

**WAYNESBORO BOROUGH AUTHORITY
WATER LINE SPECIFICATIONS**

1) **MATERIALS:** All materials incorporated into the water lines of the WAYNESBORO BOROUGH AUTHORITY shall be new and unused, and shall conform to the following requirements.

(a) **GATE VALVES:** All gate valves shall be double disc, parallel seat and shall conform in every respect to A.W.W.A. Standard C500. They shall be of the inside screw non-rising stem-type with a 2 inch operating nut. They shall have clear waterway opening of the full normal nominal diameter of the valve and shall be opened by the turning to the right (clockwise). The valves shall have mechanical joint ends and be fitted with O-ring seals. The operating nut shall have cast thereon an arrow indicating the direction of opening. Each valve shall have the makers initials, pressure rating and year of manufacture cast on the body. The valves shall be for a maximum working pressure of 150 pounds per square inch. Valves shall be iron body, fully bronze mounted. All valves, including tapping valves, shall be equipped with cast iron extension type boxes of the roadway type with cover marked "WATER". Boxes and covers shall be coated inside and out with bituminous paint. All valves and valve boxes shall be set truly vertical. Valve boxes shall be of the slip type. Valves shall be as manufactured by the Kennedy Valve Manufacturing Company Inc.

(b) **Ductile Iron Pipe and Fittings:** All pipe shall be of ductile iron conforming to A.N.S.I. Specifications A21.51, latest edition, class 50 with push on joints complete with rubber gaskets and lubricant conforming to A.N.S.I. Specification A21.11, latest edition. Pipes shall be cement lined with a minimum thickness of 1/8 inch and shall be seal coated conforming to A.N.S.I. Specifications A21.4, latest edition. All fitting shall have mechanical joints conforming to A.S.A. Specifications A21.10 and A21.11, class 150. Fittings shall be cement lined and seal coated. Pipe installed at railroad, highway, and stream crossings shall have mechanical joint ends conforming to A.N.S.I. Specification A21.11, latest edition.

(c) **Copper Tubing:** Copper tubing for use on underground service lines shall be Type K seamless, soft temper, conforming to A.S.T.M. Specification B-88-47. Fittings shall be wrought copper with joint recesses.

(d) **Corporation Cocks:** Corporation cocks shall be all brass Mueller H-15000 as manufactured by Mueller Co., Decatur, Illinois or approved equal.

(e) **Curb Stops:** Curb stops shall be all brass Mueller H-15200 as manufactured by Mueller Co., Decatur, Illinois or approved equal.

(f) **Curb Boxes:** Shall be cast iron, Buffalo screw type, 36"-42", with arch pattern. Mueller H-10350 as manufactured by Mueller Co., Decatur, Illinois or approved equal.

(g) **Fire Hydrants:** Shall be compression type, shall have a 5/4 inch valve, six (6) inch inlet connection, Two (2) 2 1/2 inch hose nozzles, one (1) 1 1/4 inch pumper nozzle and shall open to the left. Hose and pumper nozzle threads shall conform to National Standard Threads. The fire hydrant shall conform to A.W.W.A. Standard Specification C502, and shall be as manufactured by the Kennedy Valve Mfg. Company Model K-11. Hydrants shall be traffic type with breakable safety flange and stem coupling.

(h) **Tapping Sleeve and Valves:** Tapping sleeves shall have bell or caulked ends. The sleeves shall be made in two halves that can be assembled and bolted around the main. Gaskets shall extend the entire length of the sleeve to form a water tight joint when the side bolts are properly tightened. The tapping valves shall have flanged inlets with mechanical joint outlets. All valves shall be vertical iron body, bronze mounted, inside screw valves with a 2-inch operating nuts, and double disc gates. The valve shall be opened by turning to the right (clockwise), and shall be fitted with O-ring seals. The tapping valves shall conform to the applicable sections of A.W.W.A. Standard C-500.

2) **CONSTRUCTION:** All water line construction shall conform to A.W.W.A. C600 plus changes and additions specified herein.

(a) **Excavation and Backfill:** Details of pipeline trench excavation and backfill are shown on drawing W-1, Bedding and Backfill. In general, trenches may be excavated and backfilled either by machinery or by hand, provided however, that hand excavation may be required where necessary to protect existing structures, utilities, or private or public properties, and provided further, that backfilling shall be done by hand to the extent hereinafter specified. The pipe for waterline, unless otherwise indicated, shall be placed at such a depth as will provide a finished cover of not less than 3'-6" over the top of pipe nor more than 4'-0" unless there is a conflict with other utilities, to be measured from the finish grade elevation to the top of the pipe. Depths over 4'-0" shall need Waynesboro Borough Authority Approval. All excavation shall conform to the current regulations of the Pennsylvania Department of Labor and Industry for Excavations and Constructions.

The term "subgrade" as used herein shall mean the bed of the trench, prepared as specified to receive pipe.

From the bottom of the trench to an elevation at least 12 inches above the top outside barrel of the pipe, the banks of the trenches shall be not less than 12 inches nor more than 16 inches wider than the outside diameter, at the barrel of the pipe to be laid therein. If sheeting is required, the foregoing dimensions shall be applicable to the inside faces of the sheeting.

From a point 12 inches above the top of the outside barrel of the pipe to the surface, the banks of the trenches shall be kept as vertical as possible, and in no case shall the width of the trench at the top exceed the outside diameter of the pipe plus 40 inches.

Where in the opinion of the Waynesboro Borough Authority, the ground does not afford a sufficiently firm foundation, a timber foundation, reinforced concrete cradle, reinforced concrete encasement shall be installed, or the bottom of the trench shall be excavated to such increased depth as may be required by the Waynesboro Borough Authority and then the bottom of the trench shall be brought up to the required level with such material as may be approved by the Waynesboro Borough Authority.

All excavations shall be kept free of water at all times during performance of work. The grading in the vicinity of the trenches shall be controlled so that the ground surface is properly pitched to prevent water running into the trenches.

The use of explosives shall be governed by the "Regulations for the Storage, Handling, and Use of Explosives" of the Pennsylvania Department of Labor and Industry.

After the pipe and its appurtenances have been installed in the trench, the trench shall be backfilled to a height of at least 1' above the top of pipe with crushed stone. The stone size shall not exceed a maximum stone size of 2 inches and shall be deposited in 6-inch layers. Each layer shall be solidly compacted with tampers and proper tools made especially for this purpose. The operation shall be done in such a manner as not to disturb the structure. The earth, to the height specified above, shall be carefully thrown in with hand shovels; under no condition shall any means other than hand shoveling, such as pushing in by heavy equipment be used. The remainder of the trench shall then be refilled evenly to the required height in layers, each layer not to exceed twelve (12) inches in thickness after compaction. Mechanical tampers shall be used so as to produce backfill (as determined by weight) at the bottom of each layer of not less than ninety five (95%) percent of the density of the material in its original undisturbed state. Care shall be taken to carry the fill up evenly on opposite sides of the pipe.

No house ashes, putrescible refuse, frozen material, or other material of unsatisfactory character shall be used in backfilling.

Along and across State Highways, Township roads and Streets, and Borough roads and streets the entire trench shall be backfilled with Pennsylvania Department of Transportation ZRC Stone.

When the repaving over trenches is required the base and surface materials shall be of the same type and thickness required by the governing governmental agency.

(b) **Laying of Water Line:** The water lines shall be laid and maintained to the required lines and grades with the valves and appurtenances at the required locations.

Where underground conditions indicate a change of alignment or grade, such change shall be made only with the approval of the Waynesboro Borough Authority.

Before being lowered and while suspended the pipe shall be inspected for defects, e.g. damage to paint seal coats or cement mortar lining, insufficient lining thickness, pipe out of round, etc., and rung with a light hammer to detect cracks. Defective, damaged or unsound pipe will be rejected. Mechanical joint and rubber gasket joint pipe shall be laid in strict conformance with the installation instructions of the manufacturer of the particular type of pipe installed. Where it becomes necessary to cut ductile iron pipe in the field, such cutting shall be done by the use of a pipe saw or other method approved by the Waynesboro Borough Authority, the cutting of ductile iron pipe by the use of a torch or arc is prohibited.

Every precaution shall be taken to prevent foreign material from entering the pipe while being placed in the line. All lumps, blisters, and excess coating shall be removed from the end of each piece of pipe and fittings. The outside of the spigot, the inside of the bell, and the gasket shall be thoroughly wiped clean and dry before the pipe is installed.

After placing a length of pipe in the trench, the spigot end shall be centered in the bell and the pipe forced home and brought to the correct line and grade. Except at predetermined points, no high points shall be established where air can accumulate. At times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug.

Fittings at horizontal and vertical bends in the water line shall be provided with a concrete reaction backing, in accordance with Drawing W-2, Standard Reaction Backings. Connections for new fire hydrants shall be installed in accordance with Drawing W-3, Fire Hydrant. Blowoffs shall be installed on all dead-end mains in accordance with drawing W-4, Standard Blowoff Detail.

(c) **Sterilization of Water Lines:** Before being placed in service, the entire water line shall be chlorinated. Chlorine may be applied by any of the following methods: calcium hypochlorite solution or granules, and IHTH tablets.

The method used for applying the chlorine shall be approved by the Waynesboro Borough Authority and shall be such as will insure treatment of the entire length of the water main.

The chlorine shall be applied in amount to produce a dosage of fifty (50) parts per million. The chlorine solution shall remain in the pipe for at least eight (8) hours after which time the residual chlorine in all parts of the water main shall not be less than five (5) parts per million.

During the chlorination process all valves and accessories shall be operated. After chlorination, the water shall be flushed from the line until the replacement water is equal in bacteriological and chemical quality to the permanent water supply.

Once the flushing of the newly installed line has been completed Representatives of the Waynesboro Borough Authority will collect samples to be tested by an approved laboratory. The test results for the Chlorine Residual shall not be less than (5) five parts per million and a Total Coliform Bacteria Presents Absents test shall be no more than zero (0). All main line valves connected to the existing system and new water services shall not be opened until the water quality meets the above requirements.

(d) **Testing Water Lines:** Where any sections of water lines are protected by concrete reaction backing, the hydrostatic pressure test shall not be made until at least seven (7) days have elapsed after the concrete reaction backing was installed. If high early strength cement concrete was used for reaction backing, the hydrostatic pressure test shall not be made until at least three (3) days have elapsed.

The section of water line being tested shall be closed by valves or temporary plugs, and filled with water a minimum of twenty four (24) hours before the line is tested. During the filling of the pipe, extreme care must be exercised to ensure that all air is expelled from the pipeline.

After the pipeline has been filled with water for twenty-four (24) hours a hydrostatic pressure test shall be conducted. The duration of the pressure test shall be at least one (1) hour. The water mains shall be tested under a pressure of 120 psi, measured at the low point of the particular section of line being tested.

The leakage test may be conducted at the same time as the pressure test, provided suitable means are provided to measure the leakage during the pressure test, and a record of water added to the pipe line is kept. The leakage test shall have a minimum duration of two (2) hours, and shall be at the same pressure as specified for the hydrostatic test.

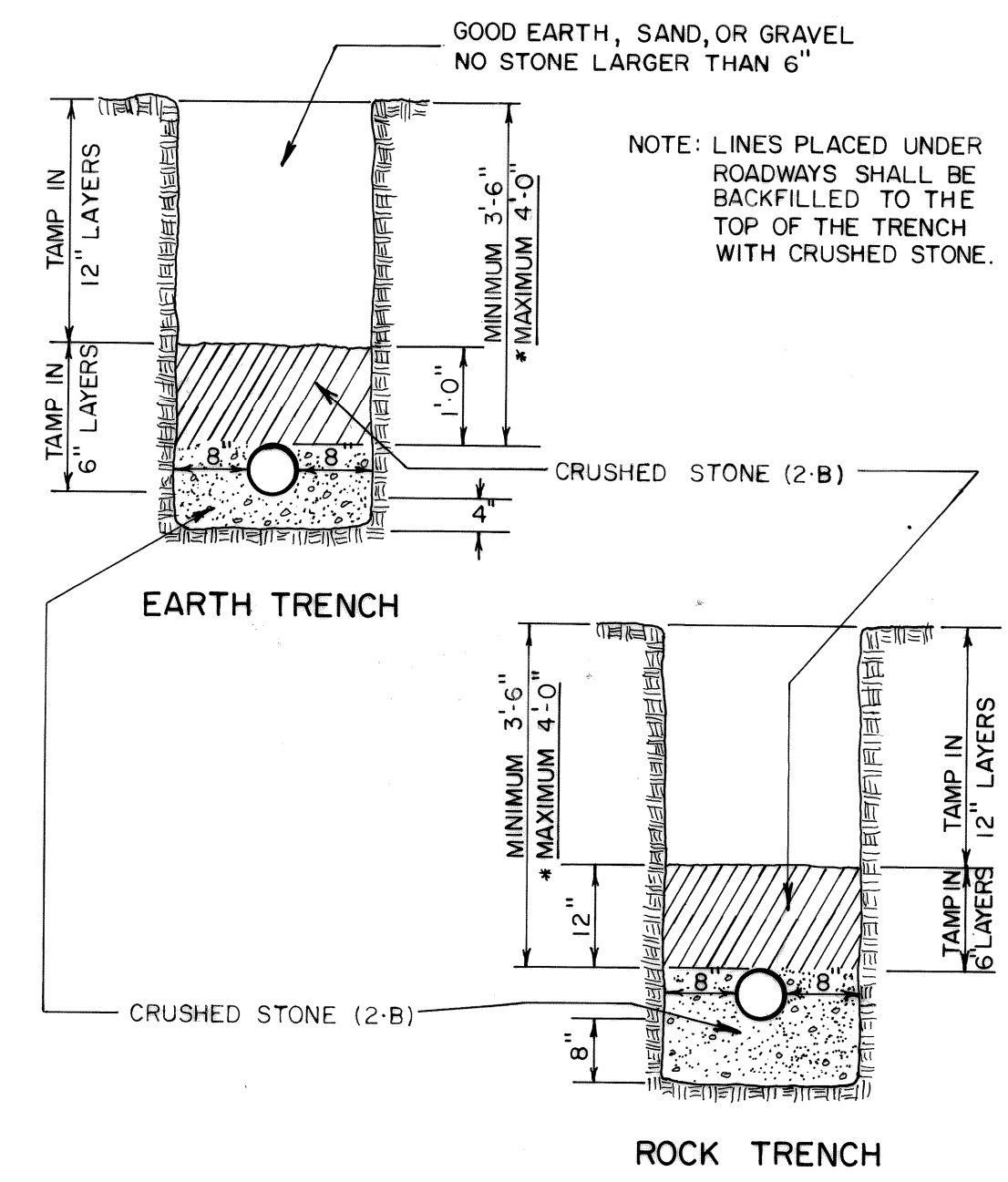
For sections of main being tested for leakage which are constructed of ductile iron pipe with push on joints, the particular section of main being tested will not be accepted if the leakage is greater than that determined by the formula

$$L = \frac{ND\sqrt{P}}{7400}$$

in which L is the allowable leakage in gallons per hour, N is the number of joints in the length of pipeline tested, D is the nominal diameter of pipe in inches, and P is the average test pressure in pounds per square inch (based on a test pressure of 120 psi, measured at the low point).

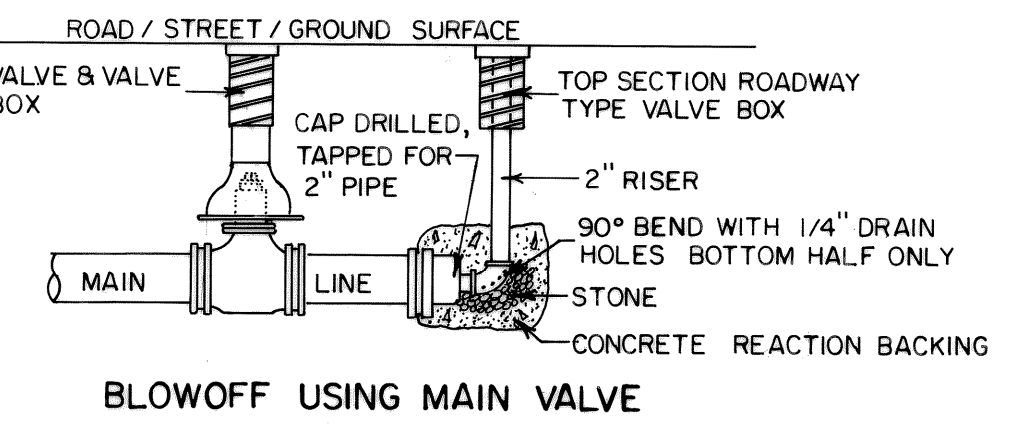
Should any test of a section of pipeline disclose leakage greater than that permitted all defective joints, fittings, and/or pipe shall be located and repaired or replaced, then the pipeline shall be re-tested until the leakage is within the permitted allowance.

(e) **Water Service Lines:** A water service of the size indicated shall be installed at the locations indicated from a corporation tap connected to the water main to a point at the property line. The service line installation shall conform with drawing W-5, Standard Water Service, and Drawing W-6, Standard Water Service Duplex. At the end of each service a curb stop or valve shall be installed and a curb box or valve box set truly vertical. A wooden stake, 2 foot exposed, shall be placed at each curb box. The water service shall be tested for leaks before backfilling and have a minimum 3'-6" of cover.

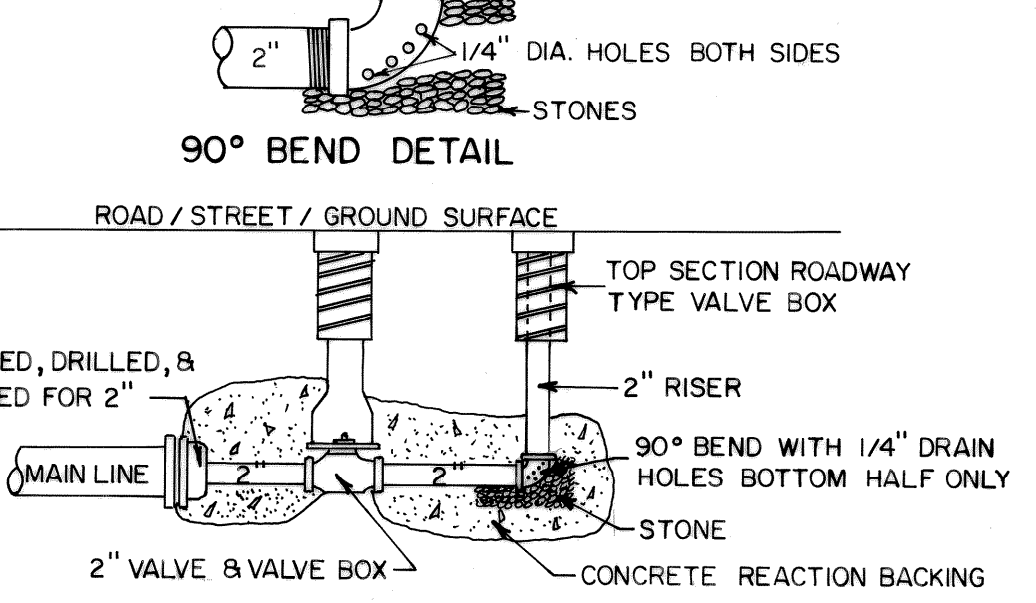


* EXCEPT WHERE IN CONFLICT WITH OTHER UTILITIES.

BEDDING & BACKFILL (W1)



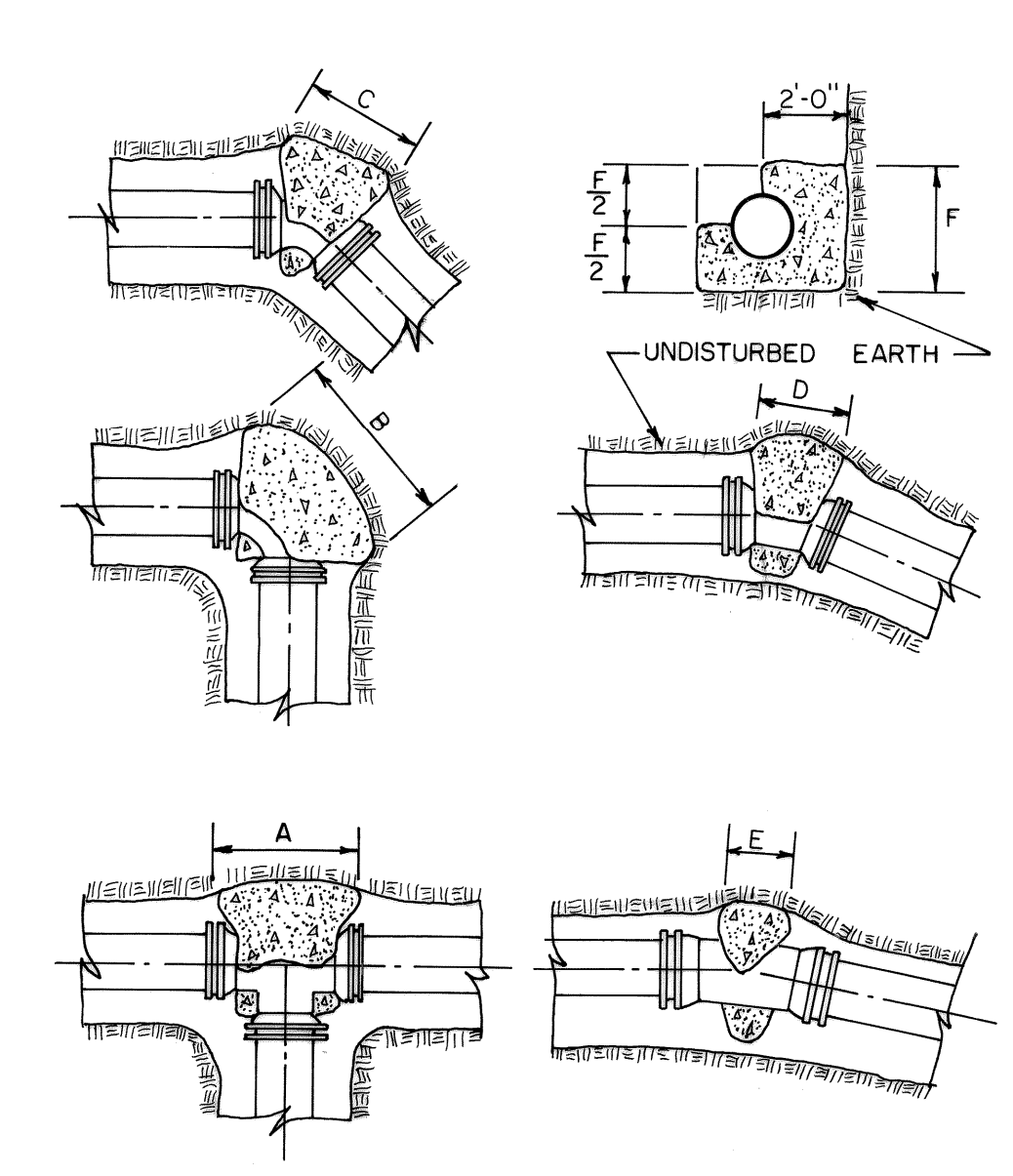
BLOWOFF USING MAIN VALVE



90° BEND DETAIL

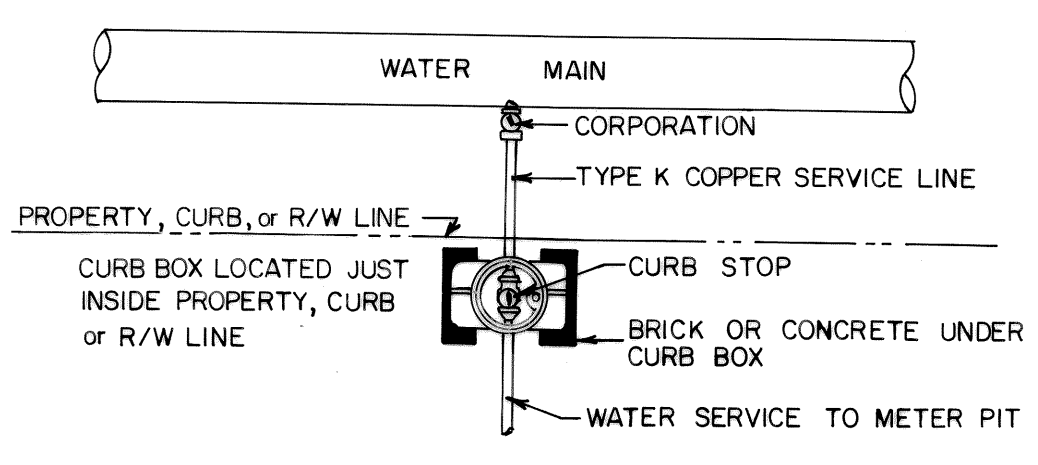


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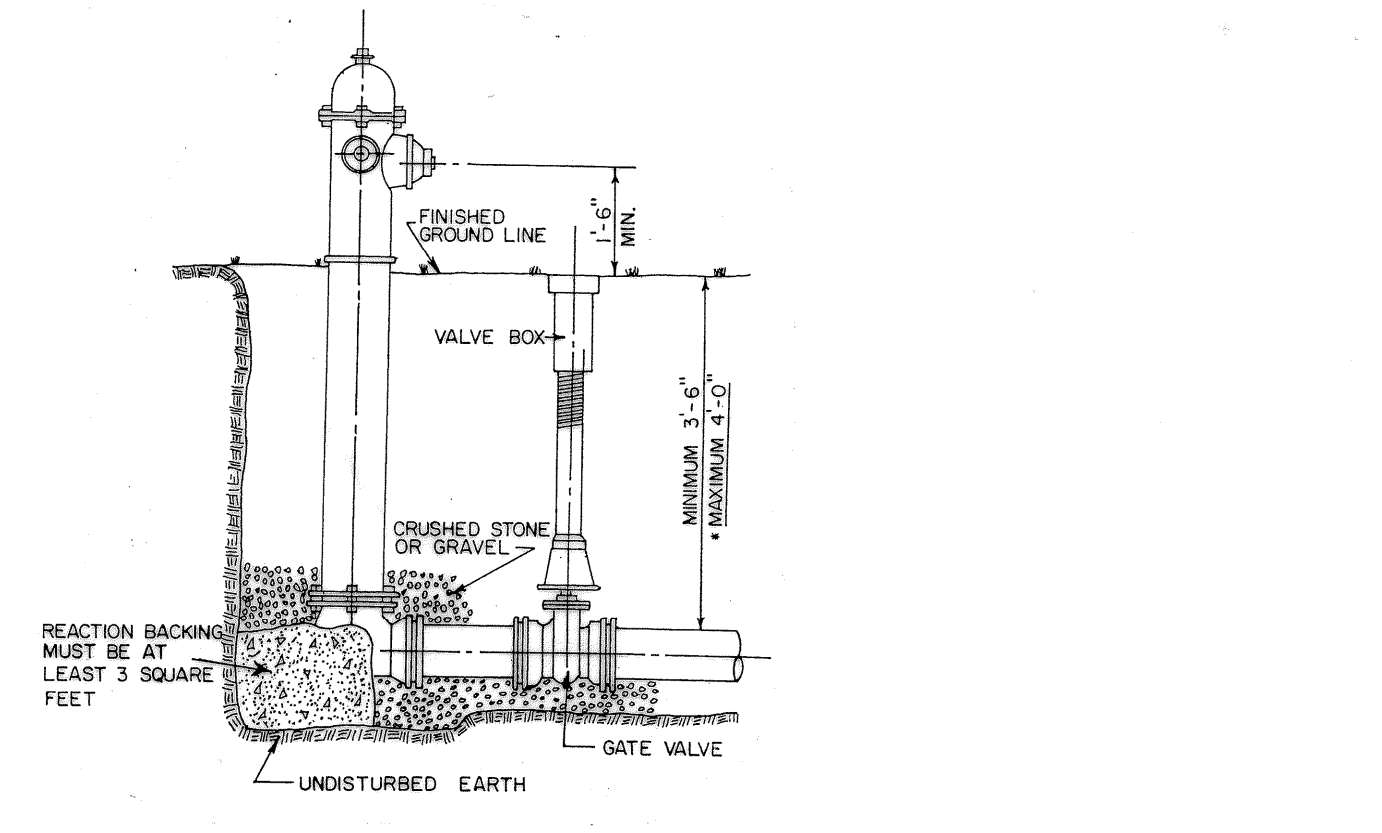
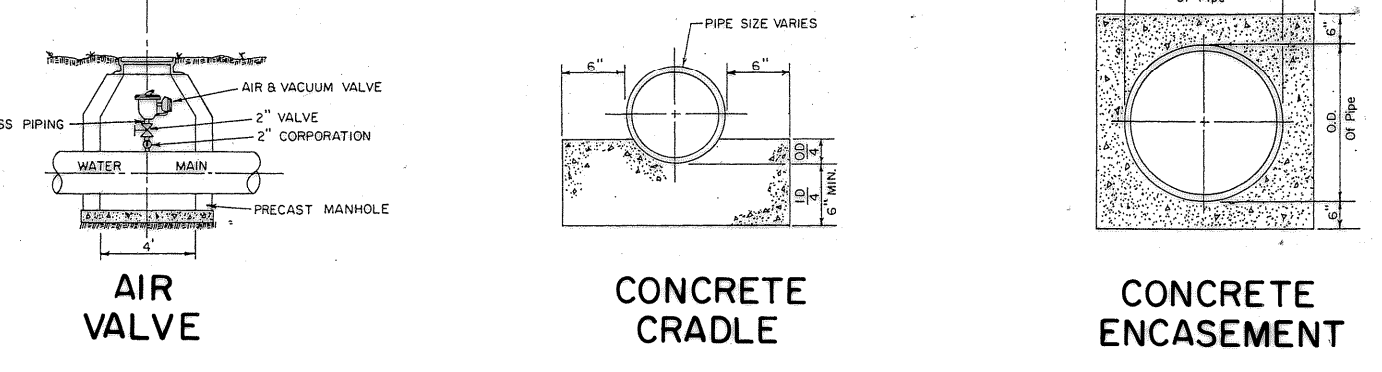


PIPE DIA.	A	B	C	D	E	F
12"	5'-11"	7'-2"	5'-4"	2'-9"	1'-3"	2'-6"
10"	4'-0"	5'-6"	4'-7"	2'-5"	1'-3"	2'-1"
8"	2'-11"	4'-2"	3'-10"	2'-0"	1'-0"	1'-8"
6"	1'-8"	2'-4"	3'-0"	1'-6"	0'-10"	1'-3"

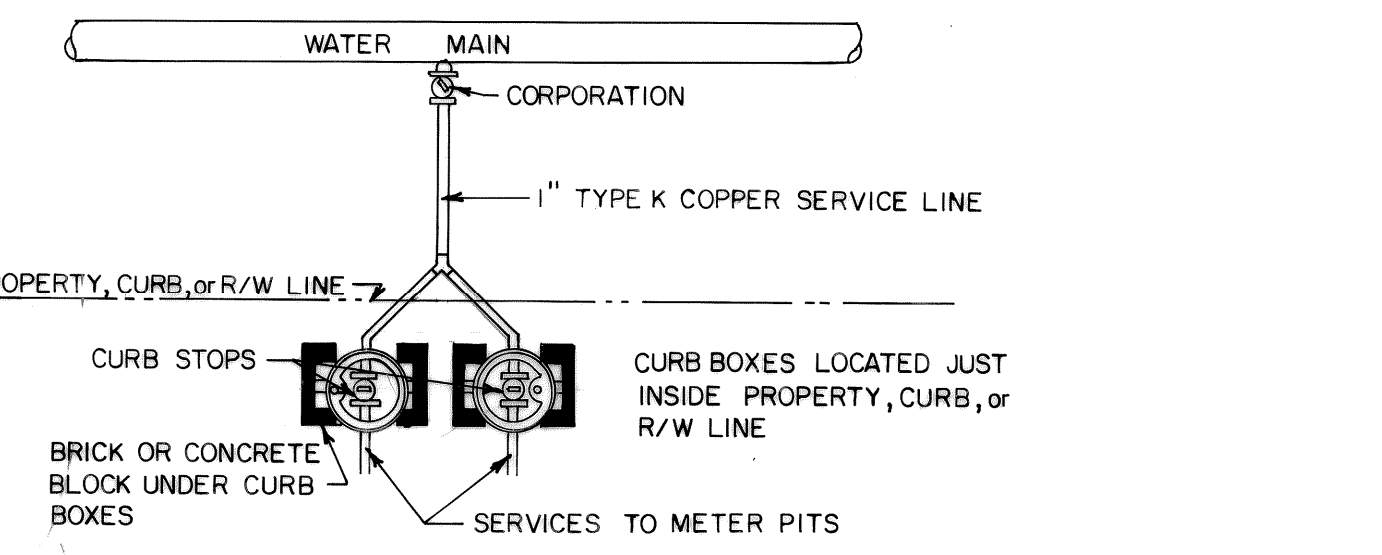
STANDARD REACTION BACKINGS (W2)



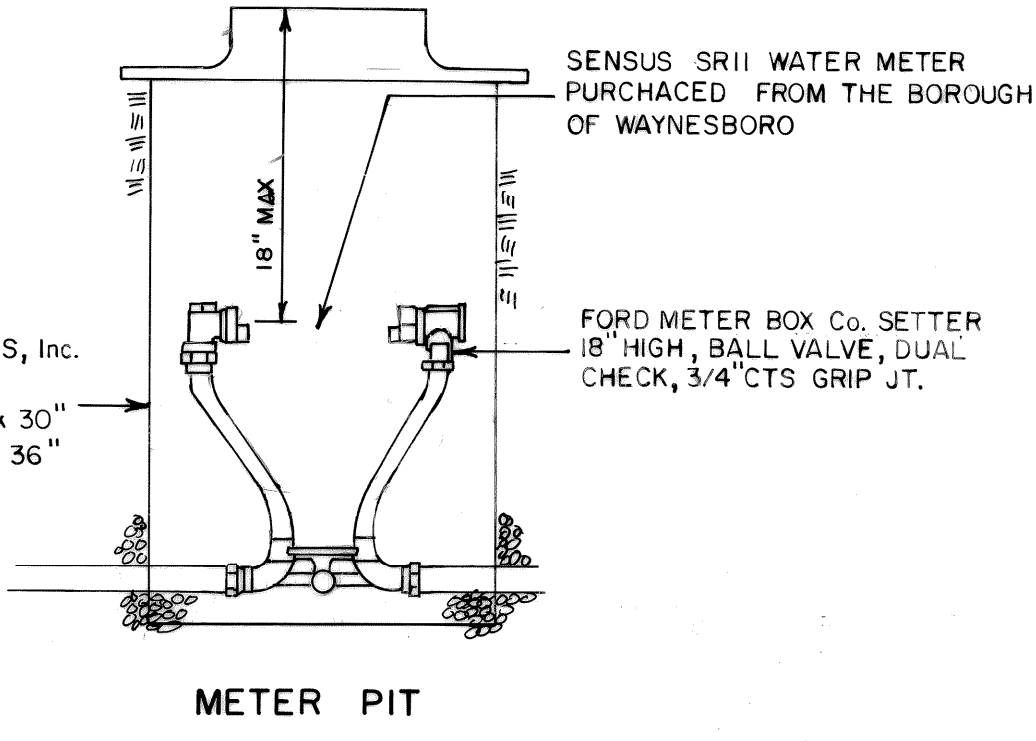
STANDARD WATER SERVICE (W5)



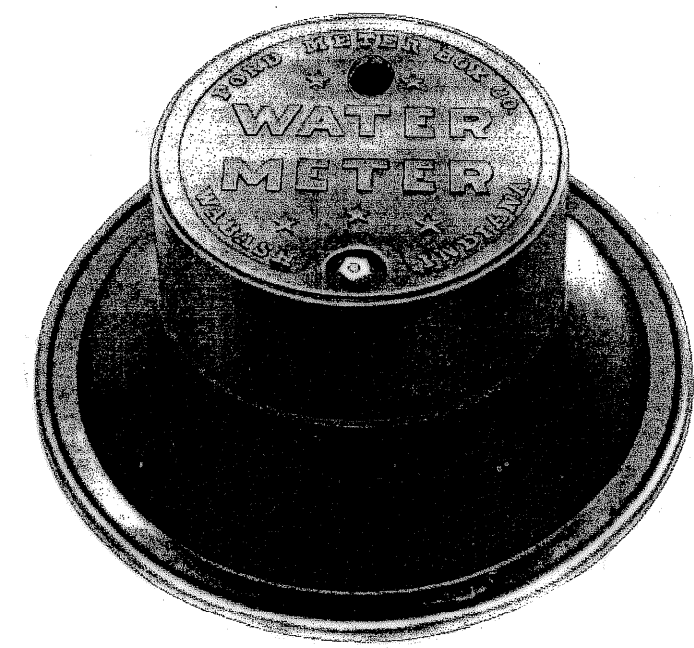
FIRE HYDRANT (W3)



STANDARD WATER SERVICE DUPLEX (W6)



METER PIT



FORD METER BOX Co. W-32T 1 1/2" LID

**WAYNESBORO BOROUGH AUTHORITY
WATER LINE SPECIFICATIONS**

APPROVED THIS 16th DAY OF MARCH 2004

[Signature]
DON FLEAGLE, CHAIRMAN

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