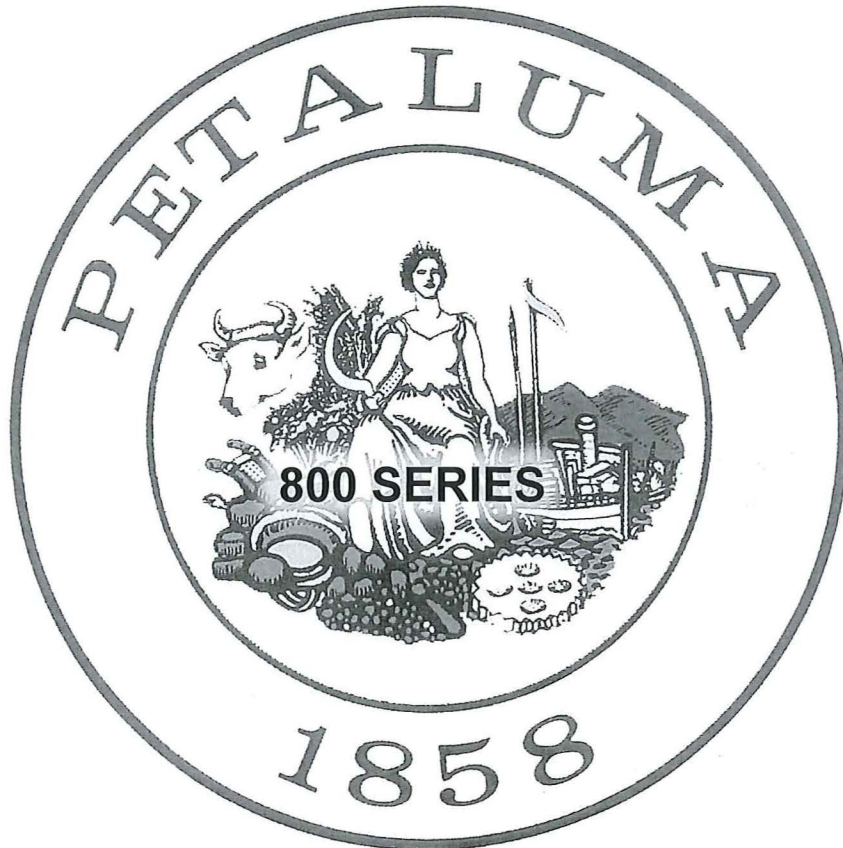


Water System

- Design Guidelines
- Construction Standards
- Approved Materials List
- Installation Specification No. 11



City of Petaluma - Sonoma County - California
Public Works & Utilities
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Petaluma, CA 94954

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Date

Table of Contents

Design Guidelines

A. Purpose	1
B. Water System.....	1
1. Water Main Materials.....	1
2. Water Main Alignment.....	2
3. Water Main Sizing.....	3
4. Water Main Cover.....	3
5. Water Main Connecting to an Existing Main and Cut-Ins.....	3
6. Water Main - Flanged Coupling Adapters.....	4
7. Water Main Fittings.....	4
8. Valves.....	4
9. Service Laterals and Water Meters.....	5
10. Fire Hydrants.....	9
11. Backflow Devices.....	10
12. Pressure.....	11
13. Specialty Items.....	11
14. Special Conditions.....	11
15. Hardware.....	12
16. Water System Component Reporting.....	12
17. Laying and Handling Pipe Materials.....	13
18. Excavation and Backfill.....	13
19. Construction Water.....	14
20. Thrust Blocking.....	14
21. Hydrostatic Testing.....	14
22. Chlorination of Pipeline.....	15
23. Water Main Tie-Ins.....	16
24. Records.....	17
25. Requirements for Pump Tank Assembly.....	17
26. Installation of Automatic Fire Sprinklers in Pre-Existing Buildings in the Historic Downtown District (as it relates to fire protection).....	19

Construction Standards

Approved Materials List

Installation Specifications



Water System Design Guidelines

A. PURPOSE

To provide guidelines for the design and construction of water utility 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 other departments of the City of Petaluma or other government agencies. These guidelines are intended to impose minimum acceptable design criteria. More stringent requirements may be imposed at the discretion of Public Works & Utilities (PW&U) based on specific project conditions. It is the responsibility of the design engineer to initiate written requests for approval of any design concepts contrary to these criteria, to verify additional requirements imposed, perform any necessary calculations or studies, and resolve specific design problems with the appropriate department or division.

B. WATER SYSTEM

1. Water Main Materials

- a. 8-inch thru 12-inch water mains shall be Polyvinyl Chloride (PVC) C900, Class 200, minimum, or cement lined ductile iron pipe, C151, Class 50, minimum.
- b. Polyvinyl chloride (PVC) pipe shall be new pipe, minimum Class 200, or as shown on the plans and conforming to the requirements of AWWA C900 "Standard for Polyvinyl Chloride Pressure Pipe, 8-inch through 12-inch for Water" and shall be furnished with either bell ends or couplings designed to effect an elastomeric pressure seal.
- c. Ductile iron pipe shall be cement lined, new pipe conforming to the most recent issue of A.N.S.I. A 21.51 1976 or most recent issue, if any, as sponsored by the American Water Works Association for thickness Class 50 Ductile Iron Pipe. The pipe shall be furnished with bell and spigot end, "Tyton Joints" or Mechanical Joints except where otherwise specified on the plans.
- d. Ductile iron pipe must be polyethylene encased (8 mil. minimum) in accordance with ANSI/ AWWA C105.
- e. 16-inch or 18-inch diameter water mains shall be cement lined ductile iron pipe or PVC C905, 235 psi or as shown on plans and specifications.
- f. 20-inch and larger water mains shall be constructed as directed by PW&U.
- g. Asbestos cement pipe shall not be installed under any circumstances.
- h. 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.
- i. Mains outside the paved roadway or crossing a delineated fault zone must be ductile iron pipe.

2. Water Main Alignment

- a. Alignment shall be in accordance with the provisions of City Standards.
- b. Public water mains outside the public street are not allowed without special permission from the PW&U and shall be installed to City Standards located in an exclusive, dedicated minimum 10-foot-wide paved easement per City Resolution 91-17 N.C.S., "Water mains including fire hydrants and service laterals to the meters or detector check valves shall be publicly maintained." For ease of maintenance, public water systems shall always be in asphalt, concrete, or turf block surfaced area with a buffer area from buildings, carports, and landscaping whenever feasible. This will provide for all weather surfaces to allow PW&U to be able to make repairs at any time and allow sufficient operating room for equipment normally used in water line maintenance. Private utilities shall not be allowed to share the easements set aside for water mains on private property. Overhangs of buildings shall not be allowed to project over a utility easement. Trash enclosures, transformer pads, retaining walls, carports, or other structures shall not be located closer than ten (10) feet from a water utility easement. The location of trees in relationship to utilities shall be coordinated with PW&U.
- c. Minimum allowable radius for 8-inch-diameter water mains is 250-feet, for a 12-inch diameter water main is 350 feet, or per the pipe manufacturer's recommendations. Whenever possible, new mains shall be roped to avoid obstacles rather than using angle fitting.
- d. New mains must match the grade and centerline offset of existing water mains where possible. Start excavation by exposing end of existing main to determine its line and grade. Start new main 8-10 feet from and on same line and grade as existing main. Pipe lying shall then be adjusted so depth of new main conforms to Section B-4 Water Main Cover.
- e. Maintain a constant distance from centerline of street wherever possible, center easement over water main alignment where applicable.
- f. Conform to the State of California Department of Health Services "criteria for the vertical and horizontal separation of water main and sanitary sewers" and City Standard 855.03.
- g. The minimum vertical clearances shown in City Standard between a main and pipes or structures must be maintained unless special permission allowing a low head crossing is obtained from PW&U. A low head crossing over or under a structure when allowed by PW&U will require the installation of a 1-inch thick felt or rubber expansion cushion between pipes. PW&U may require concrete encasement. Ductile iron pipe Class 52 minimum shall be used for low head crossings and shall extend a minimum of 36 inches beyond the plumb line of the pipe or structure crossed.
- h. When the structure or pipe to be crossed is less than 6 inches in size (such as a telephone conduit) at PW&U's direction low head-clearance requirements may be waived.
- i. Minimum separation from existing gas, electrical, and telephone lines shall be 36 inches between pipes in any direction from the outside of pipe.
- j. Metallic pipe fitting shall not be installed within 10 feet of any pipeline that is protected by induced current unless approved by PW&U.

- k. Minimum clear horizontal separation from a storm drain shall be 5 (five) feet measured from the outside of pipe.
- l. New water main crossing utility trench lines shall be made at angles between 90° and 45° whenever possible.
- m. Number 12 THHN insulated copper wire shall be secured to the top of and along the entire length of all mains and service laterals, and shall be extended to the surface at all valve locations, blow-offs, and meter boxes sufficiently for locator equipment to be attached, as noted on City Standard. All wire connections shall be made with copper crimps wrapped with electrical tape. Ductile iron fire-hydrant laterals or services are exempted.

3. Water Main Sizing

- a. Water mains must be sized to meet minimum California Fire Code requirements.
- b. For residential/commercial installations, public and private mains shall be an 8-inch minimum unless otherwise allowed by PW&U.
- c. For industrial installations, water main sizing in a looped system shall have a minimum pipe diameter of 8 inches; a dead end system requires a minimum of 12-inch diameter pipe.
- d. PW&U may modify specification size requirements to provide the pipe size for overall system benefit.

4. Water Main Cover

- a. Definition: Cover is the distance from the top of the pipe to finished grade.
- b. Minimum depth of cover from finished grade shall be: 32 inches for 6-inch mains, 36 inches for 8-inch mains, 42 inches for 12-inch mains, and 48 inches for mains larger than 12-inches.
- c. Where cover is less than the standard cover, Class 52 ductile iron pipe and special permission from PW&U is required. Concrete encasement or a cap may also be required by PW&U to protect the water pipe.
- d. Where cover exceeds 8 feet, special permission from PW&U is required.

5. Water Main Connection to an Existing Main

- a. In most major streets, or in new streets, the new water main must be bored and jacked into place. Conditions should be verified to be consistent with the City of Petaluma's "Street Cut Policy."
- b. For connecting 2-inch-diameter pipes and smaller, the contractor will be responsible for making the hot taps unless arrangements are made with PW&U for the service.
- c. For connections of pipes 4–12 inches in diameter, a hot tap or a cut-in tee may be used as determined by PW&U in conformance with the provisions of the Water System Guidelines, Section 10.m. These hot taps shall be made by PW&U at the contractor's expense. 24-Hour advance notice is required.

- d. A cut-in tee must be used if additional valves are required on the existing main. If the new lateral is larger than the existing main, the tee shall be the size of the new lateral and reduced to the size of the existing main.
- e. Any tapping sleeve or service saddle used must be on the Approved Materials List.
- f. Mechanical joint continuous-sleeve type couplings shall be used for all spigot-to-spigot pipe connections. Mechanical Joint (MJ) sleeves shall comply with AWWA C110 Table 10.10 or C153 Table 53.5. The pressure class shall be 350 psi. In cases of differing pipe ODs, a ductile iron or cast iron MJ transition sleeve or coupling shall be used. For transition couplings larger than 12-inch diameter, submit manufacturer's specification data for approval. Steel couplings shall not be permitted.

6. Water Main Flanged Coupling and Adapters

- a. Flange Coupling Adapters (FCA) - Short body ductile iron or cast-iron FCA's are permitted in manhole or vault type installations where minimal laying length dimensions are required. Acceptable FCA's are listed in the Approved Materials List.

7. Water Main Fittings

- a. All fittings shall be new ductile iron fittings conforming to ANSI/AWWA C110 thru C153 or of latest revision and shall have the proper type of ends to match the type of pipe used.
- b. Gaskets for flange fittings shall conform to AWWA STD. C115.
- c. Ductile iron fittings shall be cement mortar lined or fusion-bonded epoxy coated in accordance with AWWA C104 of latest revision and shall have petroleum asphalt outside coating conforming to AWWA C110. Ductile iron fittings shall have a minimum pressure rating of 250 psi and shall otherwise meet or exceed the pressure rating of the pipe to be installed and shall have a minimum Class 53 thickness rating.

8. Valves

- a. General
 - 1. Valves at intersections shall be in accordance with the provisions of City Standard 871. Main line valves within 250 feet of an intersection may be considered as part of the intersection. Valves shall be located so that no more than 800 feet of water main would be out of service in the event of a shut down.
 - 2. All hydrants must be on separate valve sections of the public main. No service connections are allowed between any hydrant and its isolation valve.
 - 3. After a street has been overlaid, all water-valve boxes will be marked in white paint before the close of that workday. Within 48 hours of paving, all water-valve boxes shall be brought to grade, cleaned out, and inspected by the contractor.
 - 4. All bolts, nuts, and washers shall be stainless steel.
 - 5. Where the vertical distance from the top of the operating nut exceeds four (4) feet from the finished grade, the Contractor shall install a valve stem extension per City Standard.

6. All valves shall be wrapped with 10-mil minimum polyethylene.
7. 4-inch thru 12-inch main line valves shall be resilient seat gate valves. 16-inch and larger mainline valves shall be butterfly valves.
8. Contractors are prohibited from operating valves or hydrants on the City system. Fines may be levied for violation per *City Resolution No. 94-317 NCS*. Only PW&U authorized personnel shall operate valves on water mains or water services.

b. Gate Valves

Gate valves shall be AWWA-approved resilient seat gate valves with non-rising stem opening counter-clockwise conforming to the latest AWWA C509 standard. Valves shall be manufactured by Clow, American Flow Control, American AVK, or approved equal. All internal and external surfaces of the valve body and bonnet shall have a fusion-bonded epoxy coating complying with ANSI/AWWA C550, applied electro-statically prior to assembly. All bolts, nuts, and washers shall be stainless steel. Valves shall be wrapped with 10-mil minimum polyethylene.

c. Butterfly valves

Butterfly valves shall have a ductile iron body, stainless steel shaft and discs with stainless steel seating edge. Valve seats shall be vulcanized, bonded, mechanically secured, or clamped to the body. Valves shall be the stub or through shaft design type. Wafer type valves shall not be permitted. Valves shall be the traveling nut type and open with a counter-clockwise rotation. Valve discs shall rotate 90 degrees from the full open position to the tight shut position. The valve seat shall provide a seal at a pressure differential of 150 psi upstream and 0 psi downstream in either direction. Valves shall have a fully lined rubber inner body or have corrosion resistant fusion-bonded epoxy coating internally and externally. Butterfly valves shall be manufactured and tested in accordance with AWWA Standard C504 for Class 150B.

9. Service Laterals and Water Meters

- a. All PW&U water meters, blow offs, valves, hydrants, or other facilities shall be located in a utility easement or right-of-way. See *Section B. 2. b.*
- b. As part of the plan approval process, two sets of detailed plans showing all meter sizes and calculations used by the Design engineer to determine the meter(s) size(s) proposed shall be submitted to PW&U for approval for any water meter that will serve irrigation or domestic use other than for a single family dwelling. Public Works & Utilities shall determine water meter size.
- c. Service laterals other than those shown or noted on approved plans shall not be installed prior to obtaining PW&U approval.
- d. New single-family residential construction shall be:
 1. Minimum of 1½-inch lateral service from the main to the meter.
 2. Minimum of 1-inch water meter flange, bushing, and meter coupling shall be supplied by contractor.
 3. Minimum 1½-inch or larger service from the meter to the dwelling, depending on calculated flow for fire sprinkler system. The Fire Marshal's office will verify the size of this pipe based on fire flow requirements.
 4. Provide an approved check valve device on the fire sprinkler system; installed on or near the sprinkler riser.
 5. All water connection fees as established by PW&U for the appropriate-sized meter would be charged, as required.

6. Service laterals and meters installed before the implementation of this standard will be evaluated on a case-by-case basis with respect to supplying adequate flows for the fire sprinkler system. The fire plans examiner will coordinate with the building owner and/or contractor to determine the best solution to provide fire sprinklers; i.e., pump and tank assembly, upsize the meter size, or, as a last resort, increase to the lateral and meter. If upsizing the water meter or the laterals is necessary, the plans examiner will obtain concurrence from both PW&U and Community Development before requiring them.
 7. Any new residential fire sprinkler application requiring a meter larger than 1 inch will be required to provide a separate lateral and meter from the domestic supply.
- e. Unless otherwise shown on the approved plans, 2-inch water service laterals shall be installed in commercial developments.
 - f. Water and sewer service laterals shall be separated horizontally by a minimum of 5 (five) feet or greater and as otherwise required by health codes.
 - g. At the location of each water service lateral, the letter "W" shall be inscribed into the face of the curb. The letter "W" shall be 4 inches high and completely legible.
 - h. Water service laterals less than 4 inches in diameter shall be polyethylene plastic tubing Class 200, PE 3408, CTS, and shall conform to AWWA STD C901. All connections are to be compression type plastic inserts used. Tubing shall be installed per manufacturer's recommendation. All water service laterals or stub-outs larger than 2 inches in size must be constructed of ductile iron pipe.
 - i. All meter boxes, vaults, and pits shall be bedded on 3-inch minimum thick $\frac{3}{4}$ -inch drain-rock and bedded against compacted or undisturbed base. Additional bedding material may be required to stabilize moisture saturated base. Aggregate Base (AB) shall not be used as bedding or to stabilize moisture saturated base. Bedding shall extend to a 4-inch minimum distance beyond all sides of the meter box. Box shall be set flush with top of curb, sidewalk, or ground, whichever is applicable. Lot numbers must be noted on top side of meter box with a permanent-marking pen. Where the meter box is located in such a location that water will pond over it, a drain line shall be installed to PW&U satisfaction that will keep the water level below the meter.
 - j. Where a fire hydrant is not required by the Fire Department, any water service stub-in larger than 2 inches must have a blow off at the end of the stub-in set in a meter boxes in the public right-of-way per City Standard.
 - k. Meter boxes shall be located out of traffic loading areas whenever possible. Meter boxes and vaults shall be set so that the reading lids are aligned over the meter registers as closely as possible.
 - l. Unless otherwise approved by PW&U, the on-site water service shall be at a minimum the same size as the water meter.
 - m. New service laterals must be installed and aligned generally perpendicular to the water main and property frontage. Horizontal offsets greater than 24 inches from the service alignment shall require prior approval of PW&U.
 - n. All meter manifolds must be detailed and approved by PW&U. In general, manifolds where all fittings are 2 inches or less, shall be constructed from

threaded brass pipe and fittings from the end of the service lateral to the meter connection. No soldered copper, PVC, plastic, or galvanized pipe shall be used in constructing manifolds of any size. Polyethylene plastic tubing Class 200, PE3408 C.T.S. may be used for straight sections of the manifold longer than 12 inches. On water service manifolds having water meters larger than 2 inches, the service manifold must be constructed of flanged ductile iron pipe and in accordance with the City's Standard Details. No more than 6 meters may be on a manifold off of a single water service lateral without prior approval of PW&U. Main shutoff valve for manifold shall be installed in a valve box separate from the meter boxes.

- o. Residential (single-family unit)
 - 1. One meter per lot unless approved by PW&U. Approved check valve devices are required.
 - 2. Where fire sprinklers are required or in low pressure area, install individual 1½-inch service(s) and 1-inch meter(s). Check valve shall be required to separate the systems on the site.
- p. Apartments (2-6 units) must be individually metered.
- q. Apartments (7 or more units) and mobile home parks (under common control)
 - 1. May be master metered or individually metered with the size based on the total demand.
 - 2. Separate irrigation meters are required.
 - 3. This may require a combination water service.
 - 4. Apartment or mobile-home park owners may sub-meter to the tenants at their own expense but must first obtain City authorization per City Ordinance 15.12.050.
- r. Condominiums
 - 1. Must be individually metered.
 - 2. Individual meters must be clustered and located within the public right-of-way.
 - 3. A maximum of six meters is allowed per manifold.
 - 4. Separate irrigation meters for common areas are required.
 - 5. Combination water services may be required.
- s. Commercial
 - 1. Size of the meter and service are based on calculations by the design engineer and approved by PW&U.
 - 2. A separate irrigation meter is required.
 - 3. Unless otherwise approved by PW&U, a minimum 2-inch service shall be required for any commercial lot.
 - 4. A minimum 8-inch service shall be required for industrial lots and shopping centers on lots of one acre or larger.
 - 5. All commercial installations shall be required to meet backflow prevention requirements per City Ordinance 15.09.
- t. Combination services
 - 1. 8-inch laterals are the minimum required for most installations.
 - 2. Combination services are required in commercial subdivisions per City Standard.
- u. Irrigation
 - 1. Separate irrigation meters must be provided for all commercial users, master metered condominiums, Planned Unit Developments, apartment complexes (7 or more units), and mobile-home parks.

2. All irrigation services in industrial areas or new City facilities must have reduced pressure backflow devices unless otherwise determined by PW&U.
 3. Irrigation water demands shall be determined by the maximum flow required at any one control valve or combination of valves operated the same time.
 4. Sizing of irrigation meters shall be coordinated with and approved by PW&U. At the design engineer's option, the irrigation demand may be disconnected from the domestic demand when connected to a common service lateral.
 5. Backflow devices specified on the irrigation plan must conform to City Standard and must be on the current Sonoma County Department of Health Services Approved List of Devices.
- v. Private fire systems
1. Before combustible materials may be stored or constructed on site, the Fire Department must approve fire flow and access per City Code Section 17.20 and California Fire Code, and all hydrants serving the construction site shall be operable. Before a fire hydrant may be placed in service, a high velocity flush of the fire hydrant shall be witnessed and approved by the Fire Inspector or Public Works and Utilities in conformance with the provisions of City Standard 850 Section J15 and conform to National Fire Protection Association (NFPA) standards.
 2. Lateral size must be the same or larger than the size required for the sprinkler system or the private hydrant system.
 3. Additional services will require upsizing of common laterals (combination service).
 4. All private fire systems require detector check assemblies in accordance with City Standard.
 5. Double detector check backflow assemblies shall be required in accordance with City Standard if the fire system contains:
 - (1) Chemicals, or
 - (2) An auxiliary water supply (well) exists on site, or
 - (3) A health hazard exists on the site, or
 - (4) More than one feed from the City water supply to the system, or
 - (5) A building of 3 or more stories.
 6. On residential fire systems, install a 1½-inch service lateral and a 1-inch meter unless otherwise determined by the Fire Marshal. Unless specifically approved by PW&U, meters larger than 1 inch will not be installed for single-family residential use. An approved check valve assembly must be installed where fire system connects to the domestic water system.
 7. Fire Department connection location must be approved by the Fire Department and conform to NFPA standards.
 8. The maximum length of a fire hydrant lateral from a private main to the hydrant buried is 40 feet.
 - (1) Where the intended use of the water services requires an uninterrupted supply, the design engineer shall submit a meter bypass detail to PW&U for approval. The bypass design will allow the meter to be taken out of service for repairs and testing and include a lockout or removable piece accessible in a meter vault.
- w. Where multiple taps are made for 1½-inch services, the taps must be made a minimum of 18 inches apart and a minimum of 18 inches from any joint or fitting.

10. Fire Hydrants

- a. Minimum fire flow required at all fire hydrants
 1. Residential buildings-1,500 gallons per minute with a 20-psi residual.

2. Industrial and commercial buildings-2,500 gallons per minute with a 20-psi residual.
 3. Lower fire flows may be permitted with approval of the City Fire Marshal when a built-in fire suppression system is provided in the building.
- b. Fire hydrants shall conform to the Approved Materials List.
 - c. Location of fire hydrants must be approved by the Fire Department.
 - d. Each hydrant must be on a separate valved main line section. The fire hydrant lateral will be 6" pipe, typical.
 - e. Whenever possible, locate hydrants at street intersections. If it is not possible to locate at an intersection, locate the hydrant near a property line or where it will minimize interference with property use.
 - f. All public hydrants shall be painted in accordance with the specifications; DTM ALKYD based enamel paint, gloss safety yellow, shown on City Standard. Private hydrants shall be painted chrome yellow.
 - g. Locate hydrants a minimum of 10 feet from roll down of driveways unless prior approval of PW&U is obtained.
 - h. Single Family Residential areas
 1. Space fire hydrants every 300 feet or as approved by the Fire Marshal.
 2. Evenly distribute hydrants throughout the project.
 3. No building may be more than 150 feet from the nearest hydrant.
 4. Approximately one fire hydrant is needed for every 2 acres in a single family residential development.
 5. Whenever possible, locate a fire hydrant at the end of water mains in cul-de-sacs or other non-looped systems.
 6. Residential fire hydrants will have two 2½-inch outlet and one 4½-inch outlet.
 - i. Multi-family, Commercial and industrial areas
 1. General hydrant spacing shall be every 300 feet.
 2. Evenly distribute hydrants throughout the project.
 3. No building may be more than 150 feet from the nearest hydrant.
 4. Commercial fire hydrants will have one 2½-inch outlet and two 4½-inch outlets.
 5. Hydrant shall be within 50 feet of the Fire Department connection.
 - j. Hydrants located within shopping centers and adjacent to parking areas shall be protected by 6-inch diameter concrete-filled galvanized steel bollards anchored 36 inches deep in concrete and to the City's satisfaction. Steel bollards shall be installed per California Fire Code.
 - k. Before combustible materials may be stored or constructed on site, the Fire Department must approve fire flow, hydrant operability, and access, per City Code Section 17.20 and California Fire Code.
 - l. No bends will be allowed in fire hydrant laterals without approval of PW&U.
 - m. When a connection is required to an existing water main, the contractor shall provide all excavation, shoring, backfill, and trench resurfacing, per City Standard. Where the connection is to be a "hot tap" larger than 2 inches, the contractor shall provide and install a flanged by mechanical joint tapping valve

and sleeve, and any other hardware required, and City forces will make the tap with 24-hour advance notice at the contractor's expense. No hot tap shall be made within 24 inches of a fitting (measured edge of fitting to edge of fitting). In cases where the tapping sleeve cannot be moved, the joint shall be removed and the proposed hot tap 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 inspection, and shall provide all other work and materials necessary to complete the installation to City Standards.

- n. Each fire hydrant shall be covered until it is accepted and activated following permanent connection of mainline piping to the existing system. The contractor shall protect fire hydrants whenever the engineer determines that the situation or placement warrants such protection.
- o. Before a fire hydrant may be placed in service, a high velocity flushing of the hydrant lateral shall be witnessed and approved by the City Fire Marshal and Public Works and Utilities. High velocity flushing shall consist of flushing through the 4½-inch outlet of the fire hydrant. The contractor shall provide a suitable elbow and diffuser. Under the City Fire Marshal supervision, the hydrant lateral is flushed until the PW&U inspector is satisfied that the lines are clean of debris. Prior to activation of private on-site water main(s) by the City, an approved fire check valve assembly certified by the City must be installed per City Standard.
- p. Blue reflective markers, anchored with epoxy, shall be required to be placed 6 inches from the centerline on the hydrant side of the street. When the street is without centerline marking hydrant marker shall be located beside the centerline on the hydrant side of the street per City Standard.

11. Backflow Devices

- a. Backflow devices are required to be installed by State of California Title 17 and City of Petaluma Ordinance 15.09.
- b. All backflow devices that are installed must be on the latest State of California Department of Health Services Approved List.
- c. Backflow assemblies must be installed as near as practical to the water meter, as shown on City Standards.
- d. Where residential fire sprinklers are installed, double check valve backflow preventers are required to be installed where the fire service connects to the domestic service per City Standard. The backflow preventer must be accessible for testing and maintenance.
- e. Properties with private sewer lift stations must have, at a minimum, a reduced pressure backflow assemblies installed on their water systems.
- f. All irrigation services require reduced pressure backflow assemblies unless otherwise approved by PW&U.
- g. Parcels with two or more water service laterals must have at a minimum double check valves installed on each service. This shall include private fire systems.
- h. A thermal expansion tank shall be sized and installed per manufacturer's recommendation on the cold water supply line to the water heater.

12. Pressure

- a. Maximum allowable main line pressure is 120 psi measured at a fire hydrant.
- b. Maximum allowable service pressure measured at a faucet is 80 psi.
- c. Minimum service pressure measured at a faucet is 40 psi.
 1. If the service pressure delivered to the customer exceeds 80 psi, an individual pressure regulator will be required on the service line beyond the City water meter. If the delivery pressure does not meet a minimum of 40 psi, an individual pressure booster station will be required on the service line as shown in City Standard.
- d. Fire flows must be calculated in all areas of low pressure.
 1. For calculating maximum pressures in pumped zones, calculate the maximum pressure using the elevation of the supply reservoir full.
 2. For calculating design pressure in pumped zones, calculate the available pressure using the base elevation of the supply reservoir.
 3. Pressure modeling in Zone I shall be calculated using the low setting of pressure reducers at the nearest aqueduct turnout supply. Contact Public Works & Utilities for this information.

13. Specialty Items

- a. Air relief valve
 1. Air relief valves are required at locations in the system that are one pipe diameter or higher than the remainder of the system.
 2. Air relief valves are not required in residential areas if a service or fire hydrant is installed at or near the crown within one pipe diameter vertically of the high point.
- b. Pressure reducing valves may be required to be installed to maintain overall system pressure balance.
- c. Surge or pressure relief valves are required and are to be installed where pressure could potentially reach above the maximum allowable as determined by PW&U. A long dead end main with large demands and/or fire systems/hydrant on it would require this installation.

14. Special Conditions

- a. Abandon water mains and services
 1. All steel and iron saddles or any defective or leaking fitting must be removed and replaced with full circle, all stainless-steel clamps at contractor's expense. Unused service laterals shall be abandoned at the water main by removing the saddle and installing a full circle clamp. For lines 1 inch or smaller, expose lateral at the main, close the corporation stop, disconnect the lateral, and plug or cap the corporation stop. For lines that are 1½ inches or larger, remove the valve and plug the main. Coordinate with PW&U 24 hours in advance.
 2. Valve boxes for abandoned valves must be removed and the street repaired.
 3. Abandoned mains, valves, and risers located within the street structural section must be removed.
 4. All water mains 12 inches and larger, within the public right-of-way, must be broken every 50 feet and filled with sand/concrete slurry.

5. Unused water mains must be cut and plugged to the PW&U Inspector's satisfaction. A closed gate valve is not acceptable as a permanent cap or plug on a live main or service.
- b. Private water mains vs. Public water mains
 1. Public water mains may not be constructed outside the street right-of-way without specific approval by the City and in accordance with Water System Guidelines, Section B. 2. b.
 2. Fire hydrants required on site to serve one lot will be private systems unless otherwise determined by the City.
 3. Fire hydrants required on site to serve two or more lots, or properties will be public systems unless otherwise determined by the City.
 4. Normally where the water mains are publicly maintained, the sewer mains should also be publicly maintained.
- c. Water mains installed at a slope of 15% or greater shall be constructed with restrained joints, and trench dams shall be installed every 50 feet.
- d. Water mains installed outside of the paved roadway must be ductile iron pipe.
- e. PVC water mains and/or polyethylene tubing shall not be used in areas where soils are contaminated with petroleum based products or where the intended use of the site may so contaminate the soil.
- f. Restrained joints shall be subject to the prior approval of PW&U. Restrained joints shall not be used in lieu of thrust blocking or tiebacks except as allowed by City Standard.

15. Hardware

- a. All bolts, nuts, washers, and tie rods installed below grade shall be stainless steel. To reduce galling, the use of Teflon anti-seize compound should always be used on bolt or tie-rod threads.

16. Water System Component Reporting

- a. Accompanying or preceding each load of pipe delivered, a certificate shall be furnished upon demand to PW&U certifying that the pipe which is (to be) delivered has been tested and meets the requirements of the American Water Works Association Standard Specifications. The certificate shall identify the pipe by manufacturer's name, lot number, and date tested by a State certified materials testing laboratory.
- b. The pipe shall be tested in accordance with the most recent American Water Works Standard Specifications and Amendments thereto for the pipe furnished. The testing shall be performed in a State licensed materials testing laboratory where the testing standards meet or exceed State of California Testing Standards.
- c. Each and every length of pipe and coupling shall be marked with the manufacturer's name, lot number, and date the pipe was tested.

17. Laying and Handling Pipe Materials

- a. Whenever it is necessary to use a short length of pipe at a fitting or valve, the minimum length shall be 3 feet unless otherwise approved by PW&U.

- b. Cutting pipe by means of oxyacetylene torch shall not be allowed.
- c. Proper implements, tools, and facilities satisfactory to PW&U shall be provided and used by the contractor for safe, convenient, and workmanlike performance of the work. 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 or coating.
- d. 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.
- e. 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 lying. At times when pipe lying is not in progress, the open ends of any pipe, which has 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.
- f. Individual pieces of pipe, valves, and fittings shall be joined in accordance with the manufacturer's recommendations. The joint sealing rings shall be checked to be sure they are in the proper position once 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.
- g. Necessary cutting or breaking of asbestos concrete pipe shall be done in strict accordance with applicable health and safety regulations.

18. Excavation and Backfill

- a. All excavation, backfill, and resurfacing required for installation of water system facilities shall be as shown on City Standard Trench Details.
- b. Excess material from excavation shall become the property of the contractor and shall be disposed of to the satisfaction of PW&U and in accordance with all applicable waste-disposal regulations.
- c. 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 PW&U written authorization for such disposal of materials, entry permission signed by the owners of the disposal site, and the required permits.
- d. The contractor shall not excavate within 6 (six) feet of any City valve, tie-down, thrust block, or fire hydrant without prior approval of PW&U.

19. Construction Water

- a. There shall be no un-metered connections to the water system, including connections bypassing meter for testing on-site plumbing or for obtaining

construction water. When a subdivision water main has been accepted and tied-in the individual curb stops may 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 PW&U and will result in penalties, including payment of fines and estimated water usage fees.

- b. Upon application, a contractor may install a temporary construction meter and approved backflow preventer under the direction of PW&U on the end of the existing main, service, or fire hydrant for construction water (see City Standard drawings).
- c. Unauthorized acquisition of water through appropriation at un-metered fire hydrants or other facilities is a violation of City ordinance and State law and subject to a fine per City of Petaluma resolution. *City Resolution No. 2007-022 N.C.S.*
- d. City of Petaluma must approve use of construction water from sources other than the City water system.
- e. Construction water shall be obtained from the City water system only at the point(s) designated by PW&U.
- f. The contractor must possess a valid load account agreement issued by PW&U for each metered construction water connection.
- g. A deposit for each meter will be required, which is refundable upon return of the meter by the contractor, less charges for equipment damage, daily use, and water consumed, per City Resolution.

20. Thrust Blocking

- a. All tees, bends, and plugs shall be provided with thrust blocking and/or harness as shown on the plans or in accordance with City of Petaluma Standard Details
- b. All Portland cement concrete used shall be Class "B", five (5)-sack mix, 1½-inch maximum aggregate, and 4-inch maximum slump.

21. Hydrostatic Test

- a. Pressure testing against gate valves will not be allowed unless directed otherwise by PW&U.
- b. The test shall be performed after the line has been laid and all backfill compacted as specified elsewhere in these specifications. The contractor, at his option, may test the line at any time during construction; however, the final test for acceptance shall be made only after all backfill is in place. Each valved section of pipe, or combined sections as approved by PW&U, shall be subjected to a hydrostatic pressure of not less than 50 PSI above working pressure and not less than 200 psi at any point on the main. The duration of each pressure test shall be 2 hours. No more than 1000 feet of pipe shall be included in any test. Only PW&U authorized personnel shall operate valves on existing mains in service required to be operated in connection with any project. 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 contractor shall furnish the pump, pipe connection, and all necessary apparatus except gage and measuring devices. 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 to the City's satisfaction. The PW&U inspector shall designate the time and location number at which the test shall be made.

- c. The contractor shall provide suitable means to PW&U for determining the quantity of water leakage under the test pressure. No pipe installation will be accepted if the pressure drops more than 1 PSI during the duration of the pressure test. Should any test of combined sections of pipe laid disclose leakage greater than specified limit, the contractor shall, at his own expense, locate the cause and repair the defect until the leakage is within the specified allowance.
 1. Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valves section of it, necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled. Public Works & Utilities shall designate the time and location number at which the test shall be made.
 2. The contractor shall repair any obvious leaks even though the hydrostatic test results are within the prescribed limits above.
 3. The hydrostatic test shall be performed after placement of the final aggregate base section. This test shall be at the pressure required by City specifications and shall be witnessed by the PW&U's authorized representative.
 4. Chlorination of the pipeline may be done in conjunction with the hydrostatic test.
 5. 24-hour notice is required for all inspections.

22. Chlorination of Pipeline

- a. Chlorine may be applied by any of the AWWA standard methods, subject to the approval of PW&U. 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.
- b. Water from the existing distribution system shall be controlled so that it flows slowly in the newly laid pipe during the application of chlorine. Only authorized PW&U personnel shall operate valves on water mains or water services. 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. Precautions shall be taken to prevent backpressure causing a reversal of flow in the treated pipe.
- c. Treated water shall be retained in the pipe for a period of 24 hours. After the chlorine treated water has been retained for the required time, the chlorine residual at the pipe extremities and at representative points shall be at least five (5) parts per million. In the process of chlorinating, all valves and other appurtenances on the newly laid main shall be operated.
- d. Following chlorination, all treated water shall be thoroughly flushed and discarded appropriately until residual is less than 1.5-parts per million from the new pipeline. Under no circumstance shall any chlorinated water enter the public storm drain system. The water throughout its length shall be chemically and bacteriologically proven equal to the water quality served the public from the existing water supply system. The necessary samples and tests shall be taken by PW&U at the contractor's expense. Should the initial treatment, in the opinion of PW&U, prove ineffective, the chlorination procedure shall be repeated at the

contractor's expense until samples confirm that the water from the newly laid pipeline conforms to the above requirements.

- e. There shall be a minimum 24-hour waiting period after flushing of the main prior to taking bacteria samples, unless otherwise authorized by PW&U. The initial bacteria tests shall be 24 or 48-hour duration, depending on the method used by laboratory. If the initial bacteria test fails, two consecutive repeat samples must be taken with results negative for coliform bacteria prior to making the tie-in. The first of these two subsequent tests result shall be of the 24-hour duration type, and the second shall be of the 48-hour duration. Bacteria test results are valid for only 30 days. If there is more than a 30-day lapse between a passing bacteria test and the applicable tie-in, the bacteria test must be repeated prior to water main tie-in.
- f. Water main or service extensions sized 3 inches or larger that have a total length greater than 10 feet shall be chlorinated and tested through a blow-off and meter connection per City Standard. Shorter extensions may be disinfected by swabbing with PW&U's approval.
- g. 24-hour advance notice is required for all inspections.
- h. Bacteriological tests shall be scheduled by PW&U, with the number and location of the tests to be determined by the PW&U inspector. The contractor will be responsible for the costs of all tests.

23. Water Main Tie-Ins

- a. The contractor shall contact PW&U for approval 48 hours prior to individual mainline shutdowns required to facilitate these tie-in operations. The contractor shall schedule tie-in work with PW&U. Tie-ins will not be scheduled until PW&U has received a written passing bacteria test. Authorized PW&U personnel shall perform all shutdowns and valve turning operations only. No tie-ins shall be performed without prior authorization and presence of the PW&U inspector.
- b. Pipe and fittings furnished for tie-ins shall be no smaller than the existing water main to which each tie-in is made.
- c. Contractors or parties who fail to keep field appointments may be billed for the scheduled PW&U water crew standby time used and the contractor may bear the costs incurred. The City shall not be responsible for the contractor's standby time under any circumstances.
- d. As a general rule, a customer's service shall not be terminated or interrupted on Mondays. Interruption of service to customers shall, as much as practical, be coordinated with the customer's needs. PW&U will contact the customers, consider the customer's interests, and inform the contractor accordingly. For interruption of service, the City may require the contractor to do the notification under PW&U's direction. A temporary bypass pipeline, satisfactory to the engineer, may be required to be installed by the contractor at his expense. In no event shall any shutdown be allowed that will deprive consumers of water in excess of six (6) hours during any one day or commences less than 24 hours after all effected customers have been notified of the planned service interruption.

- e. After hour, holiday, or weekend work is to be avoided whenever possible, and any overtime costs shall be borne by the contractor. Normal working hours are: 8:00 A.M. to 4:00 P.M.
- f. Contractors or parties requesting work of any kind by PW&U shall request such services a minimum of 48 hours in advance of the time such services are desired. Work requests, which will involve the PW&U for more than eight (8) hours or an extensive number of PW&U supplied parts, shall be requested a minimum of seven (7) calendar days in advance.
- g. During the work, the contractor shall prevent the entrance of trench water or any other foreign material into the water main and shall conduct all operations in accordance with AWWA guidelines.

24. Records

- a. Provide a set of 24 x 36-inch record reproducible Mylar drawings, two sets of paper prints, and an electronic copy (.tiff format) within 90 days of completion of project. The contractor shall maintain a set of current red-lined "record" drawings on the job-site at all times. Record drawings shall be signed by the PW&U inspector prior to acceptance of project.
- b. Plans shall show the profile of all existing and proposed water mains as well as any other existing or proposed underground facilities or utilities that would affect the design or construction of the improvement.

25. Requirements for Pump Tank Assembly

The purpose of this standard is to define the proper installation of a pump for fire sprinkler systems tank assembly as described. This installation will have a direct effect on the performance of the required fire sprinkler system and domestic water pressure to the residence it serves. This system is usually found in low-pressure area as determined by PW&U.

- a. Plan review
 - 1. Provide a minimum of FOUR (4) copies of the following to the Fire Marshal's office for plan review and approval prior to installation.
 - 2. The same information shall be provided to the installing sprinkler contractor.
 - 3. Pump installing contractor shall coordinate with the sprinkler contractor prior to pump install.
- b. Tank

The tank will be sized to meet the requirements of the design curve density of the sprinkler system requirements with a minimum storage capacity of ten (10) minutes of water storage.
- c. Pump
 - 1. Shall provide the required water flow and pressure to meet the requirements of the sprinkler-system design curve density above that of the domestic demand.
 - 2. Domestic demand shall be determined and included in the pump calculations.
 - 3. Provide model of pump(s).
 - 4. Provide model number of motor and rpm.
 - 5. Provide pump curve data sheet.
- d. Pipe size

1. Pipe size shall not restrict the water flow to the fire sprinkler system.
 2. Shut off valve shall turn off both fire service and domestic water.
- e. Wiring
1. Voltage: 220V
 2. Wire shall be the gage required for length of run and for horsepower of pump.
 3. Wire color code shall be WHITE, BLACK, and GREEN.
 4. Minimum horsepower for pump shall not less than 1½ horsepower.
 5. Circuit breaker for pump shall be a separate circuit and breaker.
 6. Minimum circuit breaker shall be a Fuse-a-Tron or approved equal not more than a 150% of run load.

26. Installation of Automatic Fire Sprinklers in Pre-Existing Buildings in the Historic Downtown District (as it relates to fire sprinkler protection)

- a. Geographic Boundary - Historic Downtown District
 For the purposes of this section, the Historic Downtown Business District shall include all buildings located inside the geographic area generally formed by Kentucky Street to the west, Washington Street to the north, the Petaluma River to the east, and B Street to the south. Also included in this ordinance is 201 Washington Street (Phoenix Theater) and 132 Keller Street (formerly Tuttle Drug), as more particularly described in **Figure 1003.2.12**.



Figure 1003.2.12

- b. Installation requirements
 An automatic sprinkler system conforming to the *Standard for the Installation of Sprinkler Systems* (NFPA-13) shall be installed in all existing buildings in the Historic Downtown Business District in accordance with the following criteria:
1. Kentucky Street and Western Avenue

- (a) In any building wherein a change of use as defined by the Uniform Building Code occurs.
- (b) In any building or occupancy where the square footage of the building or occupancy is increased in area by greater than or equal to 25% of the building's or occupancy's existing square footage.
- (c) All buildings with basement or space below street grade used for storage, business, or public use shall have automatic fire sprinklers installed within the basements or the below street grade areas no later than December 31, 2010.
- (d) All buildings not meeting the criteria of "a" or "b" above shall have automatic fire sprinklers installed throughout the structure, including all public, private, storage, and/or concealed spaces, as defined by the Standard for the *Installation of Sprinkler Systems* (NFPA –13), by no later than December 31, 2016.

2. Petaluma Boulevard North

Automatic fire sprinkler requirements shall not become effective until the City of Petaluma installs an appropriate-sized water main and laterals to the curb lines similar to the main installed. Upon notice by the City of such installation, an automatic sprinkler system conforming to the *Standard for the Installation of Sprinkler Systems* (NFPA-13) shall be installed according to the following criteria:

- (a) In any building wherein a change of use as defined by the Uniform Building Code occurs.
- (b) In any building or occupancy where the square footage of the building or occupancy is increased in area by greater than or equal to 25% of the building's or occupancy's existing square footage.
- (c) All buildings with basement or space below street grade used for storage, business or public use shall have automatic fire sprinklers installed within the basements or the below street grade areas, no later than December 31, six (6) years from the date of the water main installation.
- (d) All buildings not meeting the criteria of "a" or "b" above shall have automatic fire sprinklers installed throughout the structure, including all public, private, storage, and/or concealed spaces, as defined by the *Standard for the Installation of Sprinklers* (NFPA-13), no later than December 31, twelve (12) years from the date of the water main installation.

c. Property owner's responsibility for system installation

- 1. The Property owner shall be responsible for installation of the lateral service from the curb line into the building. This also includes isolation, check, or other valves or devices, as applicable.
- 2. The property owner shall be responsible for the installation of the automatic fire sprinkler system according to the *Standard for the Installation of Sprinkler Systems* (NFPA-13).

d. Plans and specifications

Plans and calculations (NFPA-13, Chapter 8) for the service lateral and fire-sprinkler system shall be submitted to and approved by the Fire Prevention Bureau prior to installation of equipment and materials.

- 1. For the Kentucky Street installations that are required on or before December 31, 2010, or December 31, 2016, all Plans and Calculations for service lateral and sprinkler systems shall be submitted no later than June 30, 2010, or June 30, 2016, respectively, with installation and approval of work to occur prior to December 31, 2010, or December 31, 2016, respectively.

2. For Petaluma Boulevard North installations that occur in the last year of the six (6) or twelve (12) year deadline (when established) after the installation of the water main by the City of Petaluma, plans and calculations shall be submitted in that last year no later than June 30, with installation and approval of work to occur prior to December 31 of that last year.

City of Petaluma
Water System
Construction Standards
January 2019

Water System Construction Standards

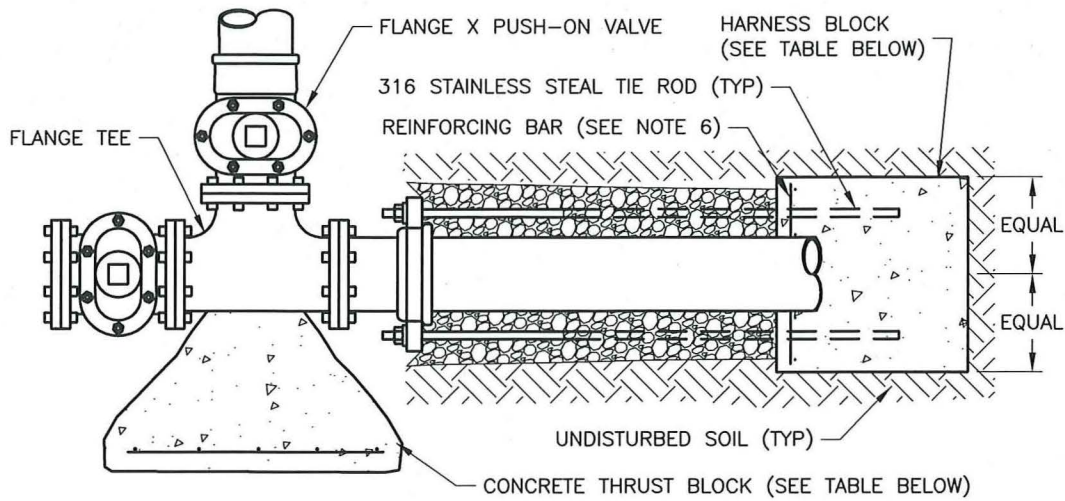
Standards List

<u>Std. No.</u>	<u>Title</u>	<u>Date Approved</u>
851	Concrete Block w/ Anchor Harness for Flanged Fittings.....	August 2016
852	Standard Trench Details.....	January 2019
853	Concrete Thrust Blocks for Vertical & Combination Bend Applications	August 2016
854.01	Concrete Thrust Blocks for Horizontal Applications	August 2016
854.02	Concrete Thrust Blocks for Horizontal Applications (Notes)	August 2016
855.01	Water Main Under Structure (Lowering).....	August 2016
855.02	Water Main Over Structure.....	August 2016
856.01	Pipe to Pipe Crossing Requirements.....	August 2016
856.02	Pipe to Pipe Crossing Requirements (Notes)	August 2016
857.01	Fire Hydrant Installation.....	March 2016
857.02	Fire Hydrant Location	March 2016
857.03	Fire Hydrant Marker Location	March 2016
858.01	6-inch Blow-off.....	March 2016
858.02	End of Line Details (6 inch Blow-off Application).....	March 2016
859	1-inch Manual Air Release Valve Connection	March 2016
861	1 ½ -inch Water Service for Existing ¾-inch or 1-inch Meters	March 2016
862	1 ½-inch Water Service for 1-inch Meter (New Residential Service)	March 2016
863.01	Residential Fire Service Installation	March 2016
863.02	Residential Fire Sprinkler Loop System	March 2016
864	1 ½-inch Water Service for 1 1/2-inch Meter (Commercial)	March 2016
865	2-inch Water Service for 1½-inch or 2-inch Meter (Commercial).....	March 2016
866.01	4-inch Water Service for 3-inch Meter	March 2016
866.02	4-inch Water Service for 3-inch Meter (Notes and Parts).....	March 2016
867.01	4-inch Water Service for 4-inch Meter	April 2016
867.02	4-inch Water Service for 4-inch Meter (Notes and Parts).....	March 2016
868.01	6-inch Water Service for 6-inch Meter (Turbine)	April 2016
868.02	6-inch Water Service for 6-inch Meter (Turbine) (Notes and Parts).....	March 2016
869	Combination Service Stub (Commercial & Multi-residential).....	August 2018
870.01	Combination Water Service (Commercial & Multi-residential)	August 2018
870.02	Combination Water Service (Commercial & Multi-residential) (Notes & Calcs).....	August 2018
871	Water Mains and Mainline Valve Alignment.....	March 2017
872	Bore and Jack Casing, Spacer and End Seal	March 2017
873.01	Air Gap Tank System.....	March 2016
873.02	Special Standard Pressure Tank System.....	March 2016
874	Above Ground Double Check Valve Backflow Assembly.....	March 2016
875	Special Installation Double Check Valve Backflow Assembly.....	March 2016

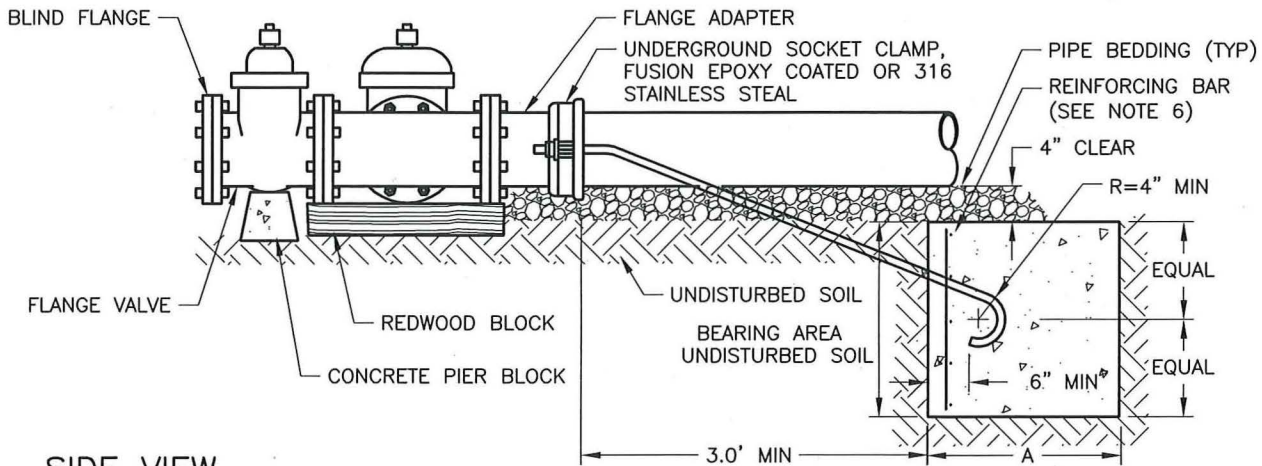
Water System Construction Standards

Standards List (continued)

<u>Std. No.</u>	<u>Title</u>	<u>Date Approved</u>
876	Above Ground Reduced Pressure Principle Backflow Assembly.....	April 2017
877.01	Gate Valve, Stem Extension and Box with Riser	August 2016
877.02	Valve Anchor	March 2016
877.03	Valve Stem Extension Assembly.....	March 2016
878	Tapping Valve and Pit.....	March 2016
879	Butterfly Valve Installation (Required for 16" and Larger Pipe).....	March 2016
880.01	4"Thru 10" Double Check Detector Fire Line Backflow Assembly	March 2016
880.02	4" Thru 10" Double Check Detector Fire Line Backflow Assembly (Parts and Notes)....	March 2016
881	Temporary Metered Connection Fire Flow Required	April 2017
884	Dry Fire Hydrant Main Sign	March 2017
885.01	2-inch Manifold Retro-fit Existing 2-inch Service	April 2017
885.02	2-inch Manifold Retro-fit Existing 2-inch Service	April 2017
887.01	Combination Fire and Domestic Service Master Meter Assembly	April 2017
887.02	Combination Fire and Domestic Service Master Meter Assembly (Notes)	April 2017



TOP VIEW



SIDE VIEW

MINIMUM DIMENSION REQUIREMENTS				
*PIPE SIZE	TIE ROD	HARNESS BLOCK	DIMENSION A	THRUST BLOCK
6 INCH	5/8 INCH	4SQFT	2FT	4SQFT
8 INCH	3/4 INCH	7SQFT	3FT	7SQFT
12 INCH	1-1/8 INCH	15SQFT	1FT	15SQFT

* PIPE SIZE 12 INCH AND LARGER BY DESIGN ENGINEER.

NOTES

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. BOLTS, NUTS, WASHERS AND TIE ROD SHALL BE 316 STAINLESS STEEL.
3. SAFE BEARING LOAD OF SOIL FOR HORIZONTAL THRUST SHALL NOT BE EXCEEDED.
4. DUCTILE IRON FITTINGS SHALL BE ENCASED WITH 8-MIL. POLYETHYLENE TUBING AND SECURED WITH 10-MIL TAPE AS DEFINE IN AWWA C105 PRIOR TO POURING THRUST BLOCK.
5. CAST CONCRETE THRUST AND HARNESS BLOCK AGAINST UNDISTURBED SOIL.
6. REINFORCING BAR MAT SHALL BE INCLUDED IN ALL THRUST BLOCK APPLICATIONS. REINFORCING BAR SPACING SHALL BE 12 INCHES EACH WAY.
- 7.
8. THRUST AND HARNESS BLOCKS ARE TO BE CLASS B CONCRETE, CAST IN PLACE AND EXTEND FROM BELLS OF FITTINGS TO UNDISTURBED SOIL. ENTIRE BEARING AREA SHALL BE AGAINST UNDISTURBED SOIL.

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CITY OF PETALUMA
PUBLIC WORKS & UTILITIES
 UTILITIES DIVISION
 202 N. McDOWELL BLVD. TEL. 707-778-4546
 PETALUMA, CALIFORNIA 94954 FAX. 707-778-4508

SPECIAL STANDARD
**CONCRETE BLOCK w/
 ANCHOR HARNESS**
FOR FLANGE FITTINGS
HORIZONTAL APPLICATIONS

DATE: AUGUST 2016 SCALE: N.T.S.
 APPROVED BY:

 Kent R. Carothers, P.E. Operations Manager C60671
 DRAWN BY: JDL NO. 851

PLEASE REFER TO CITY STANDARDS
219.1 – 219.3



CITY OF PETALUMA

PUBLIC WORKS & UTILITIES
UTILITIES DIVISION

202 N. McDOWELL BLVD. TEL. 707-778-4546
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**STANDARD TRENCH
DETAILS**

DATE: JAN 3, 2019

SCALE: N.T.S.

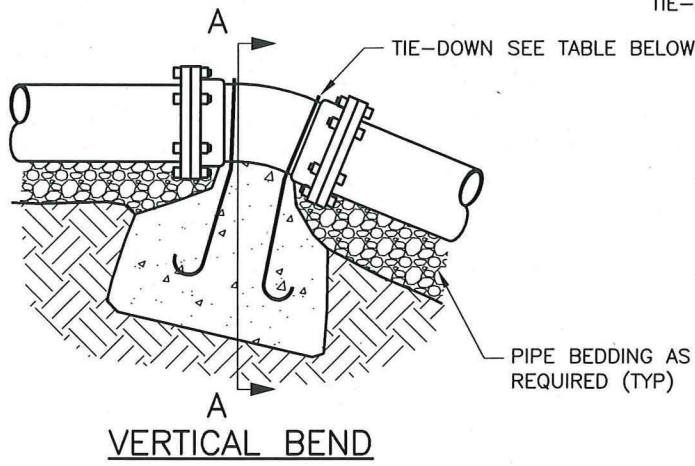
APPROVED BY:

Kent R. Carothers, P.E. Operations Manager C60671

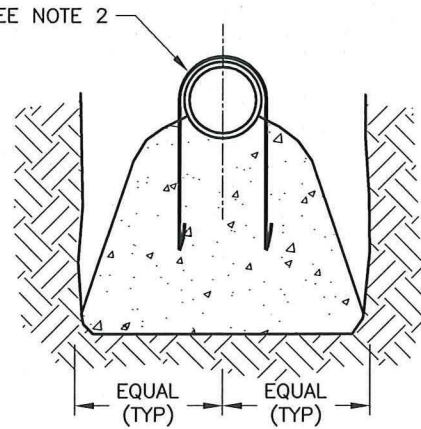
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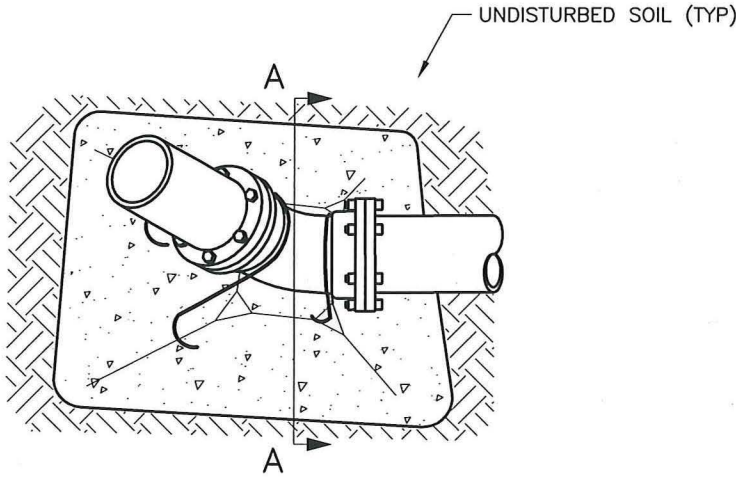
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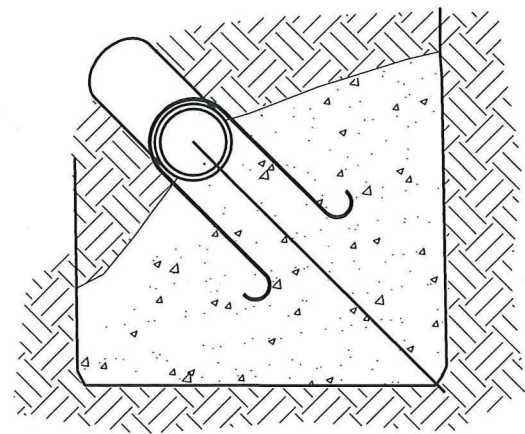
VERTICAL BEND



**SECTION A-A
VERTICAL BEND**



**COMBINATION
HORIZONTAL-VERTICAL BEND**



**SECTION
HORIZONTAL-VERTICAL BEND**

TIE-DOWN SIZING TABLE	
PIPE SIZE	BAR DIAMETER
4-6 INCHES	5/8" #5
8-10 INCHES	3/4" #6
12 INCHES	1 1/8" #9

NOTES:


- SEE WATER SYSTEM DESIGN GUIDELINES.
- ALL EXPOSED TIE DOWN REINFORCING BAR SHALL BE COATED WITH MORTAR OR PETROLEUM ASPHALT PER AWWA C110.
- DUCTILE IRON FITTINGS SHALL BE ENCASED WITH 8-MIL. POLYETHYLENE TUBING AND SECURED WITH 10-MIL TAPE PER AWWA C105 PRIOR TO POURING THRUST BLOCK.
- POUR/PLACE CONCRETE FOR ANCHOR BLOCK AGAINST UNDISTURBED SOIL.
- ANCHOR/THRUST BLOCKS SHALL BE CLASS B CONCRETE, POURED IN PLACE AND EXTEND FROM BELLS OF FITTINGS TO UNDISTURBED SOIL. FOR PIPE GREATER THAN 12" IN SIZE, DESIGN ENGINEER MUST SUBMIT CALCULATIONS TO SIZE CONCRETE THRUST BLOCKS.

• FOR SOIL BEARING AREA SEE 854.02

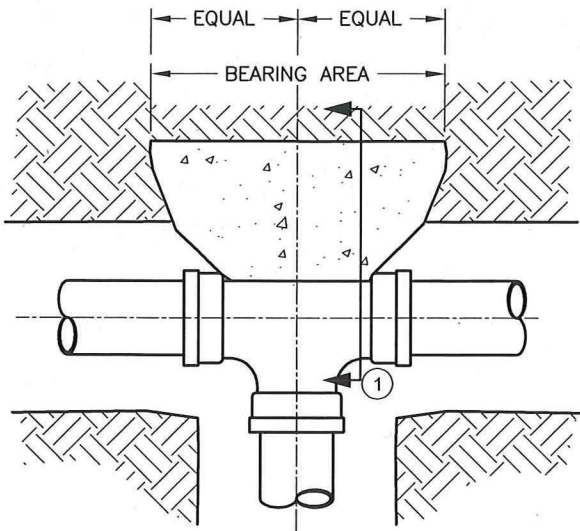


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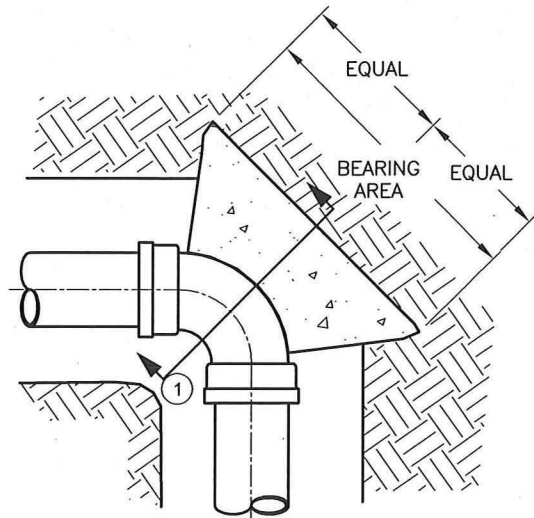
**CONCRETE THRUST
 BLOCKS
 VERTICAL AND COMBINATION
 BEND APPLICATIONS**

DATE: AUGUST 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 853

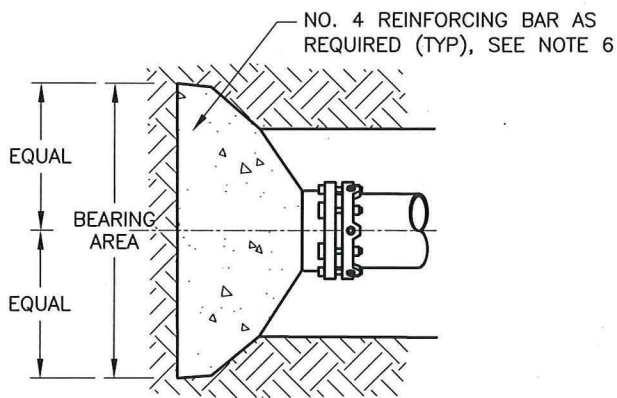
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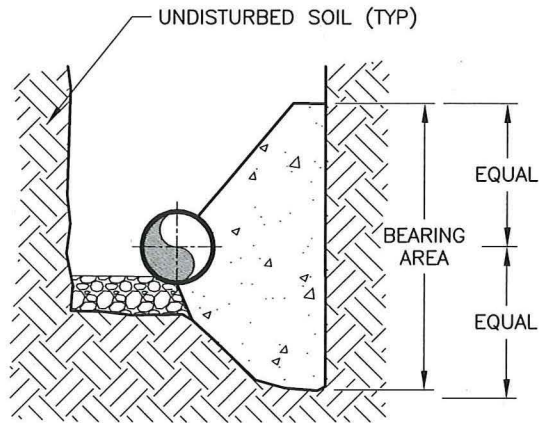
TEE
PLAN VIEW



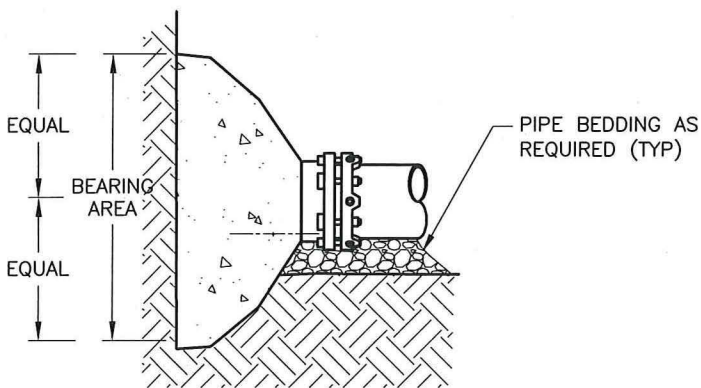
TYPICAL BEND
PLAN VIEW



DEAD END OR PLUG
TOP VIEW



TYPICAL BEND OR TEE
① SECTION VIEW



DEAD END OR PLUG
SIDE VIEW

• FOR SOIL BEARING AREA SEE 854.02



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UTILITIES DIVISION
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**CONCRETE THRUST
BLOCKS
HORIZONTAL APPLICATIONS**

DATE: AUGUST 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 854.01

THRUST BLOCK TABLE: MINIMUM REQUIRED BEARING AREA IN SQUARE FEET PER REQUIRED PSI TEST PRESSURE (FOR TEST PRESSURE SEE HYDROSTATIC TEST IN WATER SYSTEM DESIGN GUIDLINES)					
PIPE SIZE	SOIL BEARING CAPACITY PSF	TEE & DEAD END	90 DEG BEND	45 DEG BEND	22 1/2 DEG BEND
6 INCH	1000	4	6	3	2
	2000	2	3	2	1
8 INCH	1000	7	10	5	3
	2000	4	5	3	2
12 INCH	1000	16	22	12	6
	2000	8	11	6	3

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. IN USING THE THRUST BLOCK TABLE ABOVE, ASSUME 1000 PSF BEARING CAPACITY UNLESS OTHERWISE SHOWN ON THE PLANS. THE DESIGN ENGINEER SHALL SPECIFY THRUST BLOCKING REQUIREMENTS FOR ALL OTHER SOIL BEARING CONDITIONS.
3. SAFE BEARING LOAD OF SOIL FOR HORIZONTAL THRUST SHALL NOT BE EXCEEDED.
4. DUCTILE IRON FITTINGS SHALL BE ENCASED WITH 8-MIL. POLYETHYLENE TUBING AND SECURED WITH 10-MIL TAPE AS DEFINE IN AWWA C105 PRIOR TO POURING THRUST BLOCK.
5. CAST CONCRETE ANCHOR BLOCK AGAINST UNDISTURBED SOIL..
6. THRUST BLOCKS ARE TO BE CLASS B CONCRETE, CAST IN PLACE AND EXTEND FROM BELLS OF FITTINGS TO UNDISTURBED SOIL. ENTIRE BEARING AREA SHALL BE AGAINST UNDISTURBED SOIL.
7. FOR PIPE GREATER THAN 12" IN SIZE, DESIGN ENGINEER MUST SUBMIT CALCULATIONS TO SIZE CONCRETE THRUST BLOCKS.



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**CONCRETE THRUST
 BLOCKS**
HORIZONTAL APPLICATIONS

NOTES

DATE: AUGUST 2016 SCALE: N.T.S.

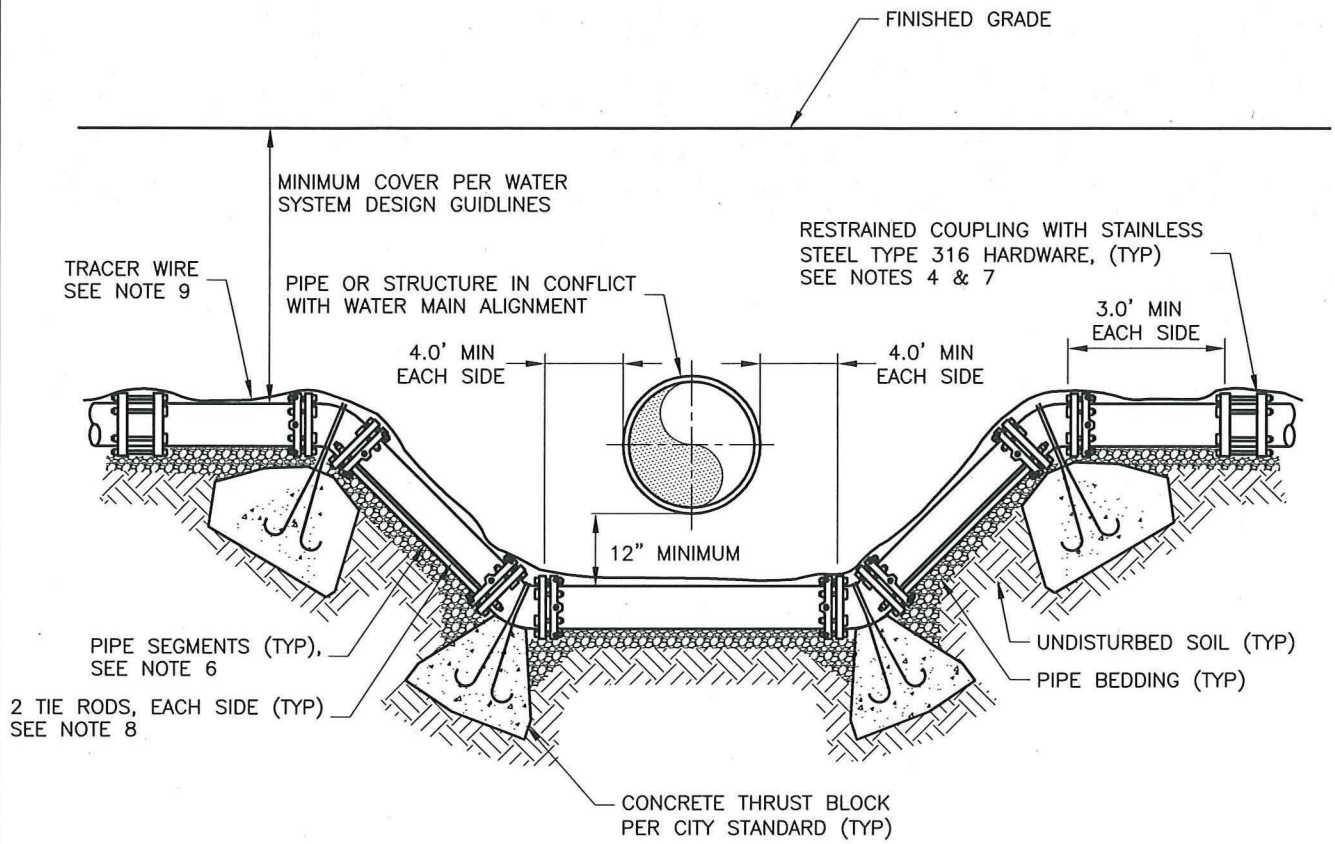
APPROVED BY:

Kent R. Carothers
 Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 854.02

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NOTES:


1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. ALL PIPE AND FITTINGS SHALL BE CEMENT LINED OR EPOXY FUSION BONDED DUCTILE IRON CLASS 53 MINIMUM AND SHALL BE WRAPPED IN POLYETHYLENE PER WATER SYSTEM DESIGN AND CONSTRUCTION GUIDELINES.
3. ONLY RESTRAINED FITTINGS, MECHANICAL JOINT, TIE RODS, MEGALUG (OR EQUAL), FLANGED MAY BE USED. ALL BENDS MUST BE RESTRAINED.
4. RETAINING GLANDS SHALL NOT BE USED ON THE TWO STRAIGHT END COUPLINGS.
5. ALL BENDS SHALL BE 45° DEG. OR 22 1-1/2° DEG. FITTINGS.
6. PIPE SEGMENT LENGTHS SHALL BE 3FT MINIMUM.
7. REDUCED CLEARANCE MAY BE APPROVED BY THE PUBLIC WORKS & UTILITIES DEPARTMENT.
8. 2 TYPE 316 TIE RODS ARE REQUIRED ON EACH SIDE. TIE ROD DIAMETER TO BE SAME AS BOLT SIZE AND SHALL BE RETAINED WITH DOUBLE NUT AT EACH END.
9. USE INSULATED NO. 12 THHN WIRE. ALL WIRE CONNECTIONS SHALL BE MADE WITH MECHANICAL WIRE CONNECTORS WRAPPED WITH ELECTRICAL TAPE.
10. DUCTILE IRON TRANSITION COUPLINGS MAY BE ALLOWED WHEN THE NOMINAL PIPE SIZE IS THE SAME AND THE O.D. IS DIFFERENT.
11. ALL HARDWARE IS TO BE TYPE 316 STAINLESS STEEL.
12. EXPOSED REINFORCING BARS SHALL BE COATED WITH EPOXY, MORTAR OR PETROLEUM ASPHALT PER AWWA C110.

• FOR SOIL BEARING AREA SEE 854.02

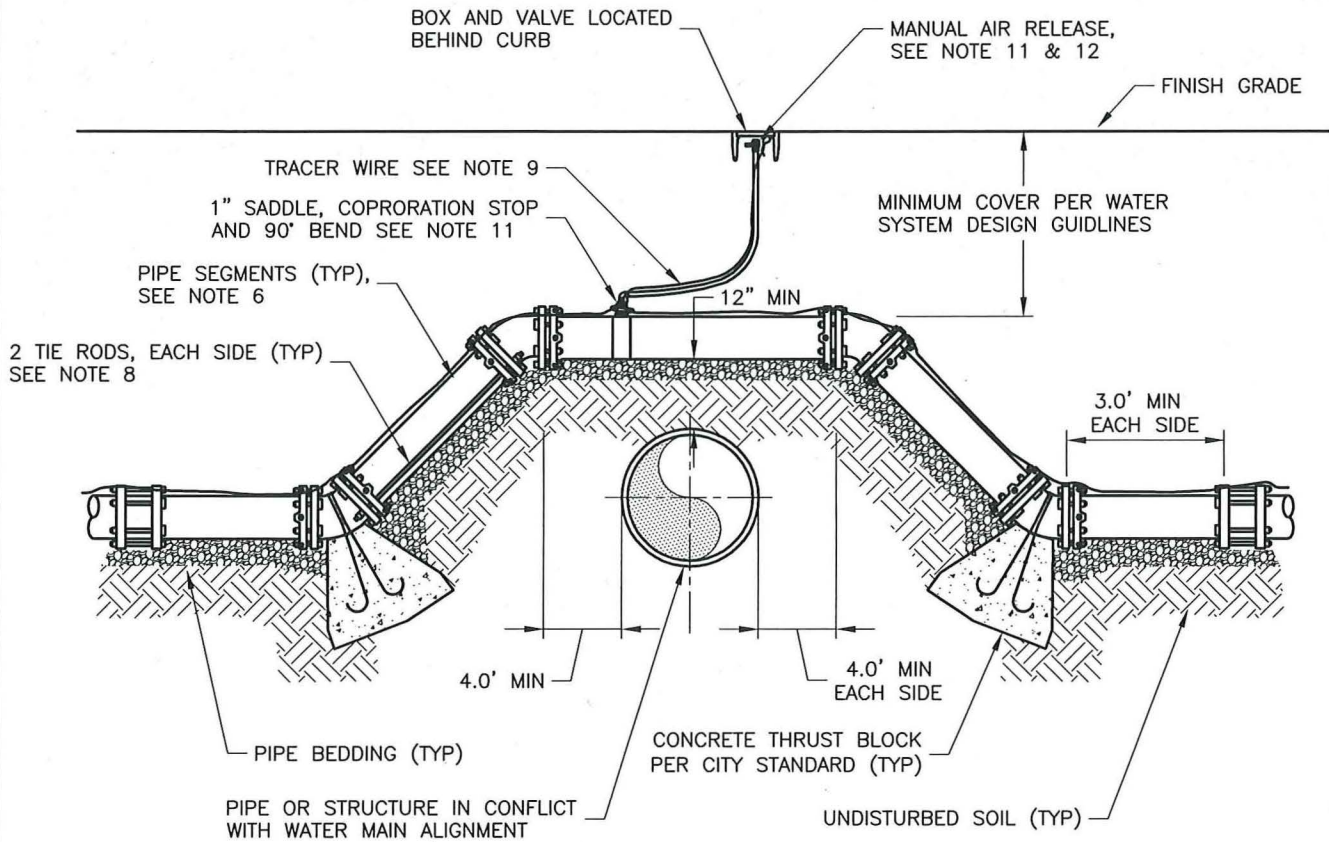


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WATER MAIN
UNDER STRUCTURE
 (LOWERING)

DATE: AUGUST 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 855.01

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NOTES:


1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. ALL PIPE AND FITTINGS SHALL BE CEMENT LINED OR EPOXY FUSION BONDED DUCTILE IRON CLASS 53 MINIMUM AND SHALL BE WRAPPED IN POLYETHYLENE PER WATER SYSTEM DESIGN GUIDELINES.
3. ONLY RESTRAINED FITTINGS, MECHANICAL JOINT, TIE RODS, MEGALUG (OR EQUAL), FLANGED MAY BE USED. ALL BENDS MUST BE RESTRAINED.
4. RETAINING GLANDS SHALL NOT BE USED ON THE TWO STRAIGHT END COUPLINGS.
5. ALL BENDS SHALL BE 45° DEG. OR 22 1-1/2° DEG. FITTINGS. 90° BEND ARE NOT ALLOWED.
6. PIPE SEGMENT LENGTHS SHALL BE 3FT MINIMUM.
7. REDUCED CLEARANCE MAY BE APPROVED BY THE PUBLIC WORKS & UTILITIES DEPARTMENT.
8. DUCTILE IRON TRANSITION COUPLINGS MAY BE ALLOWED WHEN THE NOMINAL PIPE SIZE IS THE SAME AND THE O.D. IS DIFFERENT.
9. USE INSULATED NO. 12 THHN WIRE.
 - ALL WIRE CONNECTIONS SHALL BE MADE WITH MECHANICAL WIRE CONNECTORS WRAPPED WITH ELECTRICAL TAPE.
 - END OF TRACER WIRE TO BE EXPOSED 6" MINIMUM INSIDE OF BOX
10. ALL HARDWARE IS TO BE TYPE 316 STAINLESS STEEL.
11. EXPOSED REINFORCING BARS SHALL BE COATED WITH EPOXY, MORTAR OR PETROLEUM ASPHALT PER AWWA C110.
12. PROVIDE A 1-INCH MANUAL AIR RELIEF. TAP TO BE ON TOP OF PIPE, 24-INCHES MIN FROM FITTING.
13. EXTEND TUBING AND PLACE MANUAL AIR RELIEF VALVE AND BOX AT BACK OF CURB. CAUTION TO BE USED AS NOT TO KINK THE TUBING. FINAL PLACEMENT OF THE VALVE SHALL BE VERTICAL AND CENTERED IN THE BOX.

• FOR SOIL BEARING AREA SEE 854.02

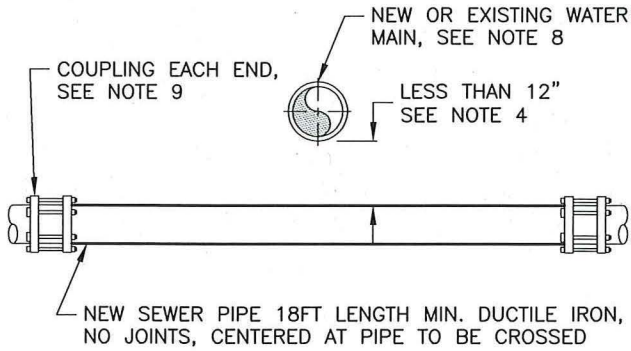


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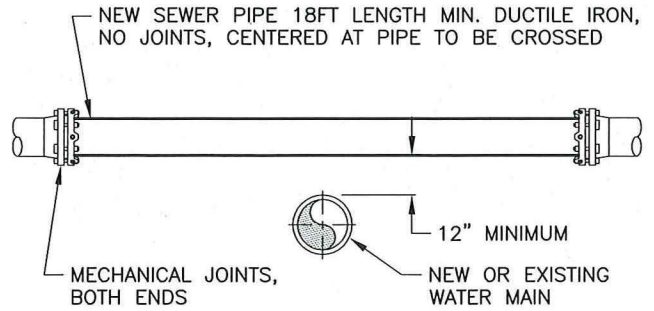
**WATER MAIN
 OVER STRUCTURE**

DATE: AUGUST 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. · Operations Manager C60671	
DRAWN BY: JDL	NO. 855.02

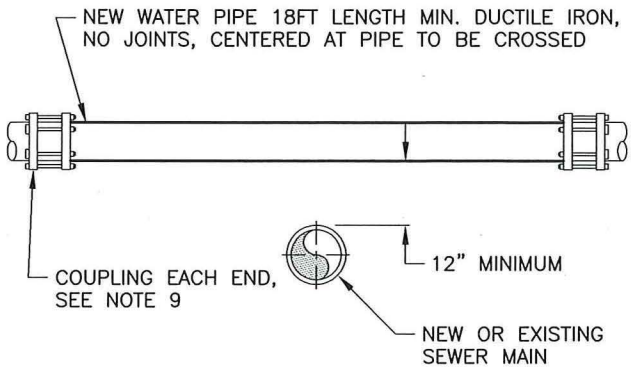
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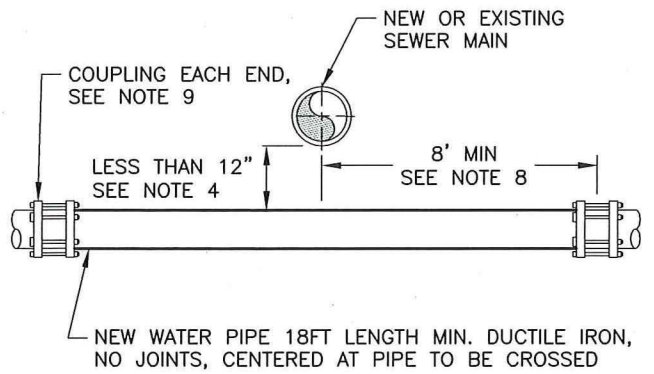
**NEW SEWER UNDER
NEW OR EXISTING WATER**
CASE 1



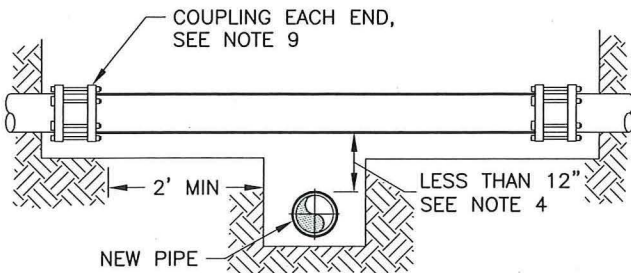
**NEW SEWER OVER
NEW OR EXISTING WATER**
CASE 2



**NEW WATER OVER
NEW OR EXISTING SEWER**
CASE 3



**NEW WATER UNDER
NEW OR EXISTING WATER**
CASE 4




NEW PIPE UNDER EXISTING
CASE 5 (SEE NOTE 5)



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**PIPE TO PIPE CROSSING
REQUIREMENTS**

DATE: AUGUST 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 856.01

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. THIS STANDARD APPLIES TO ALL PIPES UP TO AND INCLUDING 16 INCHES IN DIAMETER. LARGER DIAMETER PIPE CROSSING SHALL BE APPROVED BY THE DIRECTOR OF PUBLIC WORKS & UTILITIES.
3. ALL NEW DUCTILE IRON PIPE SHALL BE ENCASED IN POLYETHYLENE PER WATER SYSTEM DESIGN GUIDELINES.
4. WHERE SEWER CROSSES BELOW A WATER MAIN WITH MORE THAN 12 INCHES OF VERTICAL CLEARANCE, NO SPECIAL INSTALLATION IS REQUIRED.
5. NEW PIPE UNDER EXISTING PIPE, CASE 5, SHALL BE USED WHEN THE EXISTING PIPE HAS A JOINT WITHIN 2 FEET OF THE NEW TRENCH AND THE NEW PIPE IS NOT A WATER OR SEWER PIPE.
6. ANY PIPE TO PIPE CROSSING WITH LESS THAN 6 INCH VERTICAL CLEARANCE SHALL NOT BE INSTALLED WITHOUT THE APPROVAL OF THE PUBLIC WORKS & UTILITIES DEPARTMENT.
7. THE MINIMUM SEPARATION DISTANCES SHALL BE MEASURED FROM THE NEAREST EDGE OF EACH PIPE BARREL.
8. A NEW WATER MAIN SHALL BE CONSTRUCTED NO LESS THAN 45-DEGREES TO AND AT LEAST ONE FOOT ABOVE THAT PIPELINE. NO CONNECTION JOINTS SHALL BE MADE IN THE WATER MAIN WITHIN EIGHT (8') HORIZONTAL FEET OF THE PIPELINE.
9. FOR LOWERING A WATER MAIN SEE CITY STANDARD 855.01. FOR RAISING A WATER MAIN SEE CITY STANDARD 855.02
10. SEE CITY APPROVED MATERIALS LIST.



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**PIPE TO PIPE CROSSING
REQUIREMENTS
NOTES**

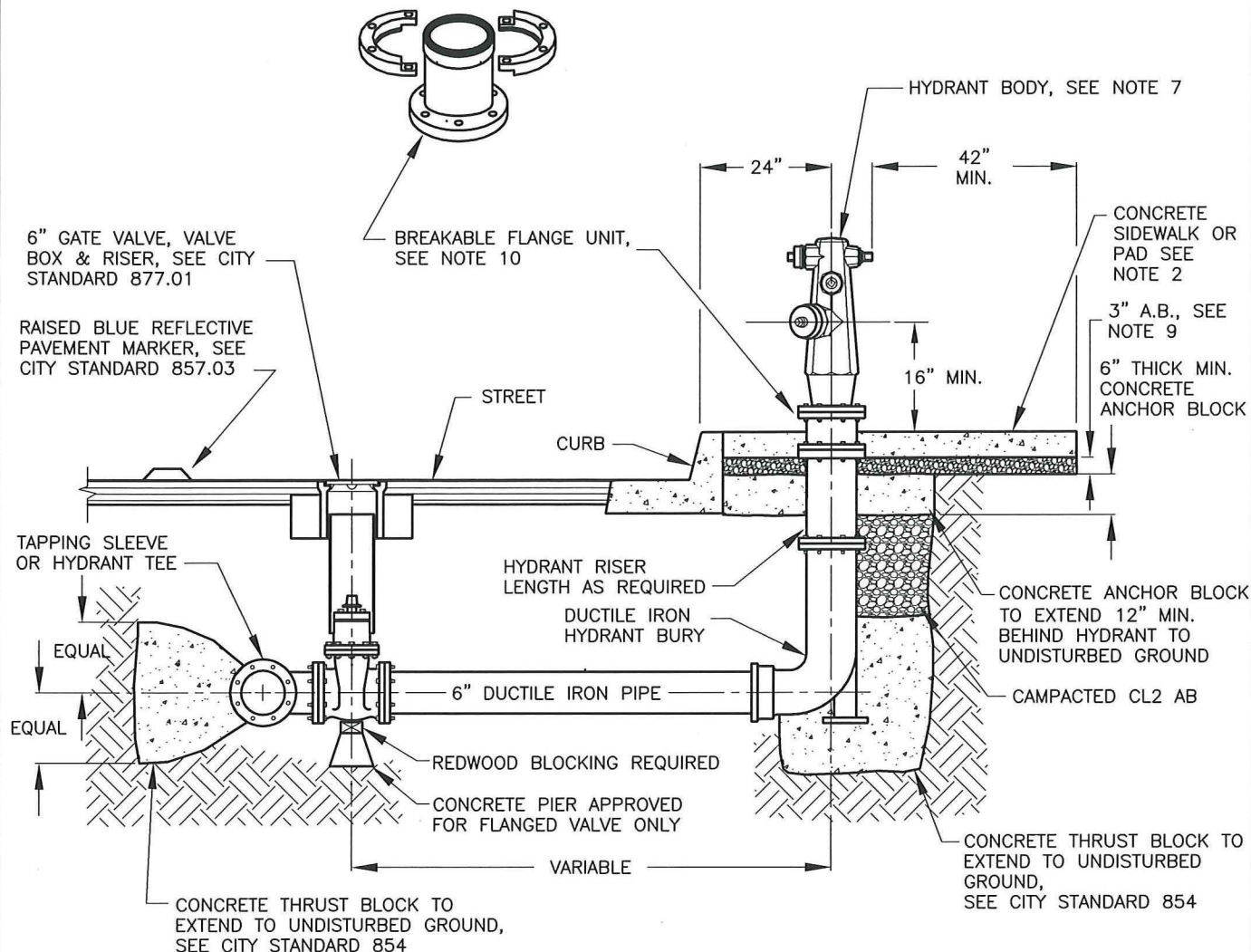
DATE: AUGUST 2016 SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers
Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 856.02



NOTES:


1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. WHERE NO SIDEWALK EXISTS, OR WHERE HYDRANT IS INSTALLED IN PLANTER STRIP, A 6" THICK 4' X 4' CONCRETE PAD SHALL BE INSTALLED. SEE CITY STANDARD DETAIL 857.02.
3. RESIDENTIAL FIRE HYDRANTS SHALL HAVE TWO 2-1/2" & ONE 4-1/2" OUTLETS. COMMERCIAL FIRE HYDRANTS SHALL HAVE ONE 2-1/2" & TWO 4-1/2" OUTLETS. COMMERCIAL HYDRANTS: FACE 4-1/2" OUTLETS TO STREET.
4. VERIFY FIRE PROTECTION REQUIREMENTS WITH THE CITY FIRE MARSHAL'S OFFICE.
5. INSTALL FIRE HYDRANT A MINIMUM OF 10 FEET FROM DRIVEWAY.
6. FIRE HYDRANT SHALL BE PAINTED BY MANUFACTURER IN ACCORDANCE WITH AWWA STANDARD SPECIFICATION C503. THE FINISHED PAINT COLOR SHALL BE DTM ALKYD BASED ENAMEL PAINT, GLOSS SAFETY YELLOW. ALL DAMAGED PAINT SURFACES SHALL BE CORRECTED BY TOUCH UP PRIOR TO ACCEPTANCE.
7. FOR APPROVED HYDRANTS—SEE APPROVED MATERIALS LIST.
8. MAINTAIN A MINIMUM OF 36" OPERATIONAL CLEARANCE ALL AROUND.
9. MAINTAIN A 3" MINIMUM SPACE BETWEEN BOTTOM OF FLANGE OF HYDRANT RISER AND TOP OF CONCRETE ANCHOR BLOCK.
10. INSTALL 6" AMERICAN AVK BREAKABLE FLANGE UNIT OR APPROVED EQUAL. SET RISER BARREL CENTERED VERTICALLY AT FINISH GRADE.
11. SEE 857.02 (FIRE HYDRANT LOCATION) AND 857.03 (FIRE HYDRANT MARKER DETAIL)
12. NO BENDS WILL BE ALLOWED IN FIRE HYDRANT LATERALS WITHOUT APPROVAL OF PUBLIC WORKS AND UTILITIES.



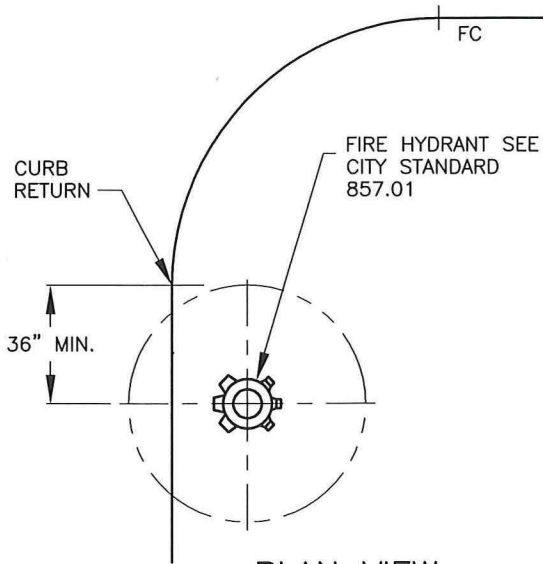
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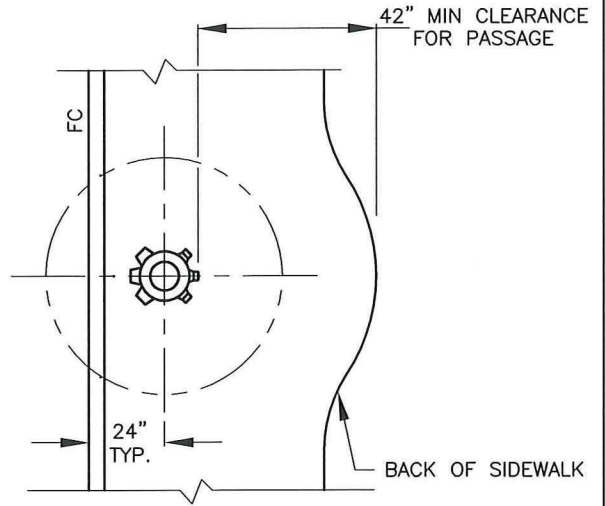
**FIRE HYDRANT
 INSTALLATION**

DATE: MARCH 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 857.01

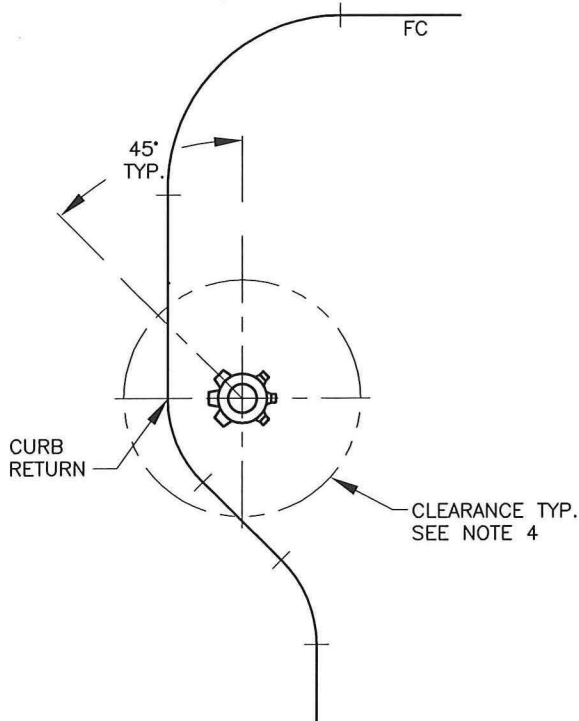
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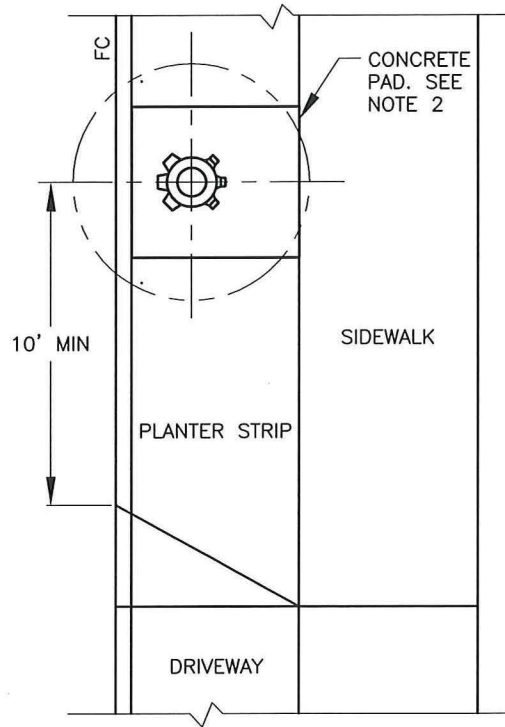
PLAN VIEW
CURB RETURN



PLAN VIEW
MID BLOCK



PLAN VIEW
CURB RETURN WITH NECKDOWN



PLAN VIEW
SIDEWALK WITH PLANTER STRIP

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. WHERE NO SIDEWALK EXISTS, OR WHERE HYDRANT IS INSTALLED IN PLANTER STRIP, A 6" THICK 4' X 4' CONCRETE PAD SHALL BE INSTALLED.
3. RESIDENTIAL FIRE HYDRANTS HAVE TWO 2-1/2" & ONE 4-1/2" OUTLETS. COMMERCIAL FIRE HYDRANTS HAVE ONE 2-1/2" & TWO 4-1/2" OUTLETS. ON COMMERCIAL HYDRANTS: FACE 4 1/2" OUTLETS TO STREET.
4. MAINTAIN A MINIMUM OF 36" OPERATIONAL CLEARANCE ALL AROUND.
5. FOR DESIGNATED "NO PARKING" AREAS SEE STREET DESIGN AND CONSTRUCTION STANDARDS.



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**FIRE HYDRANT
LOCATION**

DATE: MARCH 2016

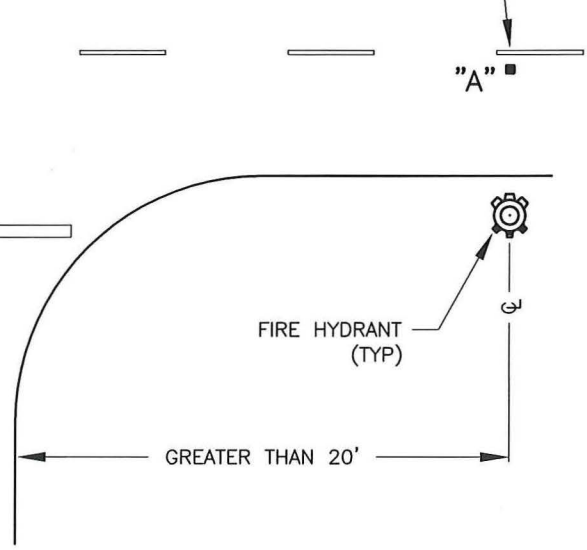
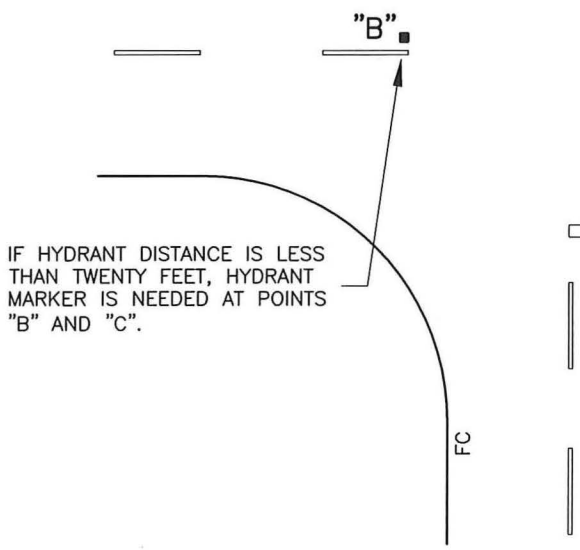
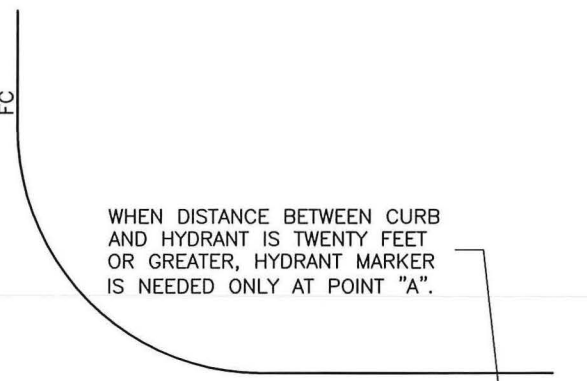
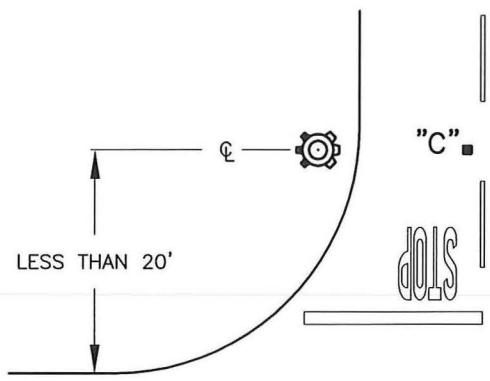
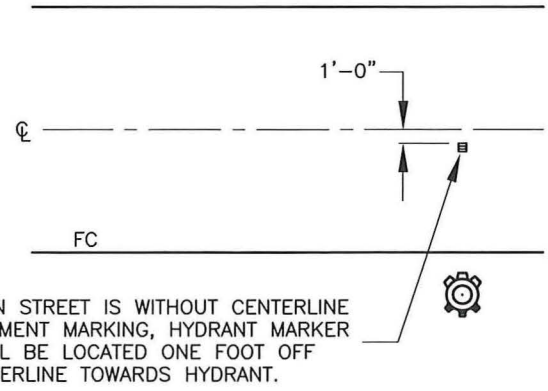
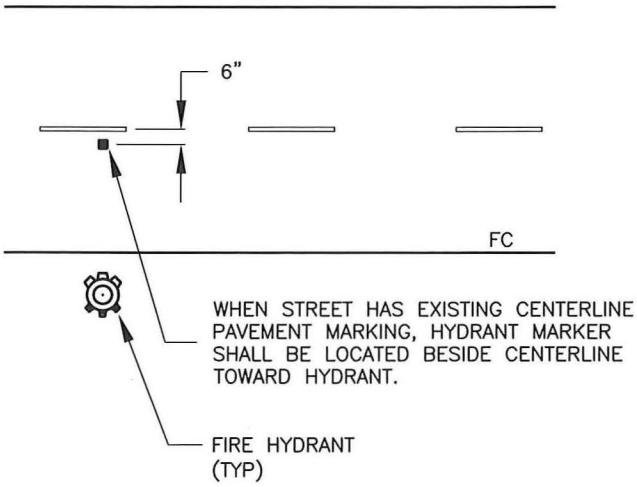
SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 857.02



NOTES:

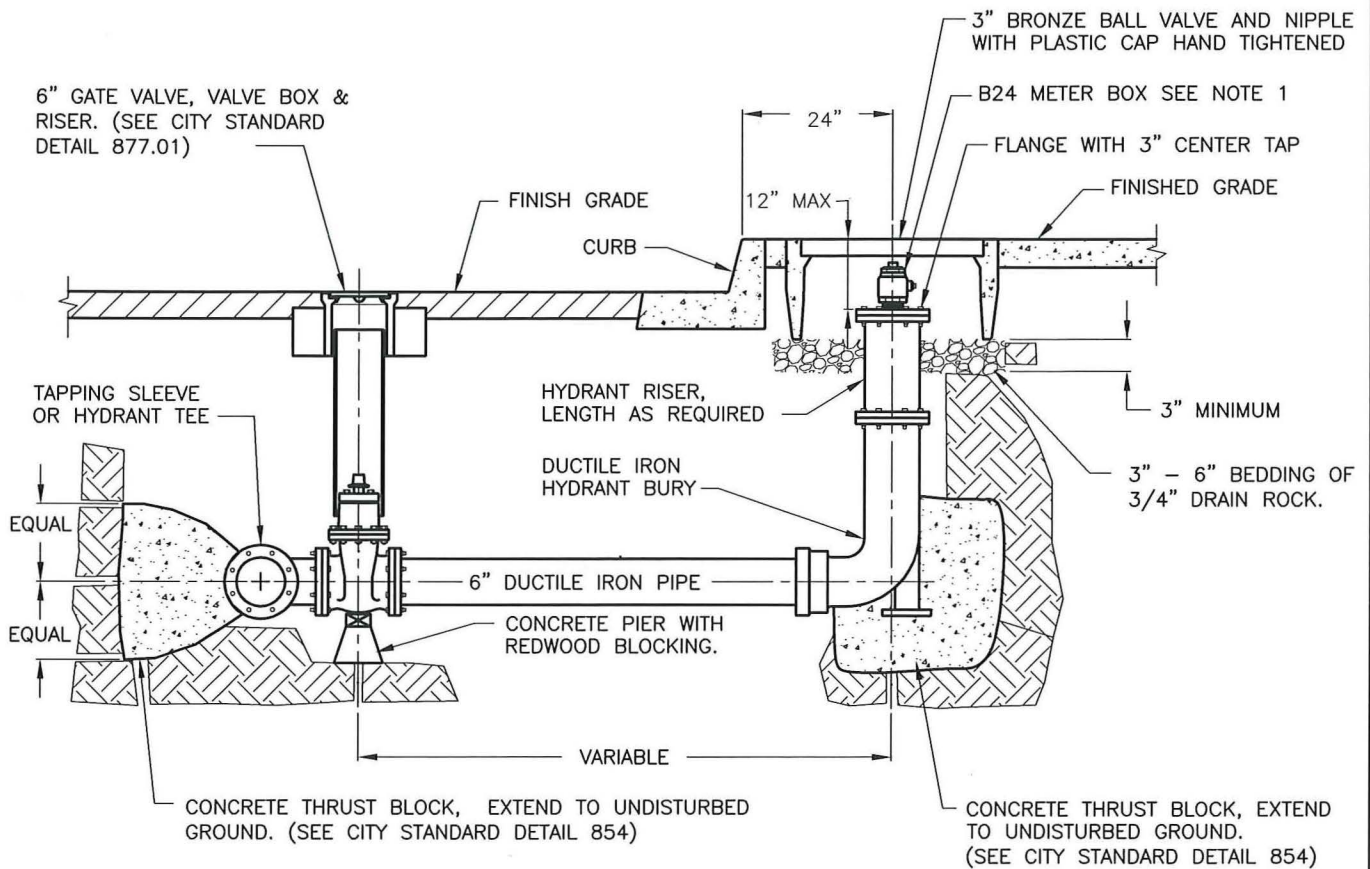
1. SEE WATER SYSTEM DESIGN GUIDELINES.



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FIRE HYDRANT MARKER LOCATION

DATE: MARCH 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 857.03



NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. METER BOXES SHALL BE LOCATED OUT OF TRAFFIC LOADING AREAS WHERE POSSIBLE. THE LID SHALL BE SET FLUSH WITH FINISHED GRADE.
3. FOR INSTALLATION ON A DEAD END OR THROUGH STREET, THE MINIMUM DISTANCE BETWEEN THE LINE VALVE OR BLIND FLANGE SHALL BE NO LESS THAN 6 FEET FROM THE BRANCH TEE.
4. BEDDING BACKFILL MATERIAL TO BE COMPACTED IN ACCORDANCE WITH CITY STANDARD DETAIL 852.01.
5. METER BOXES AND COVERS AND TAPPING SLEEVES—SEE ENGINEER'S APPROVED LIST.
6. NO SERVICE MAY BE TAPPED BETWEEN THE LINE VALVE AND BLOWOFF.

• SEE 858.02 FOR APPLICATION



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6" BLOW-OFF

DATE: MARCH 2016 SCALE: N.T.S.

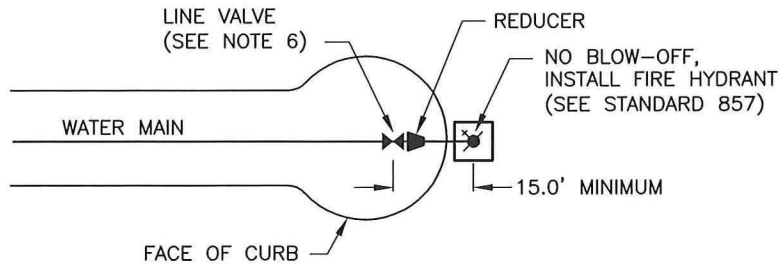
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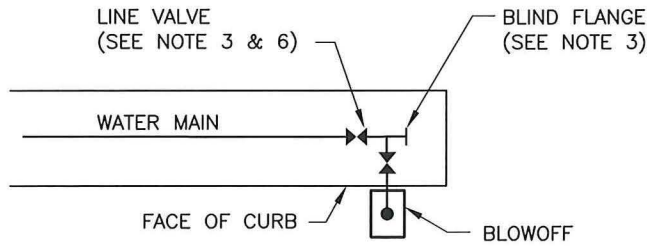
Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

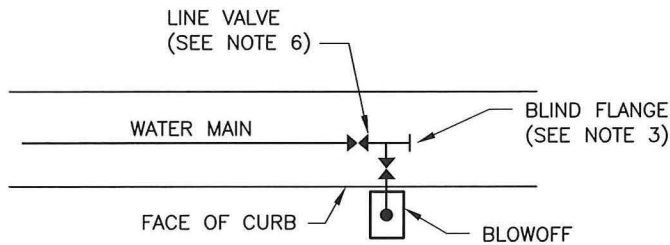
NO. 858.01



CUL DE SAC



DEAD END STREET



THROUGH STREET

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. METER BOXES SHALL BE LOCATED OUT OF TRAFFIC LOADING AREAS WHERE POSSIBLE. THE LID SHALL BE SET FLUSH WITH FINISHED GRADE.
3. FOR INSTALLATION ON A DEAD END OR THROUGH STREET, THE MINIMUM DISTANCE BETWEEN THE LINE VALVE OR BLIND FLANGE SHALL BE NO LESS THAN 6 FEET FROM THE BRANCH TEE.
4. BEDDING BACKFILL MATERIAL TO BE COMPACTED IN ACCORDANCE WITH CITY STANDARD DETAIL 852.01.
5. METER BOX, COVER AND TAPPING SLEEVE—SEE APPROVED MATERIALS LIST.
6. NO SERVICE MAY BE TAPPED BETWEEN THE LINE VALVE AND BLOWOFF.



CITY OF PETALUMA

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**END OF LINE DETAIL
(6" BLOW-OFF
APPLICATION)**

DATE: MARCH 2016 SCALE: N.T.S.

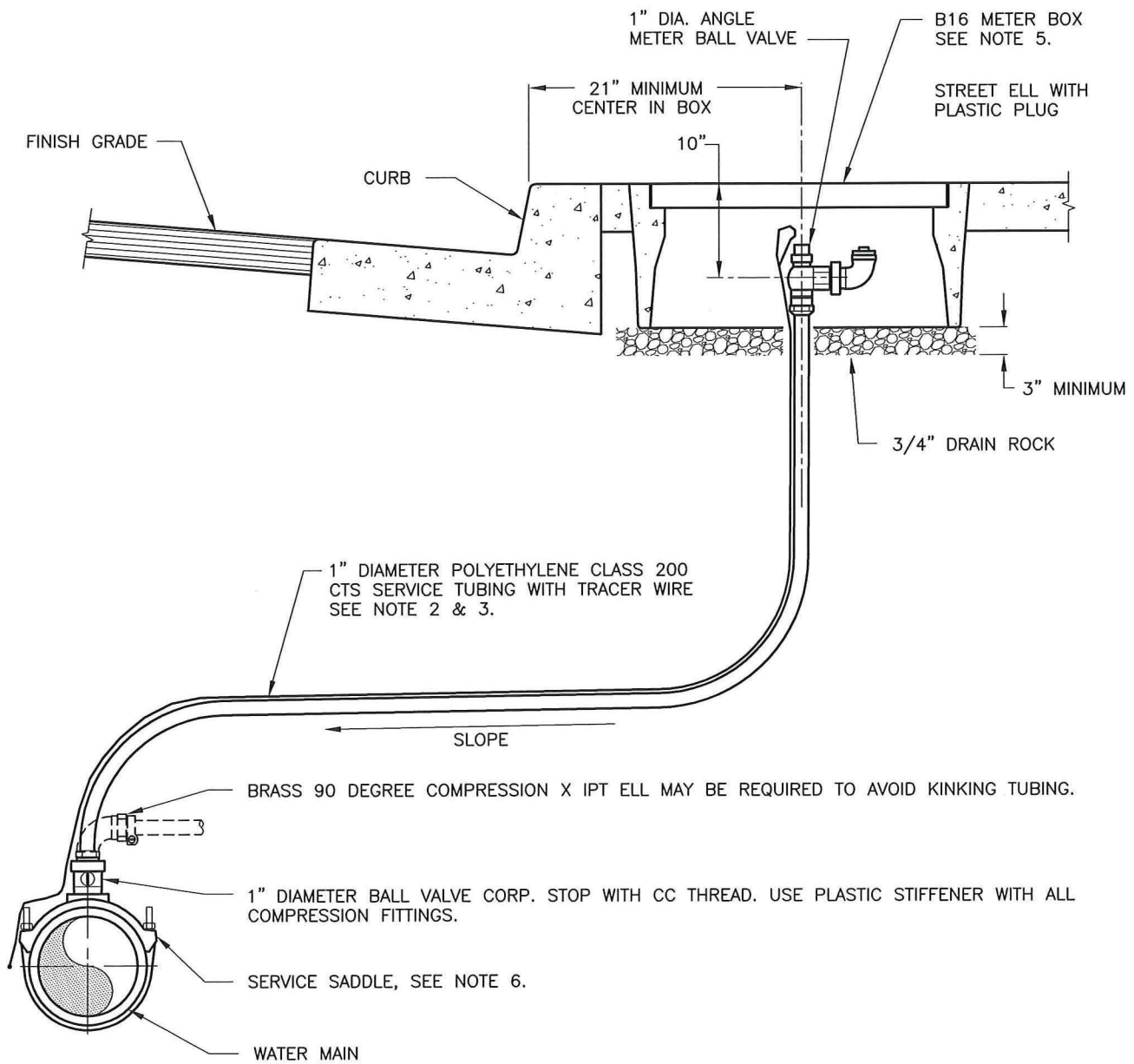
APPROVED BY:

[Signature]

Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 858.02




NOTES:

1. SEE WATER SYSTEM DESIGN AND CONSTRUCTION GUIDELINES.
2. SERVICE BEDDING MATERIAL TO BE COMPACTED IN ACCORDANCE WITH CITY STANDARD DETAIL 852.01.
3. CONTINUOUS TRACER WIRE TO BE EXPOSED 6" MINIMUM INSIDE OF METER BOX. USE INSULATED NO. 12 THHN WIRE. ALL WIRE CONNECTIONS SHALL BE MADE WITH MECHANICAL WIRE CONNECTORS WRAPPED WITH ELECTRICAL TAPE, SEE WATER SYSTEM DESIGN AND CONSTRUCTION GUIDELINES.
4. METER BOXES SHALL BE LOCATED OUT OF TRAFFIC LOADING AREAS WHERE POSSIBLE. TRAFFIC LOADING BOX & LID TO BE INSTALLED IN ALL LOCATIONS WHERE VEHICULAR TRAFFIC MAY OCCUR, THE STEEL LID SHALL BE SET FLUSH WITH FINISHED SURFACE.
5. METER BOX, COVER AND SERVICE SADDLE—SEE APPROVED MATERIALS LIST.

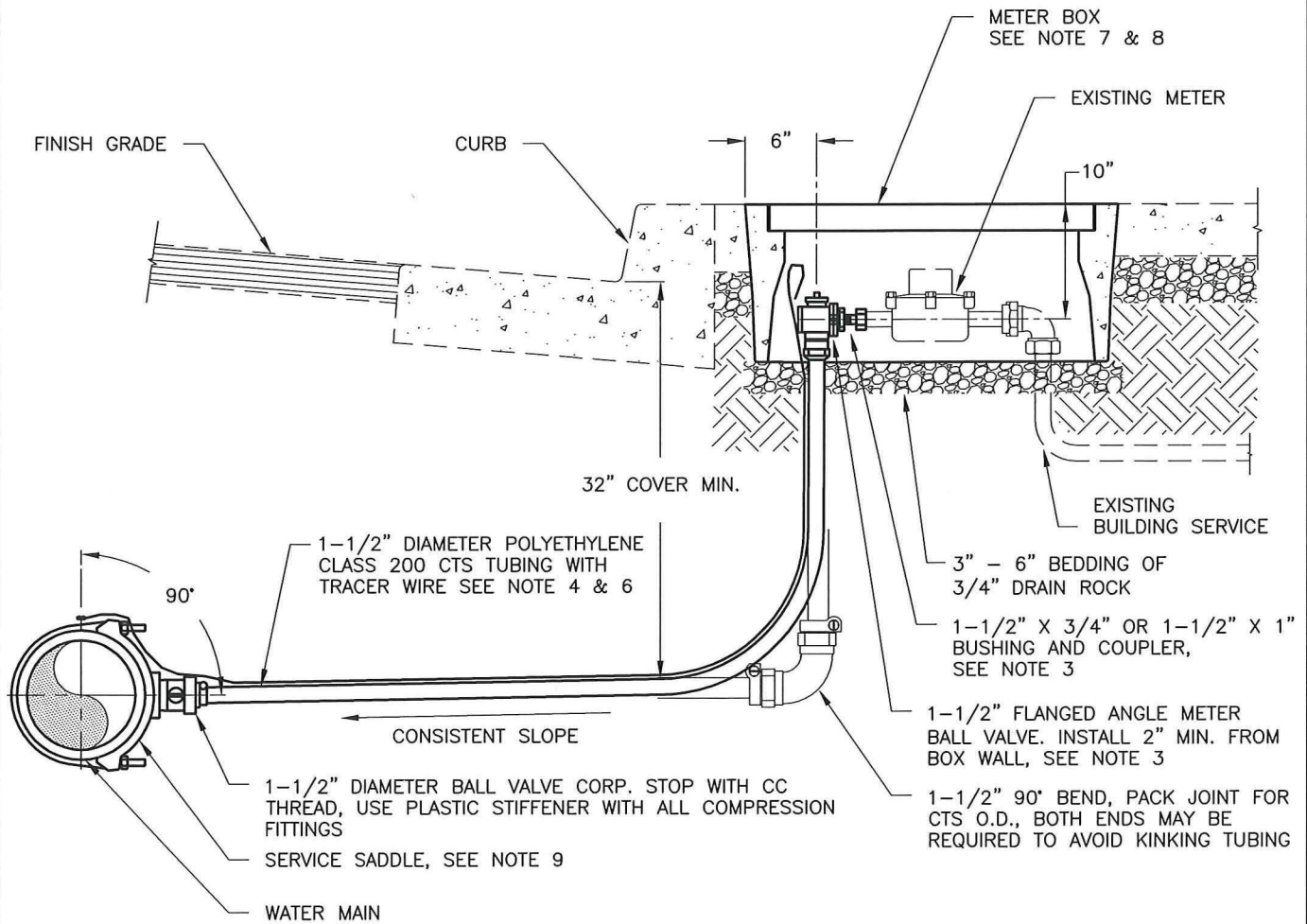


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**1" MANUAL AIR RELEASE
 VALVE CONNECTION**

DATE: MARCH 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 859

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NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. THE SERVICE SHALL NOT BE SIZED SMALLER THAN THE METER.
3. NEW 1-1/2" WATER SERVICE FOR EXISTING 5/8" OR 3/4" RESIDENTIAL METER, USE A BRASS REDUCING ADAPTER/BUSHING AND COUPLER TO CONNECT TO EXISTING METER.
4. USE INSULATED NO. 12 THHN WIRE.
 - ALL WIRE CONNECTIONS SHALL BE MADE WITH MECHANICAL WIRE CONNECTORS WRAPPED WITH ELECTRICAL TAPE.
 - END OF TRACER WIRE TO BE EXPOSED 6" MINIMUM INSIDE OF METER BOX.
5. METER BOXES SHALL BE LOCATED OUT OF TRAFFIC LOADING AREAS WHERE POSSIBLE. TRAFFIC LOADING BOX & LID TO BE INSTALLED IN ALL LOCATIONS WHERE VEHICULAR TRAFFIC MAY OCCUR, THE STEEL LID SHALL BE SET FLUSH WITH FINISHED SURFACE.
6. SERVICE BEDDING MATERIAL SHALL BE COMPACTED IN ACCORDANCE WITH CITY STANDARD DETAIL 852.01.
7. METER BOXES AND COVERS—SEE APPROVED MATERIALS LIST.
8. REPLACE EXISTING METER BOX WITH NEW B-30 METER BOX. REPLACE CONCRETE TO NEAREST SCORE LINE OR JOINT, ASPHALT TO 1.0' AROUND BOX OR LANDSCAPING IN-KIND.
9. TAPPING SERVICE SADDLES—SEE APPROVED MATERIALS LIST.



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**1-1/2" WATER SERVICE
 FOR EXISTING 3/4" OR
 1" METER**

DATE: MARCH 2016

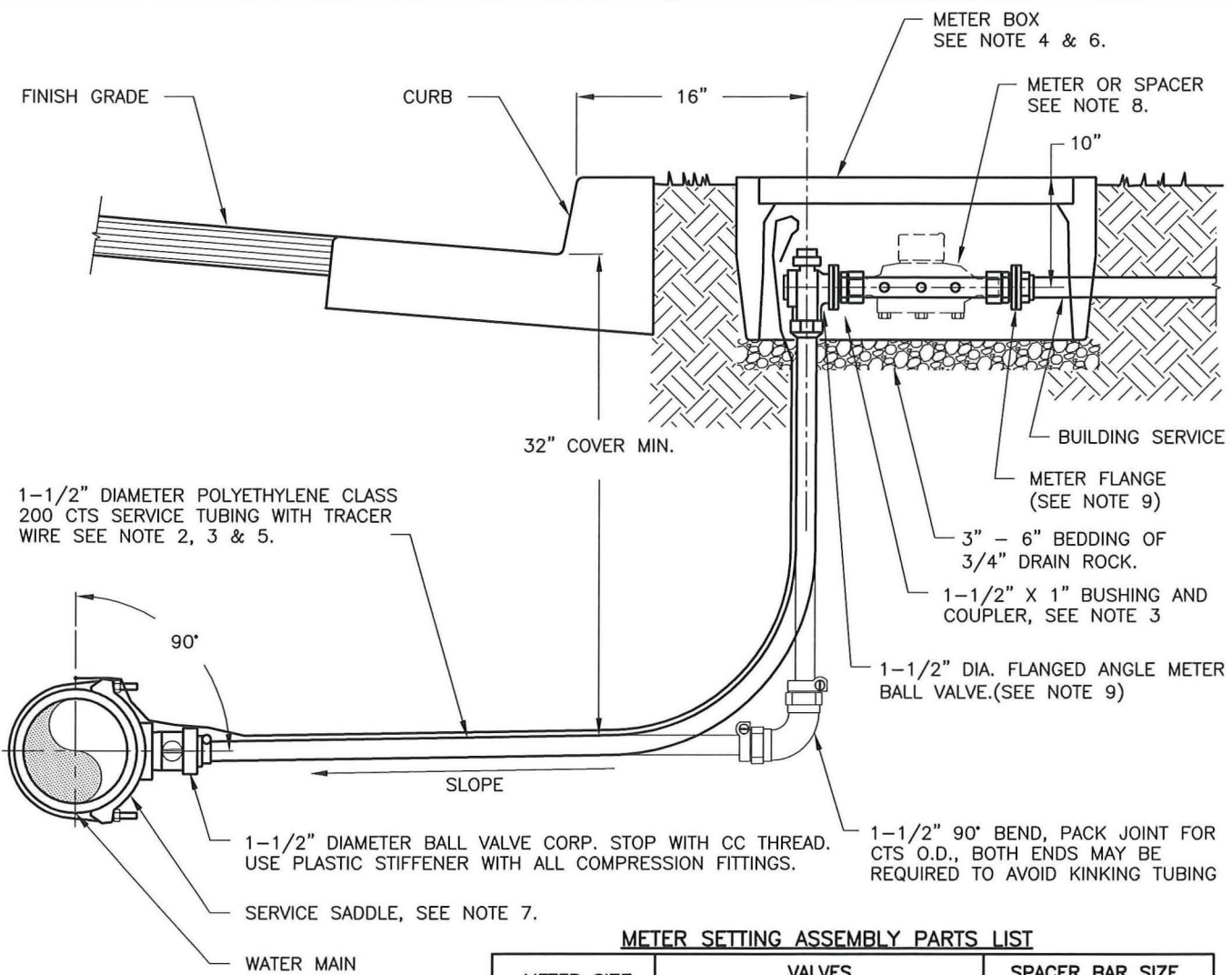
SCALE: N.T.S.

APPROVED BY:

[Signature]
 Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 861



METER SETTING ASSEMBLY PARTS LIST

METER SIZE	VALVES	SPACER BAR SIZE (SEE NOTE 9.)
1"	SEE APPROVED MATERIALS LIST	1" DIA X 11" LONG SCH. 80 PVC PIPE

NOTES:

- SEE WATER SYSTEM DESIGN GUIDELINES.
- THE SERVICE SHALL NOT BE SIZED SMALLER THAN THE METER. IF FIRE SPRINKLERS ARE REQUIRED SEE CITY STANDARD DETAIL 863.
- USE INSULATED NO. 12 THHN WIRE.
 - ALL WIRE CONNECTIONS SHALL BE MADE WITH MECHANICAL WIRE CONNECTORS WRAPPED WITH ELECTRICAL TAPE.
 - END OF TRACER WIRE TO BE EXPOSED 6" MINIMUM INSIDE OF METER BOX.
- METER BOXES SHALL BE LOCATED OUT OF TRAFFIC LOADING AREAS WHERE POSSIBLE. TRAFFIC LOADING BOX & LID TO BE INSTALLED IN ALL LOCATIONS WHERE VEHICULAR TRAFFIC MAY OCCUR, THE STEEL LID SHALL BE SET FLUSH WITH FINISHED SURFACE. BOX PIPE KNOCKOUTS TO BE GROUTED TO PREVENT DIRT INTRUSION WHERE REQUIRED.
- TRENCH BACKFILL REQUIREMENTS - SEE CITY STANDARD DETAIL 852.01.
- METER BOX AND COVER SHALL BE B-30 - SEE APPROVED MATERIALS LIST.
- TAPPING SERVICE SADDLES - SEE APPROVED MATERIALS LIST.
- FOR NEW SERVICES CONTRACTOR SHALL INSTALL SCHEDULE 80 PVC SPACER PIPE WITH 1/2" DIAMETER HOLES DRILLED THRU PIPE AT 2" ON CENTER, THREAD BOTH ENDS. CITY PUBLIC WORKS AND UTILITIES PERSONNEL TO REMOVE SPACER PIPE AND INSTALL METER. SEE METER SETTING ASSEMBLY PARTS LIST.
- INSTALL BRASS METER FLANGE, 1-1/2"x1" BUSHING AND 1"x2" METER COUPLING. SET 2" MIN. FROM SIDE OF BOX. USE 316 SS HARDWARE.



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1-1/2" WATER SERVICE
FOR 1" METER
 (NEW RESIDENTIAL SERVICE)

DATE: MARCH 2016

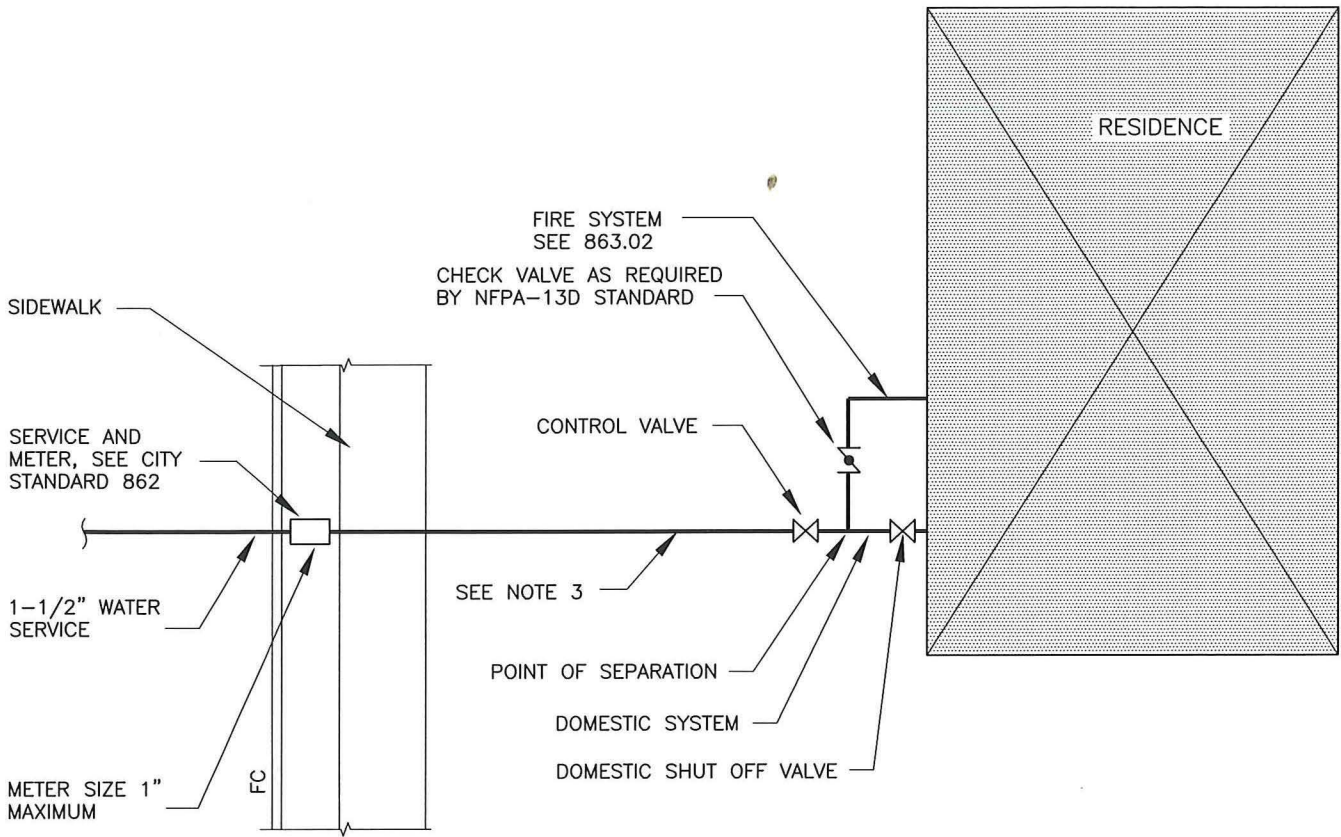
SCALE: N.T.S.

APPROVED BY:

[Signature]
 Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 862



PLAN VIEW

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. LOCATE CHECK VALVE AND SEPARATION POINT AT HOUSE OR IN GARAGE.
3. SERVICE SIZE FROM METER TO DWELLING MUST BE 1-1/2" MINIMUM. FOR SERVICES WITH LONG RUNS OR SIGNIFICANT CHANGES IN GRADE FROM THE METER TO THE DWELLING, LARGER PIPE MAY BE REQUIRED. CONTACT THE FIRE MARSHAL FOR REQUIREMENTS.



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**RESIDENTIAL FIRE
 SYSTEM SERVICE**

DATE: MARCH 2016

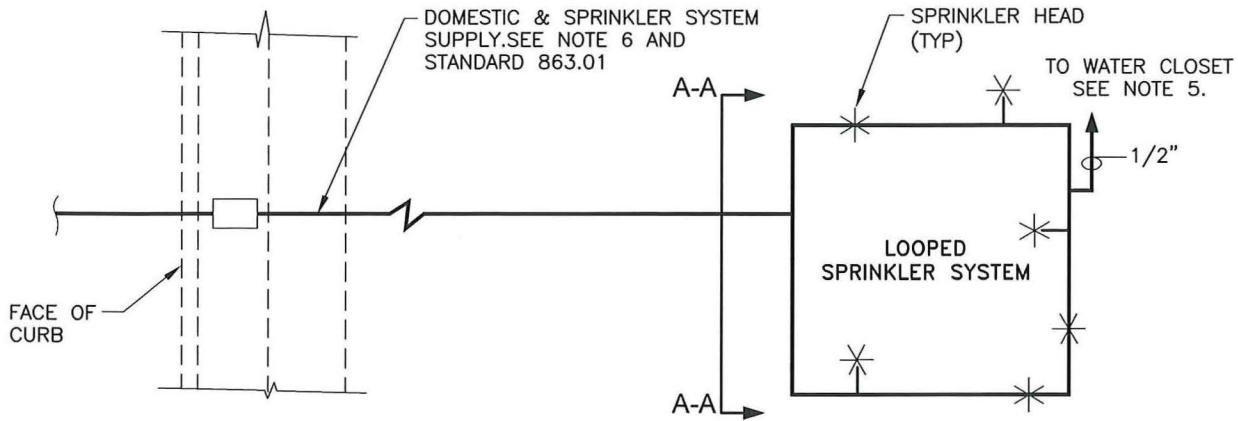
SCALE: N.T.S.

APPROVED BY:

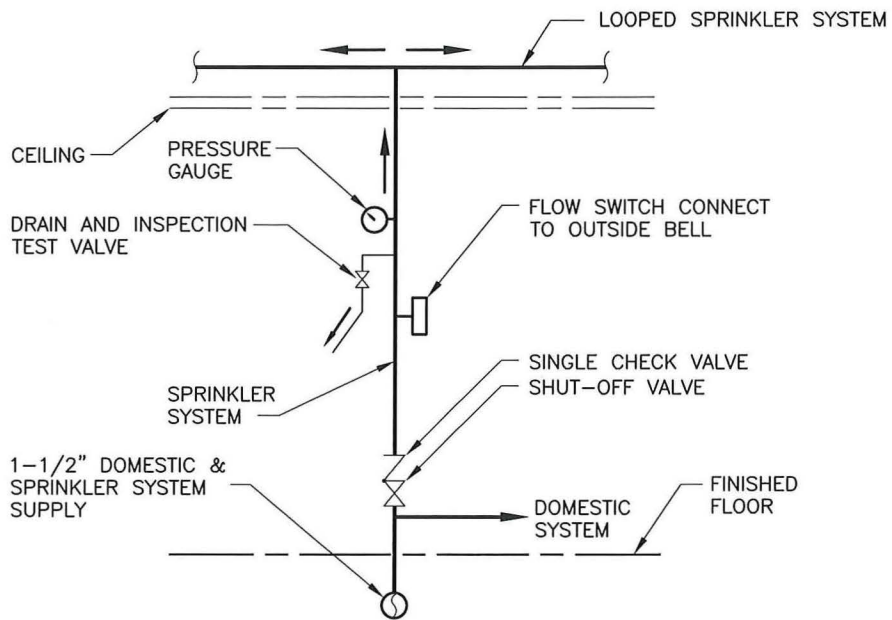
[Signature]
 Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 863.01



PLAN VIEW



A-A RISER DETAIL

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. SPRINKLER SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH NFPA 13D AS APPROVED BY THE FIRE MARSHAL.
3. THE SPRINKLER SYSTEM MUST BE A LOOPED SYSTEM.
4. BACK FLOW DEVICES WILL NOT BE REQUIRED FOR A LOOPED SYSTEM CONNECTED TO A WATER CLOSET (TOILET).
5. THE CONNECTION FOR THE WATER CLOSET MUST BE LOCATED AT THE MOST REMOTE FIXTURE (FARTHEST FROM THE SPRINKLER SYSTEM RISER). FOR SYSTEMS WHERE THE AVAILABLE PRESSURE IS GREATER THAN 70 PSI, A PRESSURE REDUCING VALVE (PRV) WILL BE REQUIRED TO BE INSTALLED BETWEEN THE TEE CONNECTION FROM THE SPRINKLER SYSTEM AND THE WATER CLOSET CONNECTION.
6. MINIMUM 1-1/2" DIA. SINGLE SERVICE—MAY REQUIRE LARGER SERVICE BASED ON FIRE SPRINKLER DESIGN CONSULT FIRE SPRINKLER CONTRACTOR FOR APPROPRIATE SIZING OF SERVICE.
7. FOR SPRINKLER SYSTEMS THAT CANNOT BE LOOPED, A SINGLE CHECK VALVE APPROVED IN ACCORDANCE WITH NFPA 13D AND OR OTHER NATIONALLY RECOGNIZED STANDARDS SHALL BE INSTALLED ON THE SPRINKLER RISER. SYSTEMS REQUIRING A CHECK VALVE SHALL NOT BE REQUIRED TO BE CONNECTED TO THE WATER CLOSET.
8. THE FIRE SPRINKLER FLOW SWITCH SHALL BE SET TO ITS HIGHEST SETTING TO AVOID ACTUATION OF THE AUDIBLE FIRE ALARM.

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RESIDENTIAL
FIRE SPRINKLER
LOOP SYSTEM

DATE: MARCH 2016

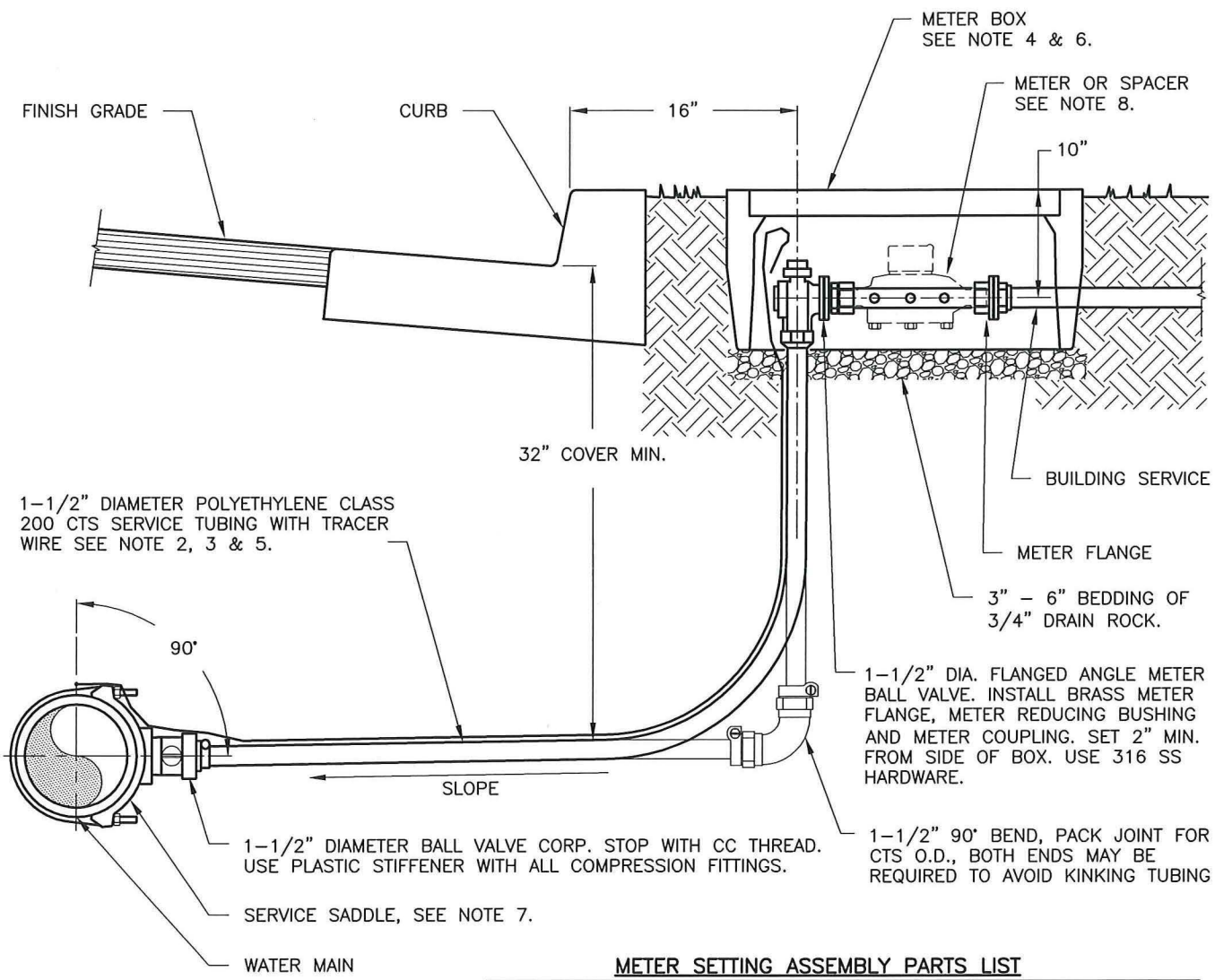
SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 863.02



1-1/2" DIAMETER POLYETHYLENE CLASS 200 CTS SERVICE TUBING WITH TRACER WIRE SEE NOTE 2, 3 & 5.

1-1/2" DIA. FLANGED ANGLE METER BALL VALVE. INSTALL BRASS METER FLANGE, METER REDUCING BUSHING AND METER COUPLING. SET 2" MIN. FROM SIDE OF BOX. USE 316 SS HARDWARE.

1-1/2" 90° BEND, PACK JOINT FOR CTS O.D., BOTH ENDS MAY BE REQUIRED TO AVOID KINKING TUBING

1-1/2" DIAMETER BALL VALVE CORP. STOP WITH CC THREAD. USE PLASTIC STIFFENER WITH ALL COMPRESSION FITTINGS.

SERVICE SADDLE, SEE NOTE 7.

WATER MAIN

METER SETTING ASSEMBLY PARTS LIST

METER SIZE	VALVES	SPACER BAR SIZE (SEE NOTE 9.)
1-1/2"	SEE APPROVED MATERIALS LIST	1-1/2" DIA X 13" L SCH. 80 PVC PIPE

NOTES:

- SEE WATER SYSTEM DESIGN GUIDELINES.
- THE SERVICE SHALL NOT BE SIZED SMALLER THAN THE METER. IF FIRE SPRINKLERS ARE REQUIRED SEE CITY STANDARD DETAIL 863.01 & 863.02.
- USE INSULATED NO. 12 THHN WIRE.
 - ALL WIRE CONNECTIONS SHALL BE MADE WITH MECHANICAL WIRE CONNECTORS WRAPPED WITH ELECTRICAL TAPE.
 - END OF TRACER WIRE TO BE EXPOSED 6" MINIMUM INSIDE OF METER BOX.
- METER BOXES SHALL BE LOCATED OUT OF TRAFFIC LOADING AREAS WHERE POSSIBLE. TRAFFIC LOADING BOX & LID TO BE INSTALLED IN ALL LOCATIONS WHERE VEHICULAR TRAFFIC MAY OCCUR, THE STEEL LID SHALL BE SET FLUSH WITH FINISHED SURFACE. BOX PIPE KNOCKOUTS TO BE GROUTED TO PREVENT DIRT INTRUSION WHERE REQUIRED.
- TRENCH BACKFILL REQUIREMENTS - SEE CITY STANDARD DETAIL 852.01.
- METER BOX AND COVER SHALL BE B-36 - SEE APPROVED MATERIALS LIST.
- TAPPING SERVICE SADDLES - SEE APPROVED MATERIALS LIST.
- FOR NEW SERVICES CONTRACTOR SHALL INSTALL SCHEDULE 80 PVC SPACER PIPE WITH 1/2" DIAMETER HOLES DRILLED THRU PIPE AT 2" ON CENTER, THREAD BOTH ENDS. CITY PUBLIC WORKS AND UTILITIES PERSONNEL TO REMOVE SPACER PIPE AND INSTALL METER. SEE METER SETTING ASSEMBLY PARTS LIST.

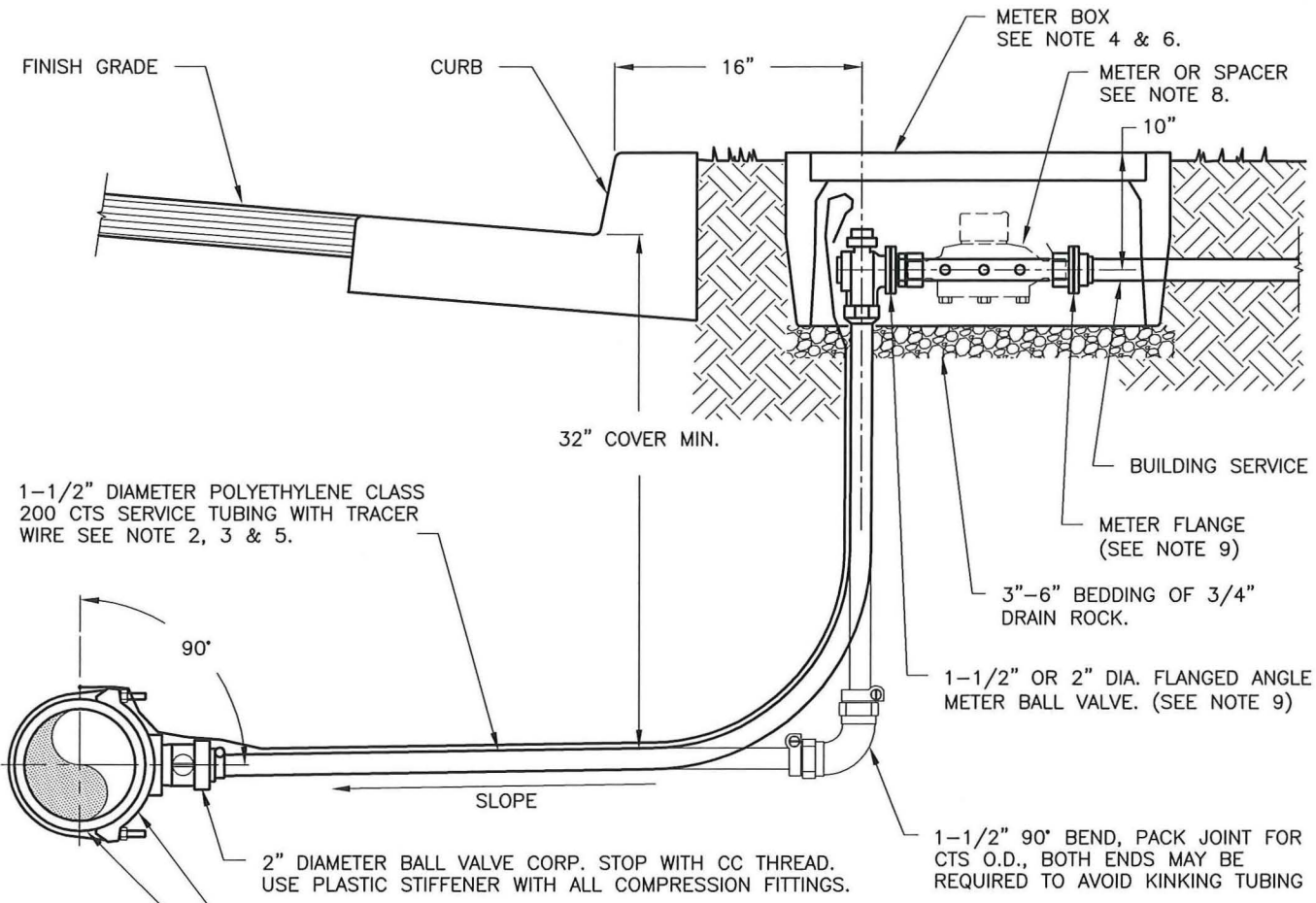


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1-1/2" WATER SERVICE
FOR 1-1/2" METER
(COMMERCIAL)

DATE: MARCH 2016 SCALE: N.T.S.
 APPROVED BY:

 Kent R. Carothers, P.E. Operations Manager C60671
 DRAWN BY: JDL NO. 864



METER SETTING ASSEMBLY PARTS LIST

METER SIZE	VALVES	SPACER BAR SIZE (SEE NOTE 9.)
1-1/2"	SEE APPROVED MATERIALS LIST	1-1/2" DIA X 13" L SCH. 80 PVC PIPE
2"	SEE APPROVED MATERIALS LIST	2" DIA X 17" LONG SCH. 80 PVC PIPE

NOTES:

- SEE WATER SYSTEM DESIGN GUIDELINES.
- THE SERVICE SHALL NOT BE SIZED SMALLER THAN THE METER. IF FIRE SPRINKLERS ARE REQUIRED SEE CITY STANDARD DETAIL 863.01 & 863.02.
- USE INSULATED NO. 12 THHN WIRE.
 - ALL WIRE CONNECTIONS SHALL BE MADE WITH MECHANICAL WIRE CONNECTORS WRAPPED WITH ELECTRICAL TAPE.
 - END OF TRACER WIRE TO BE EXPOSED 6" MINIMUM INSIDE OF METER BOX.
- METER BOXES SHALL BE LOCATED OUT OF TRAFFIC LOADING AREAS WHERE POSSIBLE. TRAFFIC LOADING BOX & LID TO BE INSTALLED IN ALL LOCATIONS WHERE VEHICULAR TRAFFIC MAY OCCUR, THE STEEL LID SHALL BE SET FLUSH WITH FINISHED SURFACE. BOX PIPE KNOCKOUTS TO BE GROUTED TO PREVENT DIRT INTRUSION WHERE REQUIRED.
- TRENCH BACKFILL REQUIREMENTS - SEE CITY STANDARD DETAIL 852.01.
- METER BOX AND COVER SHALL BE B-36 - SEE APPROVED MATERIALS LIST.
- TAPPING SERVICE SADDLES - SEE APPROVED MATERIALS LIST.
- FOR NEW SERVICES CONTRACTOR SHALL INSTALL SCHEDULE 80 PVC SPACER PIPE WITH 1/2" DIAMETER HOLES DRILLED THRU PIPE AT 2" ON CENTER, THREAD BOTH ENDS. CITY PUBLIC WORKS AND UTILITIES PERSONNEL TO REMOVE SPACER PIPE AND INSTALL METER. SEE METER SETTING ASSEMBLY PARTS LIST.
- INSTALL BRASS METER FLANGE (WITH OBLONG BOLT HOLES AND BUSHING TO FIT 1-1/2" METERS). SET 2" MIN. FROM SIDE OF BOX. USE 316 SS HARDWARE.

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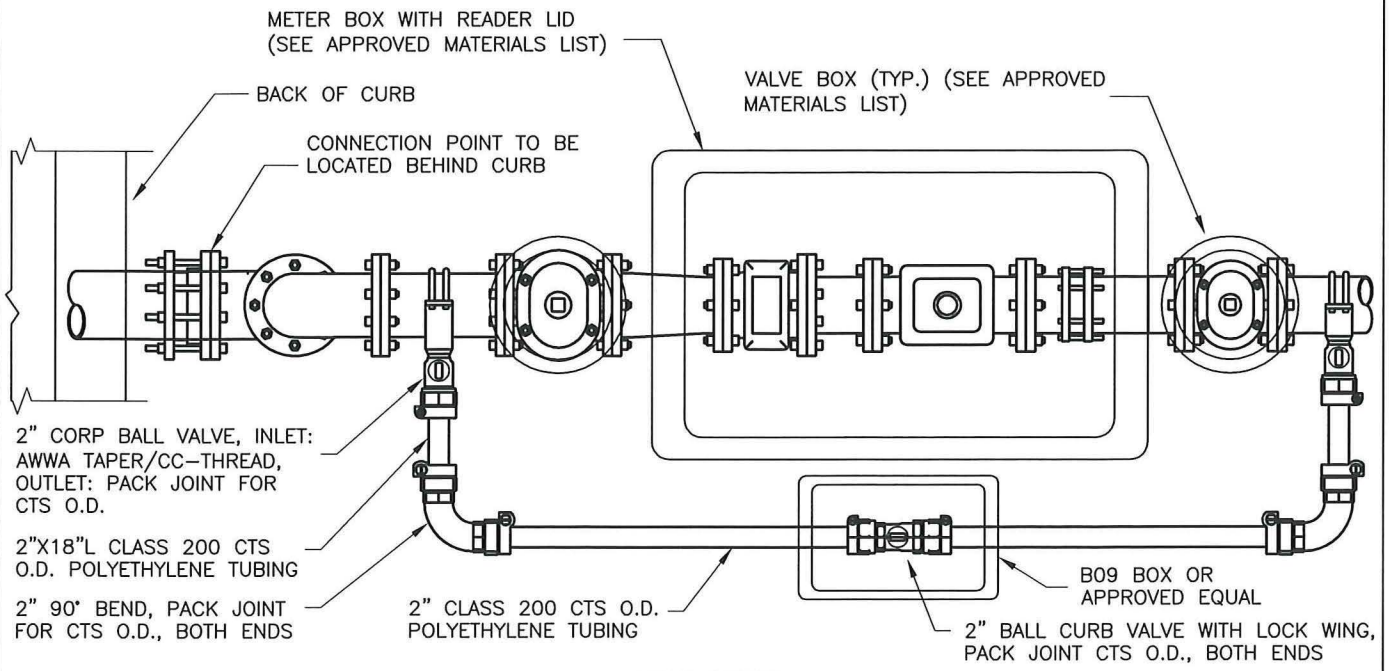


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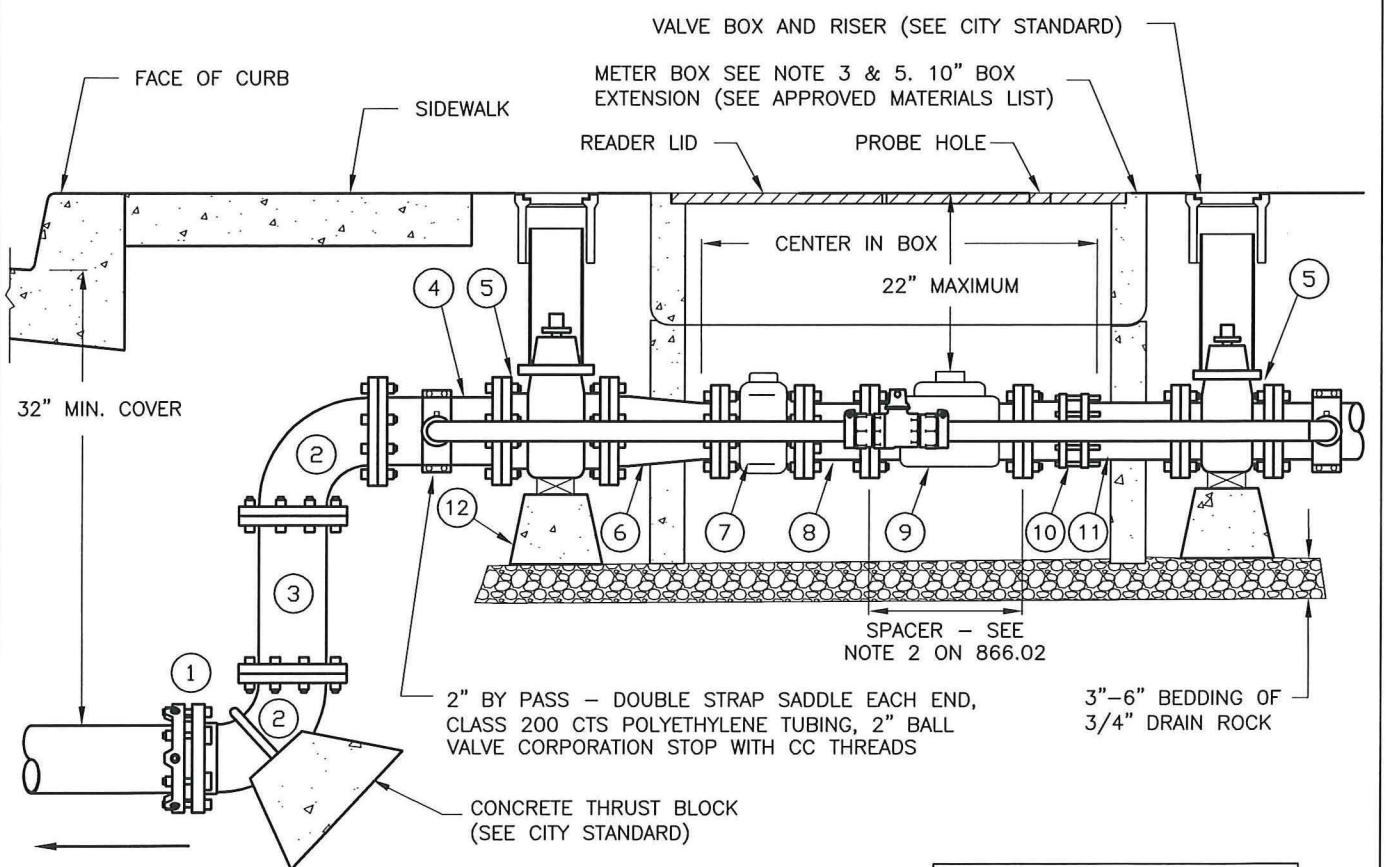
2" WATER SERVICE
FOR 1-1/2" OR 2" METER
(COMMERCIAL)

DATE: MARCH 2016 SCALE: N.T.S.
 APPROVED BY:

 Kent R. Carothers, P.E. Operations Manager C60671
 DRAWN BY: JDL NO. 865



TOP VIEW



SIDE VIEW

• SEE 866.02 FOR NOTES AND PARTS LIST.

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4" WATER SERVICE
FOR 3" METER

DATE: MARCH 2016 SCALE: N.T.S.
 APPROVED BY:

 Kent R. Carothers, P.E. Operations Manager C60671
 DRAWN BY: JDL NO. 866.01

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. CONTRACTOR SHALL INSTALL SCHEDULE 80 P.V.C. PIPE SPACER WITH 1/2" DIAMETER HOLES DRILLED THROUGH VERTICALLY AT 2" SPACING. CITY TO REMOVE SPACER BAR AT TIME OF METER INSTALLATION. LENGTH IS FOR A 3" DOMESTIC COMPOUND TYPE WATER METER. IF THE USE IS FOR IRRIGATION OR FIRE FLOW THIS LENGTH MAY VARY. CONTRACTOR TO VERIFY WITH UTILITY DIVISION PRIOR TO INSTALLATION.
3. METER BOX MUST BE SET SO THE STEEL COVER IS FLUSH WITH FINISHED SURFACE.
4. PRIOR TO METER SET, ADDRESS SHALL BE CLEARLY MARKED ON TOP OF METER BOX WITH PERMANENT MARKER.
5. METER BOX PIPE KNOCKOUTS SHALL BE NEATLY CUT AND GROUTED SUFFICIENTLY TO PREVENT INTRUSION OF DIRT.
6. ALL FITTINGS AND PIPE ARE SHALL BE DUCTILE IRON UNLESS OTHERWISE SPECIFIED.
7. SPOOL LENGTH SHALL BE A MINIMUM OF FIVE (5) TIMES THE PIPE DIAMETER.
8. THE SERVICE LATERAL SHALL NOT BE SIZED SMALLER THAN THE METER.
9. IN THE CASE OF A MONOLITHIC CURB AND SIDEWALK THE VALVE FLANGE LOCATION SHALL BE 17" BEHIND SIDEWALK.

4" SERVICE ASSEMBLY FOR A 3" METER PARTS LIST	
NO.	DESCRIPTION
①	MEGALUG MECHANICAL JOINT RESTRAINT OR APPROVED EQUAL
②	4" FLANGED 90° BEND
③	4" FLANGED SPOOL – LENGTH AS REQUIRED
④	4" FLG X FLG 18" LONG D.I.P. SPOOL
⑤	4" FLG X FLG RESILIENT WEDGE GATE VALVE
⑥	4" X 3" FLG X FLG REDUCER
⑦	STRAINER FURNISHED INSTALLED BY CITY AT DEVELOPERS EXPENSE
⑧	3" X 15" DIP SPOOL (SEE NOTE 7)
⑨	3" COMPOUND METER AND STRAINER INSTALLED BY CITY AT DEVELOPERS EXPENSE (SEE NOTE 2)
⑩	3" FLANGED COUPLING ADAPTER
⑪	3" PE X FLG D.I.P. SPOOL – LENGTH AS REQUIRED
⑫	CONCRETE PIER BLOCK WITH REDWOOD BLOCKING (2) REQUIRED



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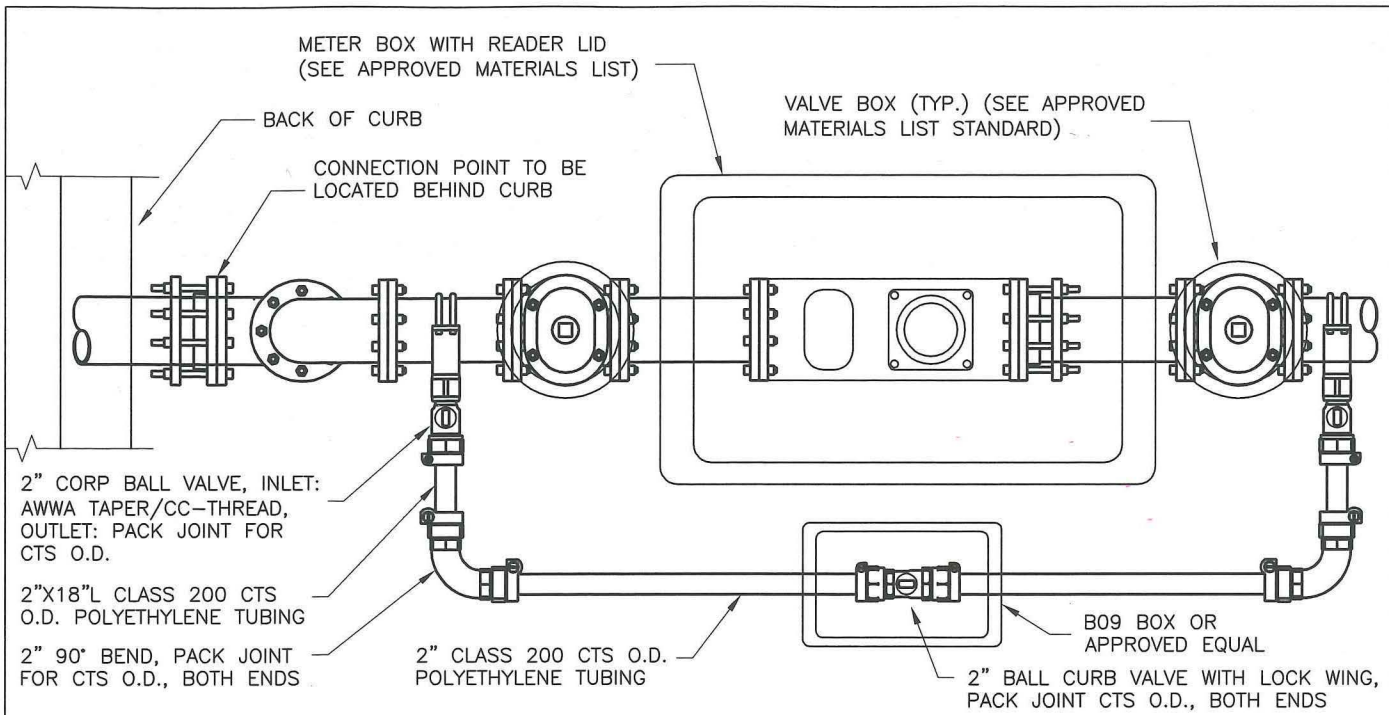
**4" WATER SERVICE
 FOR 3" METER
 (NOTES AND PARTS LIST)**

DATE: MARCH 2016 SCALE: N.T.S.

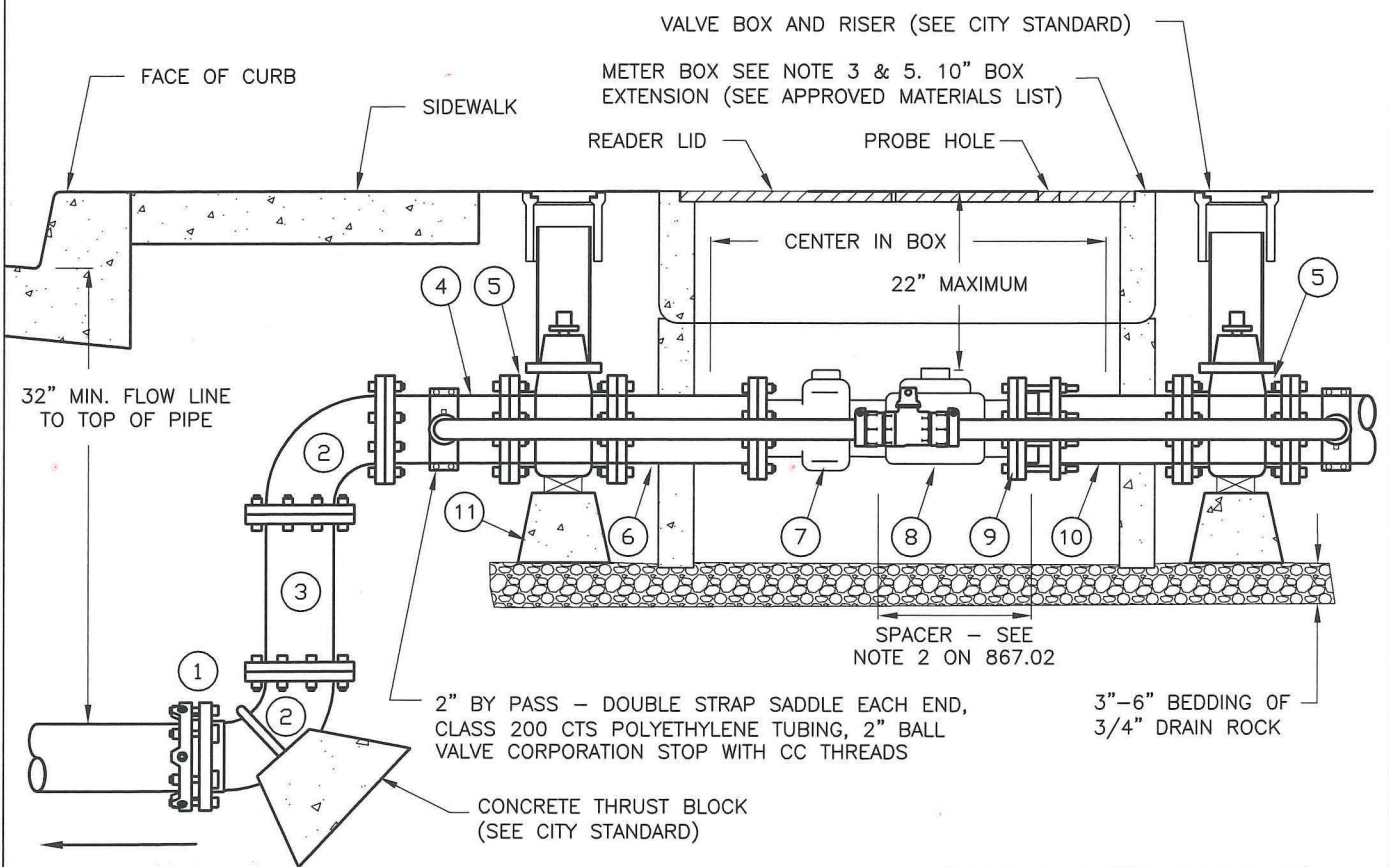
APPROVED BY:

 Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL NO. 866.02



TOP VIEW



SIDE VIEW

• SEE 867.02 NOTES FOR AND PARTS LIST



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4" WATER SERVICE
FOR 4" METER

DATE: APRIL 2017 SCALE: N.T.S.
 APPROVED BY:

 Kent R. Carothers, P.E. Operations Manager C60871
 DRAWN BY: JDL NO. 867.01

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. CONTRACTOR SHALL INSTALL SCHEDULE 80 P.V.C. PIPE SPACER WITH 1/2" DIAMETER HOLES DRILLED THROUGH VERTICALLY AT 2" SPACING. CITY TO REMOVE SPACER BAR AT TIME OF METER INSTALLATION. LENGTH IS FOR A 6" DOMESTIC TYPE WATER METER. IF THE USE IS FOR IRRIGATION OR FIRE FLOW THIS LENGTH MAY VARY. CONTRACTOR TO VERIFY WITH UTILITY DIVISION PRIOR TO INSTALLATION.
3. METER BOX MUST BE SET SO THE STEEL COVER IS FLUSH WITH FINISHED SURFACE.
4. PRIOR TO METER SET, ADDRESS SHALL BE CLEARLY MARKED ON TOP OF METER BOX WITH PERMANENT MARKER.
5. METER BOX PIPE KNOCKOUTS SHALL NEATLY CUT AND GROUTED SUFFICIENTLY TO PREVENT INTRUSION OF DIRT.
6. ALL FITTINGS AND PIPE ARE SHALL DUCTILE IRON UNLESS OTHERWISE SPECIFIED.
7. SPOOL LENGTH TO BE A MINIMUM OF FIVE (5) TIMES THE PIPE DIAMETER.
8. THE SERVICE LATERAL SHALL NOT BE SIZED SMALLER THAN THE METER.
9. IN THE CASE OF A MONOLITHIC CURB AND SIDEWALK THE VALVE FLANGE LOCATION SHALL BE 17" BEHIND SIDEWALK.

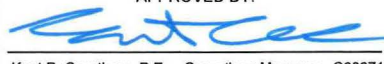
4" SERVICE ASSEMBLY FOR A 4" METER PARTS LIST	
NO.	DESCRIPTION
①	MEGALUG MECHANICAL JOINT RESTRAINT OR APPROVED EQUAL
②	4" FLANGED 90° BEND
③	4" FLANGED SPOOL – LENGTH AS REQUIRED
④	4" FLG X FLG 18" LONG D.I.P. SPOOL
⑤	4" FLG X FLG RESILIENT WEDGE GATE VALVE
⑥	4" X 20" DIP SPOOL (SEE NOTE 7)
⑦	STRAINER FURNISHED INSTALLED BY CITY AT DEVELOPERS EXPENSE
⑧	4" METER AS REQUIRED INSTALLED BY CITY AT DEVELOPERS EXPENSE (SEE NOTE 2)
⑨	4" FLANGED COUPLING ADAPTER
⑩	4" PE X FLG D.I.P. SPOOL – LENGTH AS REQUIRED
⑪	CONCRETE PIER BLOCK WITH REDWOOD BLOCKING (2) REQUIRED

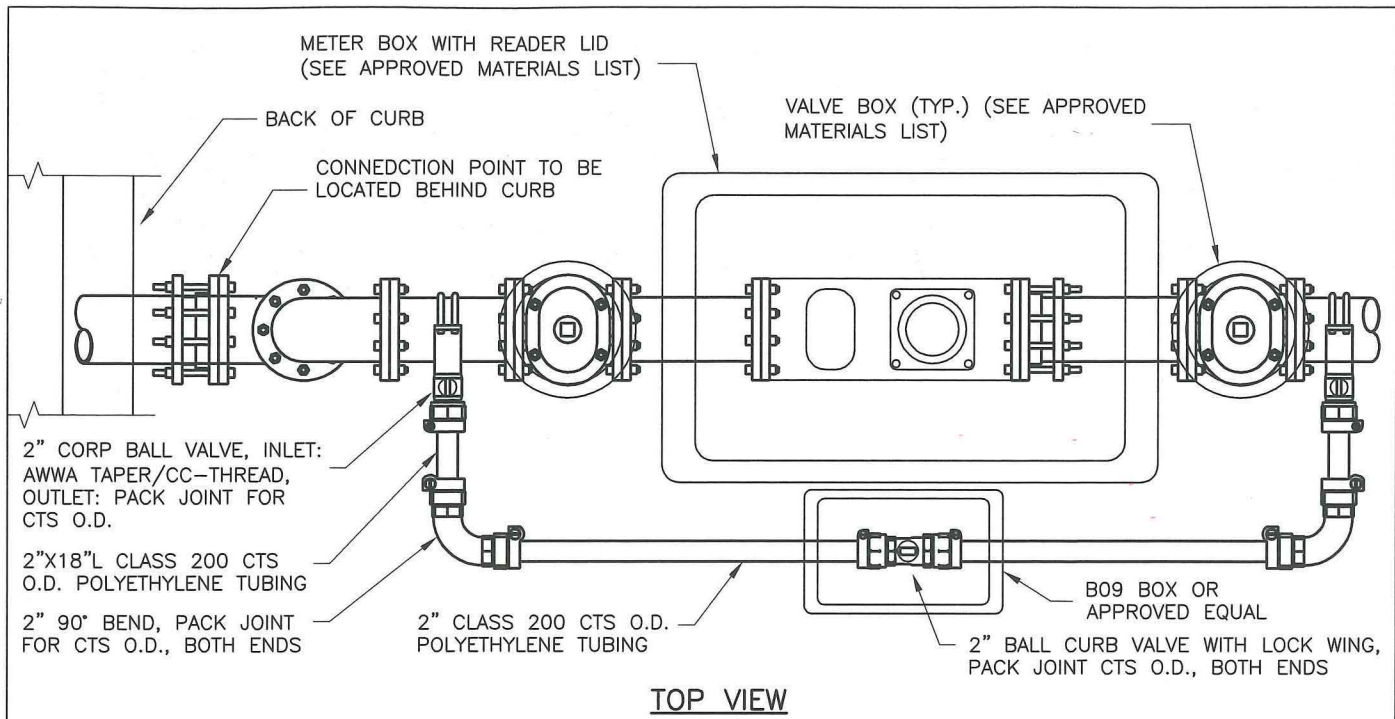
4" METER SPACER TABLE	
METER TYPE	SPACER LENGTH
COMPOUND METER WITH STRAINER	29 1/2"
TURBINE METER WITH STRAINER (SHOWN)	23 1/2"



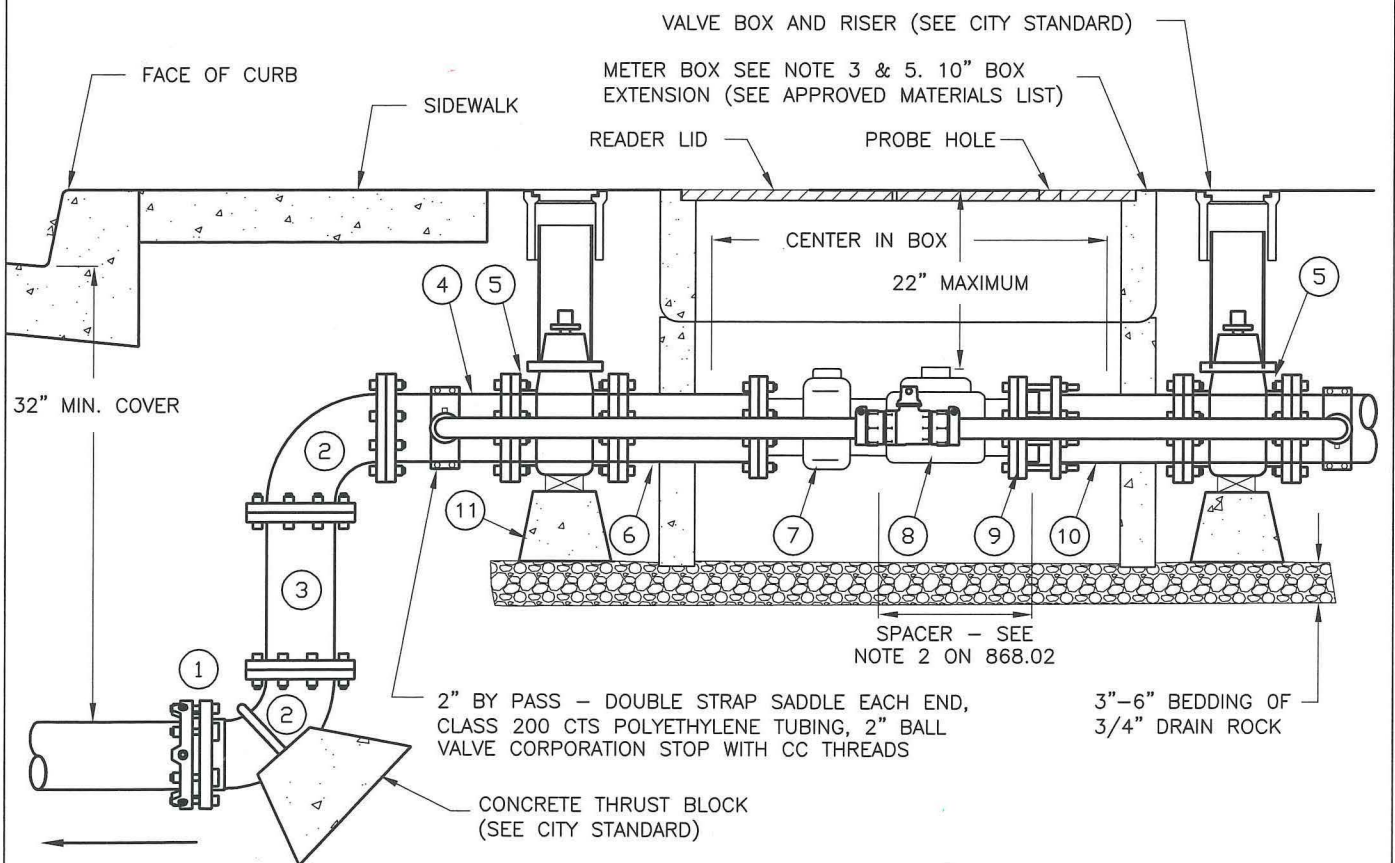
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**4" WATER SERVICE
 FOR 4" METER
 (NOTES AND PARTS)**

DATE: MARCH 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 867.02



TOP VIEW



SIDE VIEW

• SEE 868.02 FOR NOTES AND PARTS LIST



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**6" WATER SERVICE FOR
 6" METER
 (TURBINE)**

DATE: APRIL 2017	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 868.01

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. CONTRACTOR SHALL INSTALL SCHEDULE 80 P.V.C. PIPE SPACER WITH 1/2" DIAMETER HOLES DRILLED THROUGH VERTICALLY AT 2" SPACING. CITY TO REMOVE SPACER BAR AT TIME OF METER INSTALLATION. LENGTH IS FOR A 6" DOMESTIC TYPE WATER METER. IF THE USE IS FOR IRRIGATION OR FIRE FLOW THIS LENGTH MAY VARY. CONTRACTOR TO VERIFY WITH UTILITY DIVISION PRIOR TO INSTALLATION.
3. METER BOX MUST BE SET SO THE STEEL COVER IS FLUSH WITH FINISHED SURFACE.
4. PRIOR TO METER SET, ADDRESS SHALL BE CLEARLY MARKED ON TOP OF METER BOX WITH PERMANENT MARKER.
5. METER BOX PIPE KNOCKOUTS SHALL BE NEATLY CUT AND GROUTED SUFFICIENTLY TO PREVENT INTRUSION OF DIRT.
6. ALL FITTINGS AND PIPE ARE SHALL BE DUCTILE IRON UNLESS OTHERWISE SPECIFIED.
7. SPOOL LENGTH SHALL BE A MINIMUM OF FIVE (5) TIMES THE PIPE DIAMETER.
8. THE SERVICE LATERAL SHALL NOT BE SIZED SMALLER THAN THE METER.
9. IN THE CASE OF A MONOLITHIC CURB AND SIDEWALK THE VALVE FLANGE LOCATION SHALL BE 17" BEHIND SIDEWALK.

6" SERVICE ASSEMBLY FOR A 6" METER PARTS LIST	
NO.	DESCRIPTION
①	MEGALUG MECHANICAL JOINT RESTRAINT OR APPROVED EQUAL
②	6" FLANGED 90° BEND
③	6" FLANGED SPOOL – LENGTH AS REQUIRED
④	6" FLG X FLG 18" LONG D.I.P. SPOOL
⑤	6" FLG X FLG RESILIENT WEDGE GATE VALVE
⑥	6" X 30" DIP SPOOL (SEE NOTE 7)
⑦	STRAINER FURNISHED INSTALLED BY CITY AT DEVELOPERS EXPENSE
⑧	6" METER AS REQUIRED INSTALLED BY CITY AT DEVELOPERS EXPENSE (SEE NOTE 2)
⑨	6" FLANGED COUPLING ADAPTER
⑩	6" PE X FLG D.I.P. SPOOL – LENGTH AS REQUIRED
⑪	CONCRETE PIER BLOCK WITH REDWOOD BLOCKING (2) REQUIRED

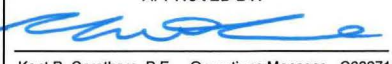
6" METER SPACER TABLE	
METER TYPE	SPACER LENGTH
COMPOUND METER WITH STRAINER	33"
TURBINE METER WITH STRAINER (SHOWN)	27"



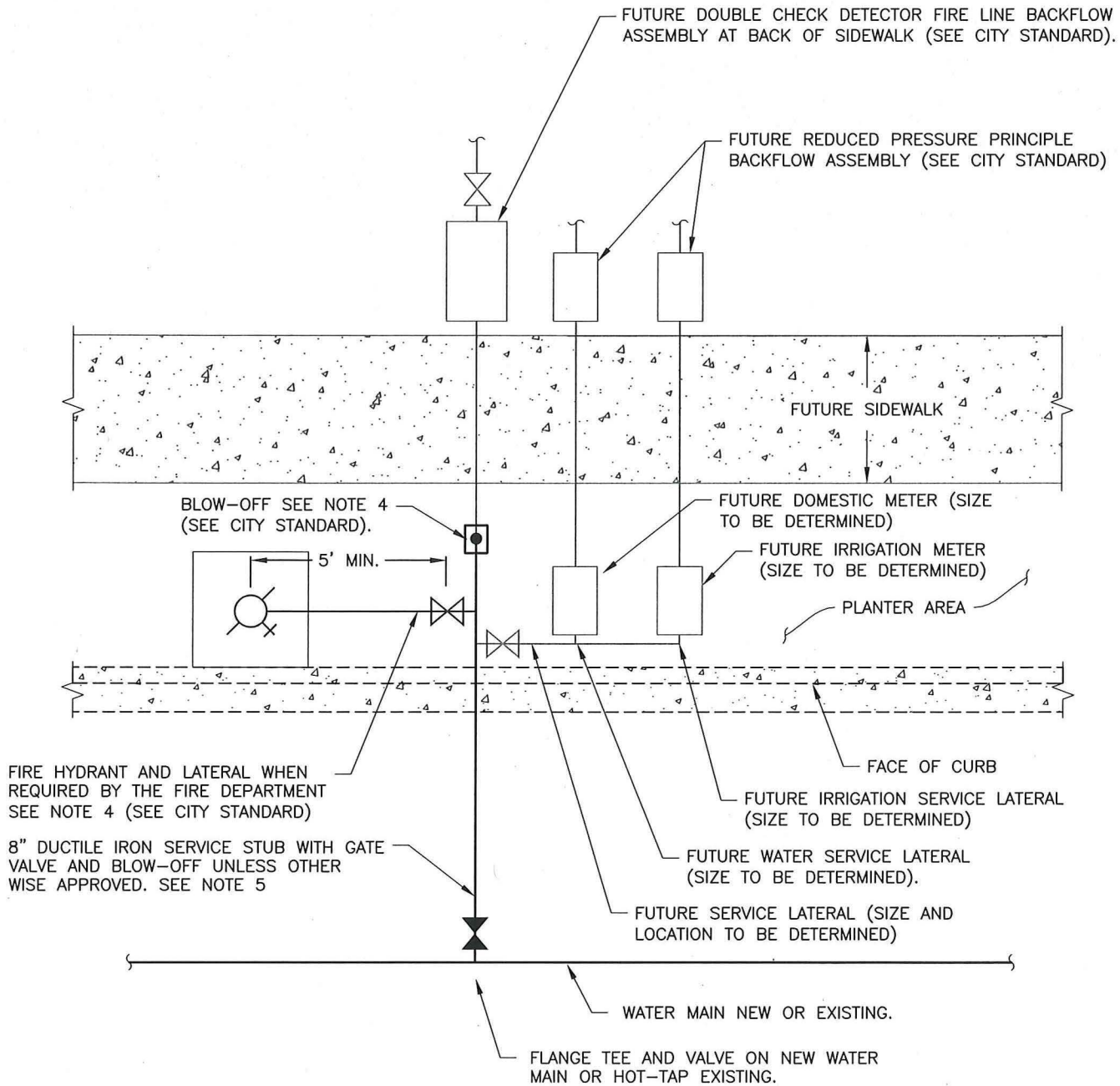
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 PETALUMA, CALIFORNIA 94954 FAX. 707-778-4508

**6" WATER SERVICE FOR
 6" METER
 (TURBINE)
 (NOTES AND PARTS)**

DATE: MARCH 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60871	
DRAWN BY: JDL	NO. 868.02

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NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. THIS STANDARD APPLIES TO COMMERCIAL AND MULTI-RESIDENTIAL DEVELOPMENTS WHEN DOMESTIC, IRRIGATION AND FIRE PROTECTION REQUIREMENTS ARE NOT ESTABLISHED AT TIME OF APPLICATION.
3. DESIGN APPROVAL MUST BE OBTAINED FROM PUBLIC WORKS & UTILITIES.
4. WHEN A FIRE HYDRANT IS REQUIRED THE BLOW-OFF SHALL BE DELETED, AND A TEE, FIRE HYDRANT AND BLIND FLANGE WITH A 3FT MINIMUM FLANGE SPOOL SHALL BE INSTALLED.
5. ADEQUATE SPACING SHALL BE PROVIDED FOR FUTURE SERVICE LATERAL, BETWEEN THE BACK OF CURB AND TEE.
6. APPROPRIATE THRUST BLOCKING IS REQUIRED PER CITY STANDARD.

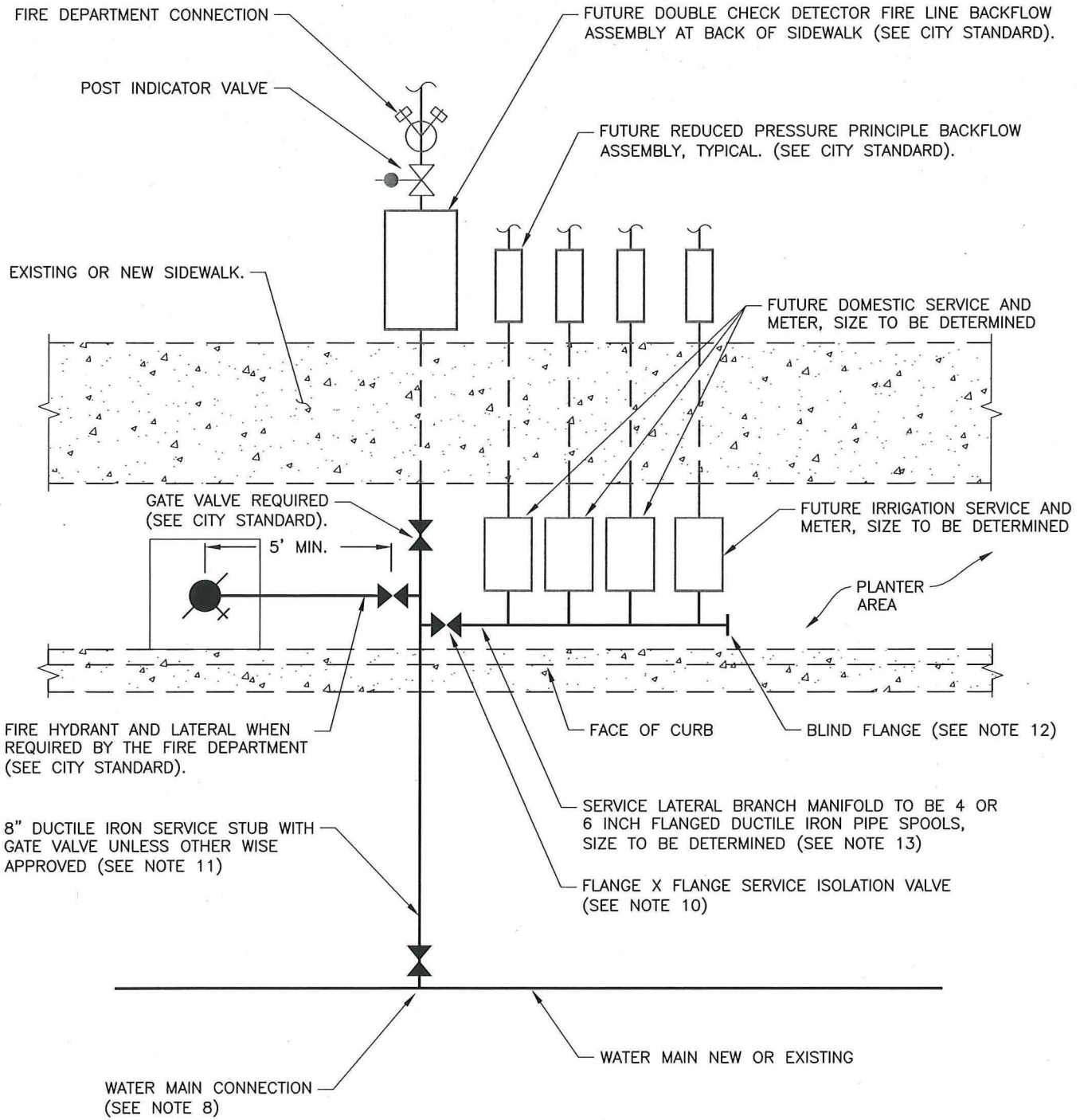


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PUBLIC WORKS & UTILITIES
 UTILITIES DIVISION
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COMBINATION SERVICE STUB
 COMMERCIAL & MULTI-RESIDENTIAL

DATE: AUGUST 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 869

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• FOR NOTES & CALCULATIONS SEE 870.02



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COMBINATION WATER SERVICE
 COMMERCIAL & MULTI-RESIDENTIAL

DATE: AUGUST 2016	SCALE: N.T.S.
APPROVED BY: <i>[Signature]</i>	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 870.01

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. THIS STANDARD APPLIES TO COMMERCIAL AND MULTI-RESIDENTIAL DEVELOPMENTS WHERE DOMESTIC, IRRIGATION AND FIRE PROTECTION REQUIREMENTS ARE NOT ESTABLISHED AT THE TIME OF APPLICATION.
3. DESIGN APPROVAL FROM PUBLIC WORKS & UTILITIES MUST BE OBTAINED PRIOR TO INSTALLATION.
5. WHEN THE PLANTER AREA IS WIDER THAN 8 FEET THE DOUBLE CHECK DETECTOR FIRE LINE BACKFLOW ASSEMBLY, METER(S) AND BACKFLOW PREVENTER SHALL BE LOCATED IN PLANTER AREA.
6. NO MANIFOLD VALVES OR FITTINGS EXCEPT SERVICE ISOLATION VALVE ARE TO BE BELOW 36" FROM FINISHED GRADE.
7. NO MORE THAN 6 SERVICES MAY BE INSTALLED ON A MANIFOLD WITHOUT THE APPROVAL FROM PUBLIC WORKS & UTILITIES: SEE CITY STANDARD FOR MANIFOLD DEMAND REQUIREMENTS UNDER 100 GALLONS PER MINUTE.
8. REFER TO CITY WATER SYSTEM DESIGN AND CONSTRUCTION GUIDELINES FOR WATER MAIN CONNECTION REQUIREMENTS.
9. FOR METER SIZES 1" THRU 2" SEPARATE SERVICES MAY BE INSTALLED ON THE SERVICE LATERAL MANIFOLD BRANCH PER CITY STANDARD.
10. THE SERVICE ISOLATION VALVE TO BE A CITY APPROVED GATE VALVE
11. SERVICE TO BE 2" LARGER DIAMETER THAN FIRE LINE OR MINIMUM 8", WHICHEVER IS GREATER.
12. INSTALL BLIND FLANGE 9" FROM END OF LAST SERVICE.
13. SERVICE LATERAL BRANCH MAY BE LOCATED IN THE STREET UPON APPROVAL FROM PUBLIC WORKS & UTILITIES.

MANIFOLD SIZE CALCULATIONS:

1. USE TABLE TO ASSIGN FLOW RATE PER METER.

METER SIZE	G.P.M. FLOW ALLOWED
1" SEE NOTE 7 & 9	25
1 1/2" SEE NOTE 7 & 9	50
2" SEE NOTE 7 & 9	80
3"	160
4"	250
6"	500

2. CALCULATE TOTAL MAXIMUM FLOW ALLOWED THROUGH MANIFOLD BY ADDING INDIVIDUAL METER FLOWS TOGETHER.

3.

METER SIZE	G.P.M. FLOW ALLOWED
4"	101 - 420
6"	421 - 950


MAXIMUM FLOW ALLOWED TO BE SUPPLIED BY A 2" MANIFOLD FED BY ONE (1) 2" SERVICE IS 100 GPM WITH PUBLIC WORKS & UTILITIES DEPT. APPROVAL. THE DESIGN ENGINEER MAY COUNT FLOWS FOR IRRIGATION METER(S) SEPARATELY IF THE MANIFOLD SERVES ONLY ONE (1) PROPERTY AND THE PROPERTY IS UNDER COMMON CONTROL.

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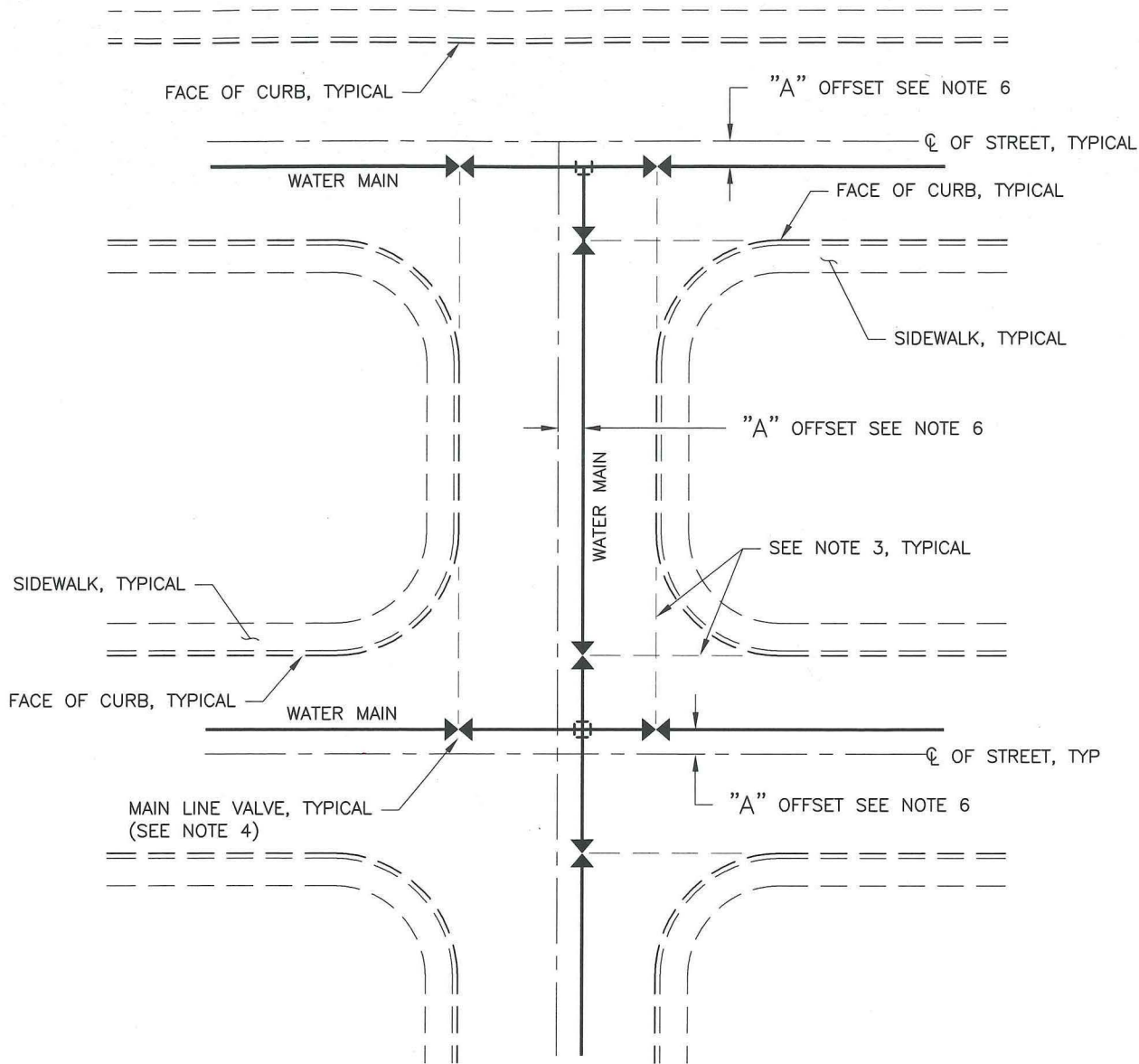


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**COMBINATION
 WATER SERVICE**
 COMMERCIAL & MULTI-RESIDENTIAL
 NOTES & CALCULATIONS

DATE: AUGUST 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 870.02

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NOTES

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. WATER MAINS SHALL BE LOCATED PARALLEL TO STREET CENTERLINES AT THE OFFSET SHOWN ABOVE UNLESS CONFLICTS WITH OTHER UNDERGROUND FACILITIES CANNOT BE AVOIDED. NONSTANDARD ALIGNMENTS SHALL BE APPROVED BY THE PUBLIC WORKS & UTILITIES DEPARTMENT.
3. MAIN LINE VALVES, EXCEPT HYDRANT VALVES AND TAPPING VALVES SHALL BE LOCATED ON THE FACE OF CURB-LINE EXTENSION WHERE POSSIBLE.
4. A MINIMUM OF (3) THREE MAINLINE VALVES ARE REQUIRED FOR "T" INTERSECTIONS AND (4) FOUR VALVES ARE REQUIRED FOR CROSS INTERSECTIONS UNLESS OTHERWISE APPROVED BY THE PUBLIC WORKS & UTILITIES DEPARTMENT.
5. MAIN LINE VALVES SHALL BE REQUIRED TO ISOLATE BOTH PUBLIC AND PRIVATE FIRE HYDRANTS INTO SEPARATELY VALVED MAIN LINE SECTIONS. MAIN LINE VALVES SHALL HAVE A MAXIMUM SPACING OF 500 FEET.
6. DISTANCE "A";
 - MINIMUM OF 5 FEET FROM CENTERLINE OF STREET TO OUTSIDE OF PIPE WHERE POSSIBLE.
 - REFERENCE CA DEPARTMENT OF HEALTH SERVICES - GUIDANCE CRITERIA FOR THE SEPARATION OF WATER MAINS AND NON-POTABLE PIPELINES.
 - INSTALL WATER MAINS WITH CONSISTENT ALIGNMENT WHERE POSSIBLE.



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UTILITIES DIVISION

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**WATER MAINS AND
MAIN LINE VALVE
ALIGNMENT**

DATE: MARCH 2017

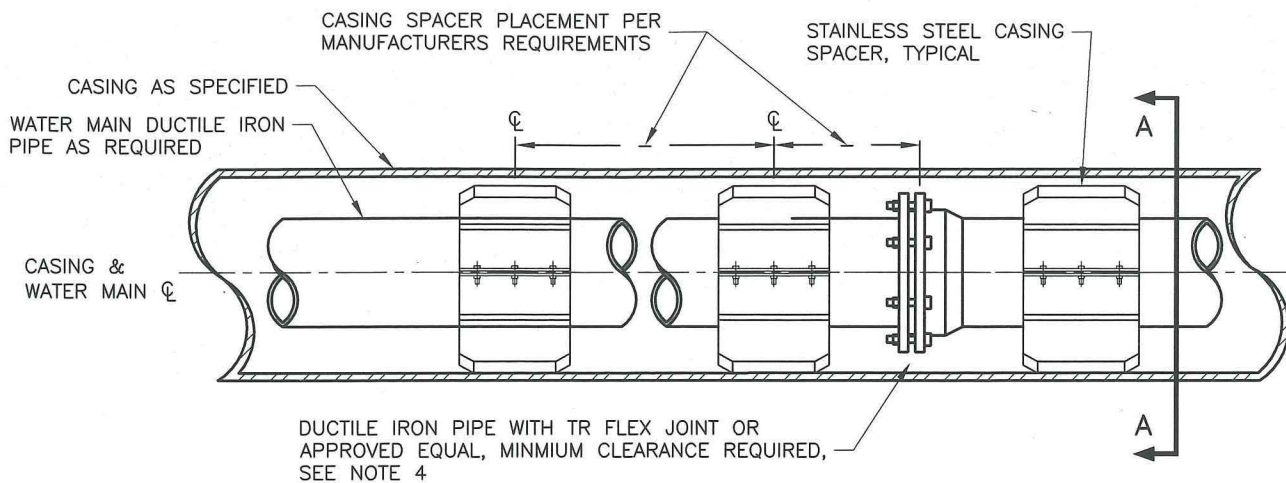
SCALE: N.T.S.

APPROVED BY:

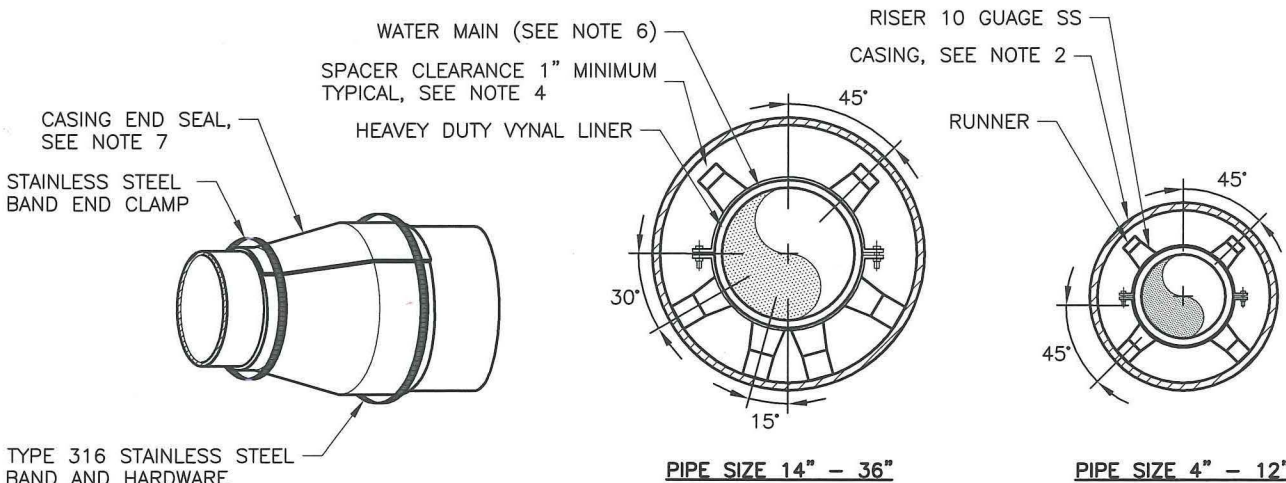
Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 871



PIPE JOINT AND SPACER



CASING END SEAL

**(A) CASING SPACER CONFIGURATION
- CENTERED NON-RESTRAINED**

CASING TABLE - MINIMUM REQUIRED SIZE

PIPE SIZE	6"	8"	12"	14"	16"
CASING SIZE (INSIDE DIA.)	16"	16"	20"	24"	30"
CASING WALL THICKNESS	.375	.375	.375	.375	.500

NOTES

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. CASING WALL THICKNESS AS INDICATED IN THE CASING TABLE IS A MINIMUM REQUIREMENT. HEAVIER WALL THICKNESS MAY BE REQUIRE BY JACKING OPERATION AND DESIGN BY A PROFESSIONAL ENGINEER REGISTER IN THE STATE OF CALIFORNIA, WHICH SHALL BE FURNISHED BY THE CONTRACTOR FOR APPROVAL.
3. CASING SPACER SHALL BE MODEL S12GN2 AS MANUFACTURED BY PIPELINE SEAL AND INSULATOR, INC., HOUSTON TX, OR APPROVED EQUAL. INSTALL SKIDS PER MANUFACTURERS SPECIFICATIONS.
4. CASING SPACER SHALL BE SIZED SO THAT PIPE JOINTS AND CASING HAVE A 1" MINIMUM CLEARANCE.
5. DUCTILE IRON PIPE AND FITTINGS SHALL BE CLASS 250 AND ENCASED IN 8MIL POLYETHYLENE TUBE PER AWWA C105.
6. CASING END SEAL SHALL BE MODEL W WRAP AROUND END SEAL AS MANUFACTURED BY PIPELINE SEAL AND INSULATOR, INC., HOUSTON TX, OR APPROVED EQUAL.
7. ALL STAINLESS STEEL SHALL MEET SS316 ASTM A240 SPECIFICATION.



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**BORE AND JACK
CASING, SPACER AND
END SEAL**

DATE: MARCH 2017 SCALE: N.T.S.

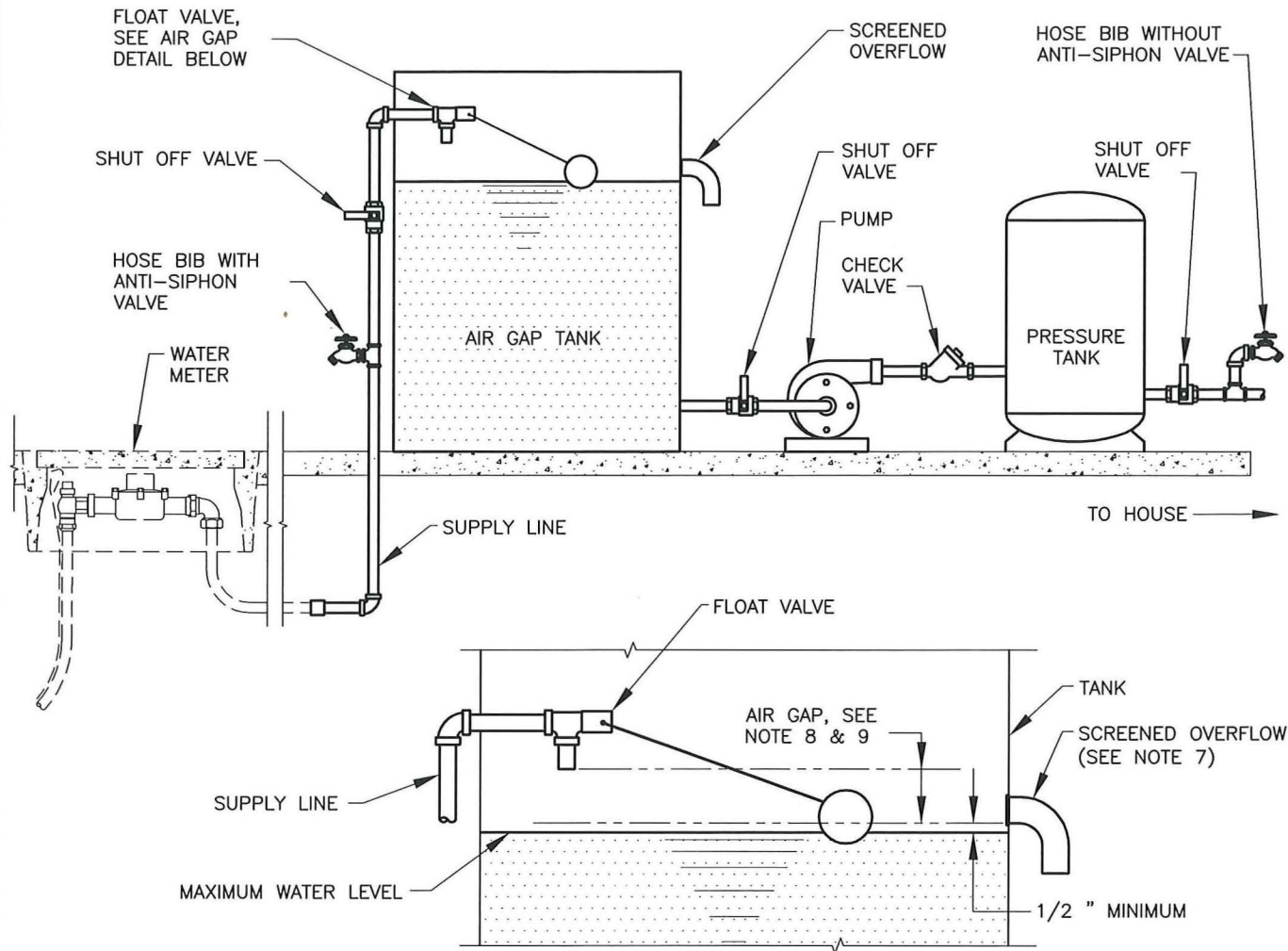
APPROVED BY:

Kent R. Carothers

Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 872



AIR GAP DETAIL

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. THE SYSTEM DESIGN SHALL BE APPROVED BY THE FIRE MARSHALL AND PUBLIC WORKS AND UTILITIES PRIOR TO INSTALLATION. FOR TANK CAPACITY SEE WATER SYSTEM DESIGN GUIDELINES.
3. THE AIR GAP TANK SHALL BE INSTALLED AS CLOSE AS POSSIBLE TO THE WATER METER LOCATION. NO TEE OR BRANCH CONNECTIONS ARE ALLOWED BETWEEN THE WATER METER AND THE AIR GAP TANK.
4. NO PERMANENT BYPASS OF THE AIR GAP SYSTEM IS ALLOWED.
5. AN IN LINE SHUT OFF VALVE SHALL BE INSTALLED BETWEEN;
THE SUPPLY PIPE AND THE AIR GAP TANK
THE AIR GAP TANK AND THE PUMP
THE PRESSURE TANK AND THE HOUSE
6. THE AIR GAP TANK SHALL HAVE AN OVERFLOW OPENING LOCATED AT LEAST 1/2 INCH ABOVE THE MAXIMUM WATER LEVEL.
7. THE OVERFLOW OPENING SHALL BE AT LEAST 4 SQUARE INCHES AND COVERED BY A BUG PROOF WIRE MESH SCREEN.
8. THE AIR GAP IS MEASURED FROM THE LOWEST OPENING SUPPLYING WATER TO THE TANK, TO THE LOWEST OPENING OF THE OVERFLOW VENT PIPING. (SEE DETAIL)
9. THE AIR GAP SHALL BE AT LEAST 2 TIMES THE DIAMETER OF THE SUPPLY PIPE BUT IN NO CASE LESS THAN 1 INCH.
10. AN INLINE CHECK VALVE SHALL BE INSTALLED BETWEEN THE PUMP AND THE PRESSURE TANK.
11. A HOSE BIB SHALL BE INSTALLED ON THE SUPPLY PIPE BEFORE THE AIR GAP TANK, AND SHALL BE EQUIPPED WITH A APPROVED ANTI-SIPHON VALVE. A SECOND HOSE BIB SHALL BE INSTALLED DOWNSTREAM OF THE PRESSURE TANK AND SHALL NOT HAVE A ANTI-SIPHON VALVE.

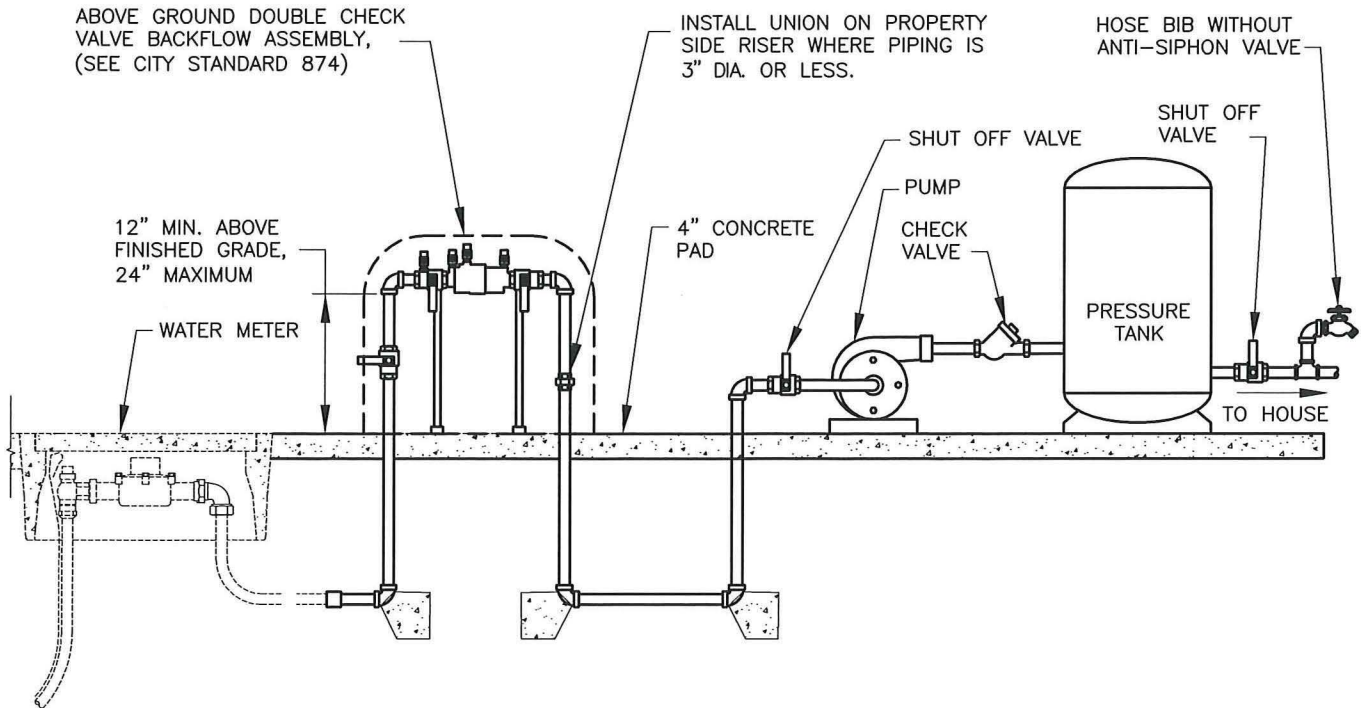


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AIR GAP TANK SYSTEM

DATE: MARCH 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 873.01

THIS STANDARD WILL ONLY BE ALLOWED WITH PRIOR WRITTEN APPROVAL OF
PUBLIC WORKS & UTILITIES AND THE FIRE MARSHAL'S OFFICE.



NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. THIS SPECIAL STANDARD, IF APPROVED, WILL REPLACE CITY STANDARD 873.01
3. THE DOUBLE CHECK VALVE SHALL BE INSTALLED AS CLOSE AS POSSIBLE TO THE WATER METER LOCATION, SEE CITY STANDARD 874.
4. NO TEE OR BRANCH CONNECTIONS ARE ALLOWED BETWEEN THE WATER METER AND THE PRESSURE TANK.
5. AN IN LINE SHUT OFF VALVE SHALL BE INSTALLED BETWEEN;
THE SUPPLY PIPE AND THE AIR GAP TANK
THE AIR GAP TANK AND THE PUMP
THE PRESSURE TANK AND THE HOUSE
6. AN INLINE CHECK VALVE SHALL BE INSTALLED BETWEEN THE PUMP AND THE PRESSURE TANK


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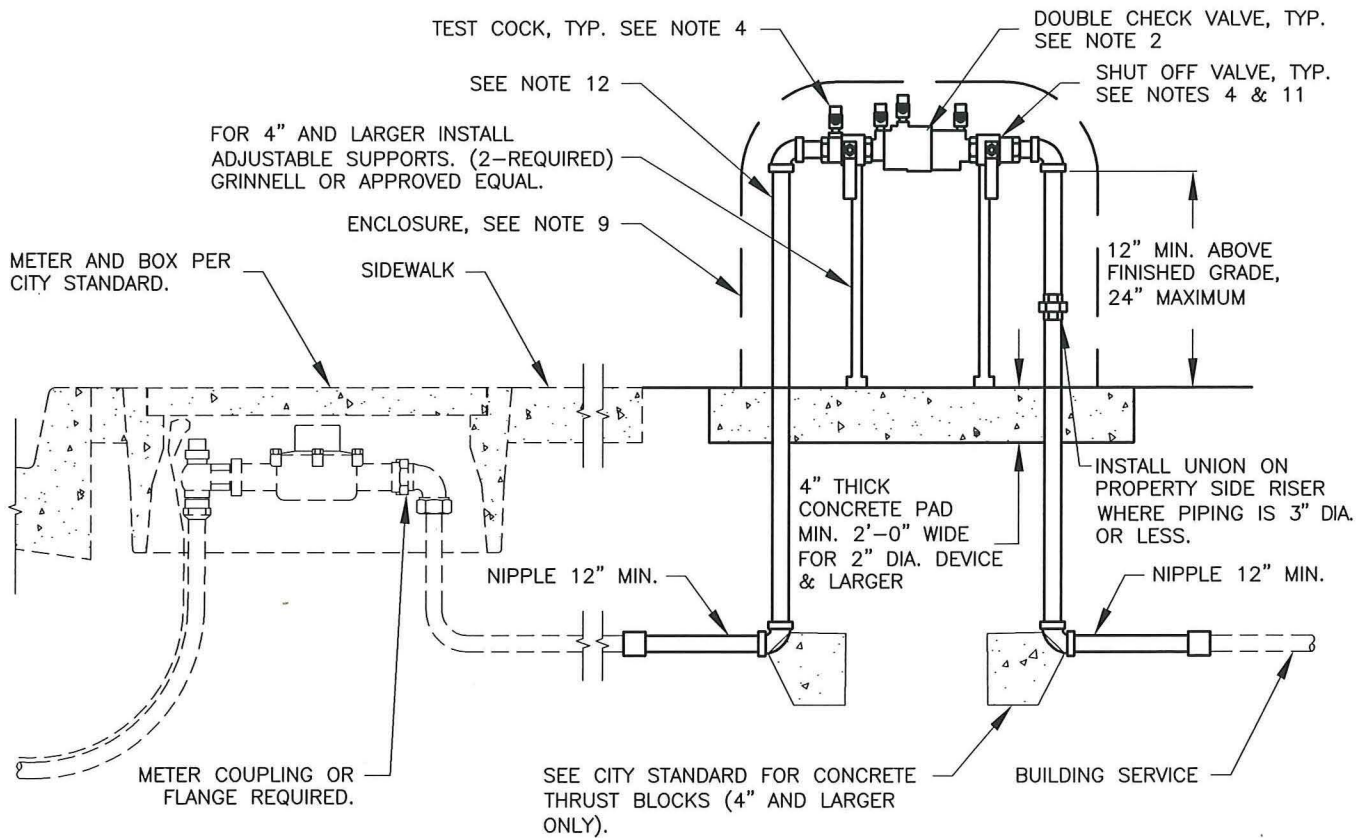


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SPECIAL STANDARD
PRESSURE TANK
SYSTEM

DATE: MARCH 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 873.02



NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
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. THERE SHALL BE NO TEE OR BRANCH LINES BETWEEN THE WATER METER AND ASSEMBLIES. ANY CONFLICTS SHALL BE RESOLVED BY PUBLIC WORKS AND UTILITIES.
3. APPROVED DOUBLE CHECK VALVES SHALL BE AS SHOWN ON "LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES" (LATEST REVISION) BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES.
4. ALL DOUBLE CHECK VALVE ASSEMBLIES SHALL BE PROVIDED WITH A MINIMUM OF FOUR (4) TEST COCKS. AND (2) SHUT OFF VALVES.
5. THIS STANDARD APPLIES TO RESIDENTIAL CONNECTIONS WITH AUXILIARY WATER SUPPLIES ON SITE OR WHERE A POTENTIAL HAZARD EXISTS, AS DETERMINED BY PUBLIC WORKS AND UTILITIES.
6. THE PIPING FROM THE METER TO THE DOUBLE CHECK VALVE ASSEMBLY AND THE REDUCED PRESSURE BACKFLOW ASSEMBLY ITSELF MUST BE THE SAME SIZE AS THE METER UNLESS OTHERWISE APPROVED BY PUBLIC WORKS AND UTILITIES.
7. NOT FOR USE ON INDUSTRIAL OR COMMERCIAL PROPERTY SERVICES.
8. IF ABOVE GROUND INSTALLATION IS NOT FEASIBLE OBTAIN APPROVAL FROM PUBLIC WORKS AND UTILITIES FOR SPECIAL INSTALLATION STANDARDS.
9. AN ENCLOSURE IS RECOMMENDED FOR PROTECTION FROM FREEZING AND VANDALISM.
10. A THERMAL EXPANSION TANK WHEN USED ON A DOMESTIC SERVICE SHALL BE SIZED AND INSTALLED PER MANUFACTURES RECOMMENDATION ON THE COLD WATER SUPPLY LINE TO THE WATER HEATER.
11. SHUT OFF VALVES:
 1. 2" AND LESS SHALL BE BALL VALVE
 2. 2 1/2" AND GREATER SHALL BE RESILIENT SEAT GATE VALVE.
12. ALL PIPING, VALVES, NIPPLES, ETC.:
 3. 2" AND LESS SHALL BE TYPE "L" HARD-TEMPER COPPER.
 4. 2 1/2" AND GREATER SHALL BE FLANGED DUCTILE IRON.
13. PVC PIPE OR FITTINGS SHALL NOT BE USED.
14. IF PROPOSING TO INSTALL THIS DEVICE IN A FLOOD ZONE, CONTACT PUBLIC WORKS AND UTILITIES FOR APPROVAL.


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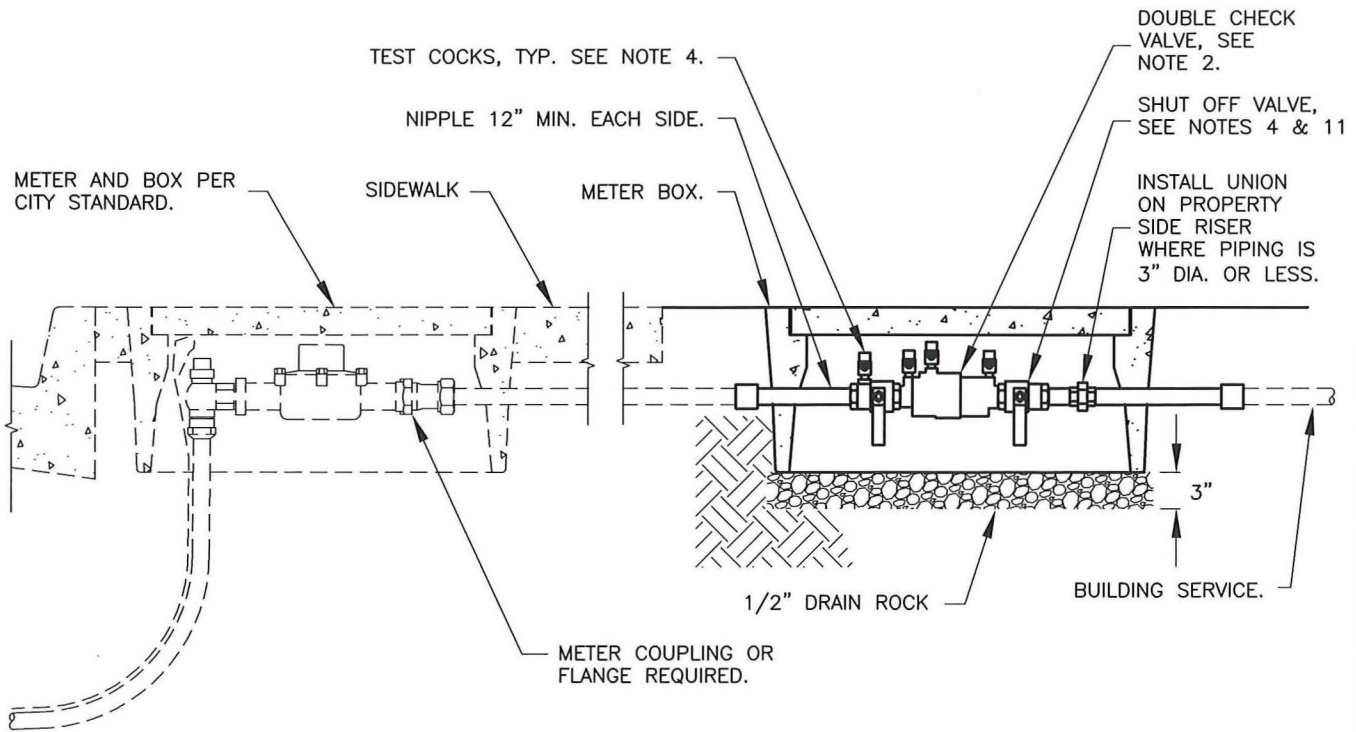


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**ABOVE GROUND DOUBLE
 CHECK VALVE BACKFLOW
 ASSEMBLY**

DATE: MARCH 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 874



NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
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. THERE SHALL BE NO TEE OR BRANCH LINES BETWEEN THE WATER METER AND ASSEMBLIES. ANY CONFLICTS SHALL BE RESOLVED BY PUBLIC WORKS AND UTILITIES.
3. APPROVED DOUBLE CHECK VALVES SHALL BE AS SHOWN ON "LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES" (LATEST REVISION) BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES.
4. ALL DOUBLE CHECK VALVE ASSEMBLIES SHALL BE PROVIDED WITH A MINIMUM OF FOUR (4) TEST COCKS. AND (2) SHUT OFF VALVES.
5. THIS STANDARD APPLIES TO RESIDENTIAL CONNECTIONS WITH AUXILIARY WATER SUPPLIES ON SITE OR WHERE A POTENTIAL HAZARD EXISTS, AS DETERMINED BY PUBLIC WORKS AND UTILITIES.
6. 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 PUBLIC WORKS AND UTILITIES.
7. NOT FOR USE ON INDUSTRIAL OR COMMERCIAL PROPERTY SERVICES.
8. **THIS DETAIL CAN ONLY BE USED IF APPLICANT OBTAINS PRIOR WRITTEN APPROVAL FROM PUBLIC WORKS & UTILITIES DEPARTMENT.**
9. (NOT USED)
10. A THERMAL EXPANSION TANK WHEN USED ON A DOMESTIC SERVICE SHALL BE SIZED AND INSTALLED PER MANUFACTURES RECOMMENDATION ON THE COLD WATER SUPPLY LINE TO THE WATER HEATER.
11. SHUT OFF VALVES:
 - 2" AND LESS SHALL BE BALL VALVE
 - 2 1/2" AND GREATER SHALL BE RESILIENT SEAT GATE VALVE.
12. ALL PIPING, VALVES, NIPPLES, ETC.:
 - 2" AND LESS SHALL BE TYPE "L" HARD-TEMPER COPPER.
 - 2 1/2" AND GREATER SHALL BE FLANGED DUCTILE IRON.
13. PVC PIPE OR FITTINGS SHALL NOT BE USED.

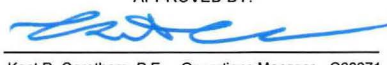
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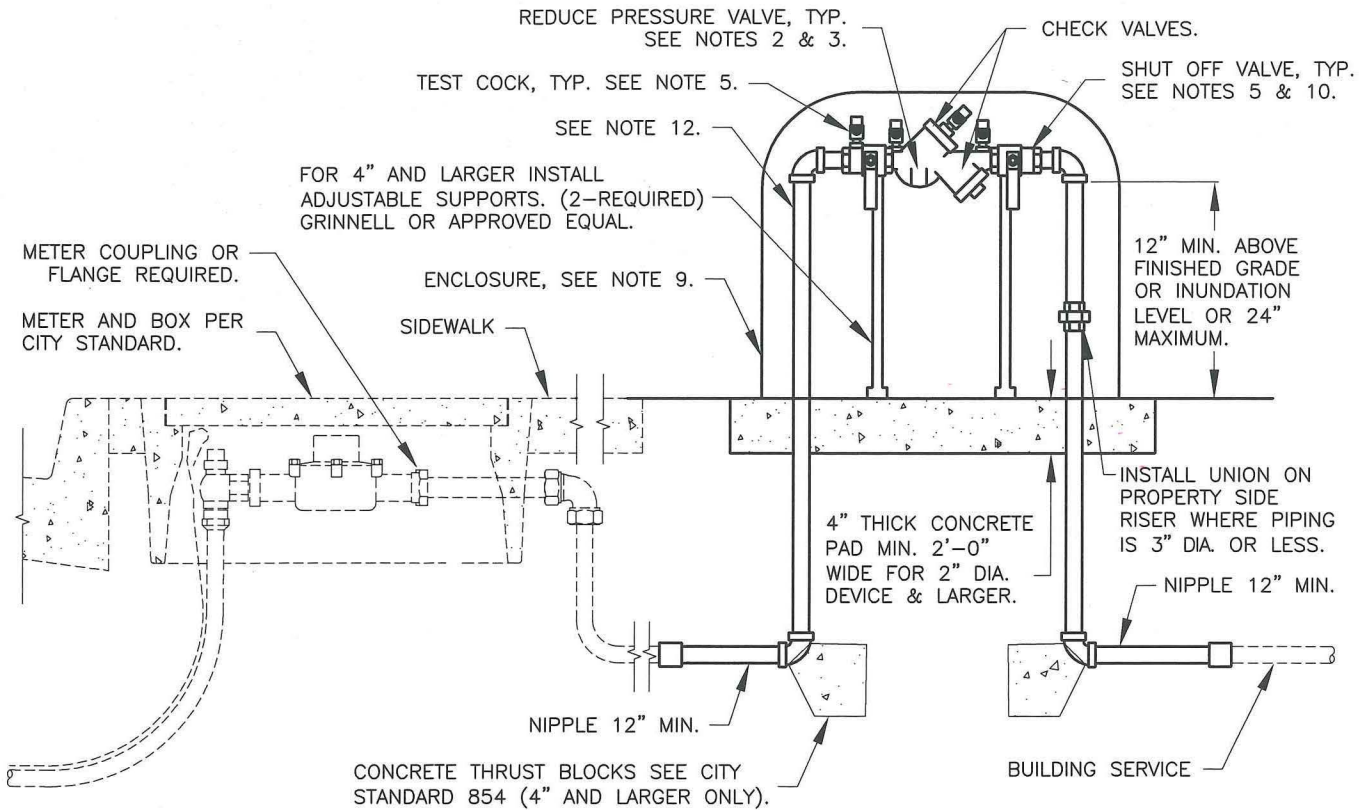


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 PETALUMA, CALIFORNIA 94954 FAX. 707-778-4508

SPECIAL INSTALLATION
DOUBLE CHECK VALVE
BACK FLOW ASSEMBLY

DATE: MARCH 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 875



NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. REDUCED PRESSURE BACKFLOW ASSEMBLIES SHALL BE REQUIRED FOR ANY USE WHERE TOXIC MATERIALS ARE USED OR WHERE POSITIVE PROTECTION OF THE PUBLIC WATER SUPPLY IS REQUIRED. TYPICAL APPLICATIONS INCLUDE, ALL INDUSTRIAL AND IRRIGATION SERVICES, PARKS, HOSPITALS, MEDICAL AND DENTAL LABORATORIES, MORTUARIES, INDUSTRIAL PLANTS AND DRY CLEANERS OR AS DETERMINED BY PUBLIC WORKS & UTILITIES.
3. REDUCED PRESSURE BACKFLOW ASSEMBLIES SHALL BE INSTALLED ADJACENT TO AND ON THE PROPERTY SIDE OF SIDEWALK WHERE APPLICABLE. WHERE NO SIDEWALK EXISTS, THE REDUCED PRESSURE BACKFLOW ASSEMBLY SHALL BE INSTALLED AS CLOSE AS POSSIBLE TO THE WATER METER LOCATION. THERE SHALL BE NO TEE OR BRANCH LINES BETWEEN THE WATER METER AND ASSEMBLY LOCATION. ANY CONFLICTS SHALL BE RESOLVED BY PUBLIC WORKS & UTILITIES.
4. APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLIES SHALL BE AS SHOWN ON "LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES" (LATEST REVISION) BY THE STATE OF CALIFORNIA WATER RESOURCE CONTROL BOARD, DIVISION OF DRINKING WATER, INFORMATION FOR PUBLIC DRINKING WATER SYSTEMS.
5. ALL REDUCED PRESSURE BACKFLOW ASSEMBLIES SHALL BE PROVIDED WITH A MINIMUM OF FOUR (4) TEST COCKS. AND TWO (2) SHUT OFF VALVES.
6. THE PIPING FROM THE METER TO THE REDUCED PRESSURE BACKFLOW ASSEMBLY AND THE REDUCED PRESSURE BACKFLOW ASSEMBLY ITSELF, MUST BE THE SAME SIZE AS THE METER UNLESS OTHERWISE APPROVED BY PUBLIC WORKS & UTILITIES.
7. FOR 2" PIPE DIAMETER OR LESS, A 12" LONG MINIMUM BRASS NIPPLE OR TYPE "L" HARD TEMPER COPPER PIPE IS REQUIRED AT BOTH UNDERGROUND ELBOWS.
8. A THERMAL EXPANSION TANK WHEN USED ON A DOMESTIC SERVICE SHALL BE SIZED AND INSTALLED PER MANUFACTURERS RECOMMENDATION ON THE COLD WATER SUPPLY LINE TO THE WATER HEATER.
9. AN ENCLOSURE IS RECOMMENDED FOR PROTECTION FROM FREEZING AND VANDALISM.
10. SHUT OFF VALVES:
 - 2" AND LESS SHALL BE BALL VALVE
 - 2 1/2" AND GREATER SHALL BE RESILIENT SEAT GATE VALVE.
11. ALL PIPING, VALVES, NIPPLES, ETC. SHALL BE THREADED BRASS.
 - 2" AND LESS SHALL BE TYPE "L" HARD-TEMPER COPPER.
 - 4" AND GREATER SHALL BE FLANGED DUCTILE IRON.
12. PVC PIPE OR FITTINGS SHALL NOT BE USED.
13. IF PROPOSING TO INSTALL THIS DEVICE IN A FLOOD ZONE, CONTACT PUBLIC WORKS & UTILITIES FOR APPROVAL.
14. PVC PIPE OR FITTINGS SHALL NOT BE USED.



CITY OF PETALUMA
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**ABOVE GROUND
 REDUCED PRESSURE
 PRINCIPLE BACKFLOW
 ASSEMBLY**

DATE: APRIL 2017

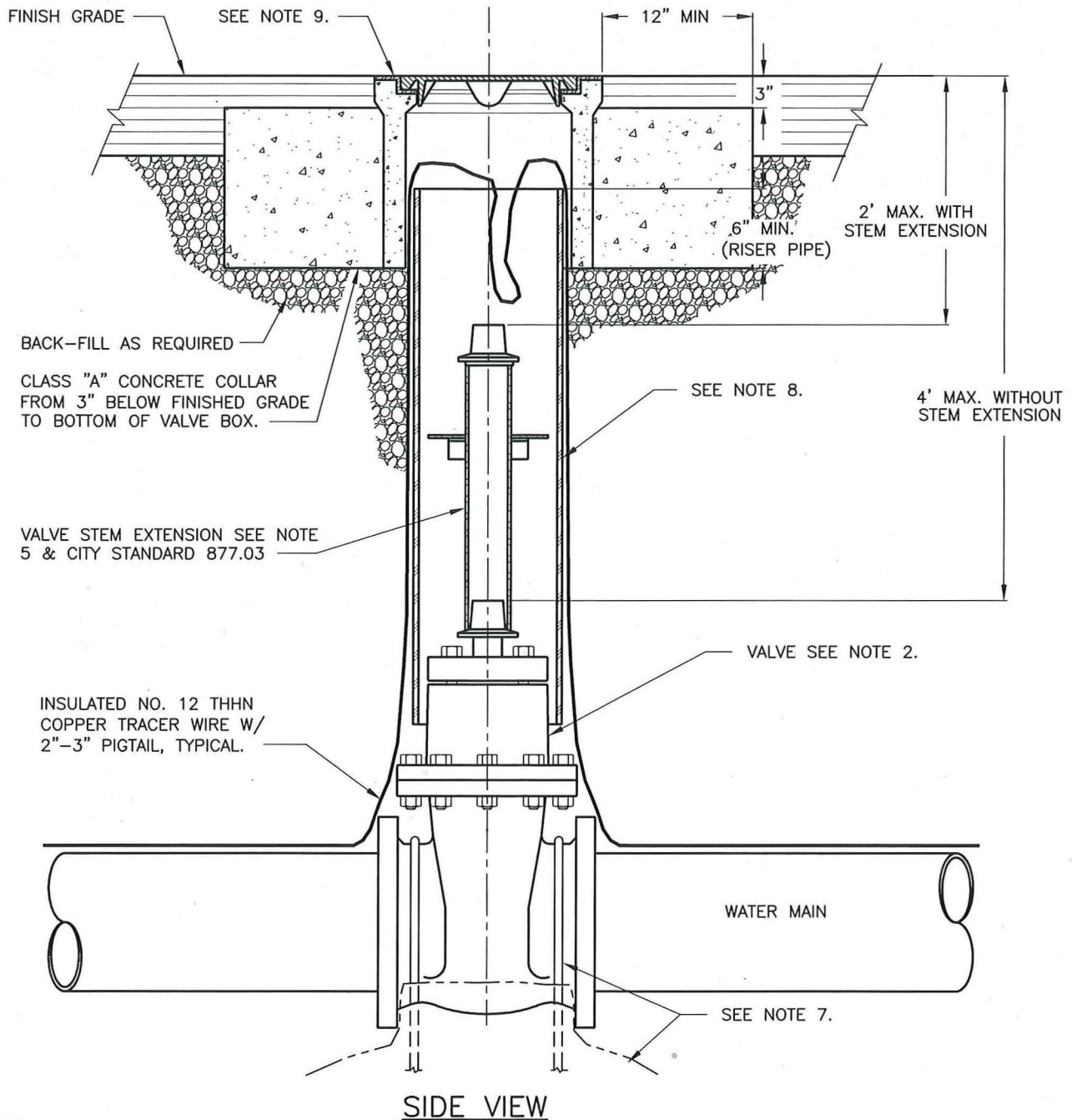
SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers
 Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: LTV/JDL

NO. 876



SIDE VIEW

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. VALVES 2" THROUGH 12" SHALL BE RESILIENT SEATED GATE VALVES AND VALVES 16" AND LARGER SHALL BE BUTTERFLY VALVES (SEE WATER SYSTEM DESIGN GUIDELINES) UNLESS OTHERWISE APPROVED BY PUBLIC WORKS AND UTILITIES.
3. GATE VALVES SHALL CONFORM TO THE CITY WATER SYSTEM DESIGN GUIDELINES.
4. ALL EXTERNAL BOLTS AND NUTS ON VALVES SHALL BE TYPE 316 STAINLESS STEEL.
5. IF VALVE IS INSTALLED SO THAT THE TOP OF THE OPERATING NUT IS MORE THAN 4' BELOW FINISHED GRADE, THE VALVE STEM RISER SHALL BE REQUIRED.
6. FOR INSTALLATION OF BUTTERFLY VALVE AND TAPPING VALVE, SEE STANDARD.
7. SEE CITY STANDARD DETAIL NO. 877.02 FOR VALVE TIE DOWN REQUIREMENTS.
8. 8" DIA. SDR 35 PVC SEWER PIPE CONFORMING TO ASTM3034. RISER PIPE TO BE PLUMB AND CENTERED OVER VALVE STEM AND SHALL BE CONSTRUCTED FROM A SINGLE LENGTH OF PIPE WITH NO JOINT. (IF VALVE RISER PIPE IS EXISTING AND VALVE BOX IS RAISED, A BELL JOINT EXTENSION IS ALLOWED). VALVE RISER PIPE MUST EXTEND INTO VALVE BOX.
9. SET VALVE BOX FLUSH WITH STREET SURFACE OR FINISHED GRADE WITH CAST IRON RING AND COVER MARKED "WATER". VALVE BOX TO BE CHRISTY G5 OR G8 OR APPROVED EQUAL WITH TRAFFIC LID.



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**GATE VALVE,
 STEM EXTENSION
 AND
 BOX WITH RISER**

DATE: AUGUST 2016 SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers

Kent R. Carothers, P.E. Operations Manager C60671

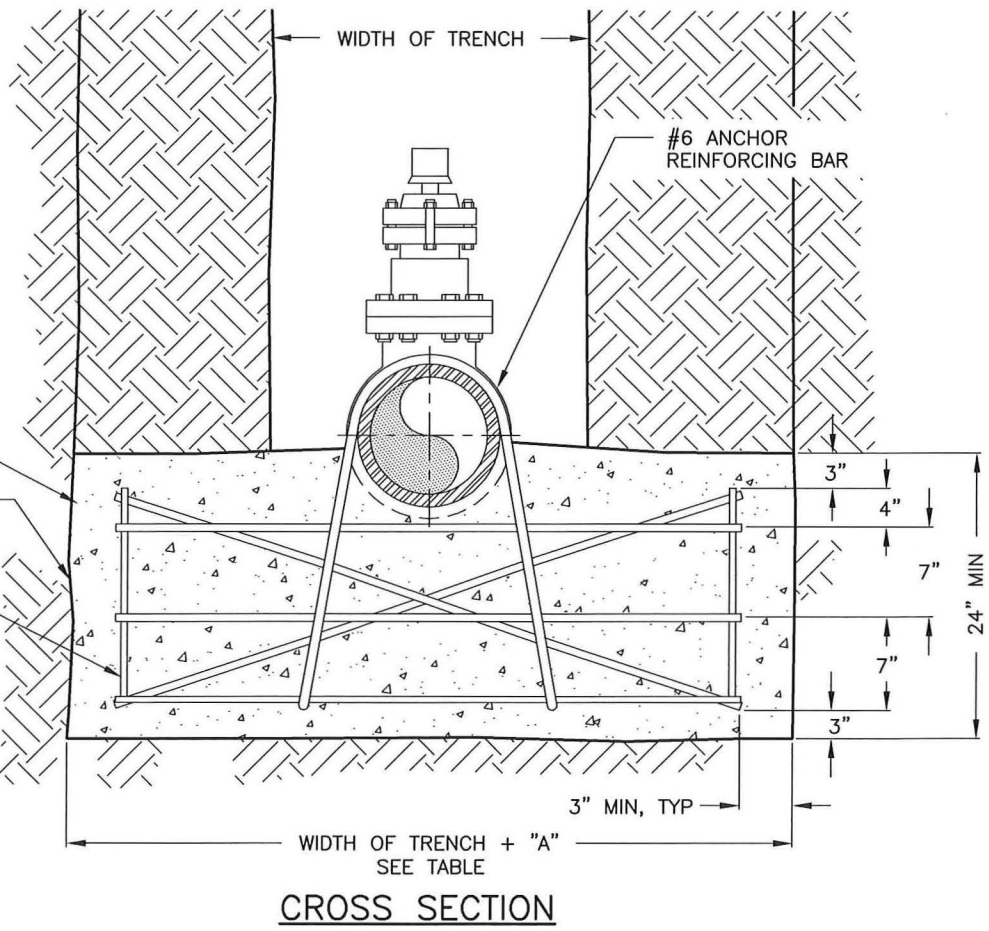
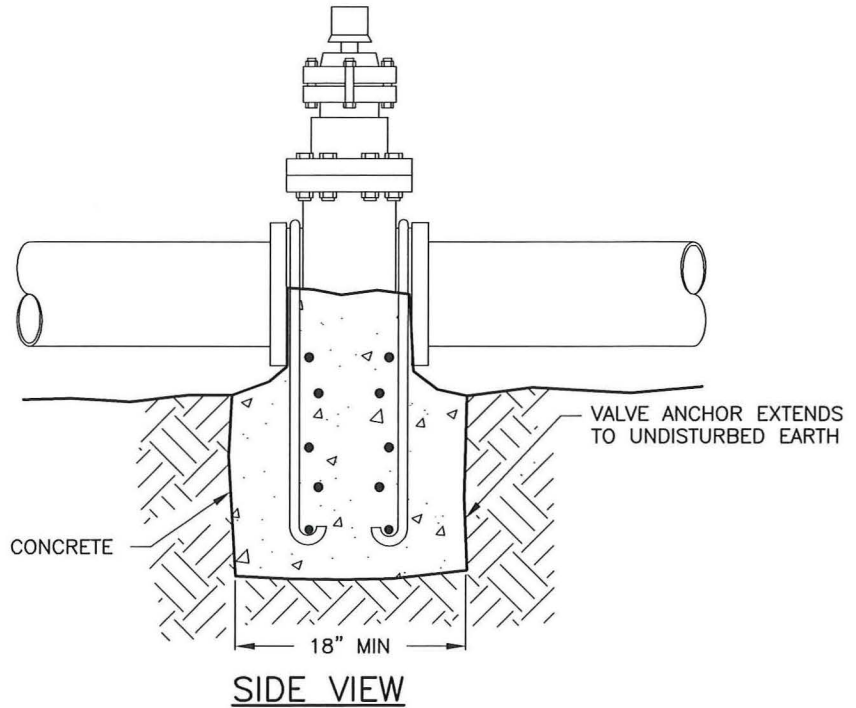
DRAWN BY: JDL

NO. 877.01

VALVE ANCHOR WIDTH

WIDTH OF TRENCH + "A"

VALVE SIZE	"A"
6 INCH	18 INCHES
8 INCH	30 INCHES
10 INCH	4 FEET
12 INCH	6 FEET
14 INCH	8 FEET
16 INCH	10 FEET



CONCRETE

VALVE ANCHOR EXTENDS TO UNDISTURBED EARTH

#4 REINFORCING BAR (TYPICAL)

WIDTH OF TRENCH

#6 ANCHOR REINFORCING BAR

CROSS SECTION

NOTE

1. SEE WATER SYSTEM DESIGN GUIDELINES.



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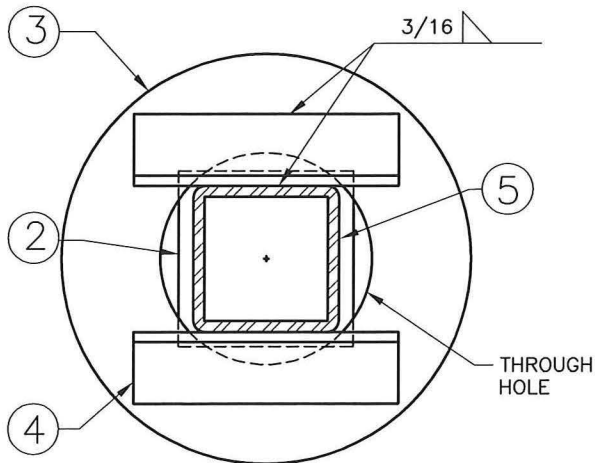
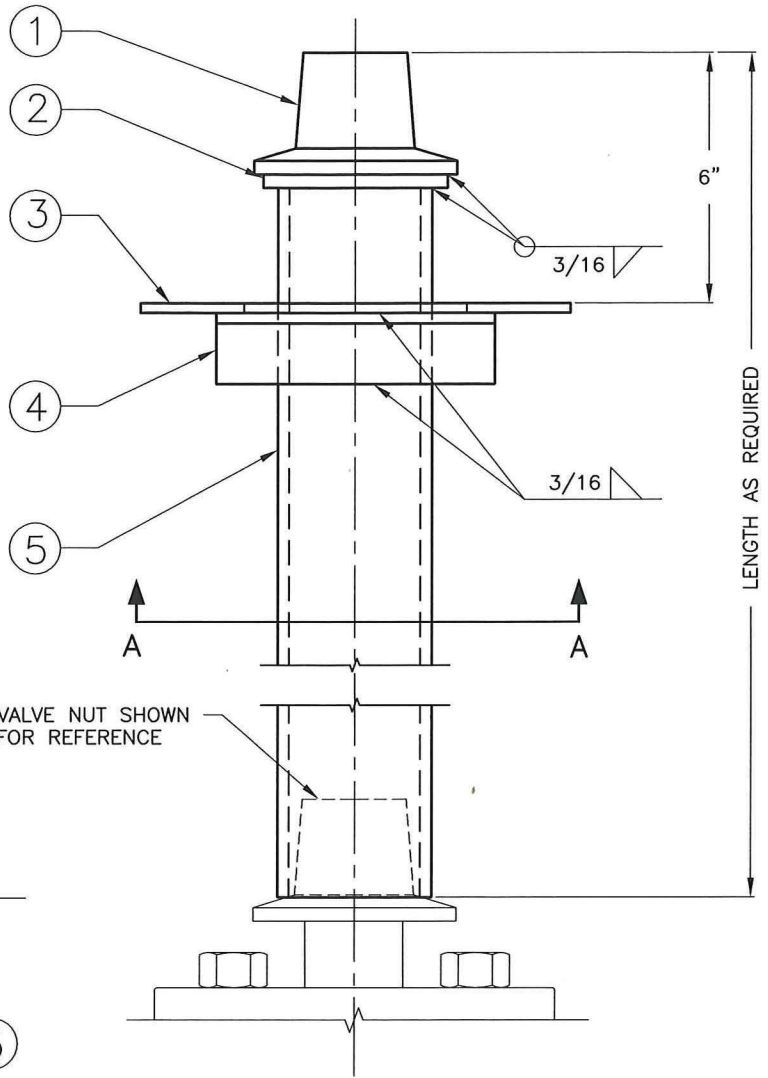
VALVE ANCHOR

DATE: MARCH 2016 SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers
 Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: LTV/JDL NO. 877.02



VIEW A-A

No. VALVE STEM EXTENSION PARTS LIST

①	VALVE OPERATING NUT OR 1-7/8" X 1-7/8" X 2" HIGH SOLID STEEL PIECE WELDED TO TOP PLATE.
②	3" X 3" X 1/4" STEEL TOP PLATE. WELD TO RISER SHAFT.
③	3/16" THK. X 7-1/2" DIA. GUIDE PLATE, WITH 3-5/8" DIA. HOLE IN CENTER.
④	TWO 3/16" X 1-1/2" X 1-1/2" X 5"L STEEL ANGLE WELDED TO TWO SIDES OF RISER SHAFT. (TO REINFORCE GUIDE PLATE.)
⑤	2-1/2" X 3/16"t SQUARE STEEL TUBING LENGTH AS REQUIRED.

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. ALL WELDS TO EXTENSION SHAFT SHALL BE FILLET WELDS AS SHOWN.
3. ALL STEEL REQUIRED FOR EXTENSION FABRICATION SHALL BE STRUCTURAL STEEL PER ASTM A36.



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**VALVE STEM
 EXTENSION ASSEMBLY**

DATE: MARCH 2016

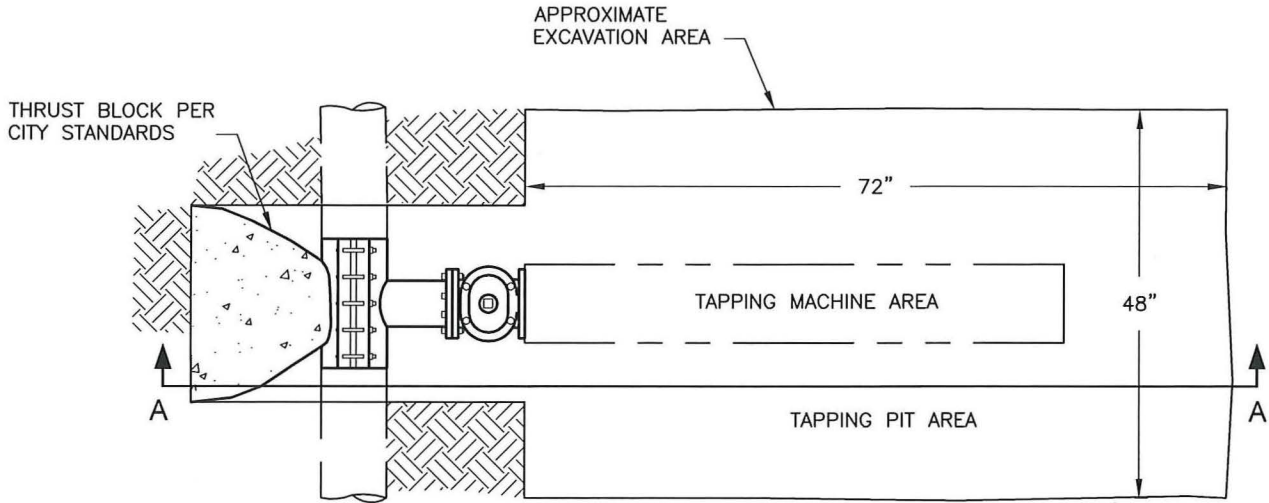
SCALE: N.T.S.

APPROVED BY:

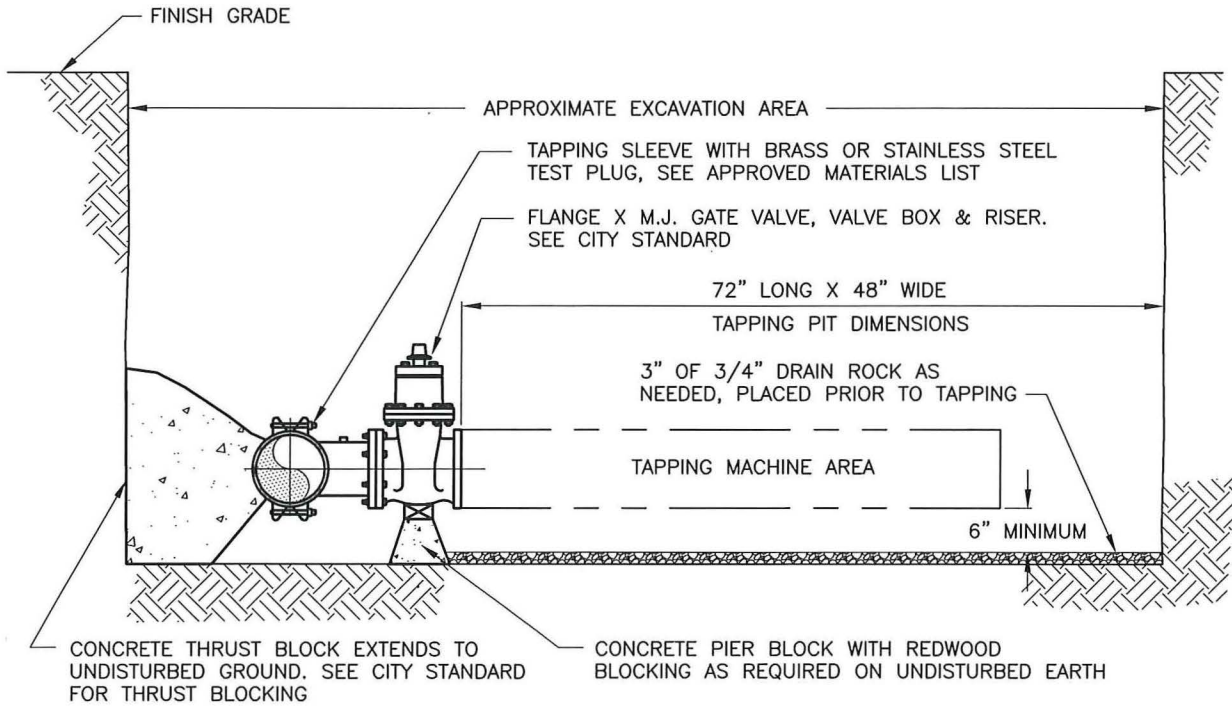
[Signature]
 Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 877.03



PLAN



VIEW A-A

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES FOR TAPPING LOCATION REQUIREMENTS.
2. ALL EXTERNAL NUTS AND BOLTS ON VALVES SHALL BE TYPE 316 STAINLESS STEEL.
3. TAPS LARGER THAN 2 INCH SHALL BE MADE BY THE CITY PUBLIC WORKS & UTILITIES AT THE CONTRACTORS EXPENSE.
4. INSTALL SHORING PER OSHA REQUIREMENTS.



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TAPPING VALVE AND PIT

DATE: MARCH 2016

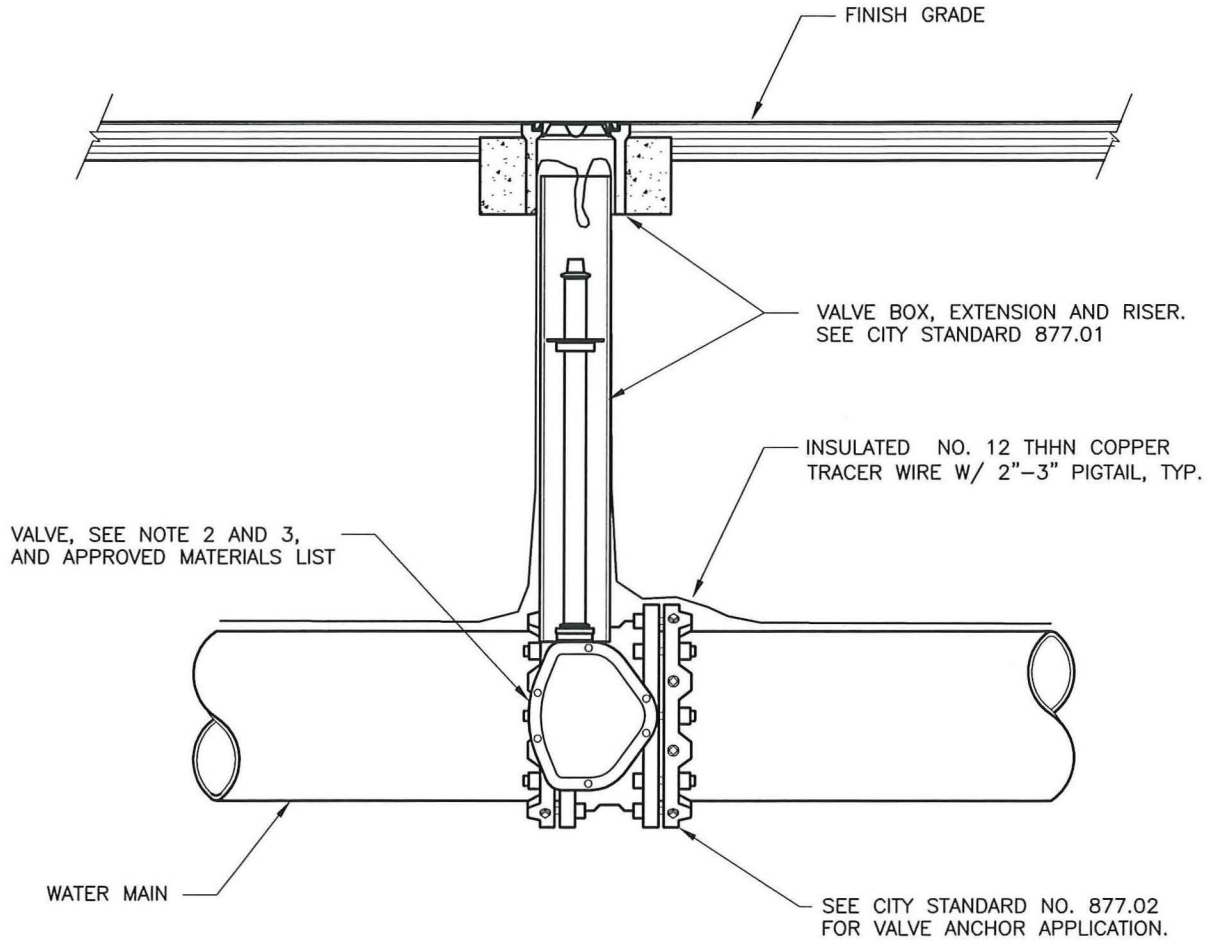
SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers
 Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 878



ELEVATION


NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. ALL EXTERNAL NUTS AND BOLTS ON VALVES SHALL BE TYPE 316 STAINLESS STEEL.
3. BUTTERFLY VALVES;
 CLASS 200 PVC PIPE SHALL USE A FLANGED VALVE WITH MECHANICAL RESTRAINTS.
 CLASS 150 PVC OR DUCTILE IRON PIPE SHALL USE A VALVE WITH SUITABLE END CONNECTIONS.



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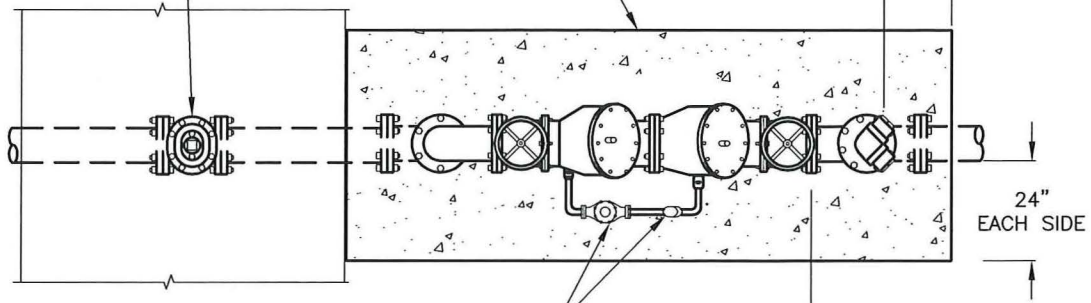
**BUTTERFLY VALVE
 INSTALLATION**
 (REQUIRED FOR 16" AND
 LARGER PIPE)

DATE: MARCH 2016	SCALE: N.T.S.
APPROVED BY:  Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 879

ISOLATION VALVE REQUIRED ONLY WITH COMBINATION SERVICE

4" CONCRETE SLAB, SEE NOTE 7

18" EACH END MINIMUM



BYPASS METER WITH DOUBLE CHECK VALVE TO BE INSTALLED AT THE CONTRACTORS EXPENSE. THE METER SHALL REGISTER IN CUBIC FEET(SEE NOTE 11)

PLAN

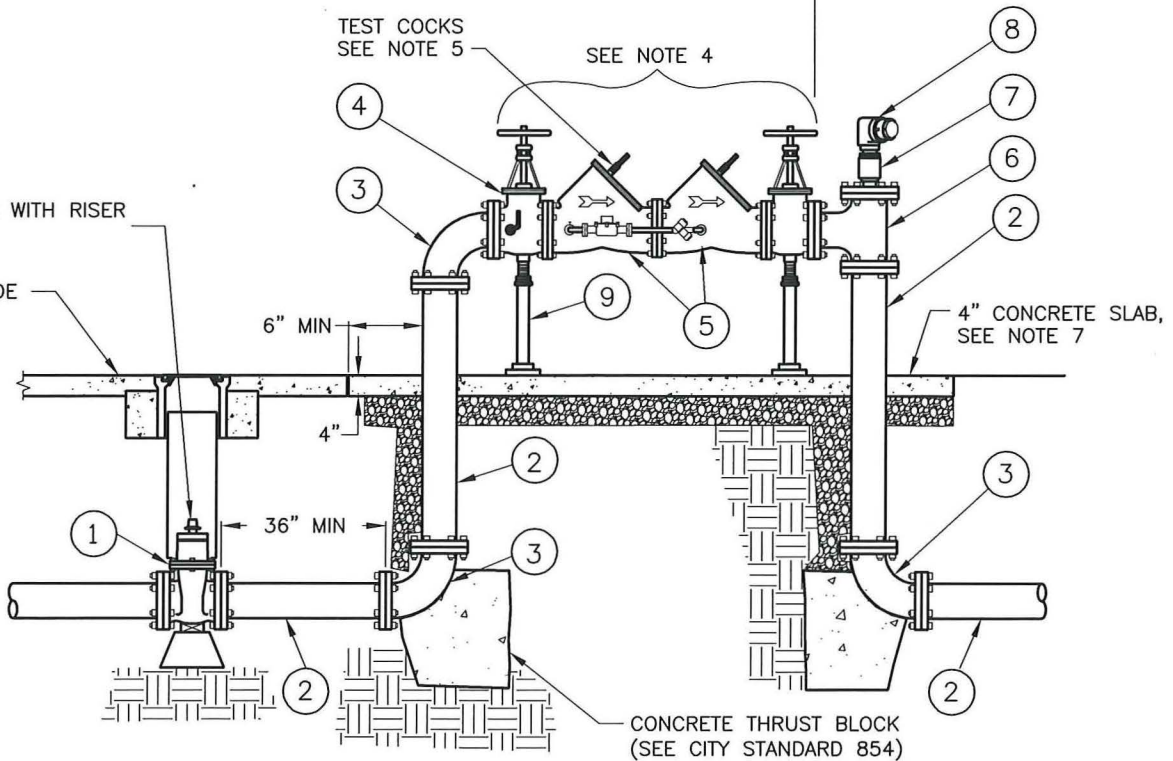
PUBLIC WORKS & UTILITIES INSPECTION
FIRE DEPARTMENT INSPECTION

GATE VALVE WITH RISER AND BOX

FINISH GRADE

TEST COCKS SEE NOTE 5

SEE NOTE 4



ELEVATION

*SEE 880.02 FOR NOTES AND PARTS LIST

*FOR TAPPING SLEEVE REQUIREMENTS SEE APPROVED MATERIALS LIST



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4" THRU 10"
DOUBLE CHECK DETECTOR
FIRE LINE BACKFLOW
ASSEMBLY

DATE: MARCH 2016

SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers
Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 880.01

**4" THRU 10" DOUBLE CHECK DETECTOR FIRE LINE BACKFLOW ASSEMBLY
PARTS LIST**

NO.	DESCRIPTION
1	FLG X FLG RESILIENT WEDGE GATE VALVE, CONCRETE PIER BLOCK REQUIRED
2	FLG X FLG D.I.P. SPOOL – LENGTH AS REQUIRED (36" MINIMUM)
3	90° FLANGED D.I.P. ELBOW
4	SELF-RISING STEM SHUTOFF VALVES, 2 REQUIRED (SEE NOTE 4)
5	DOUBLE CHECK DETECTOR ASSEMBLY (SEE NOTE NO. 6 & 9)
6	TEE AND BLIND FLANGE WITH 4" TAP
7	CHECK VALVE AND NIPPLE
8	90-DEG. 4" X 2-1/2" X 2-1/2" FIRE DEPARTMENT CONNECTION AND NIPPLE
9	FOR 4 INCH AND LARGER INSTALL ADJUSTABLE SUPPORTS-GRINNEL OR APPROVED EQUAL

NOTES:


- SEE WATER SYSTEM DESIGN GUIDELINES.
- DOUBLE CHECK DETECTOR VALVE BACKFLOW ASSEMBLIES SHALL BE REQUIRED ON ALL PROPERTIES WITH CLASS 3 OR 4 FIRE SPRINKLER SYSTEMS, AUXILIARY WATER SUPPLY ON SITE, WHERE THE CITY FIRE MARSHALL AND PUBLIC WORKS & UTILITIES DEPARTMENT DETERMINES EXTREME FIRE HAZARD EXISTS OR WHERE THERE IS MORE THAN ONE CONNECTION TO THE CITY WATER SUPPLY.
- ALL APPROVED DOUBLE CHECK DETECTOR BACKFLOW ASSEMBLIES SHALL BE SHOWN ON THE LIST OF APPROVED BACKFLOW DEVICES OF THE LATEST REVISION BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES.
- SHUT OFF VALVES SHALL BE RESILIENT WEDGE TYPE O.S. AND Y., AND MUST BE CHAINED AND PADLOCKED IN THE OPEN POSITION. FIRE DEPARTMENT REQUIRES ELECTRONIC MONITORING OF TAMPER SWITCHES.
- 4 TEST VALVES ARE REQUIRED AND SHALL BE FITTED WITH APPROPRIATE SIZE FEMALE TEST COCKS.
- DOUBLE CHECK DETECTOR BACKFLOW ASSEMBLY SHALL BE LOCATED 24 INCHES ABOVE FINISHED GRADE (36 INCHES MAX) OR 12 INCHES ABOVE THE INUNDATION LEVEL, WHICHEVER IS GREATER AND AS CLOSE AS POSSIBLE TO THE SIDEWALK OR PUBLIC RIGHT OF WAY, WHERE NO SIDEWALK EXISTS INSTALL NEAR WATER METER.
- THE CONCRETE SLAB TO INCLUDE 6 X 6 WIRE MESH AND PLACED ON 6" OF CLASS 2 AGGREGATE BASE COMPACTED 95% RELATIVE COMPACTION.
- ANY COVER OR SCREENING OF THIS ASSEMBLY MUST HAVE THE APPROVAL OF HE CITY FIRE MARSHALL AND THE PUBLIC WORKS & UTILITIES DEPARTMENT PRIOR TO INSTALLATION.
- DOUBLE CHECK DETECTOR BACKFLOW ASSEMBLY SHALL BE THE SAME SIZE AS THE FIRE LINE EXCEPT WHERE A 12 INCH FIRE LINE IS REQUIRED. WHEN A 12 INCH FIRE LINE IS REQUIRED A 10 INCH DOUBLE CHECK DETECTOR BACKFLOW ASSEMBLY SHALL BE INSTALLED.
- WHEN THE ASSEMBLY IS CONSTRUCTED WITHIN 3.0' OF A SLOPE GREATER THAN 3:1, A RETAINING WALL SHALL BE CONSTRUCTED WITH A 36" HORIZONTAL CLEARANCE AT FINISHED GRADE.
- THE FIRE LINE WILL NOT BE ACTIVATED UNTIL THE CITY PUBLIC WORKS & UTILITIES DEPARTMENT HAS APPROVED THE INSTALLATION OF THE BYPASS METER AND THE ACCOUNT FOR THE SERVICE IS OPENED.
- FOR TAPPING SLEEVE REQUIREMENTS SEE APPROVED MATERIALS LIST.

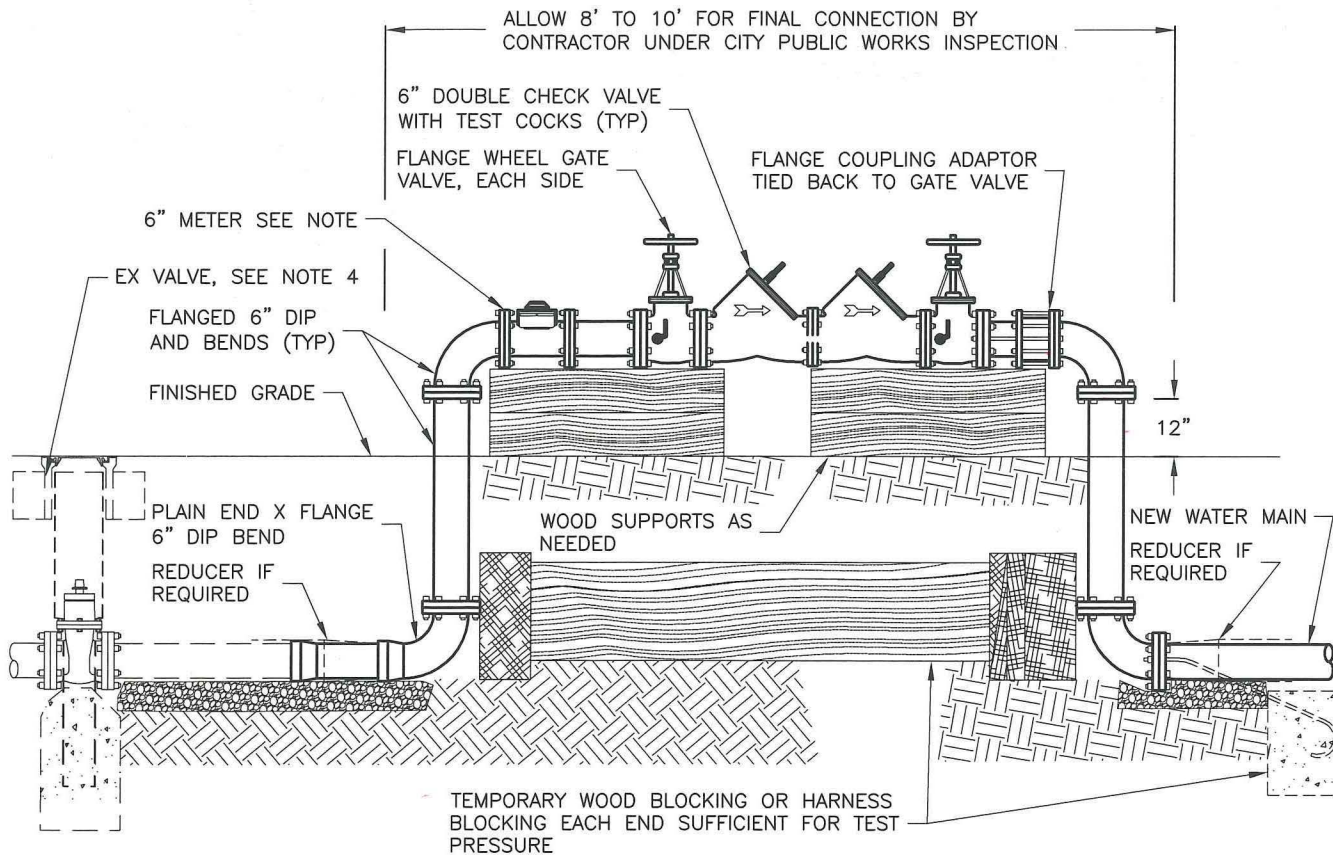


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**4" THRU 10"
DOUBLE CHECK DETECTOR
FIRE LINE BACKFLOW
ASSEMBLY
(PARTS AND NOTES)**

DATE: MARCH 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 880.02



ELEVATION

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. THIS ASSEMBLY SHALL BE INSTALLED PRIOR TO COMBUSTIBLE MATERIALS BEING STORED ON-SITE AND/OR CONSTRUCTION IS DONE PRIOR TO TO ACCEPTANCE OF THE ON-SITE WATER MAIN SYSTEM. FIRE FLOW AND ACCESS MUST BE SATISFACTORY TO THE CITY FIRE MARSHAL / FIRE DEPARTMENT.
3. THE CONTRACTOR SHALL FURNISH AN APPROVED 6" TURBINE METER AND DOUBLE CHECK VALVE ASSEMBLY. THE ENTIRE ASSEMBLY WILL BE TESTED AND CERTIFIED ON-SITE BY THE CITY PUBLIC WORKS & UTILITIES DEPARTMENT PRIOR TO SYSTEM ACTIVATION. A STANDARD FEE MAY BE CHARGED FOR THE TESTING AND CERTIFICATION. THE CONTRACTOR WILL BE RESPONSIBLE TO PAY THE CITY FOR ALL WATER DELIVERED THROUGH THIS CONNECTION. THE METER WILL BE READ AT TIME OF ACTIVATION AND A LOAD ACCOUNT STARTED.
4. IF AN ISOLATION VALVE DOES NOT EXIST WITH-IN 8' OF THE TIE-IN POINT, THE CONTRACTOR WILL BE REQUIRED TO INSTALL AN APPROVED GATE VALVE PER CURRENT CITY STANDARD UNLESS THE MAIN IS ON A SEPARATELY VALVED RUN WITH NO INTERVENING SERVICES AND AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS & UTILITIES.
5. THE CONTRACTOR WILL MAKE FINAL TIE-IN UNDER INSPECTION BY THE CITY PUBLIC WORKS & UTILITIES DEPARTMENT AT THE DEVELOPER'S EXPENSE. AFTER FINAL TIE-IN, THE METER WILL BE READ BY THE INSPECTOR AND THE LOAD ACCOUNT WILL BE CLOSED OUT.
6. GATE VALVES IN THE ASSEMBLY WILL BE RESILIENT WEDGE TYPE.
7. METER TO BE CUBIC FEET READING TYPE ONLY.
8. THE CONTRACTOR SHALL NOT EXCAVATE WITH-IN 6 FEET OF AND EXISTING GATE VALVE WITH OUT APPROVAL. GATE VALVES SHALL BE OPERATED BY CITY PERSONNEL ONLY.



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**TEMPORARY
 METERED CONNECTION
 FIRE FLOW REQUIRED**

DATE: APRIL 2017

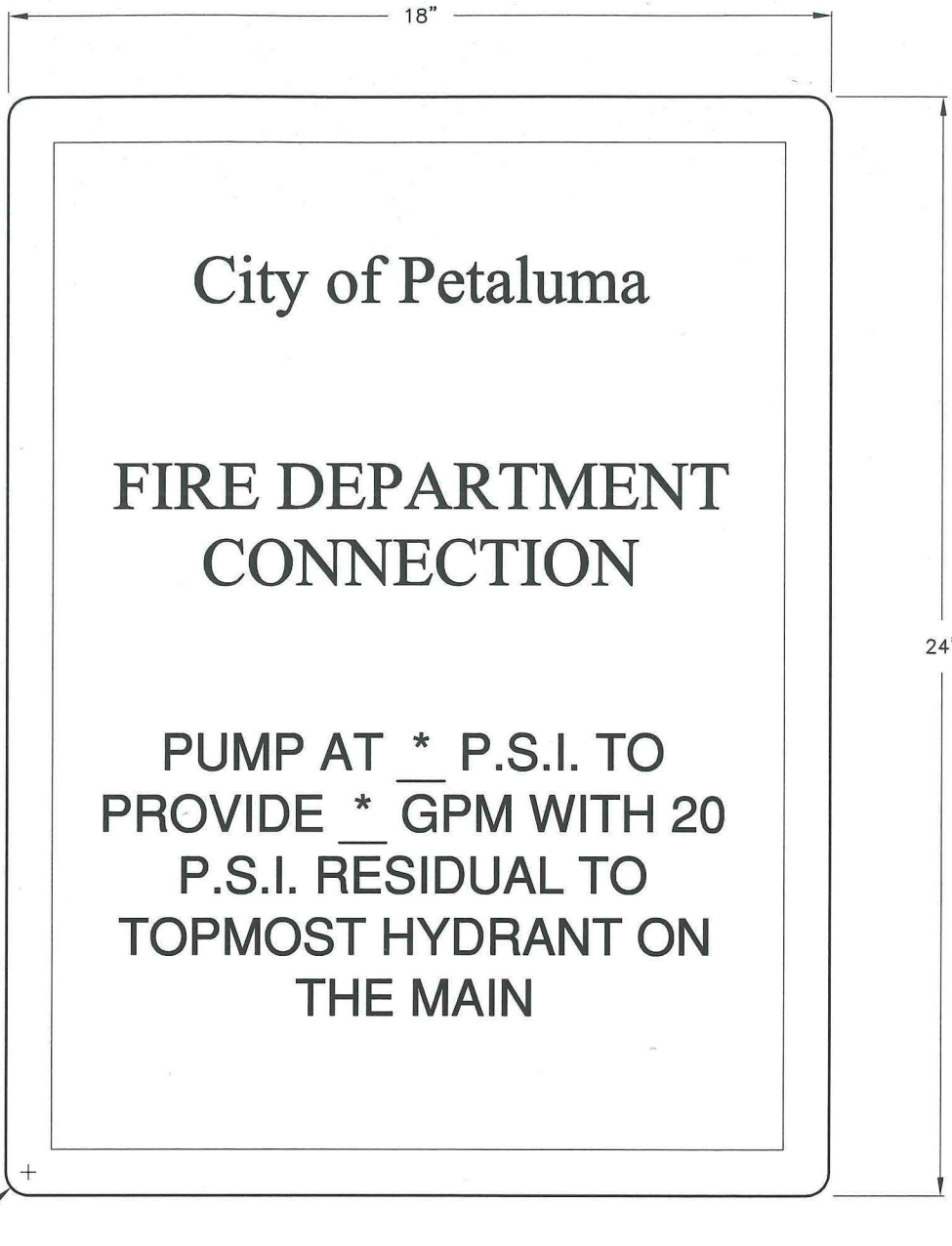
SCALE: N.T.S.

APPROVED BY:

Kent Carothers
 Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 881



1/2" R

NOTES:

NOTES:

1. PROVIDE A SIGN ADJACENT TO THE FIRE DEPARTMENT CONNECTION FACING THE STREET WITH THE PUMPING INSTRUCTIONS, THE SIGN SHALL BE SCOTCHLITE REFLECTIVE OR EQUAL MOUNTED ON ALUMINUM, MINIMUM THICKNESS = .080". THE SIGN SHALL BE WEATHER RESISTANT WITH WHITE REFLECTIVE LETTERS 1.5 INCHES HIGH, 3/8 STROKE ON GREEN BACKGROUND AND SHALL READ:

"FIRE DEPARTMENT CONNECTION DRY HYDRANT MAIN. PUMP AT P.S.I. TO PROVIDE GPM WITH 30 P.S.I. RESIDUAL TO TOPMOST HYDRANT ON THE MAIN"
(# P.S.I. & # GPM VALUES TO BE DETERMINED BY THE FIRE MARSHALL)
2. THE BASE, POST AND SIGN MOUNTING SHALL BE AS DESCRIBED IN CITY STANDARD 208 (2 OF 3) NOTES AND THE SIGN SHALL BE INSTALLED SO THAT THE BOTTOM OF THE SIGN IS 48" FROM FINISHED GRADE.



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**DRY FIRE HYDRANT
MAIN SIGN**

DATE: MARCH 2017

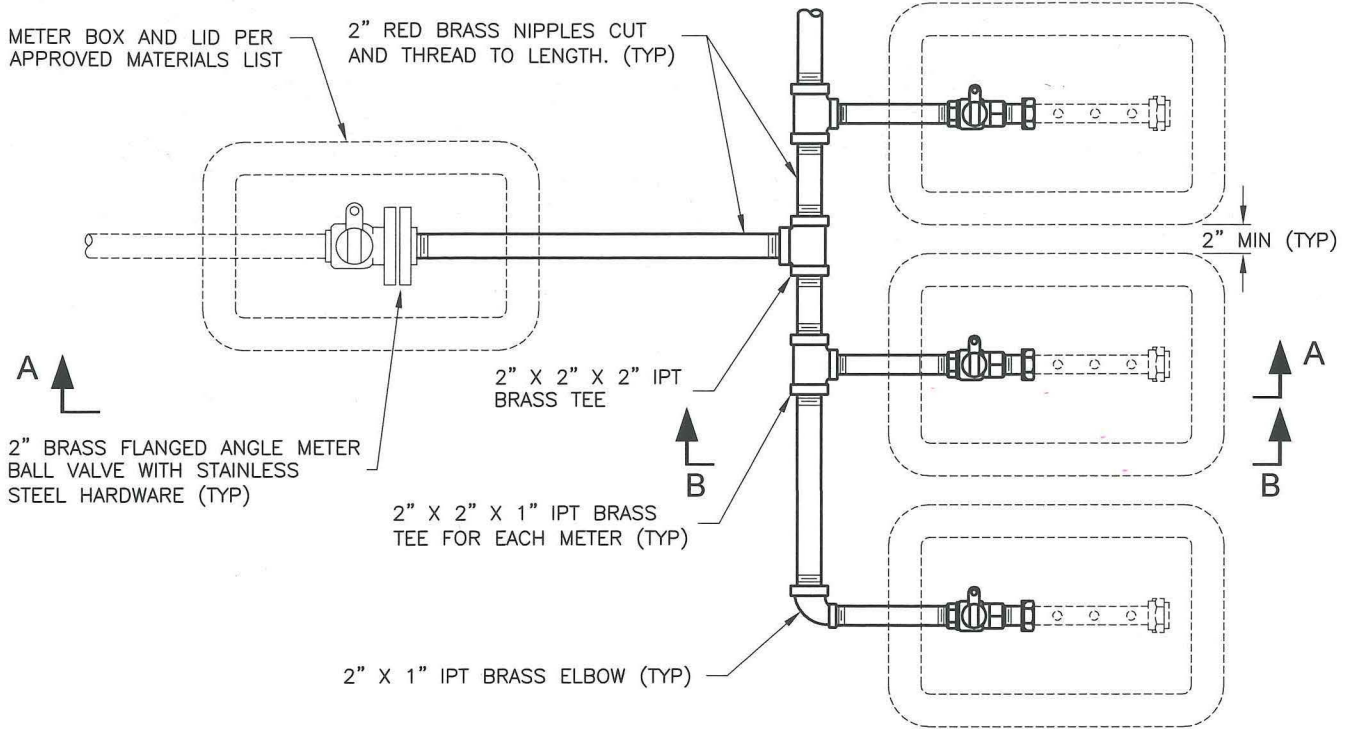
SCALE: N.T.S.

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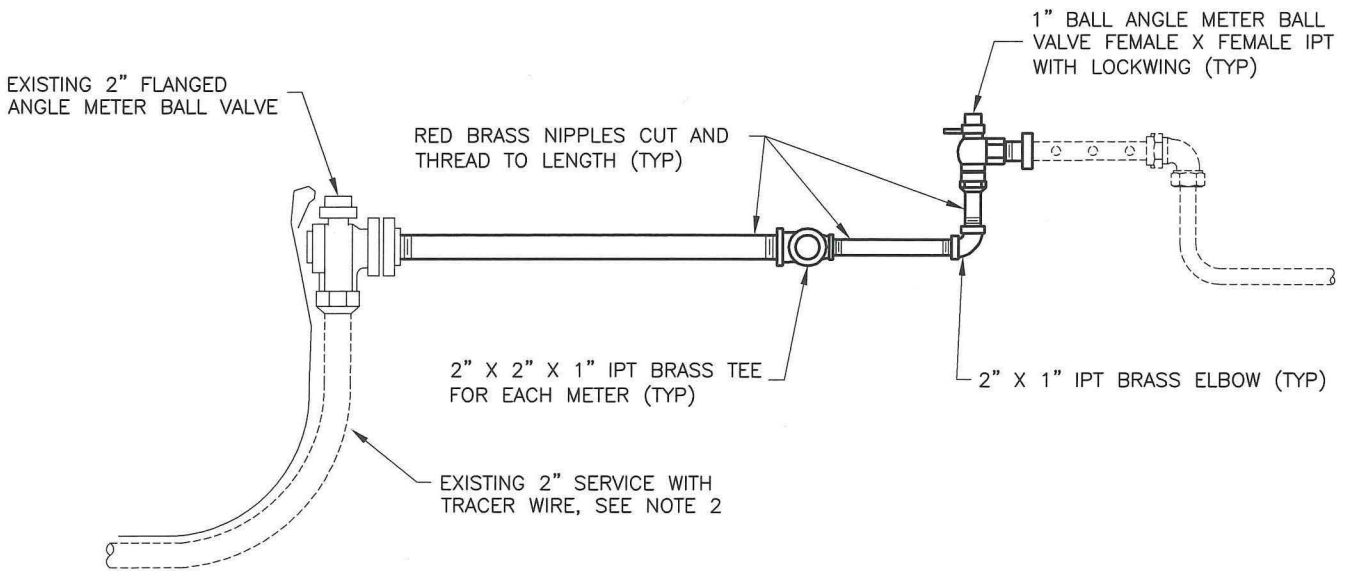
Kent Carothers
Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

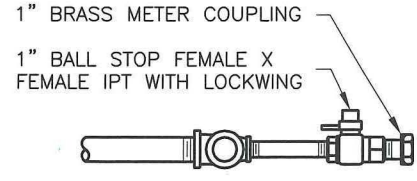
NO. 884



PLAN VIEW



SECTION A-A




ALTERNATE SERVICE RUN

• FOR NOTES AND FLOW CALCULATIONS SEE 8XXX.02



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2" MANIFOLD RETRO-FIT
EXISTING 2" SERVICE

DATE: APRIL 2017	SCALE: N.T.S.
APPROVED BY:  Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 885.01

USE THIS TABLE TO ASSIGN FLOW RATE PER METER TO
CALCULATE TOTAL MAXIMUM FLOW THROUGH A MANIFOLD SYSTEM

2" SERVICE MANIFOLD LOAD CALCULATIONS	
METER SIZE	G.P.M. FLOW ALLOWED
3/4" X 5/8"	20
1"	25
1 1/2	50
2"	80

NOTES:

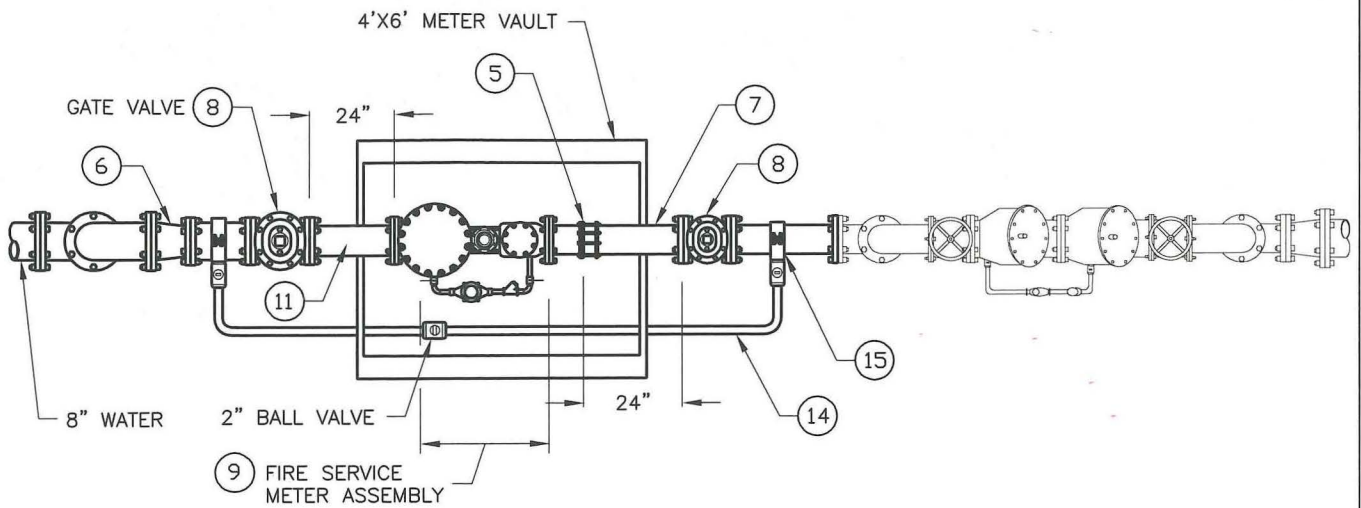
1. SEE CITY WATER SYSTEM DESIGN GUIDELINES.
2. ALL MANIFOLD LOAD CALCULATIONS AND DESIGN MUST HAVE PRIOR APPROVAL FROM PUBLIC WORKS & UTILITIES DEPARTMENT PRIOR INSTALLATION.
3. MAXIMUM OF SIX (6) 1" METERS PER MANIFOLD.
4. FOR MANIFOLD LOAD CALCULATION SEE CITY STANDARD 889.02.
5. FOR NEW 2" SERVICE SEE APPROPRIATE CITY STANDARD.
6. SEE APPROVED MATERIALS LIST FOR APPROVED FITTINGS



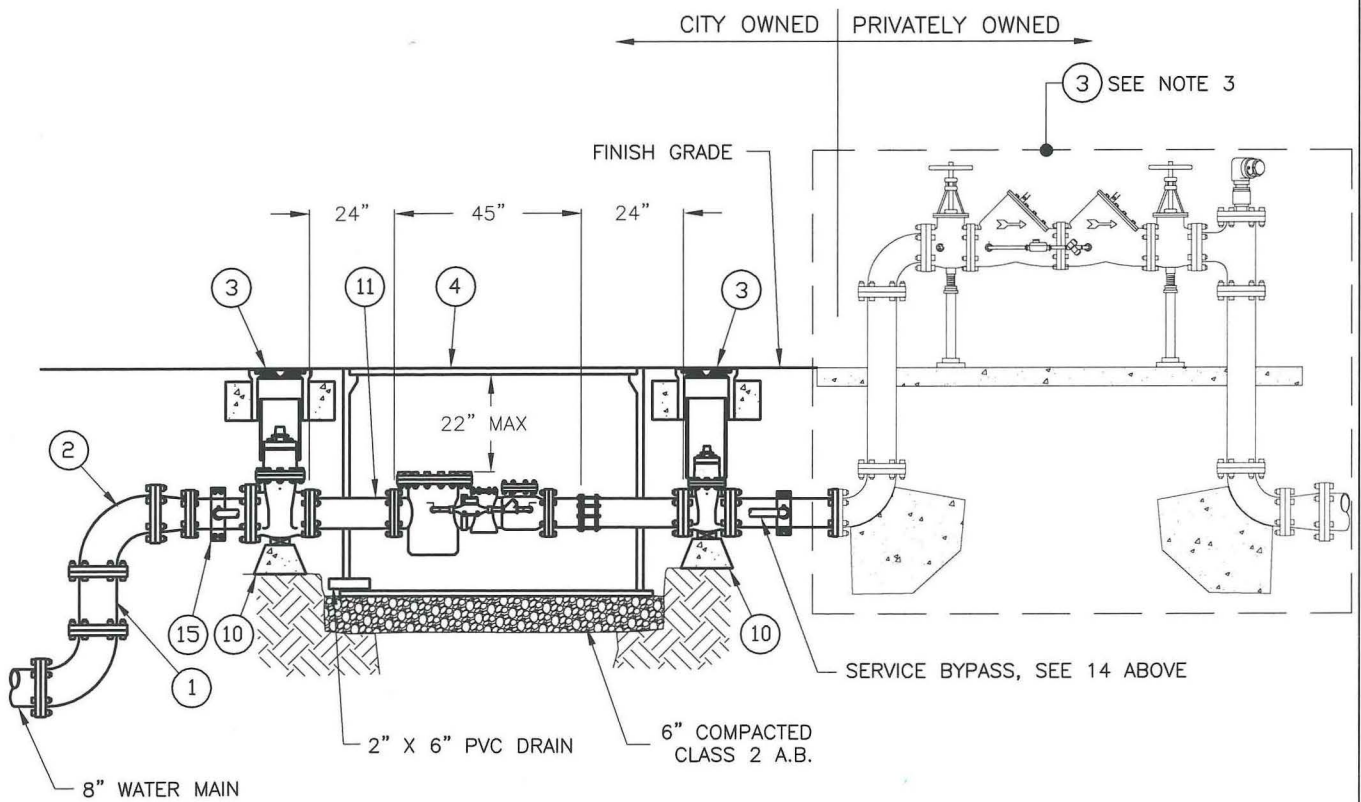
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 UTILITIES DIVISION
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**2" MANIFOLD RETRO-FIT
 EXISTING 2" SERVICE**

DATE: APRIL 2017	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 885.02



PLAN VIEW



ELEVATION

*SEE 887.02 FOR NOTES AND PARTS LIST
 *SEE APPROVED MATERIALS LIST



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COMBINATION FIRE & DOMESTIC
 SERVICE MASTER METER
 ASSEMBLY

DATE: APRIL 2017

SCALE: N.T.S.

APPROVED BY:

Kent Carothers
 Kent R. Carothers, P.E. Operations Manager C60871

DRAWN BY: JDL

NO. 887.01

SERVICE ASSEMBLY PARTS LIST	
NO.	DESCRIPTION
①	8" DUCTILE IRON FLANGE SPOOLS OR M.J. FITTINGS WITH RETAINER GLANDS.
②	8" X 90° FLANGED ELBOW
③	VALVE BOX AND RISER Christy G5 OR APPROVED EQUAL
④	VAULT AND COVER WITH 9"X12" METER LID COVER, CENTERED OVER METER REGISTERS OR APPROVED EQUAL.
⑤	6" FLANGE COUPLING ADAPTER
⑥	8" X 6" FLANGED REDUCER
⑦	6" PE X FLG PIPE- LENGTH AS NEEDED
⑧	6" FLG X FLG RESILIENT SEAT GATE VALVE, PER CITY STANDARD
⑨	6" NEPTUNE HP FIRE SERVICE METER TO BE PROVIDED BY THE CITY AT DEVELOPERS EXPENSE
⑩	CONCRETE PIER BLOCK REQUIRED (TYPICAL)
⑪	6" FLG X FLG D.I.P. SPOOL- LENGTH AS NEEDED (TYPICAL)
⑫	6" DOUBLE CHECK DETECTOR FIRE LINE ASSEMBLY PER CITY STANDARD
⑬	2" BALL VALVE BRASS
⑭	2" CLASS 200 C.T.S. POLYETHYLENE PIPE WITH TRACER WIRE
⑮	2" DOUBLE STRAP BRONZE SERVICE SADDLE W/ CC THREADS

NOTES:

1. SEE CITY WATER SYSTEM DESIGN GUIDELINES.
2. ALL PIPE AND FITTINGS ARE TO BE FLANGED DUCTILE IRON CEMENT MORTAR LINED OR FUSION-BONDED EPOXY COATED, EXCEPT AS NOTED OR UNLESS OTHERWISE SPECIFIED.
3. INSTALL DOUBLE CHECK DETECTOR FIRE LINE BACKFLOW ASSEMBLY PER CITY STANDARD.
4. SET METER VAULT SO THAT THE STEEL COVER IS FLUSH WITH FINISHED SURFACE.
5. METER VAULT KNOCKOUTS OR NEEDED PIPE OPENINGS ARE TO BE NEATLY CUT AND GROUTED SUFFICIENTLY TO PREVENT DIRT INTRUSION.
6. THIS ASSEMBLY TO BE INSTALLED ONLY WITH PRIOR APPROVAL OF THE PUBLIC WORKS & UTILITIES DEPARTMENT.



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COMBINATION FIRE & DOMESTIC
 SERVICE MASTER METER
 ASSEMBLY
 NOTES

DATE: APRIL 2017

SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers

Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 887.02

**Water System
Approved Materials List
March 2016**

**Water System
Approved Materials List**

CITY STANDARD DETAIL NO. 857.01

Hydrants

Residential

(All Two-2-1/2" and One-4-1/2" Outlet)
Clow 960
American AVK Series 2490

Commercial

(All One-2-1/2" and Two-4-1/2" Outlet)
Clow 865
American AVK Series 2420

Breakable Flange Unit

American AVK Co. 24-150-80
or Approved Equal

American AVK Co. 24-150-80
or Approved Equal

Paint: Safety Yellow, DTM (Direct to Metal) ALKYD based Enamel

CITY STANDARD DETAIL NO. 858

6" Blow-off

Ball Valve - Brass

3" Size

Watt B6000
Jomar T100

Meter Boxes and Covers

(Non-Traffic Loading Areas)

Box

Christy B40

Cover

Christy B40D

(Traffic Loading Area)

Box

Christy B40

Cover

Christy B40-61G

CITY STANDARD DETAIL NO. 862

Angle Meter Valves, Pack Joint, Brass

1-1/2" FL. x Compression

Ford	BFA43-777W and BFA43-666W
Jones	J1975W
McDonald	4602B-22
Mueller	P-24276-3

Corporation Stop Ball Valve - CC Threads

1-1/2" Size

Ford	FB1000
Jones	J1935
Mueller	P-25008
McDonald	4701B-22

Service Saddle - Brass, CC Threads - C-900 PVC, AC and Ductile Iron Pipe

Ford	S-90 and 202B
Jones	J-996 and J-979
Mueller	H13000 and BR2B
McDonald	3805 and 3825

Meter Boxes and Covers

1-1/2" (Non-Traffic Loading)

Box		Cover	
Christy	B30	Christy	B30

1-1/2" (Traffic Loading Area)

Box		Cover	
Christy	B30	Christy	B30

CITY STANDARD DETAIL NO. 864 and 865

Straight Meter Valves - Pack Joint, Brass, CC Threads

2" and 1-1/2" FL. x Compression

Ford	BF43-777W and BF43-666W
Jones	J-1921W
McDonald	6100M-22
Mueller	P24335

(DETAIL NO. 864 and 865 continued)

2" and 1-1/2" FL. x Compression

Ford	BFA43-777W and BFA43-666W
Jones	J1975W
McDonald	4602B-22
Mueller	P-24276-3

2" and 1-1/2" FL. x F.I.P.

Ford	BFA13-777W and BFA13-666W
Jones	J1974W
McDonald	4604B
Mueller	B-24286

2" and 1-1/2" FL. x F.I.P.

Ford	BF13-777W and BF13-666W
Jones	J1912W and J1915W
Mueller	B24337
McDonald	6101MW

2" and 1-1/2" M.I.P. x F.I.P. Compression

Jones	J2605 and J2607
McDonald	4753-22 and 4754-22
Ford	C84-67-1-1/2", C84-77-2", C14-67-1-1/2" and C14-76-2"

2" and 1-1/2" ELL 90° MIP & FIP x Compression and I.P.T.

Ford	L14-66, L84-77 and L84-66
McDonald	4761-22 and 4779M-22
Mueller	P-15531 and P-15533
Jones	J-2619 and J2620

2" and 1-1/2" Corporation Stop

Ford	FB1000-7 and FB1000-6
Jones	J1937
McDonald	4701B-22
Mueller	P25008

Meter Boxes and Covers
(Non-Traffic Loading Areas)

Box		Cover	
Christy	B36	Christy	B36E
Extension	1395	Christy	B36
(Traffic Loading Areas)			
Christy	B1730	Christy	B1730-51G

CITY STANDARD DETAIL NO.(S) 866, 867, 868 and 886

Tapping Sleeves

Size on size up to and including 12" on 12" (Example 4" on 4", 6" on 6") and any combinations (Example 4" on 8", 6" on 8"), DIP, CIP, PVC, and existing ACP.

Powerseal-Stainless Steel 3490 AS	
Ford-Stainless Steel	FTSS
JCM-Stainless Steel	432
Romac-Stainless Steel	SST III

CITY STANDARD DETAIL NO. 866

Meter Boxes and Covers

(Non-Traffic Loading Areas)

Box		Cover	
Christy	B52 w/Extension	Christy	B52-62-D-P/H

(Traffic Loading Areas)

Box		Cover	
Christy	B52 w/Extension	Christy	B52-62-D-P/H

CITY STANDARD DETAIL NO. 867

Meter Boxes and Covers

(Non-Traffic Loading Areas)

Box		Cover	
Christy	B52 w/Extension	Christy	B52-62-D-P/H

(Traffic Loading Areas)

Box		Cover	
Christy	B52 w/Extension	Christy	B52-62-D-P/H

CITY STANDARD DETAIL NO. 875

Meter Box, Vaults and Covers

Box		Cover	
Christy	B16	Christy	B16C
Christy	B36	Christy	B36D
Christy	B48	Christy	B48D2
Christy	R10P36	Christy	R10-52H

CITY STANDARD DETAIL NO. 877

Gate Valves

Valves shall conform to the latest revision of AWWA Standard C509 for resilient wedge gate valves.

Valve Box

Christy G5 (or Approved Equal)

CITY STANDARD DETAIL NO. 878

Tapping Sleeves

(See Approved Material List Standard Detail 866)

CITY STANDARD DETAIL NO. 879

Butterfly Valves 16” and Larger

Valves shall conform to the latest revision of AWWA Standard C504

DeZurik BAW, or Approved Equal

CITY STANDARD DETAIL NO. 880

Detector Check Valve

Ames	1000	Hersey LA Pattern Model	DC
Kennedy	1369	Mueller	A-2130 and A-2132
Watts	07F		

CITY STANDARD DETAIL NO. 882

Tapping Sleeves

(See Approved Material List Standard Detail 866)

Utility Box and Cover

(Non-Traffic Loading)

Box		Cover	
Christy	B48	Christy	B48M2
Quazite	Pg3048BA18	Quazite	LG3048WAQ150

CITY STANDARD DETAIL NO. 883

Tapping Service Saddle

(See Approved Material List Standard Detail 866)

Ball Valve No. 1’

Ford	B11-444
Jones	J-1900
Mueller	B25008
McDonald	6101W-1

(DETAIL NO. 883 continued)

Corporation Stop (Ball Valve)

1" M.I.P. x Comp. 1" F.I.P. x Comp. 90° Ell 90° Ell (Brass)

Ford	L84-44G	Ford	L14-44
Jones	J2619-SG	Jones	J2621-SG
Mueller	H15531	Mueller	H15533
McDonald	4779-MT		

Combination Valves

APCO	143C
Crispin	AL10

(DETAIL NO. 883 continued)

Meter Box and Cover

(Non-Traffic Loading)

Box		Cover	
Christy	B36	Christy	B36D
Quazite	PG1730WA12	Quazite	PG1730WA50

Meter Box and Cover
(Traffic Loading)

Box		Cover	
Christy	B36	Christy	B36D-61D
Quazite	PG1730BA12	Quazite	PG1730HAR250

CITY STANDARD DETAIL NO. 886

(See Approved Material List Standard Detail 863 and 866)

CITY STANDARD DETAIL NO. 889.01

Meter Boxes and Covers

5/8" x 3/4" (Non-traffic Loading)

Box		Cover
Christy	B9X	Christy B9XCor D and B9X