard-temper copper for 2" or less, & shall be flanged ductile iron for 3" or greater. PVC pipe is not acceptable.

5. All double check valve assemblies shall be provided with a minimum of four (4) test cocks.

6. See Engineer's Approved List for approved vaults and covers. The vault must be min. 6" longer than the backflow assembly.

7. The piping from the meter to the double check valve assembly and the double check valve assembly itself must be the same size as the meter unless otherwise approved by the Utilities Dept.

8. To be used only upon the specific approval of the Director Of Utilities.
1. Reduced pressure type backflow devices shall be required as determined by the City Utilities Dept.

2. Approved reduced pressure backflow device shall be as shown on "List of approved backflow prevention devices" (of latest revision) by the University of Southern California Foundation For Cross-Connection Control & Hydraulic Research.

3. Backflow prevention devices shall be installed adjacent to and on property side of sidewalk where applicable. Where no sidewalk exists, the assembly shall be installed as close as possible to the water meter location.

4. A valve of the same size as the backflow device shall be installed on each side of the backflow prevention assembly. Valves 2" & less shall be ball valves, 3" & greater shall be resilient seat gate valves.

5. Any cover or screening for the backflow prevention assembly must be approved by the Utilities Dept. prior to installation.

6. In limited space applications valves may be installed on risers min. 4" above grade.

7. The addition of spools must be approved by the City inspector prior to installation.

8. The piping from the meter to the reduced pressure backflow device & the reduced pressure backflow device valve assembly itself must be the same size as the meter unless otherwise approved by the Director of Utilities.
1. All welds to riser shaft shall be fillet weld all around as specified below.
2. All steel required for riser fabrication shall be structural steel per ASTM A36.

Valve operating nut or 1-7/8" x 1-7/8" high solid steel welded to top plate.
3/16" thick x 7-1/2" dia. free spinning guide plate, with 3-5/8" dia. hole in center.
Two 3/16" x 1-1/2" angle steel angle weld to two sides of riser shaft.
2-1/2" x 3/16" square steel tubing length as required edge to weld to top plate.
3" x 3" x 1/4" steel top plate.
Riser shaft after guide plate is in place.

8" SDR 35 PVC sewer pipe conforming to ASTM 3034. Riser pipe to be plumb and centered over valve stem, and shall be constructed from a either a single length of pipe, or with up to 2 glued joints. Joints shall be factory made glue on couplings with square cut well fitted joints.

Notes:
1. Valves 2" through 16" shall be resilient wedge gate valves and valves 16" and larger shall be butterfly valves (see Std. 878) unless otherwise approved by the Utilities Dept.
2. Gate valves shall conform to City Specification number 99-1.05.
3. All external bolts and nuts on valves shall be 304 stainless steel or the entire valve shall be wrapped tightly with polyethylene film held securely with adhesive tape.
4. If valve is installed so that the top of the operating nut is less than 30" below finished grade, the valve stem riser is not required.
5. For installation of butterfly valve and tapping valve, see Std. 878.

Concrete pier block and redwood blocking required when installing new valve on existing main.

City of Santa Rosa
Gate Valve

Scale: None
Date: June 2009
Dwn: TBM BB
Chk: AA
Install Flanged Butterfly valve with two flanged by mechanical adapters on Class 200 PVC.

Valve box, valve stem extension, & valve riser (See Std. 877)

**BUTTERFLY VALVE**
To be used on pipe 18" and larger

**Approximate Excavation Area**

Water Main

Concrete thrust Block (See Std. 854)

Tapping sleeve or hydrant tee

**TAPPING SLEEVES & VALVE**

**TAPPING SLEEVES**
(See Engineer’s Approved List for Std. 866/867)

**NOTES:**
1. All external bolts and nuts on valves shall be 304 stainless steel or the entire valve shall be wrapped tightly with polyethylene film held securely with adhesive tape.

2. Taps shall be made by City forces. Schedule through the Utilities Engineering Dept.

**CITY OF SANTA ROSA**
**BUTTERFLY VALVE AND TAPPING VALVE**

Scale: NONE  Date: June 2009

OWN: GC BB  APPROVED  FILE NO.
CHK: AA  STD- 878
Bypass meter to be supplied & installed by the Utilities Dept. upon City approval of fire line installation.

Precast vault & cover (See note 3, sheet 2)

Sidewalk

Grout around pipe or install dirt stops similar to Std. 872

P.V.C. or D.I.P.

Ball valve & tee behind valve (See DETAIL A)

Min. 4" thick concrete pad — length as required.

4" thick drain rock

Restraint flange adapter (both ends)

To private hydrant(s)

Valve Status Indicator to face street

Provide 1" conduit for tamper switch controls when req. (see note 2 sheet 2)

Post Indicator Valve (resilient wedge type)

Det. Check Valve

PREVIOUS DETAIL

PUBLIC WORKS INSPECTOR

FIRE DEPARTMENT INSPECTOR

APPROVED DETECTOR CHECK VALVES (See Engineer's Approved List)
BY-PASS PARTS LIST

<table>
<thead>
<tr>
<th>NO.</th>
<th>DESCRIPTION</th>
<th>QUANT.</th>
<th>PART SIZE OR MODEL NO.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>HOSE BIB - MIP</td>
<td>3</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>2.</td>
<td>TEE - FIP x FIP x FIP</td>
<td>3</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>3.</td>
<td>SHORT MTR SPUD - 2&quot; L</td>
<td>2</td>
<td>C38 - 23 - 2</td>
</tr>
<tr>
<td>4.</td>
<td>STRAIGHT GHK. VALVE - MIP x FIP</td>
<td>1</td>
<td>HS81 - 333</td>
</tr>
<tr>
<td>5.</td>
<td>ADAPTER - COMP x MIP</td>
<td>1</td>
<td>CB4 - 33</td>
</tr>
<tr>
<td>6.</td>
<td>COPPER TUBING - TYPE &quot;K&quot; (SOFT)</td>
<td>VARIEST</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>7.</td>
<td>90° ADAPTER - COMP x MIP</td>
<td>4</td>
<td>L84 - 33</td>
</tr>
<tr>
<td>8.</td>
<td>STRAIGHT BALL VALVE - FIP x FIP</td>
<td>2</td>
<td>B11 - 33</td>
</tr>
<tr>
<td>9.</td>
<td>CLOSE NIPPLE</td>
<td>4</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>10.</td>
<td>90° ADAPTER - COMP x FIP</td>
<td>1</td>
<td>L14 - 33</td>
</tr>
<tr>
<td>11.</td>
<td>ADAPTER - COMP x FIP</td>
<td>2</td>
<td>C14 - 33</td>
</tr>
<tr>
<td>12.</td>
<td>BUSHING</td>
<td>2</td>
<td>3/4&quot; x VARIEST</td>
</tr>
</tbody>
</table>

* FORD MODEL NO's ARE GIVEN. SUBMIT SUBSTITUTIONS FOR APPROVAL.

NOTES

1. This Standard applies when above ground installation per Std. 888 is not possible due to site constraints.

2. The post indicator valve shall be installed as close as possible to the detector check vault. If a post indicator cannot be installed, an O.S. & Y. valve with locking chain must be installed inside the vault on the property side of the detector check with approval from the City Utilities Department. The installation shall be provided with electronic supervision monitoring when required by the Fire Department.

3. Refer to vault size chart for proper size. Should an O.S. & Y. valve be installed in the vault, the vault size may need to be verified by the Contractor. See the engineer's approved list for approved vaults and covers.

4. All fire line services to the post indicator valve shall be tested by the Public Works Dept. Construction inspection section per City of Santa Rosa Construction Specifications. All on-site fire lines, hydrants, and the P.I.V. shall be tested & inspected by the Fire Dept. per City Fire Code.

5. Double check detector check valve assembly with bypass double check shall be installed where the Utilities Dept. determines an extreme hazard exists. Installation details shall be approved by the Utilities Dept. prior to installation. (See Std. 880).

6. The fire department connection shall be installed and located as required by the Fire Department.

7. Post indicator valves shall be locked with a break-away lock. The top of the P.I.V. shall not be less than thirty-six inches (36") above finished grade.

VAULT SIZES

<table>
<thead>
<tr>
<th>D.C. SIZE</th>
<th>WIDTH</th>
<th>LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>4&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
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<td>4&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>5&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>5&quot;</td>
<td>5&quot;</td>
</tr>
</tbody>
</table>

CITY OF SANTA ROSA
SINGLE CHECK DETECTOR IN VAULT

SCALE: NONE  DATE: Sept 2002

PAGE 2 OF 3
READING LID DETAILS

NOTES

1. Reading lid shall be centered over the by-pass meter.

2. Galvanize coat all parts after welding. Vaults that are to be placed in pedestrian way must have lids with "all-grip" surface in lieu of galvanizing.
NOTES:

1. This Standard is required for:
   a) all connections serving commercial fire sprinkler systems.
   b) any fire line connections to properties with auxiliary water supplies.
   c) sites with multiple fire line connections to the City water system.

2. Approved double check detector backflow assemblies shall be shown on "List of approved backflow devices" of latest revision, by the University of Southern California Foundation for Cross Connection Control & Hydraulic Research.

3. All test valves shall be fitted with 1/4" female test cocks.

4. Double check detector assembly shall be located as close as possible to the sidewalk or public right-of-way.

5. Any cover or screening for this assembly must have both Fire Department & Utility Department approval prior to installation.

6. Shut-off valves to be resilient wedge type O.S. & Y and will be chained and padlocked in the open position.

7. Must have specific approval of the Fire Dept. prior to installation.

8. The installation shall be provided with electronic supervision monitoring when required by the Fire Department.

9. Double check detector shall be the same size as the fire line except when a 12" fire line is required, then a 10" double detector check backflow assembly is required.

10. Restrained joints are required for all new construction from gate valve to 90" all. Thrust blocks are only required where existing services are being modified and restrained joints are not used.
1. Make 3/4" top tap - install risers as shown.
2. See the engineer's approved list for approved vaults and covers.
3. The low flow by-pass (part numbers 8-13) shall be installed unless otherwise approved by the Utilities Dept. and shall be a min. 4" in size. If a single P.R.V. is installed, center in vault and change parts Number 4 to 90° flanged ells, and delete part 5.
4. Install fire hydrant and low profile hydrant only when required by the City Utilities Dept.
5. 2" schedule 40 P.V.C. drain pipe shall be installed from a perforated sump canister to an existing drainage system or to daylight.
6. Valves 18" and larger shall be butterfly valves.
7. Valves 16" and smaller shall be resilient, wedge gate valves.
8. All pressure reducing valves to be epoxy fused, inside and outside. (See the engineer's approved list)
9. Restrained joints are required for all new construction from mainline gate valve to vault. Thrust blocks are only required where existing services are being modified and restrained joints are not used.

**CITY OF SANTA ROSA**

**PRESSURE REDUCING VALVES**

<table>
<thead>
<tr>
<th>NO.</th>
<th>ITEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>MJ x MJ x FL TEE</td>
</tr>
<tr>
<td>1</td>
<td>FL x MJ GATE VALVE</td>
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<tr>
<td>2</td>
<td>DUCTILE IRON PIPE - FL X P.P.</td>
</tr>
<tr>
<td>3</td>
<td>FLANGED TEE</td>
</tr>
<tr>
<td>4</td>
<td>FL x MJ ADAPTER</td>
</tr>
<tr>
<td>5</td>
<td>FLANGED P.R.V. - HIGH FLOW</td>
</tr>
<tr>
<td>6</td>
<td>FLANGED REDUCER</td>
</tr>
<tr>
<td>7</td>
<td>FLANGED 90° ELL</td>
</tr>
<tr>
<td>8</td>
<td>FLANGED COUPLING ADAPTER</td>
</tr>
<tr>
<td>9</td>
<td>FLANGED P.R.V. - LOW FLOW</td>
</tr>
<tr>
<td>10</td>
<td>3/4&quot; BAILCORP (FORD FB 1000)</td>
</tr>
<tr>
<td>11</td>
<td>3/4&quot; TYPE &quot;K&quot; COPPER TUBING</td>
</tr>
<tr>
<td>12</td>
<td>3/4&quot; COMP. X F.I.P. ADAPTER (FORD C14-33)</td>
</tr>
<tr>
<td>13</td>
<td>3/4&quot; M.I.P X HOSE BIBB - BRASS</td>
</tr>
<tr>
<td>14</td>
<td>3/4&quot; M.I.P. TEE WITH TWO (2) 3/4&quot; F.I.P. X H.B.</td>
</tr>
</tbody>
</table>

SCALE: NONE  
DATE: June 2009  
DRAWN: T.B. R  
CHECKED: A  
APPROVED:  
FILE NO. STD.- 881
NOTE: Surge anticipator valve installation is shown. Pressure relief valve installation is similar except no sensing line is required.

1" Type "K" copper sensing line – attach to surge anticipator. Make 1" horizontal top connection to water main. See the engineer’s approved list for Std. 863 for approved tapping saddles & valves.

Utility Box (See Engineer’s Approved List)

Valve Box And Riser
(See Std. 877)

Concrete Thrust Block
(See Std. 854)

Water Main

Valve
(See Std. 877 or 878)

Concrete Pier Block

Face of Curb

Service Lateral – (See Note 1)

Redwood Blocking
As Required

Concrete pier block and 2 x 12 Redwood Blocking As Req’d

Flange Adapter

Harress Block
(See Std. 851)

10 Gauge – 1/2” wire mesh screen – tack weld to interior of outlet.

Drain Pipe – (See Note 2)

Min. 3” Thick Conc. Base

NOTES

1. Service lateral pipe shall be either 4" diameter or equal in size to the surge anticipator valve, whichever is greater. The pipe material shall be Cl. 50 or PC 350 Ductile Iron, unless otherwise shown on the plans. Should the surge anticipator valve be smaller than 4", install a flanged reducer as required on the inlet side of the valve.

2. Discharge water shall drain either to an existing drainage system or to daylight. The Project Engineer shall submit design to the appropriate agencies for approval.

3. All piping & fittings on the discharge side of the surge anticipator valve shall be equivalent in size to the valve.

4. Discharge riser shall be fabricated from standard welded steel pipe. Welding shall conform to AWWA Standard C206. The riser assembly shall be tops coated per AWWA Standard C209.

5. Contact the Utilities Dept. for specific telemetry requirements which must be met.

6. Restrained joints are required for all new construction from gate valve to lower 90° bend. Thrust blocks are only required where existing services are being modified and restrained joints are not used.
**NOTES**

1. Air Release Valves shall have 1" threaded inlets unless otherwise shown on plans.

2. See engineer's approved list for all parts.
NOTES

1. Contractor to install schedule 80 PVC spacer bar—without holes.

2. All meter boxes, vaults and pits shall be bedded on 3" minimum thick, 3/4" drain rock, AB-2, or other clean material with typical sand equivalent of 20 minimum 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 set flush with the top of curb, sidewalk or ground, whichever is applicable.

3. 1" PVC electrical conduit with pull cable may be required where a remote-read meter is to be installed. Only long-radius ells may be used. Conduit installation to be inspected by the Utilities Department.

4. Location of meter requires prior approval by Utilities Department.

5. Meters larger than 1" requires prior approval by Utilities Department.

6. Traffic loading box and lid to be installed in all driveways or locations where vehicular traffic may occur, and where specified on plans. Box shall be installed so that the steel cover is set flush with finished surface.
**METER SETTING ASSEMBLY PARTS LIST**

<table>
<thead>
<tr>
<th>METER SIZE</th>
<th>RESETTER</th>
<th>SPACER BAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8&quot; x 3/4&quot;</td>
<td>(See Engineer's approved list)</td>
<td>1&quot; x 7-3/4&quot; LG. SCHL. 80 PVC PIPE</td>
</tr>
<tr>
<td>1&quot;</td>
<td>(See Engineer's approved list)</td>
<td>1-1/4&quot; x 11&quot; LG. SCHL. 80 PVC PIPE</td>
</tr>
</tbody>
</table>

**HORIZONTAL INSTALLATION**

**NOTES:**

1. Spacer bar—without holes to be installed between ball valves. City Forces to remove spacer bar, install water meter and connect wiring.

2. Receptacle to be located on the outside wall of building. Receptacle to be mounted a minimum of 3 feet and a maximum of 4 feet above finished grade. The location of the receptacle will be determined by the Utilities Department.

3. Water meter must be mounted in a horizontal position. Water meter to be mounted a minimum of 3 feet and a maximum of 5 feet above finished floor. The location of the water meter will be determined by the Utilities Department.

4. Connecting wire to be installed in 1/2" diameter PVC conduit. Meter, conduit and wire may not be installed in areas with explosive atmospheres.

5. The Utilities Department will maintain the water meter only. All plumbing and wiring is the responsibility of the property owner.
NOTES:

1. If more than one length of 3/8" stainless steel tubing is required, stainless steel compression couplings shall be used.

2. All 3/8" tubing shall be wrapped in 10 mil tape.

3. Where planter strip exists, install min. 18" behind F/C. Where sidewalk is contiguous, install 12" behind sidewalk.

APPROVED TAPPING SERVICE SADDLES:

(See Engineer's Approved List for Standard 863)
NOTES:

1. This Standard may be adapted for connection to a combination water service per Std. 870.

2. Restrainted joints are required for all new construction from gate valve to end of 4" manifold. Thrust blocks are only required where existing services are being modified and restrained joints are not used.
NOTES:

1. Above ground single check detector valve assemblies may only be used on fire lines serving private fire hydrants. Where sprinklers are served, use double check detector per Std. 880. When above ground installation is not possible due to site constraints, use single check detector in vault per Std. 879.

2. See Engineer's Approved list for Std. 879 for approved Detector checks.

3. Shut-off valves to be resilient wedge type O.S. & Y. and will be chained and padlocked in the open position.

4. All test valves shall be fitted with 1/4" female test cocks.

5. Detector check assembly shall be located as close as possible to the sidewalk or public right-of-way.

6. Any cover or screening for this assembly must have both Fire Department & Utility Department approval prior to installation.

7. Detector check shall be the same size as the fire line except a 10" detector check assembly is permitted when a 12" fire line is required.

8. The installation shall be provided with electronic supervision monitoring when required by the Fire Department.

9. Restrained joints are required for all new construction from gate valve to 90° ell. Thrust blocks are only required where existing services are being modified and restrained joints are not used.
NOTES

1. Magnesium anode shall be driven completely into native soil at 45°. Maximize distance between copper service and anode.

2. Contractor shall confirm clearance between proposed anode location and other utilities in close proximity prior to driving anode.
3. WATER SYSTEM CONSTRUCTION STANDARD SPECIFICATIONS

SECTION 99. WATER MAIN CONSTRUCTION

99-1.01 Description

Construct all water mains and related appurtenances in accordance with the City of Santa Rosa Standard Plans and Standard Construction Specifications for Public Improvements.

99-1.02 Pipe

The pipe except where otherwise specified on the plans can either be Ductile Cast Iron or Polyvinyl Chloride (PVC) all in accordance with the following:

A. Ductile Iron Pipe 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 except where otherwise specified on the plans.

B. Polyvinyl Chloride (PVC) Pipe shall be new pipe, minimum class 150, or as shown on the plans and conforming to the requirements of AWWA Standard C900 "Standard for Polyvinyl Chloride Pressure Pipe, 4 inch through 12 inch for Water". Polyvinyl Chloride (PVC) pipe for 16" diameter water mains shall be new pipe conforming to the requirements of AWWA standard C-905 DR-25, minimum pressure rating 165 or as shown on the plans.

An affidavit shall be provided that all delivered materials comply with the requirements of AWWA Standard C900/C905 and these specifications.

99-1.03 Copper Water Service Tubing

All copper water service tubing shall conform with the latest AWWA Standards as described in ANSI/AWWA C800 of the latest revision, and with ASTM B88, and shall be Type K soft temper tubing for 3/4" and 1" tubing and Type K hard temper for 2" tubing.

99-1.04 Fittings

All fittings shall be new gray iron or ductile iron fittings conforming to ANSI/AWWA C110/A21.10 or new ductile iron compact fittings conforming to ANSI/AWWA C153/A21.53 of latest revision and shall be compatible with the type and pressure class of pipe used.

All exposed nuts, bolts and threads (except stainless steel) shall be painted with Bitumastic paint or approved equal after nuts are tightened.
99-1.04A Restrained Joint Fittings

Restrained joint fittings shall be ductile iron in accordance with the applicable requirements of ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 of latest revision and shall be compatible with the type and pressure class of pipe used.

99-1.05 Gate Valves

Gate valves shall conform to A.W.W.A. Standard C509 of latest revision and shall be the resilient seat type with non-rising stem opening counter-clockwise with O-ring stem seal and suitable ends for connection to the type of pipe or fitting used. The working pressure rating of gate valves shall meet or exceed the pressure rating of the pipe specified on the plans. External bolts and nuts shall be 304 stainless or poly wrapped per standard.

99-1.06 Butterfly Valves

Butterfly valves shall be flanged or mechanical joint type only and shall conform to AWWA Standard 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 p.s.i. upstream and 0 p.s.i. 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.

99-1.07 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".

All meter boxes, vaults and pits shall be bedded on 3" minimum thick, 3/4" drain rock, or other clean material with typical sand equivalent of 20 minimum, 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 must 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.

99-1.08 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.

Within 48 hours of paving, adjust all water valve boxes up to grade.
99-1.09 Fire hydrants and Lateral Assembly

At the location(s) shown on the plans, the Contractor shall provide and install a fire hydrant and lateral assembly in accordance with City Standard 857.

No bends are allowed in fire hydrant laterals without approval of the Director of Utilities.

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 Utilities Department personnel.

99-1.10 Asbestos Cement Pipe

The installation of asbestos cement pipe is prohibited.

All cutting, handling and disposal of asbestos cement pipe shall be done in compliance with the Contractor's State Licensing Law and all applicable laws and regulations.

99-1.11 Excavation, Backfill, and Resurfacing

All trenching, backfill and resurfacing required for installation of water system facilities shall be in accordance with City Standard 215.

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

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.
Excess Material from excavation shall become the property of the Contractor and shall be disposed of to the satisfaction of the Engineer. 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.

99-1.12 Laying and Handling Pipe Materials

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.

Start excavation by exposing end of existing pipe to determine its line and grade. Start laying new pipe 8-10 feet from the existing and install new pipe at or below the minimum depth specified in Section VIII-B of the Water System Design Standards. Elbows and ductile iron pipe shall be used to make grade adjustments as needed during tie-in operations.

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.

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. At times when pipe laying is not in progress, the open ends of any pipe which have been laid shall be closed by approved means to prevent the entrance of small animals or foreign material. Trench water shall not be permitted to enter the pipe.

99-1.13 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.
Fittings for P.V.C. pipe shall be either the mechanical joint type or push-on type.

No. 12 insulated copper wire shall be laid on top of and along entire length of all new pipes and shall be extended to the surface at all valve locations, blowoffs and meter boxes sufficiently for locator equipment to be attached. Fasten the wire to the top of the pipe so as not to be displaced by backfilling procedure (one method of accomplishing this is to affix the wire to the top of the pipe with duct tape at approximately 10 feet intervals).

99-1.14 Laying of Ductile Iron Pipe

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

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

99-1.15 Service Laterals

Service laterals other than those shown or noted on the plans shall not be installed prior to obtaining City approval. Service laterals encountered in construction that will not be used shall be abandoned.

99-1.16 Thrust Blocking

Except for restrained joint pipe systems, all tees, bends, and plugs shall be provided with thrust blocks and/or harness as shown on the plans or in accordance with City Standards 853 and 854.

99-1.17 Abandoning Water System Components

For all abandoned water services up to and including 2", remove the valve and saddle and install a full circle clamp on the main under Utilities Department inspection.

For flanged or mechanical joint tees, remove the valve and install a blind flange or mechanical joint plug under Utilities Department inspection.

For push on tees, the tee, valve and concrete thrust block must be removed and the main repaired with approved pipe and suitable couplings.

99-1.18 Hydrostatic Test

The test shall be performed after the water system has been laid and all backfill placed and compacted as specified elsewhere in these specifications. The Contractor, at his option, may test the pipe at any time during construction. However, the final test for acceptance shall be made only after all backfill is in place.

Pressure testing against valves is not allowed unless authorized by the Director of Utilities.
Valves on existing pipes in service shall be operated only by City forces.

Each section of pipe shall be slowly filled with water and the specified test pressure shall be applied by means of a pump connected to the pipe in a satisfactory manner. The pump, pipe connection, and all necessary apparatus except gauge and measuring devices shall be furnished by the Contractor. The City of Santa Rosa will furnish the gauge and measuring devices for the test. The Contractor shall make the taps into the pipe and shall furnish all necessary assistance for conducting the tests. Before applying the test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary, at the points of the highest elevation, and afterwards tightly plugged.

Each valved section of pipe, or combined sections, as approved by the Engineer, shall be subjected to a hydrostatic pressure of not less 50 psi above working pressure and not less than 150 psi at any point on the pipe. The duration of each pressure test shall be thirty minutes. Suitable means shall be provided by the City for determining the quantity of water leakage under the test pressure. No pipe installation will be accepted until or unless this leakage is less than 40 U.S. gallons per 24 hours, per mile of pipe, per inch nominal diameter of pipe. Should any test of combined or individual sections of pipe disclose leakage greater than the specified limit, the Contractor shall, at his own expense, locate the cause and repair the defect until the leakage is within the specified allowance.

Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved section of it, necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled. The Engineer shall designate the time at which the tests shall be made.

The Contractor shall repair any obvious leaks even though the hydrostatic test results are within the prescribed limits above.

99-1.19 Chlorination of Pipeline

Chlorine may be applied by any of the standard methods, subject to the approval of the Engineer. The point of application of the chlorination agent shall be at the beginning of the pipe extension, or any valved section of it, and through a corporation stop inserted in the newly laid pipe.

Water from the existing distribution system shall be controlled to flow very slowly in the newly laid pipe during the application of chlorine. Precautions shall be taken to prevent back pressure causing a reversal of flow into the pipe being treated. In the process of chlorinating, all valves and other appurtenances on the new pipe shall be operated in such a way as to provide that the chlorine mixture shall be fully distributed to all parts of the new water system. Valves on existing pipes in service shall be operated only by City forces.

The rate of chlorine feed shall be in such proportion to the rate of
water entering the pipe that the chlorine dose applied to the water entering the newly laid pipe shall be at least 100 ppm. The chlorine mixture shall be retained in the pipe for a period of twenty-four hours. After the chlorine mixture has been retained for the required time, the chlorine residual at the pipe extremities and at representative points shall be at least 5 ppm.

Following chlorination, all chlorine mixture shall be thoroughly flushed from the new pipe.

Chlorinated water used to disinfect the pipe is the property of the Contractor and its disposal is the responsibility of the Contractor. Chlorinated water used to disinfect the pipe shall be disposed of in accordance with all laws and regulations.

The following criteria must be met prior to disposal of chlorinated water to storm sewers or other inland waterways:

1. Water to be disposed of must contain no chlorine residual.
2. pH must be between 6.5 and 7.5.
3. North Coast Regional Water Quality Control Board, at 576-2220, must be notified of discharge.

Discharges not meeting the above criteria may be allowed to be disposed of into the sanitary sewer system, but must first meet the following requirements:

1. The Contractor must obtain permission from the City of Santa Rosa Utilities Department Industrial Waste Section, 543-3369, prior to the discharge being disposed of in the sanitary sewer system. The payment of any fees required will be the responsibility of the Contractor.

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

Should the initial treatment, in the opinion of the Engineer, prove ineffective, the chlorination procedure shall be repeated until confirmed tests show that the water sampled from the newly laid pipe conforms to the above requirements.

The initial bacteria samples will be taken and tests made by the City of Santa Rosa. There shall be a 24 hour waiting period after blowing off the pipe prior to taking bacteria samples. If the initial bacteria test fails, two consecutive passing bacteria tests must be obtained prior to making the tie-in. The City will pay for retesting up to ten additional individual bacteria sample tests. If additional testing is required, it will be necessary for the contractor to arrange for and to pay for the tests at a State of California certified laboratory. In extreme cases, at the discretion of the Engineer it may be necessary to require, at the contractor's expense, a complete Title 22 potable water test prior to tie-in.
Bacteria tests are valid for 30 days. If there is more than a 30 day lapse between a bacteria test and the applicable tie-in, the bacteria test must be repeated prior to performing the tie-in.

99-1.20 Water Main Connection Work

Upon completion of construction, final connection will be made by the Contractor under inspection by City Utilities Department Representative, unless otherwise specified on the plans.

The Contractor shall notify the City inspector 48 hours prior to individual mainline shutdowns required to facilitate a tie-in. The contractor shall schedule tie-in work with the Engineer and with the City Utilities Engineering Division at (707) 543-3950. Tie-ins will not be scheduled until a written passing bacteria test has been received by Utilities Engineering. All shutdowns and valve turning operations shall be performed by City Utilities personnel only. A Utilities Department Inspector must be present during all tie-in operations. No tie-ins shall be performed without prior authorization of the Engineer.

Contractors or parties who fail to keep field appointments shall be billed for scheduled Utilities Crew waiting or standby time which was used and the contractor shall bear the costs incurred by the Utilities Department for notification of its customers for the subsequent appointment.

As a general rule, customer service shall not be terminated or interrupted on Mondays.

Interruption of service to commercial customers shall, as much as practical, be coordinated with the customer's needs. The Utilities Department will contact the customers, consider the customer's interests and inform the Contractor accordingly.

After hours work or weekend work is to be avoided whenever possible and any overtime costs shall be borne by the contractor requesting such after hours work. Normal working hours are: 7:00 A.M. to 3:30 P.M.

Contractors or parties requiring work of any kind by the Utilities Department forces shall request such services a minimum of 48 hours in advance of the time such services are desired. Work requests, which will involve Utilities Department 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 that is larger than the existing pipe, the new assembly must be installed at the depth sufficient to allow the valve to remain below the subgrade of the street which may necessitate lowering the existing pipe.

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. 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 will make the tap at the developer's expense. When any joint on an existing water pipe is disturbed, that joint and any proposed hot tap 4" and larger shall be replaced with a "cut-in" tee. When a "cut-in" tee and valve(s) assembly is required on the plans, the contractor shall provide and install the entire assembly (including valves), and any other hardware necessary under City Utilities Department 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 shall conduct all operations in accordance with the most stringent sanitation practices. The interior of all appurtenances being installed shall be thoroughly swabbed with a strong HTH solution prior to installation.

Tie-in or cut-in tee connections to cast iron, PVC, or ductile iron pipes shall be made with mechanical joint solid sleeves. Flexible connections shall only be used when connecting to asbestos cement pipe.

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

99-1.21 Water System Component Reporting

The Contractor shall submit the material type, manufacturer and model number of all water system components to the City inspector prior to final testing.

99-1.22 Construction Water

Unmetered connections are not permitted to the City of Santa Rosa water system, including connections bypassing meter 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. Cutting off or tampering with the cable ties will constitute a straight tie-in connection. Such connections will be severed by the Utilities 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.

The contractor must possess a valid Water Use Permit issued by the
Utilities Department for each metered construction water connection.

A deposit for each meter will be required which is refundable upon removal of the meter by City forces, less any charges for water used.

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.
ENGINEER'S LIST OF APPROVED ITEMS
FOR USE WITH WATER SYSTEM CONSTRUCTION
STANDARDS APPROVED SEPTEMBER 2002

EFFECTIVE: OCTOBER 2002

Standard 857 - Fire Hydrant and Lateral

Hydrants

Residential
(All 1-2½" & 1-4¾" outlet)
Clow F-75
Clow F-950

Commercial
(All 1-2½" & 2-4 ¾" outlet)
Clow 865

Hydrant Break-Off Check Valve Assembly
Clow #40
Long Beach LB400

Coatings
Benjamin Moore & Co. DTM Acrylic Gloss Enamel, M28
Kelly Moore DTM Acrylic Gloss Enamel, 5780
Sherwin Williams DTM Acrylic Coating, B66-100

Standard 858 - Typical Pumper Connection Detail

Low Profile Hydrant
(1- 2¼" & 1-4¾" outlet)
Clow F-94

Hydrant Break-Off Check Valve Assembly (see Std 857)
Clow #40
Long Beach LB400

Coatings
Benjamin Moore & Co. DTM Acrylic Gloss Enamel, M28
Kelly Moore DTM Acrylic Gloss Enamel, 5780
Sherwin Williams DTM Acrylic Coating, B66-100

Standard 861 - Blow-Off With Harness

2" Brass Ball Valve (FIP X FIP)
Ford B11-777W
Jones J-1900W
McDonald 6101W
Mueller B-20200

3" Brass Ball Valve
Watts Series B-6000
### Boxes & Covers

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#### Standard 862 - 8" Blow-off
2" Brass Ball Valve (PIP X PIP)
- **Ford**: B11-777W
- **Jones**: J-1900W
- **McDonald**: 6101W
- **Mueller**: B-20200

3" Brass Ball Valve
- **Watts**: Series B-6000

### Boxes & Covers

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#### Standard 863 - 3/4" & 1" Water Service Lateral For 5/8" x 3/4" & 1" Meters
- **Angle Meter Ball Valve-Street Side (Compression x Meter Swivel Nut)**
  - **Ford**: BA43-332W-Q - 3/4"
  - **Jones**: J-1963WSG
  - **McDonald**: 4602BQ
  - **Mueller**: B-24258

- **Angle Meter Ball Valve-Property Side (FIP x Meter Swivel Nut)**
  - **Ford**: BA13-332W-Q 3/4"
  - **Jones**: J-1966W
  - **McDonald**: 4604B
  - **Mueller**: B-24265

**Corporation Stop (AWWA/CC Taper Thread Inlet x Compression CTS)**
- **Ford**: FB1000-3-Q - 3/4"
Jones J-34015G
McDonald 4701BQ
Mueller B-25008

Tapping Service Saddle
C-900 Pipe
Ford 202BS
   FC202
   FS303
Jones J969
McDonald 3845 & 3846
Mueller DE 2 S Series
   BR 2 S Series
Romac 202B
   202N
Smith-Blair 317
   393

Ductile Iron Pipe
Cascade CS22
Ford FC202
   FS303
McDonald 3825 & 3826
Mueller DE 2 S Series
   BR 2 S Series
Romac 202B
   202N
Smith-Blair 317

Existing ACP
Ford FC202
McDonald 3825 & 3826
Mueller DE 2 S Series
   BR 2 S Series
Romac 202N
Smith-Blair 317

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Standard 864 - 1" Dual Water Service Lateral
U-Branch Assembly (Compression x MIP)
Ford UVB43-42WFPQ
Jones J-2613SG
McDonald 08UQM
Mueller H-15363

Angle Meter Ball Valve (FIP x Meter Swivel Nut)
3/4"
Ford BA13-332W
Jones J-1966W
McDonald 4604B
Mueller B-24265

Meter Boxes & Covers

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*Probe - 1 3/4" hole in meter box.

Standard 865 - 2" Water Service Lateral For 2" or 1 1/2" Meter
2" Straight Ball Valve (FIP x Meter Flange)
Ford BF13-777W
Jones J-1912W
McDonald 6101MW
Mueller B-24337
2" Angle Ball Valve (FIP x Meter Flange)
Ford BPA13-777W
McDonald 4604B
Mueller B-24286

2" Angle Ball Valve (Compression x Meter Flange)
Jones J-1975WSG
McDonald 4602BQ
Mueller B-24276

2" Coupling (MIP x Compression)
Ford C84-77-Q
Jones J-2605SG
McDonald 4753Q
Mueller H-15428

2" 90° Elbow (Compression x Compression)
Ford L44-77-Q
Jones J-2611SG
McDonald 4761Q
Mueller H-15526

2" Straight Coupling (Compression x Compression)
Ford C44-77-Q
Jones J-2609SG
McDonald 4758Q
Mueller H-15403

2" Resilient Seated Gate Valve
American Flow 502
AVK Series 03-35
Clow F-6103
Mueller A-2360

Tapping Service Saddle
Refer to Approved List for Standard 863.

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*Probe - 1 3/4" hole in meter box
Standard 866  4" Water Service Lateral For 3" Meter
Standard 867  4" Water Service Lateral For 4" Meter

Tapping Sleeves
Refer to Approved List for Standard 878

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<td>Coordinate installation with your inspector.</td>
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<tr>
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Standard 868 - 6" Water Service Lateral For 6" Meter
Tapping Sleeves
Refer to Approved List for Standard 878.

<table>
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<td>6&quot;</td>
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<td>Coordinate installation with your inspector.</td>
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<td>Christy B52 w/extension</td>
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Standard 872 - Dirt Stop and Water Main Encasement
Casing Spacers
Calpico Inc.  The Model M Series
Cascade       Model CCS

Standard 875 - Below Ground Double-Check Valve Backflow Device

<table>
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<td>Quazite PG1324WA50</td>
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<td>2&quot;</td>
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<td>Christy B36D</td>
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Standard 877 - Gate Valve
Valve Box
Bes M2
Brooks 4TT
Gate Valves
Valves shall conform to the latest revision of AWWA Standard C-509 covering resilient seated gate valves. (For example: Clow, US Pipe, American Flow Control)

Standard 878 - Butterfly Valve & Tapping Valve
Tapping Sleeves (Stainless Steel) - 4" & larger
Size on size up to and including 8" on 8" (examples: 4" on 4", 6" on 6") and any combinations (examples: 4" on 8", 6" on 8")
DIP, CIP, PVC, and Existing ACP:
(Sleeve must be compatible with pipe type).
Dresser Style 630
Ford FTSS
JMC 415
JCM 432
Mueller H-304
Powerseal 3490
Romac SST111
Smith-Blair 663
664-665

For taps smaller than 4", See Appropriate Standard

Standard 879 - Single Check Detector in Vault
Detector Check Valve
Ames 1000 DCV
Hersey EDC III
Hersey EDC IV

Precast Vault
Utility Vault Co. 44-SRW(4' x 4') 4848SRW
555-SRW(5' x 5') 4848SRW
(Pedestrian Walkways must have Algrip surface)

Standard 880 - Double Check Detector Fire Line Backflow Assembly

Standard 881 - Pressure Reducing Valves
Pressure Reducing Valves
CLA-VAL 90-01
Singer 206-PRC
Watts PV-10-01

Precast Vault and Cover
Refer to Approved List for Standard 879.

Standard 882 - Surge Anticipator Valve Or Pressure Relief Valve
Tapping Sleeves
Refer to Approved List for Standard 878.

Utility Box and Cover (Non-traffic Loading)
Standard 883 - Air & Vacuum / Air Release Valve
Tapping Service Saddle
Refer to Approved List for Standard 863.

1" Ball Valve Curb Stop (FIP x FIP)
Ford B11-444W
Jones J-1900W
McDonald 6101W
Mueller B-20200

1" Corporation Stop (AWWA/CC Taper Thread Inlet x MIP or FIP)
Ford FB 400-4
Ford FB1600-4
Jones J-45
Jones J-51
McDonald 3128B
McDonald 3148B
Mueller B-20045
Mueller B-2996

1" 90° elbow (MIP x Compression)
Ford L84-44-Q
Jones J-2619SG
McDonald 4779MQ
Mueller H-15531

1" 90° Brass elbow (FIP x Compression)
Ford L14-44-Q
Jones J-2621SG
McDonald 4779Q
Mueller H-15533

Combination Valves
APCO 143C
Crispin UL10
Valmatic VM-201C

Closure

Boxes & Covers

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Standard 884 - Water Meter For Private Non-residential Systems

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<td>Brooks 37 Series</td>
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<td>Christy B12C</td>
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<td>Brooks 38 Series</td>
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Standard 885 - Water Meter for Private Process and Evaporative Water Lines

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Standard 886 - Water Sampling Station

3/8" Stainless Steel Ball Valve
"Truline Midget"

Aluminum Cast Cabinet
Kupferle Model 88 Ellipse

Standard 887 - 4" Ductile Iron Multi-Service Manifold
MIP x Compression Coupler 3/4", 1" and 2"

<table>
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<tbody>
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<td>Jones</td>
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<td>Mueller</td>
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Tapping Service Saddles for Individual Services
Refer to Approved List for Appropriate Service Lateral Std.

Tapping Sleeves
Refer to Approved List for Standard 878.
Standard 888 - Above Ground Single Check Detector Assembly
    Ames     1000DCV
    Hersey   EDC III
    Hersey   EDC IV

Standard 889 - Water Service Anode
    Magnesium Anode
    Calpico, Inc.

APPROVED:

Miles A. Ferris
Director of Utilities/City Engineer