RIVERSIDE HIGHLAND WATER COMPANY

EST. 1898

THINK — PLAN — PERFORM

CONSERVATION

# SPECIFICATIONS

# WATER SYSTEM INSTALLATIONS

**June 20, 1989**

**Last Revised: December 15, 2025**

**SPECIFICATIONS**

**WATER SYSTEM INSTALLATION**

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# SPECIFICATIONS

## STANDARD PLANS

All facilities installed under these specifications shall be in accordance with the applicable Company standard or approved drawings unless superseded by a note or detail on the plan.

## INSTALLATION AND MAINTENANCE OF VALVE CANS

It shall be the Contractor's responsibility to install and maintain valve cans until the street or streets are paved and to conform to local standards on setting valve cans and covers. The contractor shall raise the valve cans prior to paving. All paving and encasement will be done at the Contractors expense.

## INSTALLATION OF WATER SERVICE AND METER

The Contractor, after installation and inspection of the water service shall provide and install (#4 ½ for ¾" Meter and #5 ½ for 1" Meter) polymer meter box, cover, and ball valve. RHWC will provide and install meter.

## LAYING AND WORKMANSHIP

Factory test markings shall appear on all pipe when delivered. Field inspection shall be made to detect any damage resulting from shipment or handling, and all damaged material shall be rejected. Pipe couplings and rubber rings shall be checked for proper diameter and size. If rubber rings show check lines due to age they will be rejected.

All trench excavation shall provide for a minimum cover of 30 inches over the top of the pipe as measured from the gutter flow line unless the cover is otherwise noted on the Plans or as specified by the local Government Agency. The trench shall follow a true and straight alignment in the location shown on the Plans. Any deviation necessitated by unforeseen conditions must be approved by the Company before proceeding with the work. The width of the trench excavation shall not exceed 18 inches for pipe sizes less then 8 inches in diameter or larger, the trench shall not exceed the outside diameter of the pipe plus 12 inches.

The pipe trench shall be excavated at least 6 inches deeper than the grade of the bottom of the pipe. The trench shall then be refilled with select sand in the pipe zone 6 inches below and above pipe. Native soil will be used in middle of trench with 8-12" of base material on top.

Bell (coupling) holes for PVC C900 pipe shall be of sufficient size so that the pipe may be readily assembled. Wood blocking under the pipe will not be permitted.

**TRACER WIRE**

Tracer wire (14g) is to be attached to all diameters of nonmetallic pipe for full lengths of pipe, cast iron fittings, angle meter stops, and hydrant laterals, blowoffs, and Air-Vacs or mechanical joint fittings (wrapped in plastic).

**MATERIALS USED**

All pipe 12" or larger will be cement mortar lined and coated and will comply with all AWWA Standards.

PVC C900 (DR-14) pipe must comply with AWWA-C900-81 specifications and will be using cement mortar lined Ductile, Cast Iron- Mechanical Joint or Push On fittings are acceptable.

All PVC used on slopes shall be PVC Yelomine Pressure Pipe (IPS) with Certalok Restrained Joint.

**NOTE:** This is for sizes 6 inches through 12 inches. Larger sizes will be specified on the plans.

All service material to be a minimum of 1" in diameter and shall be Municipex tubing unless otherwise noted on plan.

All fittings on service material to be of the pack joint compression type.

All valve to be Mueller or Clow brand.

All valve covers shall be 8 inch diameter cast iron, bearing the word WATER in raised letters on top. Valve can material shall be 8 inch SDR #35 plastic with a 12 inch galvanized slip riser. Valve cans to be painted with permanent Royal Blue or equivalent and sprinkled with crushed glass.

## FIRE HYDRANT AND THRUST BLOCKS

All valves, including tapping valves, shall be securely supported from beneath to prohibit future settlement. Support shall consist of precast mortar blocks or concrete poured on site, but in no case shall wood blocks be permitted as a permanent means of support. Mud and other unstable material shall be removed as necessary to permit the block to bear on undisturbed material capable of providing adequate support. Valve anchors shall be incorporated when indicated on the plans and constructed in accordance with Standard Drawing.

Fire hydrants are to be painted with one coat of Galvanized Sealing Primer and a surface coat of "Safety Yellow".

A CLOW LP 619 check valve is to be installed at the top of fire hydrant bury and above ground at every fire hydrant installation.

All Fire Hydrant Bury flanges to be 4 inches above finished grade.

Adequately sized concrete thrust blocks shall be installed to withstand all thrust created by maximum internal water pressure in accordance with Riverside Highland Water Company's Standard Table No. 1 for the following conditions:

1. Change of direction, as at tees and bends.
2. Change of size, as at reducers and at plugged crosses and tees.
3. At flush outs and dead ends.
4. Thrust at valves.

## CATHODIC PROTECTION

Materials to be used in providing this protection shall be as follows unless otherwise specified on the installation drawing:

1. Coal-tar primer for use under bituminous tape shall be PROTECTO-WRAP No. 1170 Primer as manufactured by Protecto-Wrap Company, Denver, Colorado, or an approved equal.
2. Bituminous tape shall be PROTECTO-WRAP No. 200A, or an approved equal.
3. Coal-tar mastic shall be PROTECTO-Wrap No. CA 1200 coating, or an approved equal.

Rocks greater than 1 inch in any dimension shall not be permitted in the backfill material. Where rocks are included in the backfill, they shall be mixed with suitable excavated material so as to eliminate voids.

## METHODS OF CHLORINATION

PITCHLOR tablets or the equivalent shall be securely fastened to the inside top of each length of pipe by bonding the tablets to the pipe with No. 1 PERMATEX cement. Care must be taken that the tablets are merely cemented to the pipe and not covered with the cement. The table below shows the number of tablets required for each length of pipe section and size of pipe.

Number of Hypochlorite Tablets of 5-G
Required for Dose of 50 Mg/1*

| Length of Section | Diameter of Pipe | | | | | |
|---|---|---|---|---|---|---|
| | 2" | 4" | 6" | 8" | 10" | 12" |
| 13' or less 1 | 1 | 2 | 2 | 3 | 5 | |
| 18' | 1 | 1 | 2 | 3 | 5 | 6 |
| 20' | 1 | 1 | 2 | 3 | 5 | 7 |
| 30' | 1 | 2 | 3 | 5 | 7 | 10 |
| 40' | 1 | 2 | 4 | 6 | 9 | 14 |

*Based on 3-3/4g available chlorine per tablet

**NOTE:** Pipe larger than 12", the chlorine dose will be determined in the field.

These dosages will give minimum free chlorine residual of 25 part per million in the water after 24 hours standing in the pipe. If conditions are such that a contact period of only three hours can be used for disinfection, a dosage of 300 parts per million chlorine concentration is required which will require dosages 12 times as great as those indicated in the above table. A flushing plan must be developed to meet the NPDES regulations.

## PRESSURE TEST AND ACCEPTANCE

Upon completion of the preliminary flushing, the Contractor shall pressure test the line under the immediate supervision of the Company. The pipeline shall be filled with water and must withstand a pressure of 225 psi for 4 hours without apparent leakage unless otherwise required by the local Government Agency. Any leaks developed under this test shall be repaired immediately until it is possible to maintain the pressure for 4 hours without leakage. In some cases, FT Pipe may be used. This pressure test will be determined by the Company.

Anytime a street is excavated to replace a water main, the trench line backfill must be properly compacted and tested during construction or immediately at completion of pipe replacement.

The following is a guideline for recommended spacing for tests:

| | |
|---|---|
| Up to 600 linear feet | 2 tests |
| Up to 1,000 linear feet | 3 tests |
| Over 1,000 linear feet | 1 test approximately every 300 feet |
| | |
| Cul-de-sac up to 600 linear feet | 1 test |
| Cul-de-sac over 600 linear feet | 1 test approximately every 300 feet |

A test is comprised of a soils moisture test and relative compaction at 0.0 to 0.5 feet and 1.0 to 1.5 feet.

The Contractor shall guarantee all workmanship and materials utilized in the installation for a period of 2 years from the date of acceptance by the Company.

**OSHA REGULATIONS**

The Contractor shall at all times observe the applicable rules and regulations established by OSHA in the performance of his work under these Specifications.

**TRAFFIC CONTROL**

Refer to "Work Area Traffic Control Handbook" current edition.

**PROTECTION OF WORK AND CLEAN UP**

Until the final completion of the work and acceptance thereof by the Company, the Contractor shall care for and maintain all areas affected by his construction. The Contractor shall remove debris, rubbish, and spoils form the site of the work after its completion and prior to acceptance thereof by the Company. No spoils or new material piles are to remain on dedicated streets over night.

All landscaping must be restored to its original condition. Restitution of property damage must be done in a professional and timely manner.

**SHUT-DOWNS AND LINE CHARGING**

For all shut-downs, and tie-ins a twenty four (24) hour minimum advance notice must be given to the Company Representative whose name and phone number appear on the bid sheet. All shut-downs and line charging must be made by Company personal. Hourly inspection fees will be charged.

## WATER FACILITIES

No pipelines, meters, or any other water facilities shall be installed prior to curbs and gutters.

## EXTRA WORK

The Company reserves the right at any time during the progress of the work to require the Contractor to do extra work or to make changes involving more or less labor, materials, or equipment then is contemplated in the contract.

If the extra work required affects an item of work covered by a Contract unit price, and the extra work does not produce a net charge in the original item quantity in excess of 25%, than such work shall be performed at the Contract unit price.

All other extra work shall be performed at cost plus the stated percentage in the bid. Such extra work shall be ordered in writing by the company after accepting an estimate of the cost of such extra work from the contractor.

All materials furnished and all work done shall be in accordance with the Specifications. All work shall be done in thorough, workmanlike manner by persons skilled in their various trades. Material or workmanship not definitely specified, but incidental to a necessary for the work, shall conform to the best commercial practice for the type of work in question.

## NOTES

1. Irrigation Pipe Lines:
   Pipe line materials shall be notes on Standard Plans.
   Specifications shall be in accordance with approved
   Company standards. No cast-in-place pipe shall be used.

2. No field machining on AC pipe. If a Contractor does abrasive saw cutting on Asbestos Cement Pipe (ACP)he can be removed immediately from the job and another enlisted to complete the job with all extra work cost being absorbed by the violating Contractor.

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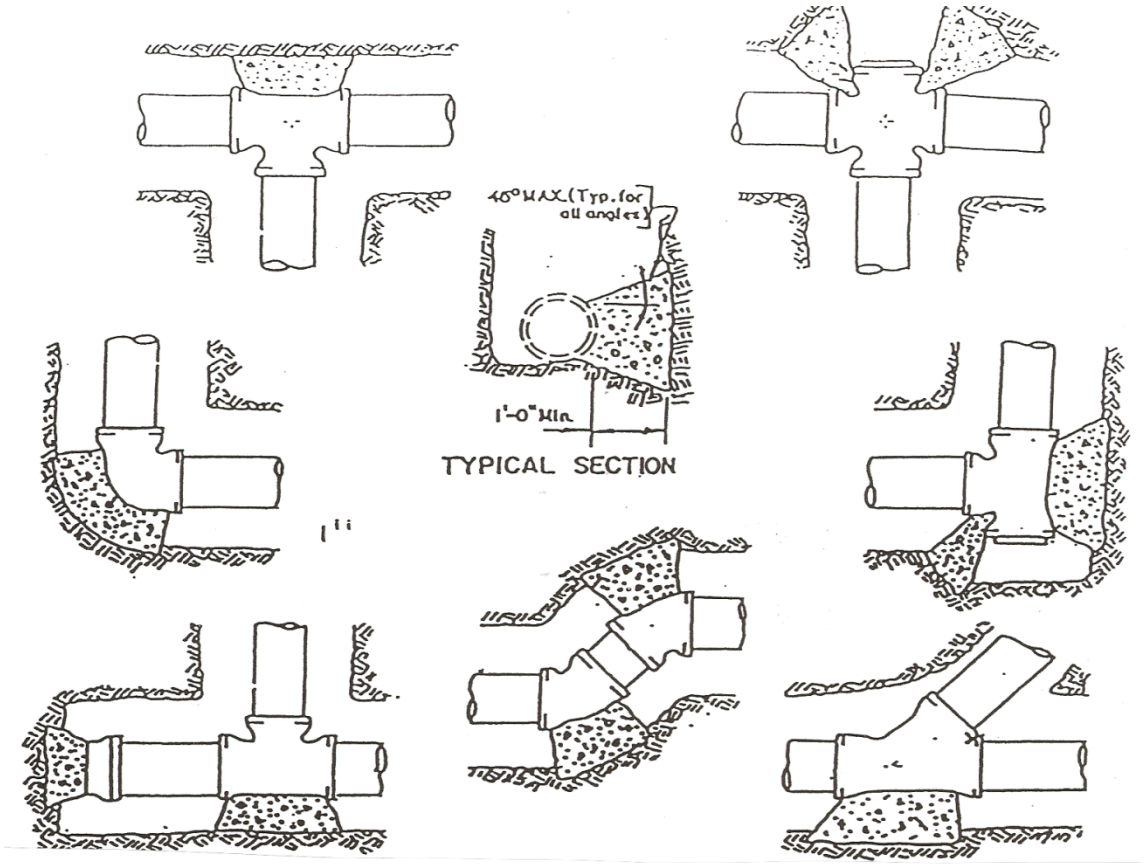
# TYPICAL LOCATION OF THRUST BLOCKS




ANCHOR BLOCK AREA REQUIRED-SQUARE FEET – SOIL BEARING VALUE 2000lb/Sq.Ft.

| Fittings | Size | 4” | 6” | 8” | 10” | 12” |
|---|---|---|---|---|---|---|
| 11 ¼ | | 1.0 Sq.Ft. | 1.0 Sq.Ft. | 1.5 Sq.Ft. | 2.5 Sq.Ft. | 3.0 Sq.Ft. |
| 22 ½ | | 1.0 Sq.Ft. | 1.5 Sq.Ft. | 3.0 Sq.Ft. | 4.5 Sq.Ft. | 6.0 Sq.Ft. |
| 45 | | 1.5 Sq.Ft. | 3.0 Sq.Ft. | 5.0 Sq. Ft. | 8.5 Sq.Ft. | 12.0 Sq.Ft. |
| 90 | | 3.0 Sq.Ft. | 5.5 Sq.Ft. | 9.5 Sq.Ft. | 15.5 Sq.Ft. | 22.0 Sq.Ft. |
| Tee Outlet | | 2.0 Sq.Ft. | 4.0 Sq.Ft. | 6.5 Sq.Ft. | 11.0 Sq.Ft. | 15.5 Sq.Ft. |
| Dead End | | 2.0 Sq.Ft. | 4.0 Sq.Ft. | 6.5 Sq.Ft. | 11.0 Sq.Ft. | 15.5 Sq.Ft. |

**NOTE:**

1. Anchor blocks shall be four (4) socks per cu. Yd. Concrete and poured against undisturbed soil.
2. Anchor blocks shall be placed at all points where the bend is greater than 10.
3. Anchor blocks shall be placed at all Tees, “Y’s”, Caps, Ells, Valves, Reducers, and hydrants.

# PVC C-900 HIGH PRESSURE WATER PIPE
## ALLOWABLE LEAKAGE WITH GASKET JOINTS
### Gallons Per 1000 Feet or 50 Joints

| Normal Pipe Size Inches | Average Test Pressure in Line-p.s.i. | | | | |
|---|---|---|---|---|---|
| | 50 | 100 | 150 | 200 | 250 |
| 6" | 0.29 | 0.41 | 0.5 | 0.57 | 0.64 |
| 8" | 0.38 | 0.54 | 0.66 | 0.76 | 0.85 |
| 10" | 0.48 | 0.68 | 0.83 | 0.96 | 1.07 |
| 12" | 0.57 | 0.81 | 0.99 | 1.15 | 1.28 |

SPEC
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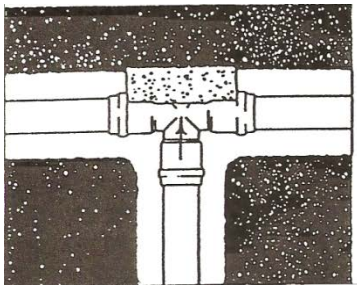
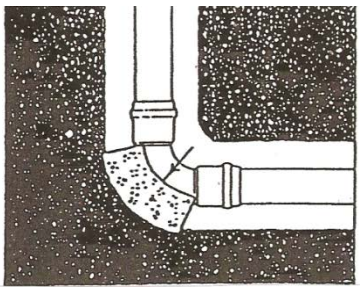
RIVERSIDE HIGHLAND WATER COMPANY

## TYPICAL THRUST BLOCK PVC C900

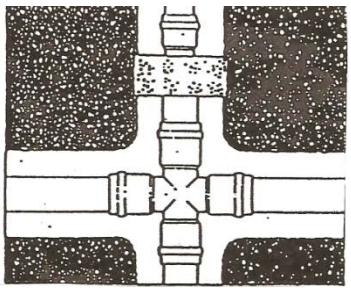
Figure 1. Examples of Thrust Blocks (specific requirements will be dictated by job condition)



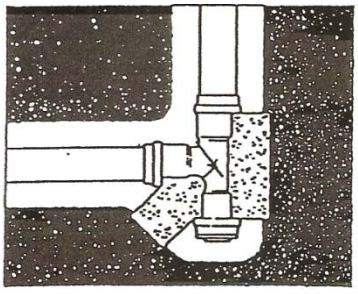
Thru line connection, tee



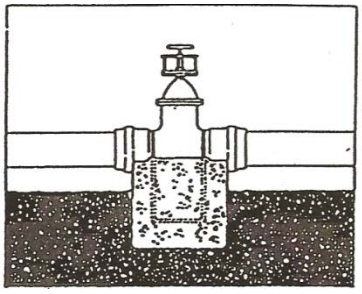
Direction Change, elbow



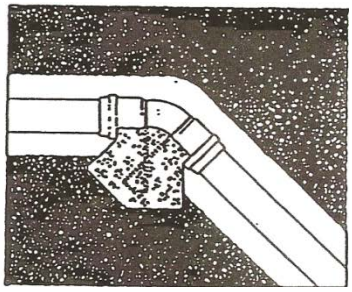
Change line size, reducer



Direction change, tee used as elbow



Valve Anchor



Direction change vertical, bend anchor

Table 1. Thrust Developed Per 100 P.S.I. Pressure (lbs. force)

| Pipe Size | Fitting 90 Elbow | Fitting 45 Elbow | Valves, Tees, Dead Ends |
|---|---|---|---|
| 1 1/2 | 300 | 200 | 200 |
| 2 | 500 | 300 | 400 |
| 3 | 1,000 | 600 | 800 |
| 4 | 1,800 | 1,100 | 1,300 |
| 6 | 4,000 | 2,300 | 2,900 |
| 8 | 7,200 | 4,100 | 5,100 |
| 10 | 11,200 | 6,300 | 7,900 |
| 12 | 16,000 | 9,100 | 11,300 |

Note: Thrusts from greater or lesser pressures may be proportioned.

Table 2. Estimated Soil Bearing Capability

| Soil Type | lbs/ft |
|---|---|
| Muck, Peat, etc | 0 |
| Soft Clay | 500 |
| Sand | 1,000 |
| Sand and Gravel | 1,500 |
| Sand and Gravel with Clay | 2,000 |
| Sand and Gravel with Cemented with Clay | 4,000 |
| Hard Plan | 5,000 |

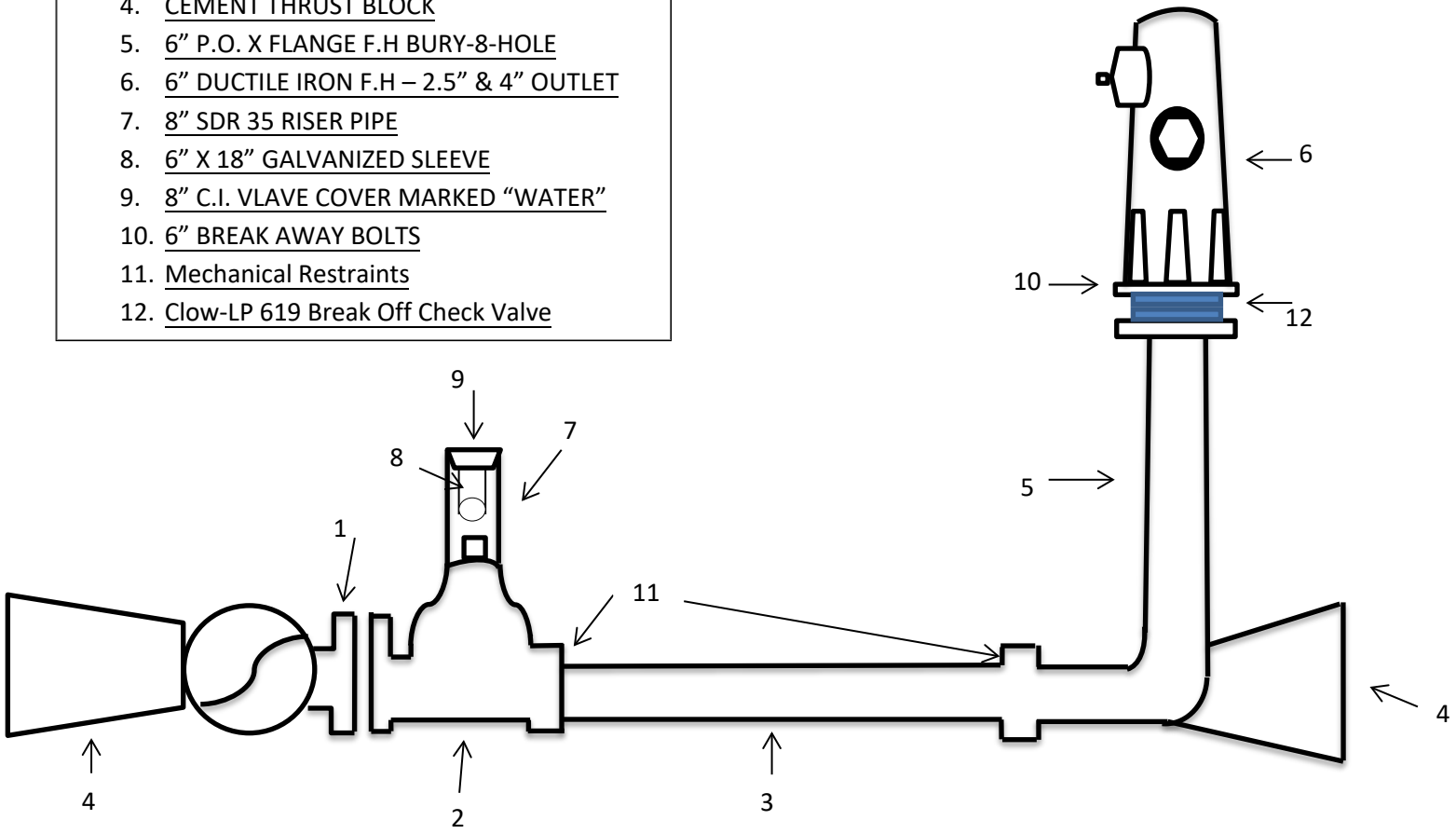
Note: Values are estimated for horizontal thrusts at depths of burial which exceed 2 ft.

## TYPICAL FIRE HYDRANT ASSEMBLY

1. FLANGE TEE
2. 6” FLANGE X P.O. RW GATE VALVE
3. 6” C900 PVC
4. CEMENT THRUST BLOCK
5. 6” P.O. X FLANGE F.H BURY-8-HOLE
6. 6” DUCTILE IRON F.H – 2.5” & 4” OUTLET
7. 8” SDR 35 RISER PIPE
8. 6” X 18” GALVANIZED SLEEVE
9. 8” C.I. VLAVE COVER MARKED “WATER”
10. 6” BREAK AWAY BOLTS
11. Mechanical Restraints
12. Clow-LP 619 Break Off Check Valve

**All Fire Hydrant laterals are to be mechanically restrained along with thrust blocking.**
**Mechanical restraints will be wrapped in plastic.**

**Bottom of Bolt/Nut Min.3”-5” Above Grade**



D-23449 Rev. A
8/22/18

# CLOW
Valve Company
902 South 2nd St. Oskaloosa, IA 52577
1-800-829-2569 info@clowvalve.com

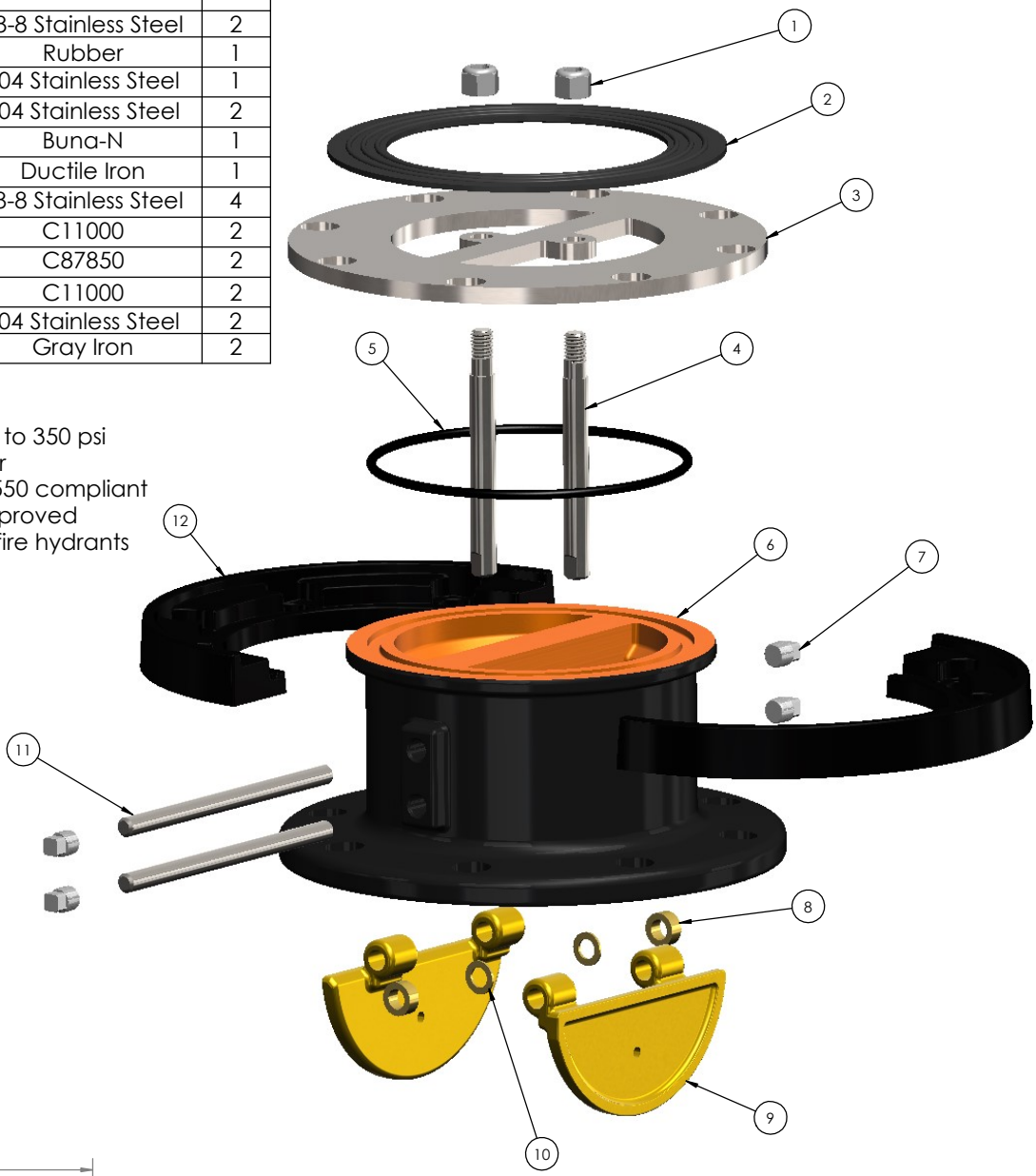
## LP 619 Low Profile Break Off Check Valve

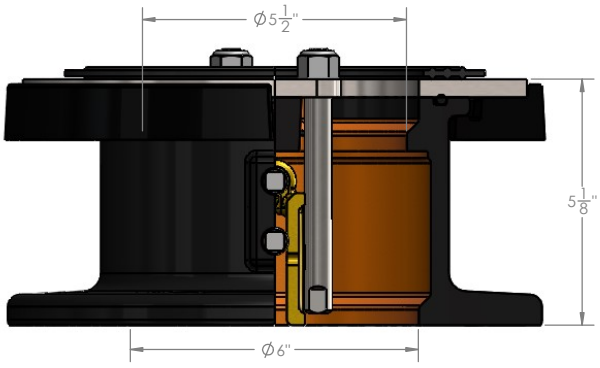
| Option | Number of Holes | Hole Size | Diameter of ℄ |
|---|---|---|---|
| 8 Hole | 8 | 7/8" | 9 1/2" |
| 6 Hole | 6 | 3/4" | 9 3/8" |
| 6 Hole SD | 6 | 7/8" | 9 1/2" |

*The option of a 6 Hole (top/hydrant) x 8 Hole (bottom/pipe) is available upon request

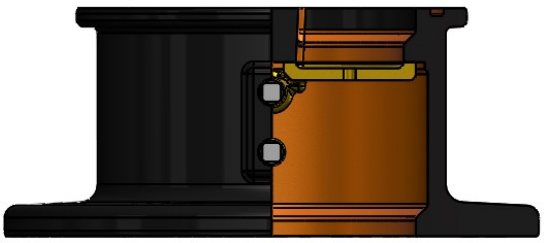
| Item No. | Description | Material | Qty. |
|---|---|---|---|
| 1 | 1/2"-13 Lock Nut | 18-8 Stainless Steel | 2 |
| 2 | 3-Ribbed Gasket | Rubber | 1 |
| 3 | Retaining Plate | 304 Stainless Steel | 1 |
| 4 | Retaining Rod | 304 Stainless Steel | 2 |
| 5 | O-Ring #364 | Buna-N | 1 |
| 6 | Body | Ductile Iron | 1 |
| 7 | 1/4" NPT Pipe Plug | 18-8 Stainless Steel | 4 |
| 8 | Large Washer | C11000 | 2 |
| 9 | Flapper | C87850 | 2 |
| 10 | Small Washer | C11000 | 2 |
| 11 | Cross Bar | 304 Stainless Steel | 2 |
| 12 | Safety Flange | Gray Iron | 2 |

Notes:
- Designed for system pressures up to 350 psi
- ∅1/4" weep hole in each flapper
- Epoxy interior coating, AWWA C550 compliant
- NSF61/Annex G and ANSI 372 approved
- Designed for all C503 wet barrel fire hydrants




Open

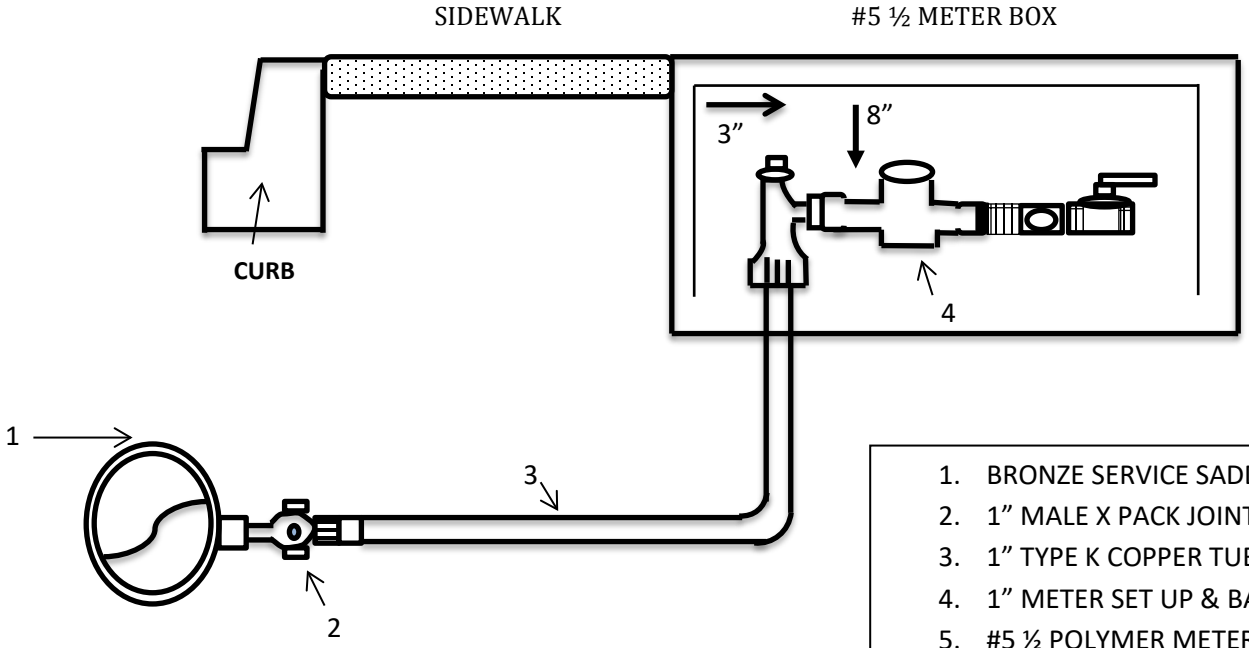


Deployed

Typical Fire Hydrant Assembly

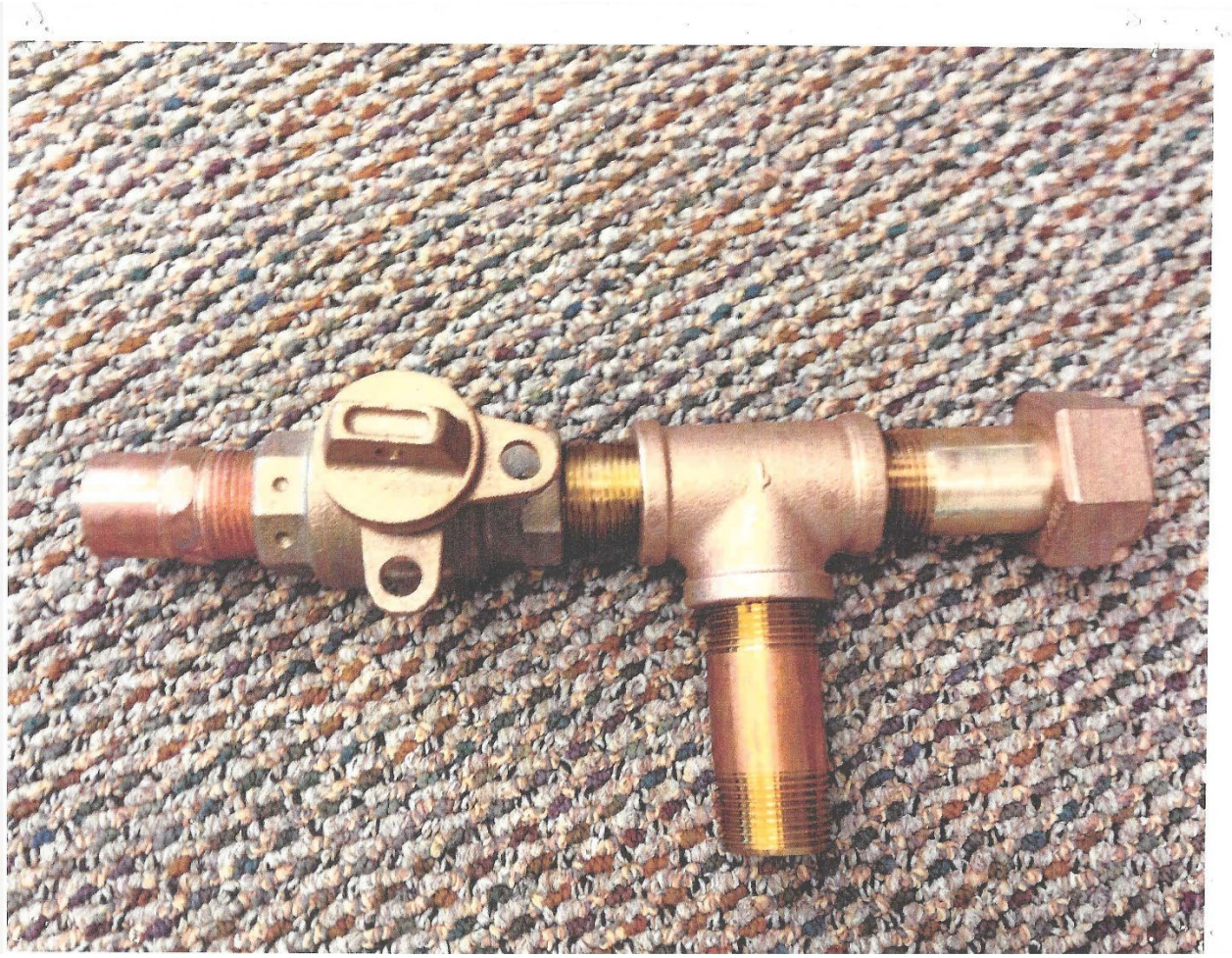
**All fire hydrant laterals will have tracer wire that is accessible in a 4” round hand hole with cover, flush with grade, located within 6” of either side of fire hydrant.**

# TYPICAL WATER SERVICE



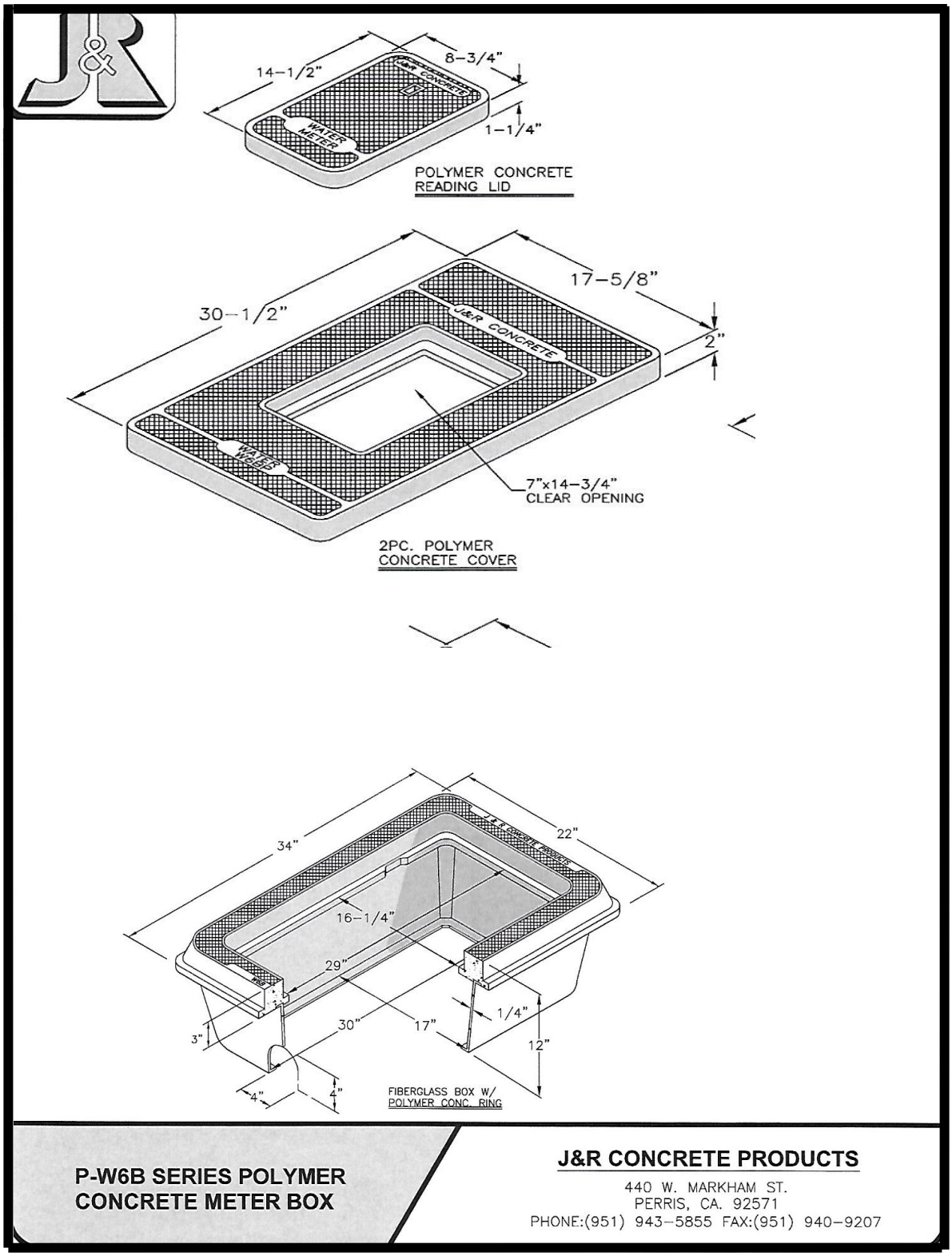

1. BRONZE SERVICE SADDLE
2. 1” MALE X PACK JOINT C.T.S. CORP STOP
3. 1” TYPE K COPPER TUBE
4. 1” METER SET UP & BACK SIDE (SEE 12-A)
5. #5 ½ POLYMER METER BOX W/ POLYMER TWO PIECE COVERS MARKED WATER
6. A BED 3” (3/4”-1”) THICK OF ROCK TO BE INSTALLED UNDER METER

# Back side of Meter setup

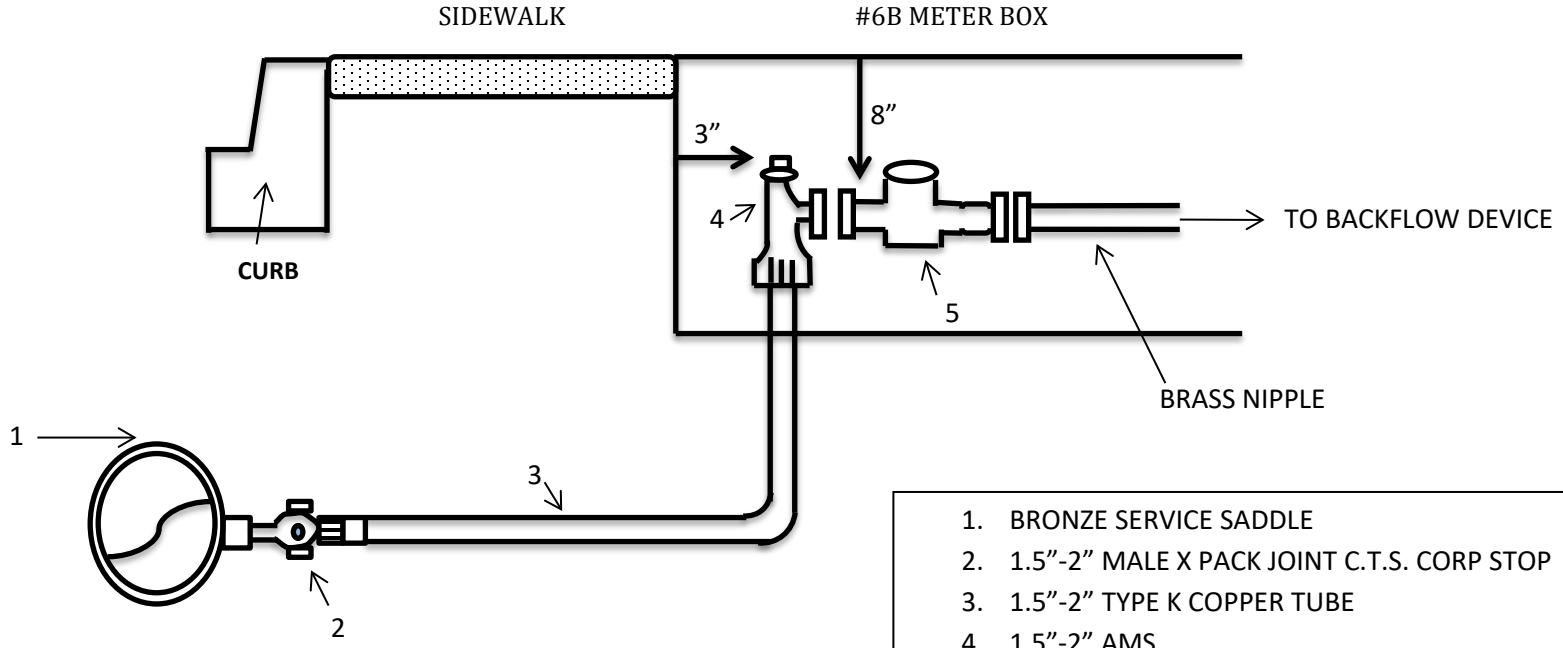


# Typical Meter Box Style

Typical Meter Box for 1.5”- 2” Meters and 1” Meters with residential Fireflow



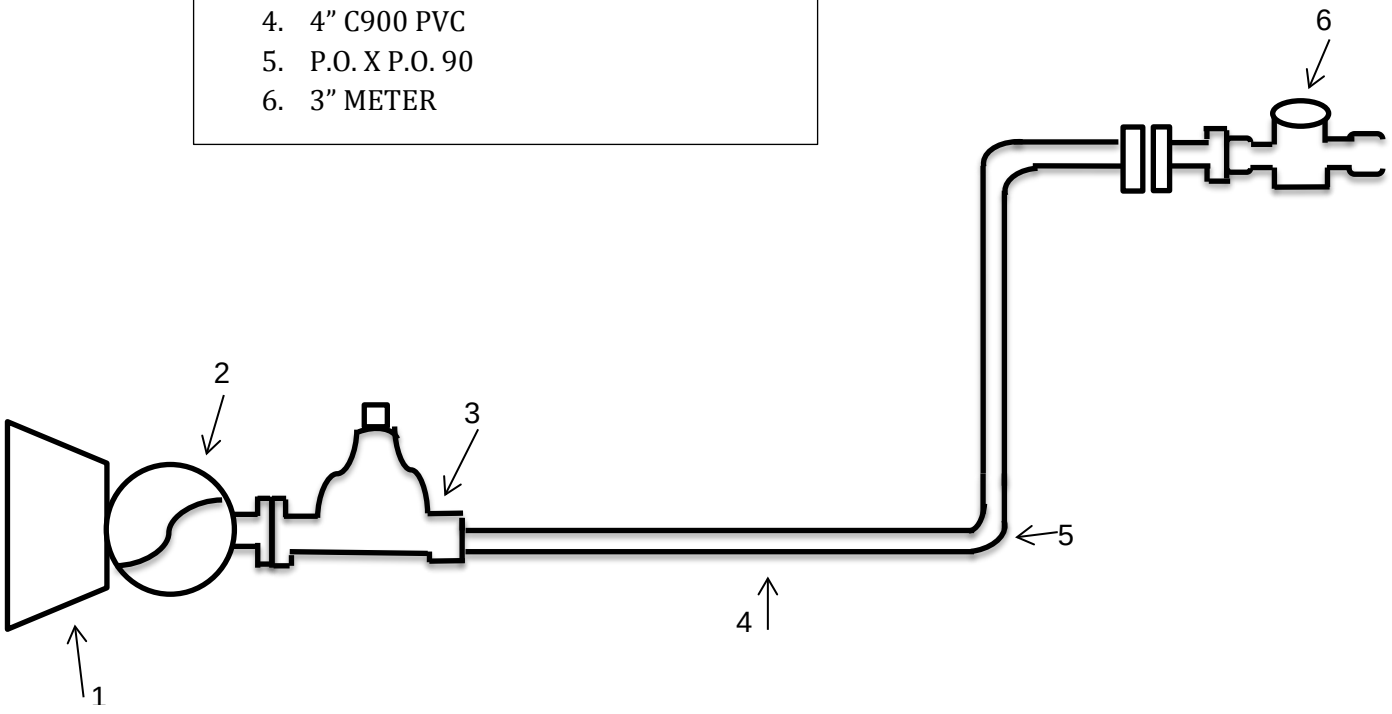
# TYPICAL 1 ½" - 2" IRR SERVICE




1. BRONZE SERVICE SADDLE
2. 1.5"-2" MALE X PACK JOINT C.T.S. CORP STOP
3. 1.5"-2" TYPE K COPPER TUBE
4. 1.5"-2" AMS
5. 1.5"-2" METER
6. #6B POLYMER METER BOX W/ POLYMER TWO PIECE COVER MARKED WATER

# TYPICAL 4” SERVICE LATERAL WITH 3” METER

1. CEMENT THRUST BLOCK
2. WELD NOZZLE OR TAPPING SADDLE
3. 4” FL;G X P.O. RW GATE VALVE
4. 4” C900 PVC
5. P.O. X P.O. 90
6. 3” METER




**ANY BARE STEEL SHALL BE WRAPPED IN 10 MIL TAPE OR EQUIVELANT**

## Riverside Highland Water Company

## FIRE SPRINKLER WITH RESIDENTIAL WATER SERVICE POLICY

### Purpose

The purpose of this policy is to establish guidelines for the application of residential fire sprinklers combined with residential water service when required by the governing agency.

### Definitions

Governing agency: Any agency that has the legal authority to enforce fire sprinkler requirements.

Riverside Highland Water Company ("RHWC") water service: That portion of the water supply system from the water main up through the backside tee and turn off valve as defined in the RHWC Specifications, Water System Installations, latest Revision.

Billing: The amount of fees or charges required per RHWC Billing Rates at the time of service.

### Policy

When the governing agency requires a residential fire sprinkler system the following policy applies:

The water service size from the meter to the residence, the fire service size for the residence, and meter size shall be specified by the governing agency.

The developer/water user shall install the required RHWC water service.

After the approved RHWC water service has been installed, Riverside Highland Water Company will take ownership and is responsible for the water service.

Billing:

The capacity fees for combined residential domestic and fire sprinkler systems shall be determined as follows:

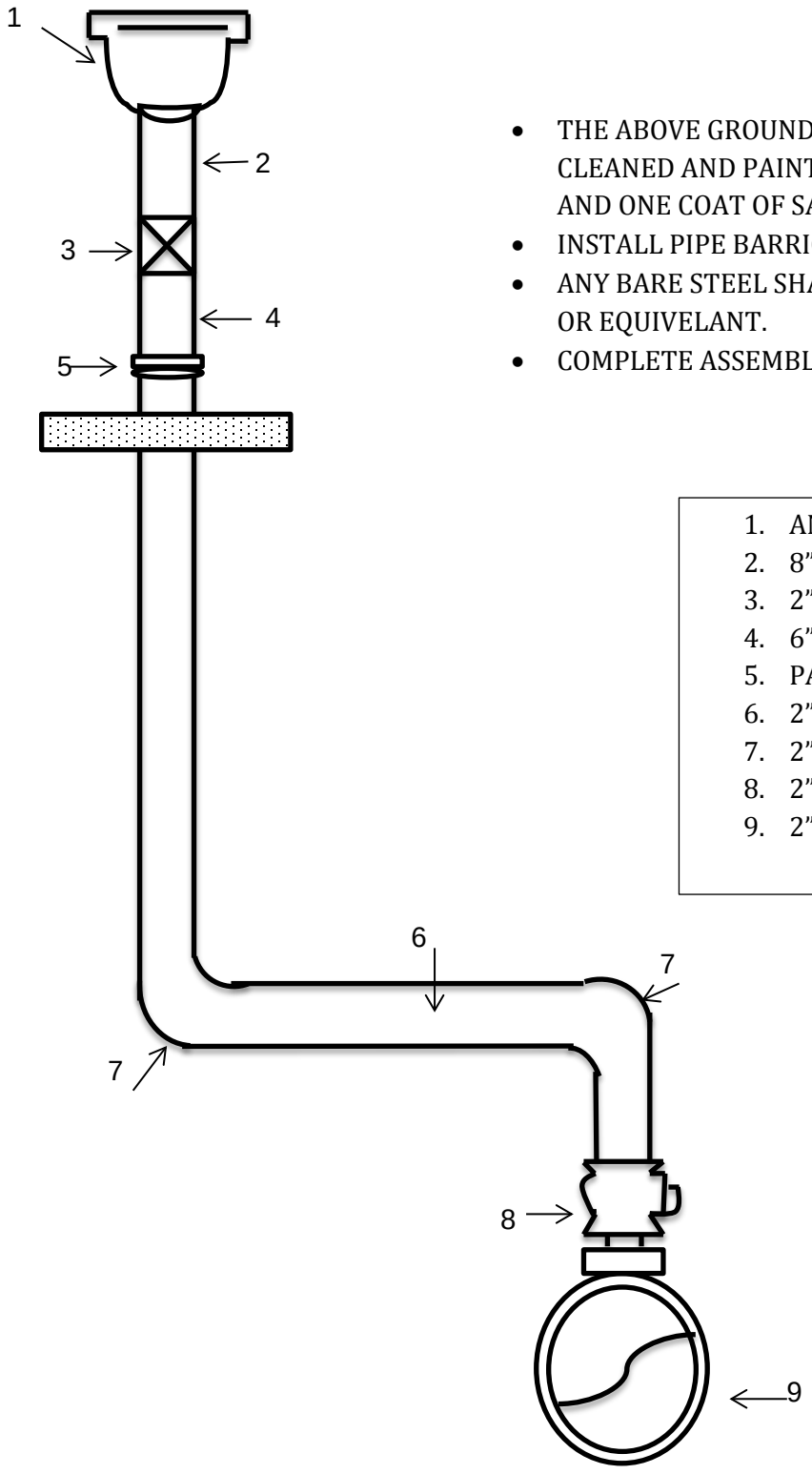
Normal Capacity Fee for service size based on domestic demand
Plus
Normal Capacity Fee for fire service size as determined by the governing agency

Example:

A typical residence requires a ¾" service for domestic purposes. The County Fire Department requires a 1" service for the fire sprinkler service. Capacity Fee would be the current capacity fee for a ¾" meter plus the current capacity fee for a 1" fire service.

The Bi-monthly Domestic Meter Charge shall be the size of the required water service charge.

# AIR VACUUM VALVE

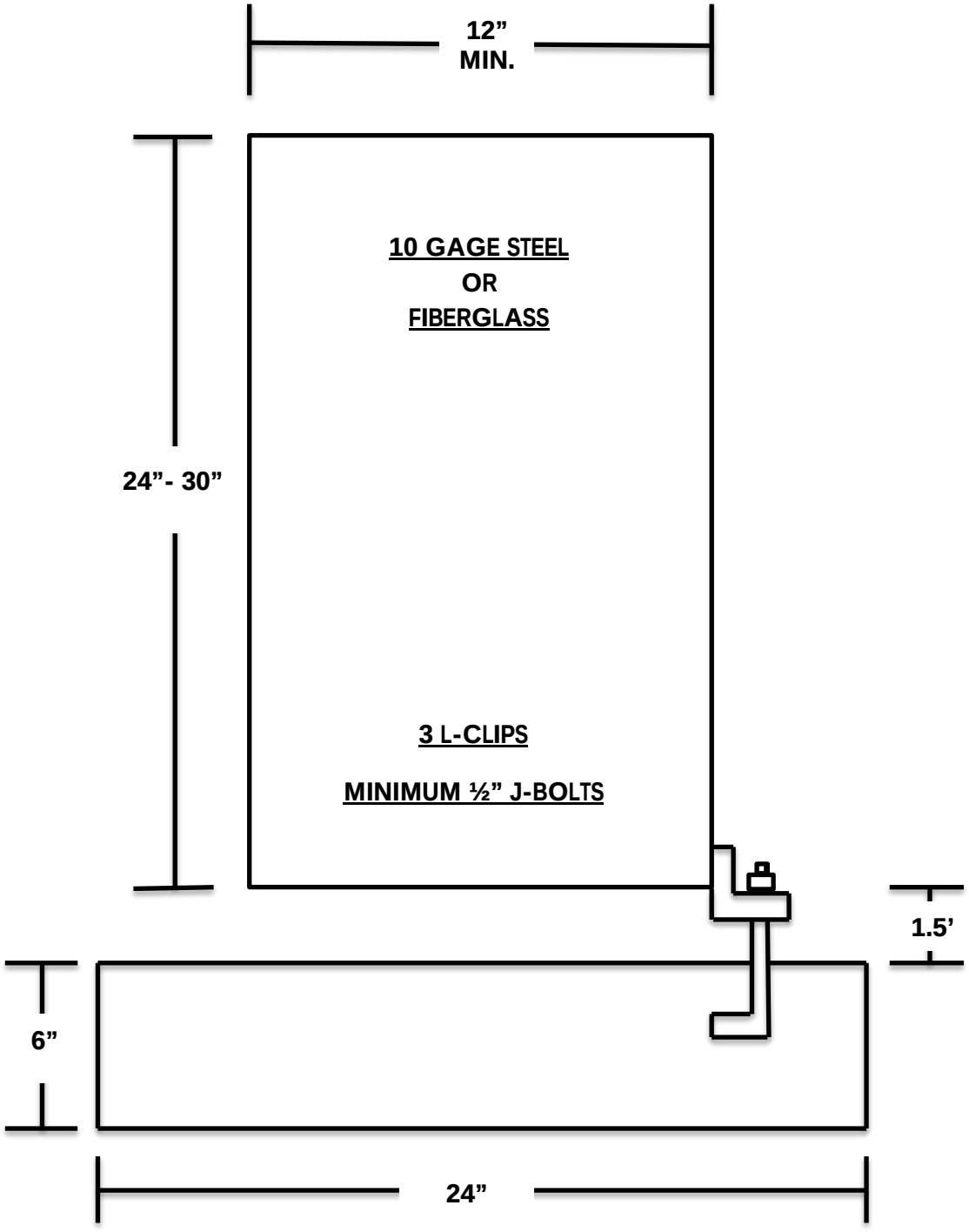



NOTES

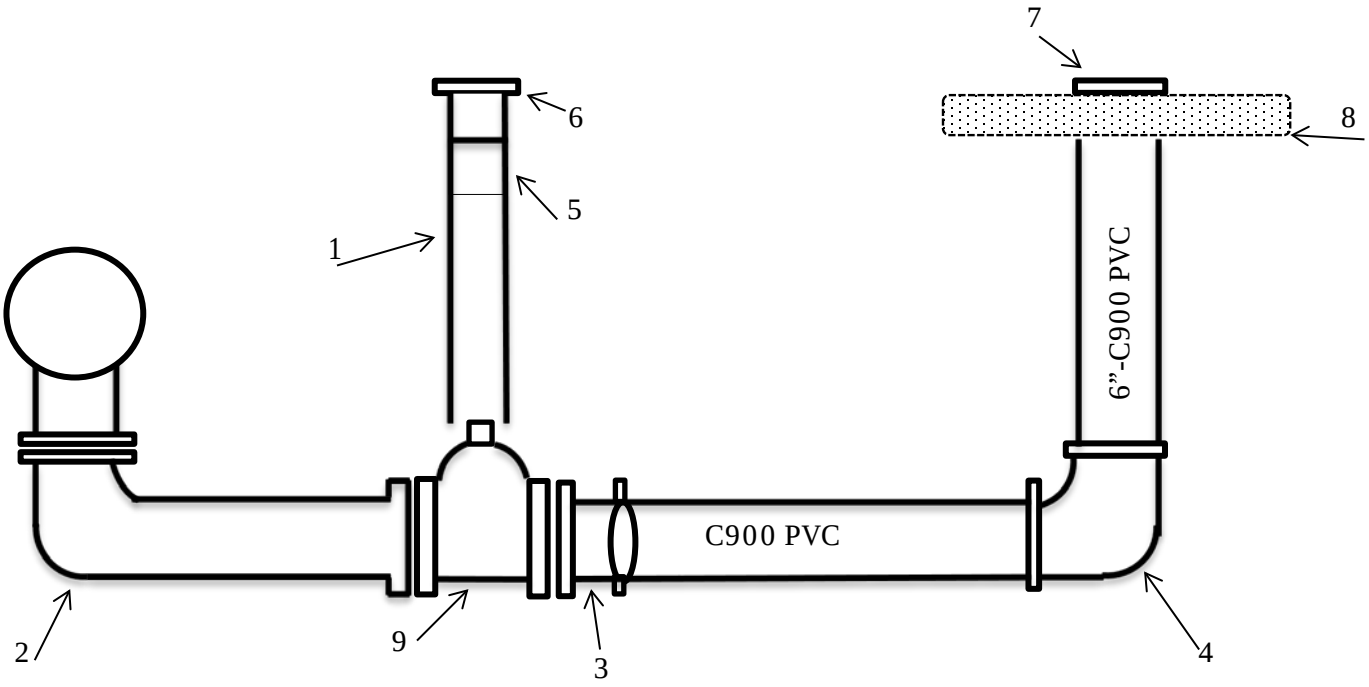
- THE ABOVE GROUND COVER SHALL BE THOROUGHLY CLEANED AND PAINTED WITH ONE COAT OF PRIMER AND ONE COAT OF SAFETY YELLOW ENAMEL.
- INSTALL PIPE BARRICADES AS DIRECTED BY RHWCO
- ANY BARE STEEL SHALL BE WRAPPED IN 10 MIL TAPE OR EQUIVELANT.
- COMPLETE ASSEMBLY SHALL BE PLUMB.

1. AN APPROVED AIR/VAC
2. 8" X 2" BRASS NIPPLE
3. 2" BRASS BALL VALVE
4. 6" X 2" BRASS NIPPLE
5. PACK JOINT CTS X FEMALE THREAD
6. 2" TYPE K COPPER TUBING
7. 2" PACK JOINT CTS 90
8. 2" CORP STOP MIP X PACK JOINT
9. 2" BRONZE SADDLE

# AIR RELEASE OR VACUUM COVER



## TYPICAL 6” BOTTOM BLOWOFF




1. 8”SDR 30-AT LEAST RISER
2. FLANGED 90
3. ADAPTOR TO PVC
4. PUSH ON 90
5. 8”x 12” GALV SLEEVE
6. 8” CAST IRON VALVE COVER MARKED WATER
7. 6” VALVE COVER
8. 4 X 4 CONCRETE PAD
9. 6” RW GATE VALVE

# Double Check Detector Backflow Prevention Assembly (DCDA) For Fire Flow

The term “double check valve backflow prevention assembly” shall mean an assembly composed of two independently acting, approved check valves, including tightly closing resilient seated shut off valves attached at each end of the assembly and fitted with properly located resilient seated test cocks. (See Specifications, Section 10for additional details.) This assembly shall only be used to protect against a non heath hazard (i.e. pollutant).

EXAMPLE 1:

EXAMPLE 2:


Requirements:

1. Above Ground
2. Drain Required
3. Protective Enclosure (If Needed)
4. Minimum Clearance 18”
5. Maximum Clearance 36”
6. Adequately Supported and Restrained to Prevent Movement
7. **NOTE: WATER COMPANY RESPOSIBILITY STOPS AT TIE IN POINT TO WATER CO. MAIN LINE i.e.: AT VALVE TAPPED OFF OF MAIN LINE FOR FIRE SERVICE LATERAL. CUSTOMER RESPONSIBILITY STARTS IMMEDIATELY AFTER ABOVE-DESCRIBED VALVE.**

Department of Industrial Relations
DIVIVSION OF OCCUPATIONAL SAFETY AND HEALTH

To: State and Local Agencies Responsible For Issuance of Building Permits

It has come to our attention that agencies issuing permits for certain construction activities are sometimes failing to REQUIRE the applicants to first obtain a permit from the Division of Occupational Safety and Health (DOSH).

Building and construction contractors are REQUIRED to obtain a permit from DOSH prior to commencing certain types of hazardous activities. These activities include:

- Construction of trenches or excavations which are five feet or deeper and into which a person is required to descend.
- The construction or demolition of any building, structure, falsework, or scaffolding more then three stories high or the equivalent height.
- The underground use of diesel engines in work in mines and tunnels

Under section 17922.5 of the Health and Safety Code, state and local agencies which issue building permits MUST REQUIRE the applicant to submit proof that a permit for the above activities has been obtained from DOSH. The section reads as follows:

§ 17922.5. Application For and Issuance of building permit: prerequisites

Any state or local agency which issues building permits shall require as a condition of issuing any building permit where the working conditions of the construction would require an employer to obtain a permit from the Division of Occupational Safety and Health pursuant to Chapter 6 (commencing with section 6500) of Part 1 of Division 5 of the Labor Code that proof be submitted showing that the employer has received such a permit from the Division of Occupational Safety and Health.

An employer may apply for a building permit prior to receiving the permit from the Division of Occupational Safety and Health.

Strict adherence to this statute by all parties is essential in protecting the safety of California workers. Your cooperation in advising applicants of this permit responsibility and when appropriate, referring them to the nearest DOSH district office to obtain the required permit, would be greatly appreciated.

# MASTER METER AMR'S TO BE SUPPLIED & INSTALLED BY RHWC

## Example 1:

## TECHNICAL SPECIFICATIONS:

**AWWA Standard** - Meets or exceeds all sections of AWWA Standard C-708, most recent revision;

**NSF/ANSI Standard 61** - Optional Standard 61 certified no - lead main case available.

**Register Sealing** - Direct read and DIALOG® registers are permanently sealed with a scratch resistant glass lens, stainless steel base and wrap-around gasket to prevent intrusion of dirt or moisture.

**Design/Operation** - Velocity-type flow measurement. Water that is evenly distributed by multiple converging inlet ports flows past an impeller in the measuring chamber, creating an impeller velocity directly proportional to water flow rate. The meter's register integrates that velocity into totalized flow. An inherent advantage for this design is unparalleled wear mitigation leading to sustained revenues. The register assembly is removable under line pressure permitting seamless, simplified upgrades in reading technology.

**Register Unit** - Registration available in U.S. gallons, cubic feet or cubic meters.

**Test Circle** - Large center sweep hand with one hundred (100) clearly marked gradations on the periphery of the dial face.

**Low Flow/Leak Indicator** - Center mounted indicator with high sensitivity resulting from direct one to one linkage to measuring element.

**Main Case** - Choice of waterworks bronze case of 81% copper composition, or, 86% copper, no lead bronze. All main cases incorporate externally threaded ends to aid installation.

**Measuring Chamber** - The measuring chamber housing and measurement element are built with an advanced synthetic polymer. This tough, non-hydrolyzing material ensures durable wear. The chamber design optimizes water flow, eliminating harsh turbulence for smooth, easy, operation that minimizes bearing wear.

Measurement surfaces are not wear surfaces, providing sustained accuracy despite the presence of entrained solids in the water. A long-life, synthetic sapphire bearing serves as a wear surface with radially balanced water flows. The chamber housing is constructed in two parts to allow access to the impeller.

**Strainer** - A rugged, 360-degree advance polymer basket strainer protects the critical measuring element from damage. The unique strainer design smoothes the flow of water entering into the meter creating a laminar flow that is gentle on the meter's internal components. Tough materials operating in a smooth, balanced environment enable the meters to perform more accurately over time. Utilities' investments last longer while capturing more revenue.

**Optional Bottom Plates** - Bronze, Cast Iron (CI), or Engineered Plastic.

**Magnetic Drive** - A reliable, direct magnetic drive provides linkage between measurement element and register. No intermediate gearing is required; no gearing is exposed to water.

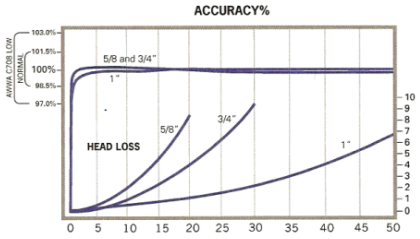
**Adjusting Port** - Sealed after factory calibration. Port is accessible for utility recalibration to compensate for inaccuracy in older meters without parts replacement.

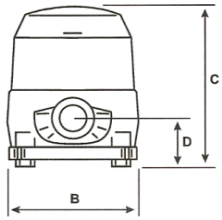
**Register** - Standard Direct Read, DIALOG 2G and DIALOG 3G AMR System registers are available. Six wheel odometers are standard. Together, an integrated and migratable technology environment is attained; direct, proximity (touch), mobile AMR, and Fixed Network AMI.

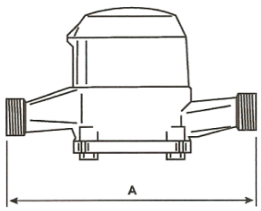
**Tamper Detection** - The Master Meter Multi-jet adjusting port and register are concealed to prevent tampering and removal of the register. This design also provides a visual indication of tampering attempts.

| METER OPERATING CHARACTERISTIC/DIMENSION | 5/8" | 3/4" x 7-1/2" | 3/4" x 9" | 3/4" x 9" x 1" | 1" |
|---|---|---|---|---|---|
| **Flow Rating** (gpm) | 20 | 30 | 30 | 30 | 50 |
| **Continuous Flow** (gpm) | 15 | 20 | 20 | 20 | 30 |
| **Normal Flow Range** (gpm) | 1-20 | 2-30 | 2-30 | 2-30 | 3-50 |
| **Extended Low Flow** (gpm) | 1/8 | 1/4 | 1/4 | 1/4 | 3/8 |
| **Maximum Working Pressure** (psi) | 150 | 150 | 150 | 150 | 150 |
| **Maximum Working Temperature** (F) | 120 | 120 | 120 | 120 | 120 |
| **Length** (A below) | 7-1/2" | 7-1/2" | 9" | 9" | 10-3/4" |
| **Width** (B below) | 3-5/8" | 3-5/8" | 3-5/8" | 3-5/8" | 4" |
| **Height, standard register with lid** (C below) | 5" | 5" | 5" | 5" | 5-1/4" |
| **Height, bottom to center line** (D below) | 1-1/2" | 1-1/2" | 1-1/2" | 1-1/2" | 1-3/4" |
| **Weight** (lbs) | 3.95 | 4.0 | 4.1 | 4.6 | 5.25 |
| **Packed To Carton** | 6 | 6 | 6 | 4 | 4 |
| **Carton Weight** (lbs) | 25.1 | 25.4 | 26 | 19.8 | 22.4 |

### ACCURACY AND HEAD LOSS CHART

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EXAMPLE 2:

1.5” and 2” Meters Require a Meter Box Size Equivalent To:

**J&R CONCRETE**
**6 B**
**With a reading lid**

## TECHNICAL SPECIFICATIONS:

**AWWA Standard** - Meets or exceeds all sections of Standard ANSI / AWWA C708, most recent revision for cold water multi-jet meters with AWWA bronze main cases.

**NSF/ANSI Standard 61** -Optional EnviroBrass unleaded main case available.

**Design/Operation** - Velocity - type flow measurement. Water that is evenly distributed by multiple converging inlet ports flows past an impeller in the measuring chamber, creating an impeller velocity directly proportional to water flow rate. The meter’s register integrates that velocity into totalized flow. An inherent advantage for this design is exceptionally low head loss for improved infrastructure efficiencies and unparalleled wear mitigation. The register assembly is removable under line pressure permitting seamless, simplified upgrades in reading technology.

**Main Case** - Choice of waterworks bronze case of 81% copper composition or EnviroBrass® II, 86% copper, unleaded bronze. Main case incorporates either compact externally threaded ends, or bolted flanged connections.

**Measuring Chamber** - The measuring chamber housing and measurement element are built with an advanced synthetic polymer. This tough, non-hydrolyzing material ensures durable wear. The chamber design optimizes water flow, eliminating harsh turbulence for smooth, easy, operation that minimizes bearing wear.

Measurement surfaces are not wear surfaces, providing sustained accuracy despite the presence of entrained solids in the water. A long-life, synthetic sapphire bearing serves as a wear surface. The chamber housing is constructed in two parts to allow access to the impeller.

**Magnetic Drive** - A reliable, direct magnetic drive provides linkage between measurement element and register. No intermediate gearing is required; no gearing is exposed to water.

**Register** - Standard Direct Read, DIALOG 2G and DIALOG 3G AMR System registers are available. Six wheel odometers are standard. Together, an integrated and migratable technology environment is attained; direct, proximity (wand), mobile AMR, and Fixed Network AMI.

**Register Sealing** - All Direct read and DIALOG® registers are IP-68 rated, permanently sealed with a scratch resistant glass lens, stainless steel base and wrap-around gasket to prevent intrusion of dirt or moisture.

**Register Units** - Registration available in either U.S. gallons, cubic feet or cubic meters.

**Test Circle** - Large center sweep hand with one hundred (100) clearly marked gradations on the periphery of the dial face.

**Magnetic Drive** - A reliable, direct magnetic drive provides linkage between measuring element and register so that no gearing is exposed to water.

**Test Circle** - Large center sweep hand with one hundred (100) clearly marked gradations near the periphery of the dial face.

**Low Flow/Leak Indicator** -Clearly visible leak indicator with high sensitivity resulting from direct one-to-one linkage to the measuring element.

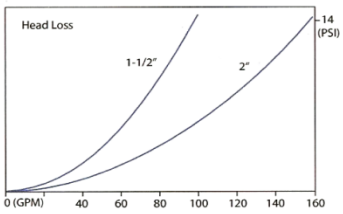
**Strainer** -A rugged, 360-degree polymer basket strainer protects the critical measuring element from damage.

**Adjusting Port Detection** -The Master Meter Multi-jet adjusting port is sealed after factory calibration to prevent tampering and provides a visual indication of tampering attempts. Port is accessible for utility recalibration to compensate for inaccuracy in older meters without parts replacement.

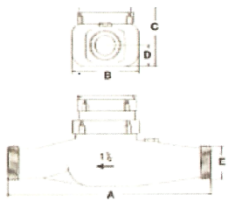
## MULTI-JET WATER METER (1-1/2” AND 2”)

| METER OPERATING CHARACTERISTIC / DIMENSION | 1-1/2" Threaded | 1-1/2" Flanged | 2" Threaded | 2" Flanged |
|---|---|---|---|---|
| Flow Rating (gpm) | 100 | 100 | 160 | 160 |
| Continuous Flow (gpm) | 75 | 75 | 120 | 120 |
| Normal Flow Range (gpm) | 5-100 | 5-100 | 8-160 | 8-160 |
| Low Flow (gpm) | 1-1/2 | 1-1/2 | 2 | 2 |
| Maximum Working Pressure (psi) | 150 | 150 | 150 | 150 |
| Maximum Working Temperature (°F) | 110 | 110 | 110 | 110 |
| Length (A below) | 12-5/8" | 13" | 15-1/4" | 17" |
| Width (B below) | 5-3/8" | 5-3/8" | 5-3/4" | 5-3/4" |
| Height, standard register with lid (C below) | 6-3/4" | 6-3/4" | 7-5/8" | 7-5/8" |
| Height with DIALOG register | 7-1/2" | 7-1/2" | 8-3/8" | 8-3/8" |
| Height, bottom to center line (D below) | 1-3/4" | 1-3/4" | 2-3/4" | 2-3/4" |
| Meter Casing Spuds, Nominal Threadsize* (E below) | 2" | N/A | 2-1/2" | N/A |
| Weight (lbs) | 11 | 12 | 20 | 24 |
| Packed to Carton | 1 | 1 | 1 | 1 |
| Carton Weight (lbs) | 12 | 14 | 22 | 26 |

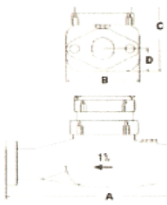
### HEAD LOSS CURVES



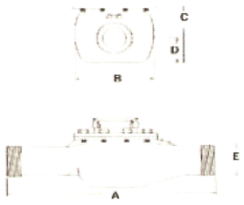

1-1/2 Threaded-End Multi-Jet



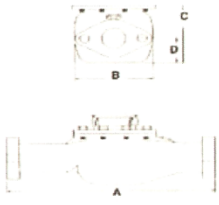

1-1/2 Flanged-End Multi-Jet




2” Threaded-End Multi-Jet




2” Flanged-End Multi-Jet

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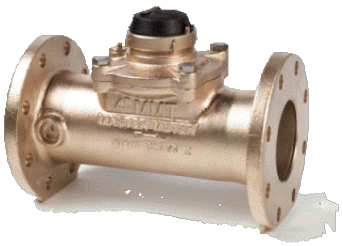
EXAMPLE: 3



## TECHNICAL SPECIFICATIONS:

**AWWA Standard** - Meets or exceeds all sections of Standard ANSI/AWWA C701 Class II, most recent revision for cold water turbine meters with AWWA bronze main cases.

**NSF/ANSI Standard 61** - Optional EnviroBrass or equivalent unleaded main case available.

**Design/Operation** - Velocity-type flow measurement. Water that is conditioned by an integral flow conditioning section flows past a rotor in the measuring chamber creating an impeller velocity directly proportional to water flow rate. The meter's register integrates that velocity into totalized flow. An inherent advantage for this design is exceptionally low head loss for improved infrastructure efficiencies and unparalleled wear mitigation. The register assembly is removable under line pressure permitting seamless, simplified upgrades in reading technology.

**Main Case** - 1.5" - 8" constructed of choice of waterworks bronze main case of 81% copper composition, or, 86% copper, unleaded bronze, either material choice are available with flanged ends. Bronze register retainers and lid are standard. A downstream test plug is provided to allow field testing without removal of the assembly from the line.

**Measuring Chamber** - The measuring chamber assembly and turbine are built with an advanced synthetic polymer for long service life. This tough, non-hydrolyzing material ensures durable wear. The chamber design optimizes water flow, eliminating harsh turbulence for smooth, easy, operation that minimizes bearing wear. Measurement surfaces are not wear surfaces, providing sustained accuracy despite the presence of entrained solids in the water. A long-life, carbide thrust bearing serves as a wear surface.

**Magnetic Drive** - A reliable, direct magnetic drive provides linkage between measurement element and register. No intermediate gearing is required; no gearing is exposed to water.

**Register** - Standard Direct Read, DIALOG 2G and DIALOG 3G AMR System registers are available. Six wheel odometers are standard. Together, an integrated and migratable technology environment is attained; direct, proximity (wand), mobile AMR, and Fixed Network AMI.

**Register Sealing** - All Direct read and DIALOG® registers are IP-68 rated, permanently sealed with a scratch resistant glass lens, stainless steel base and wrap-around gasket to prevent intrusion of dirt or moisture.

**Register Units** - Registration available in either U.S. gallons, cubic feet or cubic meters.

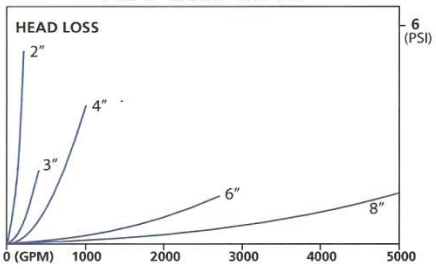
**Test Circle** - Large center sweep hand with one hundred (100) clearly marked gradations on the periphery of the dial face.

**Low Flow/Leak Indicator** - Center mounted indicator with high sensitivity resulting from direct one-to-one linkage to the measuring element.

## TURBINE METERS (2" TO 8")

| METER OPERATING CHARACTERISTIC/DIMENSION | 2" | 3" | 4" | 6" | 8" |
|---|---|---|---|---|---|
| Normal Operating Range [±1-1/2%] (gpm) | 4-350 | 5-530 | 9-1350 | 25-2700 | 35-3500 |
| Continuous Operating Range (gpm) | 4-200 | 5-400 | 9-1000 | 25-2300 | 35-2700 |
| Low Flow [95%] (gpm) | 3 | 4 | 8 | 20 | 27 |
| Maximum Intermittent Flow (gpm) | 350 | 530 | 1350 | 2700 | 3500 |
| Maximum Working Pressure (psi) | 175 | 175 | 175 | 175 | 175 |
| Maximum Working Temperature (°F) | 150 | 150 | 150 | 150 | 150 |
| Length | 10" | 12" | 14" | 18" | 20" |
| Height | 6.8" | 9.4" | 10.0" | 12.4" | 13.0" |
| Height, bottom to center line | 2.2" | 3.7" | 4.4" | 5.5" | 6.0" |
| Width | 5.9" | 7.5" | 8.9" | 11.1" | 13.6" |
| Weight (lbs) | 24 | 37 | 42 | 108 | 140 |
| Packed to Carton | 1 | 1 | 1 | 1 | 1 |
| Carton Weight (lbs) | 26 | 39 | 44 | | |
| Register Capacity [millions] (U.S. Gallons) | 100 | 100 | 1000 | 1000 | 10000 |
| Register Capacity [millions] (Cubic Feet) | 10 | 10 | 100 | 100 | 1000 |
| Maincase Material | Bronze | Bronze | Bronze | Bronze | Bronze |
| Flanges/End Connections | Eliptical | Round | Round | Round | Round |

### HEAD LOSS CHART

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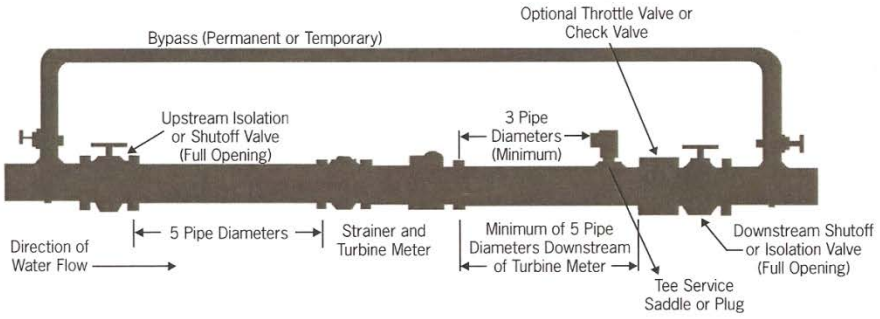
575100-8-08

EXAMPLE: 4

## STRAINERS - BRONZE & EPOXY COATED CAST IRON 2" - 12"

| METER OPERATING CHARACTERISTIC/DIMENSION | 2" | 3" | 4" | 6" | 8" | 10" | 12" |
|---|---|---|---|---|---|---|---|
| Length, without gaskets | 7" | 6" | 7.5" | 9" | 10" | 10" | 12" |
| Height | 5.2" | 7.4" | 8.8" | 10.8" | 14.1" | 16.5" | 19.5" |
| Height, bottom to center line | 2" | 3.5" | 4.3" | 5.5" | 6.875" | 8" | 9.5" |
| Weight (lbs.) | 11 | 25 | 38 | 64 | 118 | 90 | 120 |
| Body Material | Bronze | Bronze | Bronze | Bronze | Cast Iron | Cast Iron | Cast Iron |
| Flanges | Elliptical | Round | Round | Round | Round | Round | Round |
| Bolt Holes | 2 | 4 | 8 | 8 | 8 | 12 | 12 |

* Call to verify exact length prior to order

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## TRACT METER SET PROCEDURE

AFTER PIPELINES, FIRE HYDRANTS, AND SERVICES ARE INSTALLED TO CURB STOP, INSPECTED AND TESTED, THE DEVELOPERS SHALL PAY ALL FEES AND MUST HAVE ENOUGH RIVERSIDE HIGHLAND WATER COMPANY STOCK FOR EACH UNIT OR METER WITHIN THAT PROJECT.

THE CONTRACTOR SHALL PROVIDE BOXES AND INSTALL THEM WITHIN THE PROJECT. AFTER RIVERSIDE HIGHLAND WATER COMPANY HAS INSPECTED THE METER/BOX INSTALLATION, RIVERSIDE HIGHLAND WATER COMPNAY WILL INSTALL THE METER(S) AND RECORD METER NUMBERS, LOT NUMBERS, AND ADDRESSES. THE DEVELOPER MAY USE WATER THROUGH THESE METERS FOR CONSTRUCTION USE. THE DEVELOPER WILL PAY FOR ALL WATER THAT PASSES THROUGH THE METER(S), NO METER CHARGE.

THE WATER COMPANY WILL SET UP AN ACCOUNT NUMBER TO BILL ASSESMENT ON THE SHARES OF STOCK. AN ACCOUNT NUMBER WILL BE SER UP FOR EACH METER. WHEN ANY UNIT OS OCCUPIED, SOLDE, OR USED AS A MODEL THE PROPER AMOUNT OF STOCK WILL BE TRANSFRERED TO THAT ACCOUNT. THE AACOUNT WILL THEN BE CHARGED FOR ASSESMENT, METER CHARGE, AND WATER CONSUMPTION.

**RIVERSIDE HIGHLAND WATER COMPANY**

**STANDARDS FOR**

**DOMESTIC AND NON-POTABLE WATER FACILITIES**

## INTRODUCTION

To maintain integrity of the Company's water system and to assure proper and efficient water delivery the customer in years to come, all facilities installed in the **Riverside Highland Water Company** service area must be installed to meet certain minimum standards.

The establishment of minimum standards makes Developers, Contractors, Engineers, as well as Company personnel, aware of what is expected for the installation or construction of all water facilities in the Company's water system.

The "STANDARDS FOR DOMESTIC AND NON_POTABLE WATER FACILITIES" establishes the minimum requirements for the design and construction of all water facilities installed in the Company's service area.

Upon review of each project, certain circumstances may require the installation of facilities, which will meet more rigid specifications then than those included in these standards.

The Company operates two separate and distinct water systems. One is the domestic water system, which conveys drinking water and fire suppression water to customers. The second is the non-potable water system, which conveys water, which is non-potable but does not contain recycled water from wastewater treatment facilities. This non-potable water is delivered to customers for irrigation and industrial uses, which replaces potable water, where non-potable water facilities are available.

# RIVERSIDE HIGHLAND WATER COMPANY

# DESIGN CRITERIA

# DOMESTIC WATER SYSTEM

## 1.01 GENERAL

The domestic water system shall be designed to provide adequate water service during the peak hour of the maximum day during the maximum day plus fire suppression flows. The design locations of minimum service will be the most remote and highest elevation in the prespective pressure zone. To establish this level of service, the following criteria are used.

## 1.02 WATER REQUIREMENTS

- Average daily water requirement per person — 175 Gallons
- Average daily water requirement per commercial area — 4,000 Gallons per gross acre
- Maximum day of maximum month demand — 2.0 x average day
- Peak hour of maximum day — 4.0 x average day
- Equivalent Dwelling unit (EDU) — One single family unit
- Occupancy per EDU — 3.0 people
- Water source supply — 1.33 times the maximum day

## 1.03 WATER STORAGE REQUIREMENTS (RESERVOIR SIZING)

Reservoirs will be designed to contain water to meet the fire flows and other domestic water requirements in each independent pressure zone.

- Equalization storage — 0.40 x maximum day
- Emergency storage — 1.0 x average day
- Fire flow-Residential (minimum) — 1,500 gpm for 2-hours
- Fire flow-commercial (minimum) — 2,500 gpm for 3-hours

Note: Fire flow shall be the larger of the above or that quantity required by the local fire chief or County Fire Marshall.

Storage reservoirs shall be either reinforced concrete or welded steel construction. Design on welded steel water reservoirs shall conform to AWWA Standard D-100. Appurtenances shall, As a minimum, include two (2) wall access hatches, gauge board, overflow and drain pipe, proper ventilation, roof hatch, inside stainless steel ladder with safety climbs on outside ladder with safety cage and anti-climb devices, hose bibs and paint/coatings in conformance with all Federal, State, Local and Company requirements.

The design shall also include, but not limited to, containment, berm, drainage, and aesthetics. No landscaping will be maintained by Company.

Storage facilities shall be located upon land to which legal access is provided and for which a Title in fee's granted and recorded for the reservoir. Access roads shall be granted by easement. Access road and reservoir site shall be paved and the site protected by a block wall with proper gating.

## 1.04 **WATER SUPPLY**

The water supply system shall be designed as a multi-source system, capable of handling peak daily demands, with the largest source of supply not in operation.

Wells shall be housed in a structure of which Company has a standard design which shall be followed. Provisions within this structure shall be made to facilitate removal of pumps, motors and other equipment. Wells shall be located upon land to which is conveyed to Company in fee and legal access shall be provided in the name of Company. Vertical turbine pumps shall meet the standards set forth in AWWA Standard E-101. The minimum size well site shall be 100 feet by 100 feet and shall have asphalt surfacing.

## 1.05 **BOOSTER STATIONS**

Booster stations shall be located in areas accessible to both Company personnel and equipment. Legal access shall be provided and for which a permanent easement or title is recorded. Access road and booster station site shall be paved with asphalt.

Booster stations shall be designed with a minimum of two (2) pumps. In systems where pumps shall meet instantaneous peak demands, without supplementary flows from storage, the pump capacity shall be based on peak hour demands with the largest capacity pump out of service. In systems with adequate available flows from storage to supplement pumping, pump capacity shall be based on maximum day demand with the largest capacity pump out of service. Protection shall be provided to prevent pumps from operating under no-flow conditions, over-pumping, and overloading by means of automatic controls. Vertical turbine pumps shall meet or exceed the standards set forth by AWWA Standard E-101.

Booster pumps shall be housed in a weather-tight structure, of which Company has a standard design. Provisions within this structure shall be made to facilitate removing of pumps, motors and other equipment.

## 1.06 PIPELINES

The minimum sized pipeline within the domestic water system shall be eight inches (8") inside diameter. The minimum pressure class shall be 150 pounds per square inch (psi) as determined by AWWA Standards for domestic water service.

Water mains to be installed shall be 8", 12", 16", 18", 20", and 24". 6" diameter pipe may be used when no fire hydrants are connected to the main and only with the written approval of the Company.

Maximum velocity in a pipeline during a peak hour period shall be five (5) feet per second. When fire flow occurs during the maximum day, the maximum velocity shall be ten (10) feet per second, with a residual pressure of twenty (20) psi during fire flow conditions. Capacity of water mains shall be determined by using the Williams & Hazen Formula with a "C" value of 120.

## OPERATING PRESSURE

The maximum pressure within the pressure system shall be 131 psi and the minimum pressure shall be 45 psi during peak hour flows.

## DEPTH OF COVER

A minimum depth of cover is required from top of the pipe to the proposed finished grade. If sub-grade base is required, the cut for the base shall be added to the minimum cover. Minimum cover for pipelines shall be as follows: pipelines up to 8 inches in diameter shall have a 36 inch cover; 12 inch and larger pipelines shall have a 42 inch cover. Sub-grade on pipelines is to be maintained on pipelines at all times.

## LOCATION AND ALIGNMENT

Whenever possible, domestic water mains shall be located in public streets parallel to street centerlines. On a typical road section the main shall be located 6 feet off curb face on the south or west side of the street. Non-potable water mains shall be located 5 feet minimum from the domestic water main and five feet from the sewer main.

## CLEARANCE FROM SEWER LINES

A minimum horizontal clear distance of 10 feet shall be provided between domestic water mains and sewer lines. A minimum vertical distance of 1 foot shall be provided with the sewer under the domestic water line. Water service laterals shall be a minimum of 5 feet from the sewer lateral horizontally and 1 foot minimum above sewer laterals. If the above conditions can not be met, special construction shall be required and approved by Riverside Highland Water Company.

## WATER MAINS UNDER STRUCTURES

No water mains shall be located beneath a structure.

## LOOPED LINES AND FLUSHOUTS

All water mains shall be looped. Where dead-ends are necessary or temporary, provisions for flushing shall be included. Maximum length of dead-end lines shall be limited to 660 feet. Approval will be required from RHWCO to deviate from these Standards. No flushing device shall be connected directly to a sewer. Flush-out assembly and size required to be determined by Riverside Highland Water Company.

Fire hydrants may be used for flush-out, where applicable, and upon approval by RHWCO

## VALVES

Provide sufficient valves to permit isolation and repair of leaks and breaks in accordance with good water works practice. Provide at least two (2) valves at each 3-way junction and at least (4) valves at a 4-way junction. For transmission lines, no length of pipe greater than 1,000 feet or as required by Company shall be left without valve control. A valve box shall be provided for all valves below grade and shall conform to Riverside Highland Water Company Standards. Control valves shall be Resident wedge gate valve unless noted otherwise on approved plans, 16 inch and larger shall be butterfly valves.

## FIRE HYDRANTS

Fire hydrants shall be a minimum 6” diameter and spaced along domestic distribution mains at 300’ intervals:

Spacing of fire hydrants shall not exceed the above maximum distances, but fire hydrants may be spaced at closer intervals in conformance with requirements of local fire control authorities. Fire hydrant installation assemblies shall conform to Riverside Highland Water Company Standards.

## SERVICE CONNECTIONS

Service Connections assemblies shall conform to Riverside Highland Water Company Standards herein. Service Laterals shall be sized to limit water flow to a maximum velocity to 5 feet per second.

Water Meters and Service Connections shall be sized in accordance with AWWA Standards C-700 and C-701 and the following table:

| Meter Size | Max Operational Flow | Meter Size | Max Operational Flow |
|---|---|---|---|
| 3/4" | 30 GPM | 4" | 600 GPM |
| 1" | 50 GPM | 6" | 1,000 GPM |
| 1 1/2" | 100 GPM | 8" | 1,600 GPM |
| 2" | 160 GPM | 10" | 2,300 GPM |
| 3" | 320 GPM | 12" | 3,000 GPM |

## BACKFLOW PREVENTERS

Backflow Preventers shall be installed in accordance with California Health and Safety Code Chapter 5, Article 2 and shall be sized in accordance with AWWA Standards C-510 and 511 and the following table:

| Backflow Size | Max Operational Flow | Backflow Size | Max Operational Flow |
|---|---|---|---|
| 3/4" | 30 GPM | 4" | 600 GPM |
| 1" | 50 GPM | 6" | 1,000 GPM |
| 1 1/2" | 100 GPM | 8" | 1,600 GPM |
| 2" | 160 GPM | 10" | 2,300 GPM |
| 3" | 320 GPM | 12" | 3,000 GPM |

## AIR AND VACUUM VALVES

Air and vacuum combination valves shall be installed in pump line, transmission and distribution lines in according to accepted practices in the water distribution field. Air and Vacuum Combination Valves shall be provided at all high points in the water main system.

Air and Vacuum Valve Assemblies shall conform to Riverside Highland Water Company Standards.

## BLOW-OFFS

Blow-off assemblies shall be required at all low points in the transmission and distribution system pipelines, except at dead ends where flush-out is provided. Blow-off assemblies shall conform to Riverside Highland Water Company Standards herein.

## THRUST BLOCKS

Concrete thrust blocks shall be installed as required, according to Riverside Highland Water Company Standards.

## LOCATION WIRE

A continuous 14 gauge coated wire shall be placed along the full length of all non-metallic water mains. The locater wire shall be solid copper. The locator wire shall be affixed to the top of the pipe at 10 foot intervals and brought to the surface at each valve box cover. Wire shall be laid on all mains, laterals and services. (Disregard if the service is metallic). All locator wires shall be inter-connected and corrosion protected E joints.

## 1.07 ELECTRICAL EQUIPMENT

All electrical starters, switches, lights, motors, fixtures, controllers, and instruments shall be enclosed and constructed in accordance with the National Board of Fire Underwriters Specifications to meet the hazardous conditions anticipated. All Federal, State, and Local Fire Codes shall also be met. Outside type convenience outlets shall have ground fault with a separate circuit breaker and weather proof cover.

All starters shall be of the magnetic type and be provided with hand-off automatic selector switches. Only copper wire conductors shall be permitted. Starters for motors 50 horsepower and larger shall be soft start.

Company will specify equipment to be used to compliment that existing in the system.

## 1.08 AUTOMATIC CONTROLS

Wells, booster stations, storage facilities, and security devices shall be connected to the Company SCADA System. All facilities shall be electronically inter-connected to give the system automatic control. Provisions shall be made for manual control in the event of failure of automatic controls. All automatic controls shall be designated fail safe.

All automatic control valves shall be designed and integrated into the Company SCADA System.

## 1.09 MISCELLANEOUS REQUIREMENTS

### PUMP DISCHARGE LINES

A gate valve, check valve, and a flow meter shall be placed on the discharge line of each pump. Flow meters shall be installed with upstream and downstream straight sections per meter manufacturer's recommendations.

### GATE VALVES

Sufficient valves shall be provided to isolate each pump from the system.

### AIR RELEASE VALVE

An air release valve shall be installed with each pump and check valve.

## 1.10 PLAN PREPERATION AND PLAN CHECK

Plans prepared for additions to the Company's water system and submitted to the Company for approval shall be in substantial form and shall be in accordance with the following requirements:

- Final as built.
- Drawings shall be in ink on Mylar. Sheet size shall be 24 inches by 36 inches.
- The water notes shall appear once on the first sheet of the plans. All required Certifications and approvals shall appear on the first sheet.
- Each sheet shall have a title and revision block in the lower right hand corner.
- Each sheet shall have a north arrow, when applicable.
- A key map having a scale of one inch equals 200 feet shall be shown on the first sheet of each set of drawings. Said key map shall show all water mains, their sizes, gate valves, fire hydrants, and appurtenances in their scaled relation to one another. All roads shall be shown and named.
- Plan and profiles are required for all pipelines. Double plan and profile sheets may be used. Scales to be used are as follows:

| | |
|---|---|
| Plan and Profile: (Mild Grades) | 1-inch = 40 feet horizontal<br>1-inch = 4 feet vertical |
| Plan and Profile: (Steep Grades) | 1-inch =100 feet horizontal<br>1-inch =10 feet vertical |

Profiles shall show pipe size, pressure class of pipe, existing ground elevation and finish grade, appurtenances, the depth, size and location of other utilities which cross over or under the water line, the location and nature of special construction such as concrete blankets or encasements, flow line elevations at grade changes and any other pertinent items necessary to the proper construction and recordation of the water lines.

- At least one bench mark shall be shown and/or described on each sheet. The indicated elevation shall be referenced to an U.S.G.S. datum.
- The plans shall show the tract legal description and lot numbers of all property adjacent to the water line to be constructed.
- The plans shall show all right-of-way lines, the distance from the centerline of all roads, right-of-way and easements to the center of the water line and other distances necessary to easements.
- Show limits and type of street pavement, curb, gutter, and sidewalk.
- Show location of proposed service connections.
- Show exact location of all existing or proposed utilities and structures within 20 feet of the water line centerline.
- The technical Specifications and Standard Drawings shall be utilized in design of water facilities.
- When a tract is to be phased, water plans shall indicate the limit of each phasing and the location of bulkhead test station and temporary blow-off assembly.
- Blue line drawings submitted for Company review shall be submitted in accordance woth "Plan Check Requirements".
- After plans are approved by Company, Changes to the plans shall NOT be made without the approval of the Company.
- If the construction has not been commenced within one (1) year of the Company approval date, the water improvement plan shall be resubmitted to the Company for review and approval.

**WATER NOTES**

The following water notes shall appear on all water system improvement plans:

**WATER PLAN NOTES**

1. Pipe 12 inches and larger in diameter shall be CMCL 10 gauge. Pipe less than 12 inches in diameter shall be DR14 C900 PVC, unless otherwise noted on plan.
2. Water service laterals shall be minimum one inch (1") in diameter Municipex. There shall be a separate service for each lot being served and one service line per trench. All fittings on copper tubing shall be of the pack joint compression type.
3. All water service water lateral lines shall be installed at the same time the main line is installed. No splice shall be allowed on service lateral lines.
4. Water service laterals are to be terminated 6" behind the rear of curb or future curb, and at a depth of 6"-8" below top of curb to top of angle meter stop.

5. Fire hydrants shall be 6" for residential and commercial. Fire hydrants shall be Mueller or Clow. Fire hydrant spacing shall be specified herein or the requirements of the fire marshal's office or the office having jurisdiction. All 4" Steamer nozzles shall be perpendicular to the curb.
6. Depth of cover for service laterals shall be minimum 30", Max 36". Water lateral depth may change with the variation shown on the approved plans.
7. All water mains shall be flushed and disinfected in accordance with AWWA Standard C-651 prior to use and after repair.
8. All construction shall be in accordance with riverside Highland Water Company Standards for Potable and Non-Potable Water Facilities.
9. Water service is subject to the Rules and Regulations of Riverside Highland Water Company at the time service is requested.
10. No water mains shall be installed prior to the curb and gutters, sewer or storm drains or any other facility which will be below the Water Main until the lower facilities are installed and approved.
11. If construction has not commenced within one (1) year of the Company approval date, the plan shall be resubmitted to the Company for review and approval.

**CERTIFICATION:**

The following Certification shall appear on the Water System Improvement Plans:

**DESIGN**

This certifies that these plans and specifications have been designed under the direct supervision of a Civil Engineer, licensed in the state of California and are in accordance with Title 22, Code of Regulations, Chapter 16, California waterworks Standards of the State of California.

| Signature of Designing Engineer | RCE No. and Expiration Date | Date |
|---|---|---|

## WATER COMPANY APPROVAL

This certifies that these plans and specifications have been revised by and are accepted by the Riverside Highland Water Company and that this Company is willing and able to supply water to this location.

| Signature | Title | Date |
|---|---|---|

## FIRE PROTECTION SYSTEM APPROVAL

Fire Protection System Approved _____

Date

By: _____

Signature of Fire Chief, or County Fire Warden, or Fire Chief of Local District

### PLAN CHECK REQUIREMENTS:

The water system improvements shall be designed and constructed in accordance with "Riverside Highland Water Company, Standard for Domestic and Non-Potable Water Facilities". The water improvement plans shall be prepared under the direction of a Civil Engineer licensed in the state of California. The water service improvement plan shall be submitted to the company for review and approval.

- **CONTACTCS:** The initial contact regarding extension of Riverside Highland Water Company facilities shall be made with the General Manager. The General Manager may direct the applicant to others for processing, as he may desire. The applicant shall provide a tentative map and or other documents so the project can be located and the type of service to be furnished such as residential, commercial, industrial, agricultural, domestic, and/or non-potable. From this, water demands can be calculated. The names of applicant, owner, engineer and others as required shall be provided to Company.

- **PLANNING:** On smaller developments such as a 10 acre residential subdivision, or a single commercial structure, RHWC will size the pipelines and locate fire hydrants for the development. The data will be given to the applicants engineerfor incorporation into formal plans and specifications. The plans shall be prepared under the direction of a registered civil engineer in the state of California. The plans will be checked by RHWC for conformance with these standards.

- **FEES:** An estimate for fee schedule for plan checking and inspection will be developed by RHWC and provided to the applicant. Where special studies are required, RHWC may hire outside consultants. Applicant shall fund an account with RHWC to pay for these functions. Applicant shall maintain this fund to a level determined by RHWC until the project is complete. Any remaining funds will be refunded to applicant.

- **PROCESSING SCHEDULE:** RHWC staff will review all construction drawings and may revise, modify or require redesign of any concepts, drawings, or details submitted. All concepts must be approved by RHWC. Construction must begin within (1) year of date of approval by RHWC of the improvement plans. If one (1) year has elapsed the project must go through plan check procedure again before starting construction. The steps required to obtain construction drawing approval are as follows:

  **1.** Attend pre-design meeting with RHWC to determine requirements for the project.

  **2.** Submit monies to fund the plan checking and special studies as determined by RHWC.

  **3.** Submit two (2) copies of the water facilities improvement plans for checking. Include any easement description as required and schedule for procurement of any licenses or permits required for the project.

  **4.** Submit any construction plans for approval when notified by RHWC. This shall include any easements or permits or licenses required.

  **5.** Upon approval and signature by RHWC, provide RHWC three sets of blue-line drawings for inspection.

  **6.** Upon completion of construction and construction has been approved by RHWC, submit as-built plans signed as "As-Built" by the design engineer. The submittal shall include notices approval from any permitter or licensor of the construction within their jurisdiction.

**NOTE: There may be additional plan checks as necessary to meet the Standards of RHWC and obtain approval.**

- **PROCESSING SCHEDULE DETAILS:** Each step of the processing schedule is detailed below:

1. Pre-Design meeting. At this meeting the applicant or his engineer shall provide to RHWC, three (3) copies of the Tentative Tract map, street improvement plans, grading plans, storm drain plans, if applicable, sewer plans and any other plans or documents as determined by RHWC.

2. RHWC will notify applicant of the amount of monies required to be deposited for which RHWC can withdraw funds to pay for plan checking, special studies and the like. Applicant shall deposit the amount notified prior to any plan check or other items commenced.

3. Submit two ()2) sets of blue-line drawings of the water facilities improvement plans for checking. Include with this submittal copies of all easement descriptions and a schedule for obtaining any easements or licenses from others which are required for the installation of the water system improvements. Also, include any special design for facilities not covered herein. This process will be repeated as necessary for the improvement plan to be acceptable for RHWC. A completed copy of the "Plan Check Information Sheet" shall be submitted at this time. If any items changes on this sheet, a new sheet shall be provided to RHWC with revised information.

4. Submit original construction plans to RHWC for approvals when notified by RHWC. To accompany the original drawings shall be the easement documents, prepared on RHWC forms along with a final title report, Title Insurance in the amount determined by RHWC and all to be in recordable form. No easements shown on the Final Tact Map will be accepted by RHWC. Easements shall be recorded prior to the Final Tract Map. At this time, a "Dedication of Facilities" document shall be signed by the owner of record and notarized.

5. Upon completion of construction and it has been approved by RHWC, submit "As-Built" plans signed by the design or construction engineer as being in full compliance with the plans and specifications. The owner of record shall file a "Release of Lien" with RHWC showing all construction labor and materials have been paid for. The release of lien and Dedication of facilities will be recorded in the county which the construction takes place. Approvals of the construction within any right-of-way from which easements or licenses have been obtained, shall be obtained in written form from the appropriate company or agency and filed with RHWC prior to the furnishing of water to the area where the improvements have been made.

## RIVERSIDE HIGHLAND WATER COMPANY

## PLAN CHECK INFORMATION SHEET

To Plan Check Applicant:

This Plan Check Information Sheet must be filled out and submitted with first plan check. If any information in this sheet has been changed, applicant shall revise the sheet accordingly and file it with RHWC. Plan Check will be in accordance with the Plan Check Requirements.

Date of Application: _____

Project Name: _____

Project Location/Address: City: _____

County: _____

Tract No. _____ or Parcel Map No. _____

Owner Name: _____ Telephone Number: _____

Owner Address: _____

Engineering Company: _____

Contact Person: _____

Estimated Water Demand: Peak Hour Domestic Demand _____ GPM

Fire Flow _____ GPM for _____ Hours

Fire Sprinkle Flow _____ GPM at _____ PSI

Landscaping Flow _____ GPM at _____ PSI

Non-Potable Water Maximum Day _____ GPD

# DAILY CONSTRUCTION REPORT

Project_____ Weather_____

P. O. No. _____ Prior Report Date_____

Contractor_____ This Report Date_____

Visitors_____

Equipment at Site:

_____ _____ _____

_____ _____ _____

_____ _____ _____

Field Forces: Number _____

Names:

_____ _____ _____

_____ _____ _____

_____ _____ _____

Daily Job Progress: Station_____To Station_____

Construction
Activity_____

_____

_____

_____

_____

_____

_____

_____

_____

Problems
Encountered_____

_____

_____

_____

_____

C/O number if Necessary:_____

Inspector:_____

Project Manager:_____

# CHANGE ORDER

PROJECT TITLE_____C/O NO:_____

G.L.NO:_____ P/O NO:_____ CONTRACT DATE:_____

CONTRACTOR_____

**The following changes are hereby made to the Contract Document:** _____

**Justification:** _____

Original Contract Price: $____.__

The Contract Price, as adjusted by previous Change Orders: $_____.__

The Contract Price due to Change Order will be
(increased) / (decreased) by: $_____.__

The NEW Contract Price due to this Change Order will be: $_____.__

**Change to Contract Time:**

The Contract Time will be (increased) / (decreased) by _____
The DATE for completion of all work under the Contract will be ____

**Approval Required:**

To be effective, this order must be approved by the owner if it changes the scope or objective of the project, or as may otherwise be required under the term of the Supplementary General Conditions of the Contract.

Requested by: _____ Date: _____

Recommended by:_____ Date: _____

Ordered by: _____ Date: _____

Accepted by: _____ Date: _____

PAYMENT RELEASE

RELEASE NUMBER_____DATE_____

PAY TO_____

ADDRESS_____

DESCRIPTION OF MATERIALS AND/OR LABOR FURNISHED:

INVOICE NUMBER_____AMOUNT_____

_____

TOTAL OF THIS PAYMENT:_____

RELEASE OF LIEN

To introduce RIVERSIDE HIGHLAND WATER COMPANY as owner to make the payment as required, the undersigned agrees and warrants as follows: (a) any payment issued on this release shall constitute payment in full to the extent set forth in the release; (b) the labor and/or materials covered by this release have been furnished and performed; (c) any and all mechanics' lien laws of the State of California, and related and similarlaws, are hereby released and waived to the extent of this release; and (d) all supplies to the undersigned have been paid in full for the goods and/or services included within the release.

INSTRUCTIONS

This liem release must be signed by all persons performing labor or furnishing materials described above. Firm name must be shown and signatures by Principals of Officers only.

CONTRACTOR:_____

BY:_____

SUB-CONTRACTOR:_____

BY:_____

MATERIAL SUPPLIERS:_____

BY:_____

LABORERS:_____

_____

_____

_____

_____