

South Camden Water Distribution System  
Specifications  
04-15-015



**South Camden Water Distribution System**  
**Partial List of Approved Parts, Materials and Installation Requirements (Not All Inclusive)**

1. Saddles will be single strap brass with CC threads.
2. Corporation stops will be brass with CC thread to  $\frac{3}{4}$ " CTS.
3. Meter setters will be copper, with lockable cutoff ball valve, approved double check valve,  $\frac{3}{4}$ " CTS pack joint inlet side and dual purpose outlet.
4. Meters will be Hersey HV0G0202 5/8 x 3/4 (subdivisions: V0G0215 positive displacement). If a 1" service is required the meter and accessories will be Hersey 1" meter model VOKO201, US Gallon, and 1" Setter Model AYN 24412, WDTD44, 1" x 1" x 12", Ball Valve x Dual Check Valve, and Carson Meter Box 12201133.
5. Meter boxes will be standard plastic with cast iron reader lid.
6. Service lines will be  $\frac{3}{4}$  CTS tubing 200 psi, SDR-9.
7. All water lines will be class 200 PVC, SDR-21 gasketed bell and spigot pipe.
8. All street or road crossing with water lines 2 inches and larger will be encased class 200 PVC, SDR-21 pipe or restrained joint ductile iron pipe.
9. All tees will have at least two valves.
10. All valves will be electroplated resilient wedge.
11. All valve locations must be marked with a concrete valve marker with a metal coin on top showing valve size, distance and direction.
12. Hydrant valves will be bolted to a hydrant tee wherever possible.
13. Fire hydrants will be American Darling model MK-73 with 4.5 inch steamer port and two 2.5 inch nozzles and a minimum bury depth of 3.5 feet. **No substitutions permitted.**
14. Subdivisions must supply the water department with a new 5/8 x  $\frac{3}{4}$  positive displacement meter for each lot in the subdivision prior to any lot in the subdivision being supplied water.
15. Pre-approval by the water superintendent is required for materials to be used.
16. All changes in piping direction require restraint.

# SPECIFICATIONS FOR SOUTH CAMDEN WATER TRANSMISSION AND DISTRIBUTION SYSTEM

## Part 1 - GENERAL

### 1.01 DESCRIPTION

#### A. Work Included

1. This section encompasses all work required for all water transmission and distribution systems. Contractor is to install all services shown on the drawings up to and including the meter setter and box. The meters shall be purchased and delivered to the South Camden Water Department, 103 Water Plant Drive, North Carolina.

#### B. Method of Measurement and Basis of Payment

1. A complete, fully functional and satisfactorily tested water line shall be considered incidental to lump sum price.

### 1.02. SUBMITTALS:

Shop drawings must be submitted for valves, hydrants, saddles, corporation stops, meter setter, and valve and meter boxes. Manufacturer's certifications must be submitted for pipe and fittings. Contractor must report to project engineer and deviations from contractor proposed procedures for establishing witness post, flushing pressure and leakage testing and chlorination must also be submitted to project engineer for approval. The project engineer will obtain the water superintendent's approval prior to authorizing and changes.

### 1.03 JOB CONDITIONS

A. Contractor must prearrange with engineer and South Camden Water Department prior to interrupting water service to any user.

B. Service lines to be installed at time of installation of main.

C. Maximum open length of trench shall be 400 feet.

D. Construction sites to be cleaned up immediately following back filling.

## Part 2 - MATERIALS

### A. PIPE

1. Ductile iron: ANSI A21.50 and ANSI A21.51; Class 50.
2. PVC: SDR 21, 200 psi. NSF approved for potable water with push on joints.
3. Service Tubing: Plastic: ¾ " HDPE Tubing, 200 psi.

### B. JOINTS

1. Ductile iron pipe and fittings: ANSI A21.11.
2. PVC: Gasketed, push on C-111/A21.11.
3. Service tubing and fittings: Plastic – compression with stainless steel or plastic stiffener.
4. Flanged joints shall be a minimum Class 250 and 125 pound American Standard flanges.

### C. FITTINGS

1. Cast iron: ANSI A21.10, 250 psi working pressure through 12 inches and 150 psi above.

### D. VALVES

1. All valves shall be rubber encapsulated resilient wedge. American Flow Control 2500 series or approved equal.
2. Boxes: 3 section cast iron with lid marked WATER
  - a. Upper section: Screw on adjoining center section and full diameter throughout.
  - b. Center section: Minimum 5 inch inside diameter.
  - c. Base section: Fit over valve bonnet and shaped round.

### E. HYDRANTS

1. Hydrants shall be American Darling MK-73 with 5-1/4" valve opening. **NO EXCEPTIONS.** Hydrant valves to be bolted directly to

tee. Hydrant leg to be Class 150 ductile iron restrained with cast iron adjustable grip rings. See detail, Plan Sheet 1 of 2.

#### F. SERVICE FITTINGS

All fittings must be compatible with Ford or Mueller products

1. Saddles: Single strap brass, CC thread, Ford, Mueller or approved equal.
2. Meter Boxes: Standard plastic meter bosses with C.I. flip reader lid.
3. Water Meters: Meter to be Hersey 5/8" by 3/4" or approved equal.
4. Repair Clamps: Single strap repair clamps shall be stainless steel Ford style 101S or approved equals.
5. Corporation Stops: All corporation stops shall be Ford Model F1003G with CC threads or approved equal.
6. Meter Setter: Copper with lockable cut off valve. Double check valve, 3/4" CTS pack joint inlet side and dual purpose outlet. Ford Model VBHH72-7W-41-33G or approved equal.

#### G. MISCELLANEOUS

1. On site built up blow offs using 2" R/W valve shall be fabricated as detail.
2. All water mains shall have #12 solid copper tracer wire placed on the main and extending up into the valve boxes. All water service lines shall have #12 solid copper tracer wire from the meter box to and connected to main tracer wire.

#### H. METALLIC LOCATING TAPE and COPPER WIRE

Terra-tape, or approved equal, labeled "WATER LINE BELOW" minimum width of 6 inches, buried 12" below finished grade. Number 12 solid copper wire conductor to be located on top of all lines and service lines terminating to each valve box and meter boxes.

### **Part 3 – EXECUTION**

#### 3.01 PREPARATION

#### A. Alignment and Grade

1. Deviations: Notify ENGINEER and obtain instructions to proceed where there is a grade discrepancy or an obstruction not shown on plans.
2. Depth of pipe: 36" minimum, surface to top of pipe, unless noted otherwise.
3. High points in pipe line: locate at services and hydrants.

#### B. Bedding

1. Method: See details on plans for specific material and depth cover.
2. Bedding area backfill: See Section 02213, Excavating and Backfilling.
3. Cleaning Pipe and Fittings: General – Interior free of foreign materials and joint surfaces free of lumps and blisters.

### 3.02 INSTALLATION

#### A. Laying Pipe

1. General:
  - a. Contamination Protection: Prevent entrance of foreign material; plus watertight where left unattended.
  - b. Placement: Pipe length and bedding as a unit in a frost free, dry trench.
  - c. Special supports and saddles: See construction drawings.
2. Joint Deflection: Limited to manufacturer's recommendation.
3. All piping shall be installed by skilled workmen and in accordance with the best standards for piping installation. Proper tools and appliances for the safe and convenient handling and installation of the pipe and fitting shall be

used. Great care shall be taken to prevent any pipe coating from being damaged on the inside or outside of the pipe and fittings. All pieces shall be carefully examined for defects, and no piece shall be installed which is known to be defective. If any defective pieces should be discovered after having been installed, it shall be removed and replaced with a sound one in a satisfactory manner by the contractor at his expense. Pipe and fittings shall be thoroughly cleaned before they are accepted in the complete work.

4. All exposed piping shall be installed with vertical and horizontal angles properly related to adjoining surfaces or pipes to give the appearance of good workmanship.
5. All piping shall be installed to the correct line and grade, with no abrupt changes in line or grade and as shown on the contract drawings. Joint deflection shall not exceed the manufacturers' recommended deflection. Excavation and backfilling shall conform to the requirements of this section. Maximum trench widths shall conform to the trench width excavation limits on the contract drawings.
6. Following proper preparation of the trench sub grade, pipe and fittings shall be carefully lowered into the trench so as to prevent dirt and other foreign substances from gaining entrance into the pipe and fittings. Under no circumstances shall any of the materials be dropped or dumped into the trench. Proper facilities shall be provided for lowering sections of pipe into trenches.
7. The full length of each section of pipe shall rest solidly upon the bed of the trench, with recesses excavated to accommodate bells, couplings, joints, and fittings.
8. Pipe that has the grade or joint disturbed after laying shall be taken up and re-laid by the contractor at his expense. Pipe shall not be laid in water or when trench conditions are unsuitable for work, Water shall be kept out of the trench until jointing and backfilling are completed. When work is not in progress, open ends of pipe, fittings, and valves shall be securely closed so that no water, earth, or other substance will enter the pipe, fittings or valves. Pipe ends left for future connection shall be valved, plugged or capped, and anchored as required. All piping shall be installed in such a manner

that it will be free to expand and/or contract without injury to itself or to structures to which it is connected.

9. When it is necessary to cut ductile iron pipe in the field, such cuts shall be made carefully in a neat workmanlike manner using approved methods to produce a clean, square cut. The outside of the cut end shall be conditioned for use by filing or grinding a small taper, at an angle of approximately 30 degrees.
10. Before joints are made, each pipe shall be well bedded on a solid foundation, and no pipe shall be brought into position until the preceding length has been thoroughly bedded and secured in place.
11. Proper and suitable tools and appliances for the safe, convenient handling and laying of pipe shall be used and shall in general agree with manufacturer's recommendations. At the time of laying, or if the pipe is discovered to be defective after being laid, it shall be removed and replaced with sound pipe by the contractor at his expense.
12. AT THE CLOSE OF WORK EACH DAY, THE END OF THE PIPELINE SHALL BE TIGHTLY SEALED WITH A CAP OR PLUG SO THAT NO WATER, DIRT, OR OTHER FOREIGN SUBSTANCE MAY ENTER THE PIPELINES, AND THIS PLUG SHALL BE KEPT IN PLACE UNTIL PIPE LAYING IS RESUMED.

#### B. CUTTING PIPE: Manufacturers' recommendation

#### C. JOINTING

1. Mechanical
  - a. Lubricating: Vegetable Soap
  - b. Bolting: Tighten evenly to 75 to 90 foot-pounds
2. Push-on
  - a. Lubricating: Manufacturers' Standard
  - b. Beveling: Shape to Manufacturer's Standard

#### D. SETTING VALVES, FITTINGS and FIRE HYDRANTS



1. General: See construction drawings
2. Valves: Plumb
3. Valve boxes:
  - a. Witnesses: See required concrete marker specifications, Section 02666, Part 2, Par. G.2
  - b. All valve boxes must be provided with 24" concrete collars set level and flush with the top of the box and no more than 1-inch above grade.

## E. CONNECTIONS

1. Existing water lines
  - a. General
    1. Dimension: May require special fitting.
    2. Temporary support: Provide during cut in.
    3. Disinfection: Swab pipe, valves and fittings with 5 percent chlorine solution.
  - b. Pressure Off: Install solid or cutting-in sleeve.
  - c. Pressure On: Install tapping sleeve or saddle and valve.
2. Service Lines
  - a. Line and grade
    1. Alignment: Right angles to street line
    2. Minimum Depth: Same as pipe, maintain 24" minimum cover below swales.
  - b. Meter Boxes
    1. Setting: Plumb 1" above final grade
    2. Witnesses: 3 measurements to surface features.
  - c. Tapping: 45 degrees above center with corporation stop key towards surface for ease of operation.

d. Provide service connection to each lot in project area. Install according to details on construction drawings.

#### F. PIPELINE CROSSINGS

1. Separation: Whenever a waterline crosses over a wastewater pipe, the bottom of the waterline shall be 18" above the top of the wastewater pipe. If the 18" separation cannot be maintained, or if the waterline must cross below the pipe, then both waterline and wastewater pipe shall be constructed of ductile iron materials with joints equivalent to waterline standards for a distance of 10 feet on each side of the point of crossing. At crossing concrete arch bedding shall be provided as detailed on the plans.
2. Compact select granular materials between pipes to 98 percent maximum density.

#### G. CULVERT CROSSINGS

1. Cross above or beneath culverts as required. Maintain 12" minimum separation, or provide concrete saddle.

#### H. STREET, ROAD, & HIGHWAY CROSSINGS

See Asphalt pavement removal and restoration on contract drawings.

### 3.03 – FIELD QUALITY CONTROL

#### A. Testing and inspection.

##### 1. General

- a. Supervision: by ENGINEER
- b. Completion: Before connecting to existing line.
- c. Notification: Pretest and arrange with ENGINEER and WATER SUPERINTENDENT for inspection and test.
- d. Equipment and Assistance: Provide as needed.
- e. Required water: By Contractor
- f. Prior to all tests the contractor must schedule with the engineer and water superintendent a minimum of two days notice to the anticipated test. In addition, the contractor shall confirm with engineer and water superintendent on the day of the test that the contractor is indeed set up and ready to test, costs incurred by the

contractor for delays caused by failing to observe this requirement shall be borne entirely by the contractor.

Costs incurred by the engineer & water superintendent traveling and attempting to witness a test that the contractor has requested, but that the contractor is not prepared for, will be billed to the contractor by the owner and deducted from the contractor's periodic payment request.

2. Electrical Continuity: Test cast and ductile iron pipe for continuity and repair breaks.
3. Pressure: In accordance with the current county water department.
  - a. Conditions: Air or air-water methods of applying pressure prohibited.
  - b. Test Pressure: 150 psi at lowest elevation.
  - c. Duration: 2 hours and until completion of inspection.
  - d. Procedure: Fill system slowly; expel air through corporation stop at high points and apply pressure.
  - e. Inspection: Examine line and appurtenances for leaks and movement.
  - f. Corrections: Repair defects, visible leaks and repeat test until acceptable.
4. Leakage: In accordance with the South Camden Water Department
  - a. Sequence: Simultaneous with pressure test.
  - b. Average Pressure: Within pressure test range.
  - c. Duration: Two hours.
  - d. Procedure:
    1. Filling: As in pressure test
    2. Supplying make-up water: Measurable source
    3. Leakage: Quantity of water supplied to maintain test pressure
  - e. Allowable-Less than:

$$W = D'' \times L' \times P / 1598400$$

W = Leakage allowable in gallons per hour

L = Length of pipe tested in feet

D = Nominal pipe diameter (inches)  
P = Average test pressure (psig)

- f. Testing valve only: Maintain pressure on main and check all valves as follows:
  1. Vent extreme ends of main and briefly check each valve progressively back towards test point.
  2. Allowable: Pressure drop less than 1 psi in 5 minutes with test pump off for resilient wedge valves.
- g. Correction: Repair defects and repeat test until acceptable.

### 3.04 – ADJUST and CLEAN

#### A. Flushing

##### 1. Conditions

- i. Maximum intervals: One-quarter mile
- ii. Required water: By OWNER, limited to 1000 gpm, where and when available from municipal system.

2. Sequence: Follow pressure testing and prior to chlorination.

3. Minimum velocity: 2.5 feet per second at pipe wall.

#### B. Chlorination: In accordance with AWWA specification C-601

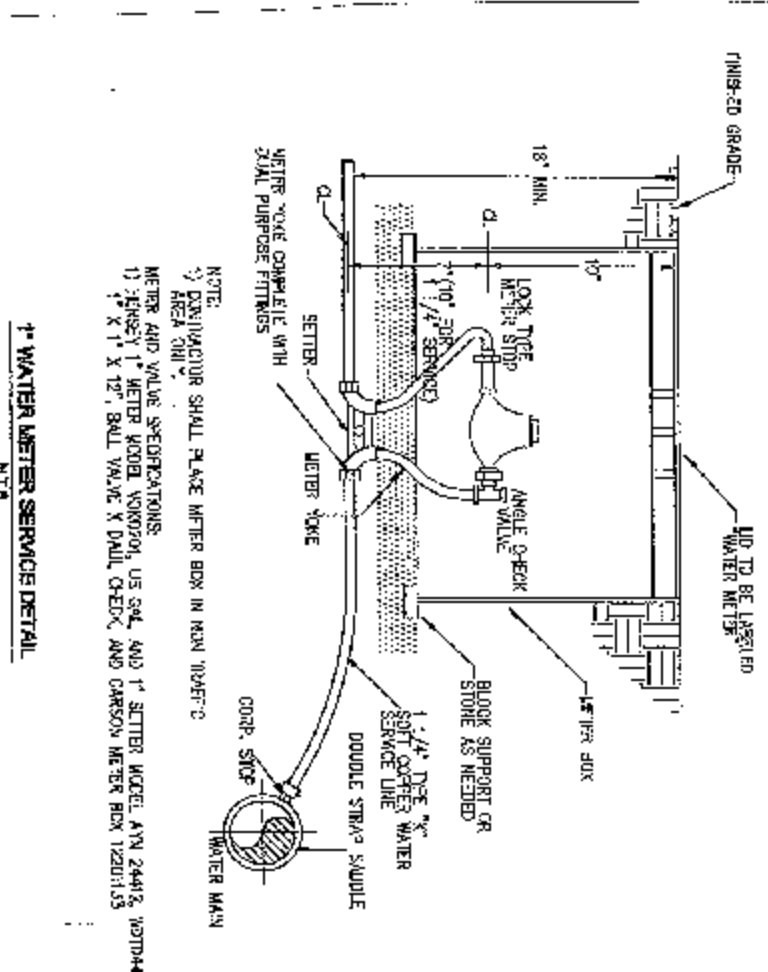
##### 1. Conditions

- a. Supervision: By ENGINEER and approved inspector
- b. Required water: By Contractor
- c. Equipment and assistance: Provided by Contractor
- d. Chlorine gas: NOT PERMITTED ON SITE

2. Sequence: Following pressure tests and flushing

3. Retention time: 24 hours at a minimum initial residual chlorine concentration of 50 ppm for a clean line and 100 ppm for other lines.
4. Procedure: Inject chlorine solution at a constant rate to produce chlorine concentration of 50 ppm residual free chlorine in pipe. Operate all valves and sustain residual for 24 hours. Water samples must show a minimum chlorine residual content of 10 ppm in all parts of the system after standing 24 hours. Flush system to county's chlorine level and wait an additional 24 hours prior to sampling.
5. Sampling: By owner's representative, contractor, witnessed by engineer or representative of South Camden Water Department.
6. Correction: Re-chlorinate sections not meeting NCDENR Water Supply bacteriological requirements. In addition sterilization procedure must be repeated as often as necessary to achieve the required results to the satisfaction of the engineer and water superintendent.

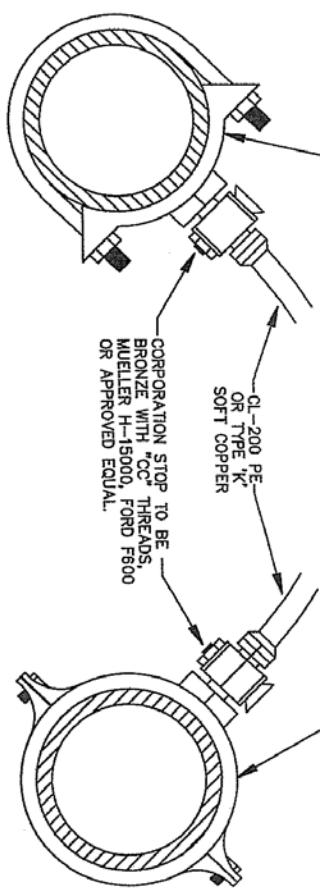




NOTE:  
 1) DIMENSIONS SHALL PLACE METER BOX IN NON INTERFERING AREA ONLY.  
 METER AND VALVE SPECIFICATIONS:  
 1) 1\"/>

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FOR MAIN SIZES OF 4", 6" & 8", ALL 3/4" & 1" TAPS MAY BE DRILLED OR SADDLED. ALL 1-1/2" & 2" TAPS WILL BE MADE WITH SADDLE ONLY.  
 FOR MAIN SIZES OF 10" OR LARGER, ALL TAPS MAY BE DRILLED OR SADDLED.  
 ALL TAPS LARGER THAN 2" SHALL BE MADE WITH TAPPING SLEEVE AND VALVE.  
 TAPPING SADDLE TO BE BRASS OR BRONZE FOR "CC" THREADS WITH DOUBLE STRAPS, FORD 202B, MUELLER H-161 OR APPROVED EQUAL.



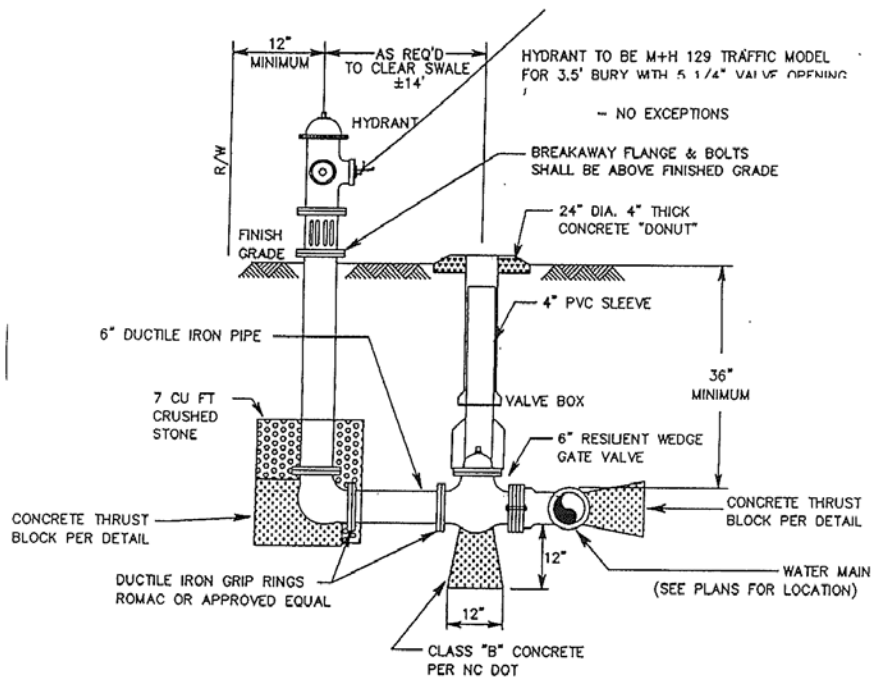
DUCTILE IRON PIPE  
 (CLASS 50 CEMENT LINED)

P.V.C. PIPE  
 (C-900 & SDR-21)

NOTE: ALL TAPS TO BE MADE ON TOP QUARTER OF MAIN.  
 CORPORATION STOP TO BE BRASS OR BRONZE WITH "CC" THREADS, MUELLER H-15000, FORD F800 OR APPROVED EQUAL.  
 TAPPING SADDLE TO BE BRASS OR BRONZE FOR "CC" THREADS, FORD S-90, MUELLER H-134 OR APPROVED EQUAL FOR C-900 PVC AND FORD S-70, MUELLER H-134 OR APPROVED EQUAL FOR SDR-21 PVC.

**STANDARD WATER TAP DETAIL**  
 N.T.S

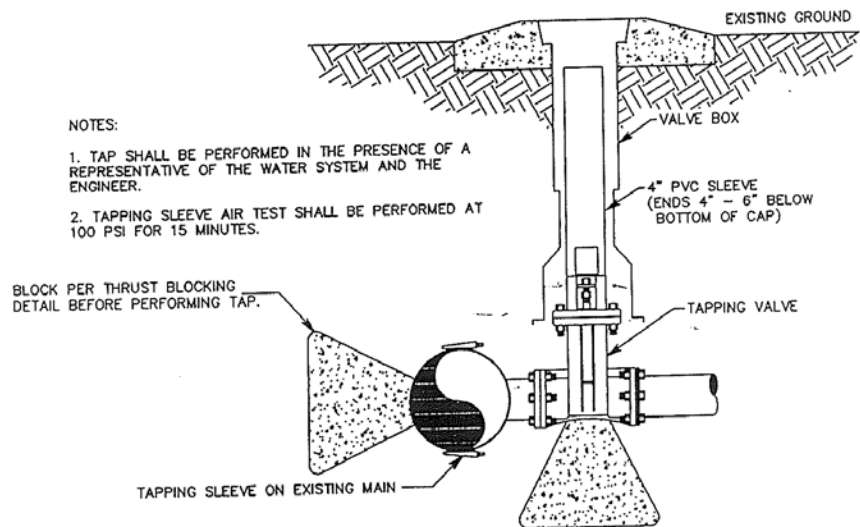




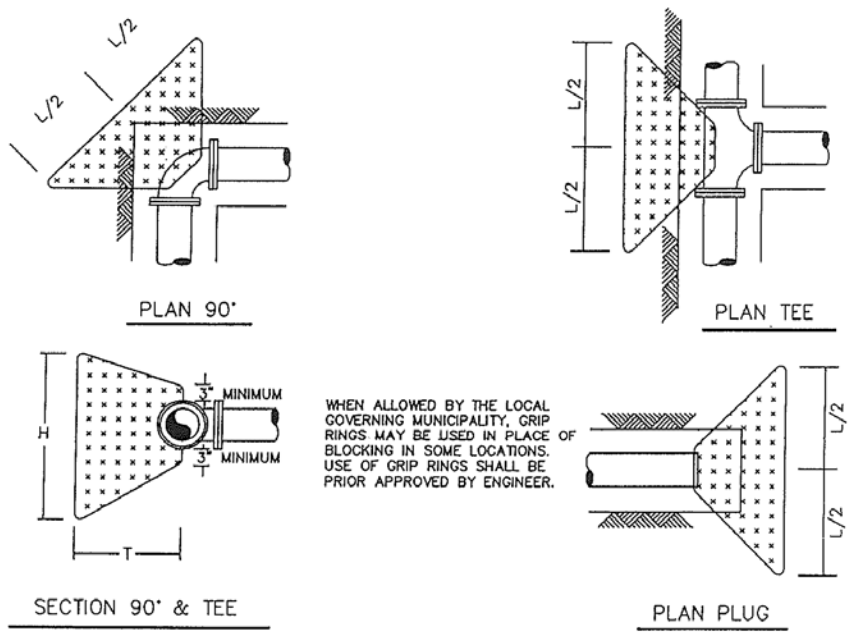
NOTES:

1. DO NOT BLOCK HYDRANT DRAIN WITH THRUST BLOCKING
2. COAT TIE RODS & NUTS WITH EPOXY
3. DO NOT SUPPORT VALVE BOX DIRECTLY ON VALVE
4. ALL JOINTS SHALL BE MECHANICAL JOINTS

## FIRE HYDRANT DETAIL



## TAPPING DETAIL



SECTION 90° & TEE

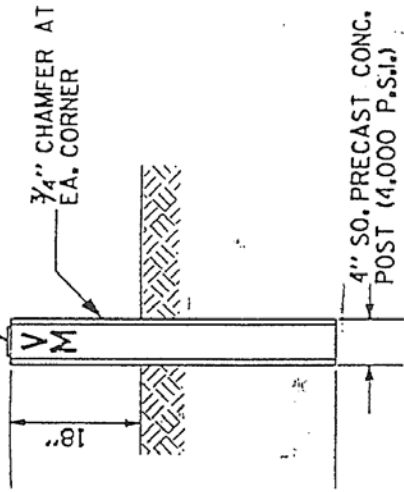
PLAN PLUG

CONCRETE THRUST BLOCK SCHEDULE				
PIPE SIZE	FITTING	L	H	T
2" - 4"	TEE	2.0	1.5	2.0
2" - 4"	90° BEND	2.0	1.5	2.0
2" - 4"	45° BEND	2.0	1.0	1.5
2" - 4"	22 1/2° BEND	2.0	1.0	1.5
6" - 8"	TEE	3.0	2.5	2.0
6" - 8"	90° BEND	4.5	2.5	2.0
6" - 8"	45° BEND	3.0	2.0	1.5
6" - 8"	22 1/2° BEND	3.0	2.0	1.5

**THRUST BLOCK DETAIL**

1. VALVE MARKER SHALL BE LOCATED AT THE POINT OF VALVE CONNECTION TO THE WATER MAIN OR LATERAL. THE MARKER SHALL BE LOCATED AT THE POINT OF VALVE CONNECTION TO THE WATER MAIN OR LATERAL. THE MARKER SHALL BE LOCATED AT THE POINT OF VALVE CONNECTION TO THE WATER MAIN OR LATERAL.

BRASS MARKER PLATE



MARKER PLATE WITH ANCHOR

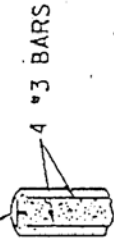
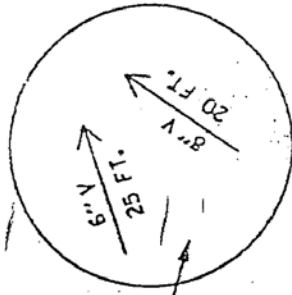
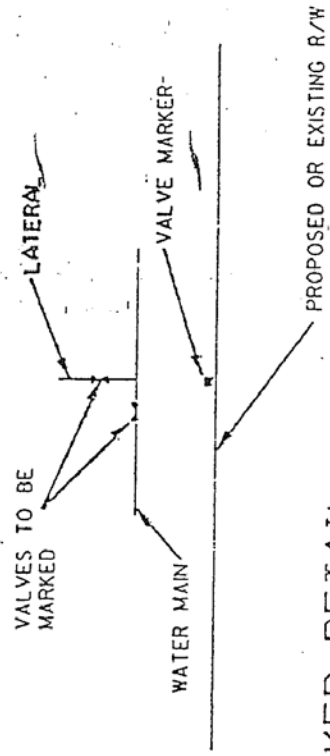


PLATE WITH VALVE SIZE, DIRECTIONAL ARROW-POINTED TO MARKED VALVES AND DISTANCES TO THE NEAREST FOOT.

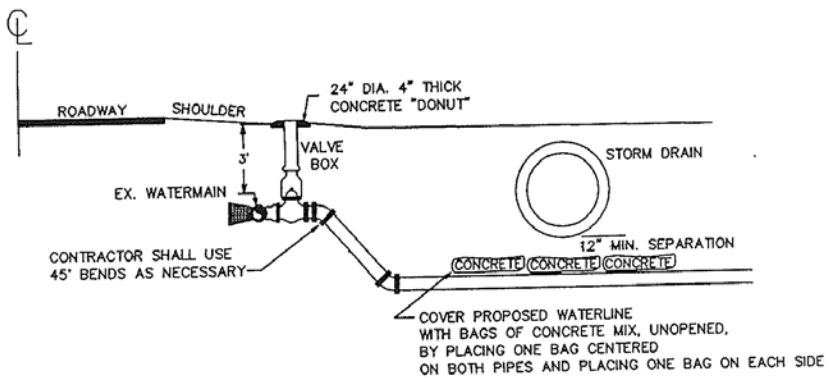


MARKERS TO BE LOCATED AT OR THE R/W WHERE ALL VALVES IN REA CAN BE LOCATED.

HYDRANT LEG VALVES WILL NOT BE TIED.

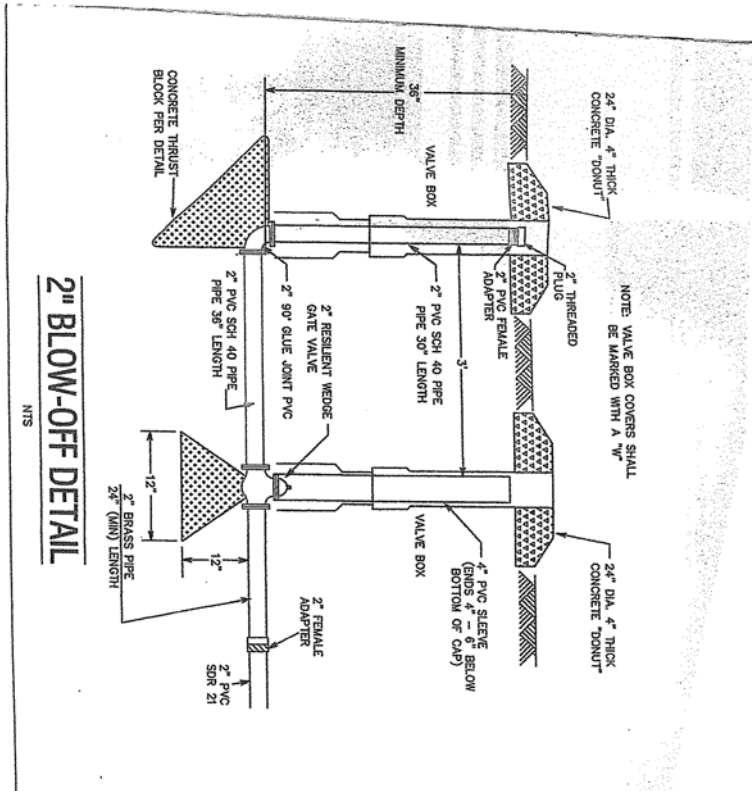


### VALVE MARKER DETAIL



NOTE: ALL FITTINGS ARE TO BE BLOCKED PER THE SPECIFICATIONS.

## CULVERT CROSSING DETAIL



**2" BLOW-OFF DETAIL**

NTS